

MEETING DATE: June 25, 2019

TITLE: Approval of St. Louis Park Local Water Management Plan

RES. NUMBER: 19-068

PREPARED BY: Becky Christopher

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REVIEWED BY: Administrator Counsel Program Mgr.
 Board Committee Engineer Other

WORKSHOP ACTION:

| | |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <input type="checkbox"/> Advance to Board mtg. Consent Agenda. | <input type="checkbox"/> Advance to Board meeting for discussion prior to action. |
| <input type="checkbox"/> Refer to a future workshop (date):_____ | <input type="checkbox"/> Refer to taskforce or committee (date):_____ |
| <input type="checkbox"/> Return to staff for additional work. | <input type="checkbox"/> No further action requested. |
| <input checked="" type="checkbox"/> Other: Requesting final action on June 25, 2019 | |

PURPOSE or ACTION REQUESTED:

Approval of the City of St. Louis Park Local Water Management Plan

PROJECT/PROGRAM LOCATION:

City of St. Louis Park

PROJECT TIMELINE:

| | |
|-------------------|-----------------------------------------------------|
| October 23, 2018 | St. Louis Park LWMP first draft submitted to MCWD |
| December 19, 2018 | MCWD comments and denial letter sent |
| March 4, 2019 | St. Louis Park LWMP revised draft submitted to MCWD |
| March 15, 2019 | MCWD comments sent |
| May 19, 2019 | St. Louis Park LWMP revised draft submitted to MCWD |
| June 17, 2019 | MCWD comments sent |
| June 20, 2019 | St. Louis Park LWMP final draft submitted to MCWD |

PROJECT/PROGRAM COST:

N/A

PAST BOARD ACTION:

| | |
|-------------------|--------------------------------------------------------------------------------------------------------------------------|
| September 3, 2009 | MCWD approval of St. Louis Park local water management plan (09-087) and associated memorandum of understanding (09-088) |
| January 11, 2018 | Approval and adoption of MCWD Watershed Management Plan for the implementation period 2018-2027 (18-004) |

SUMMARY:

Background:

MN Statutes § 103B.235 and MN Rules § 8410.0160 grant watershed districts the authority to review and approve local water management plans (LWMPs). Under this framework, watershed districts can assign responsibilities to local government units (LGUs) for carrying out implementation actions defined in the watershed plan. The LWMP is a required element of the LGU comprehensive land use management plan which LGU's were required to adopt by the end of 2018.

The Minnehaha Creek Watershed District (MCWD or District) adopted its new Watershed Management Plan (Plan) in January 2018. The Plan is rooted in the District's Balanced Urban Ecology policy (BUE) as the principal strategy to accomplish its mission. The BUE policy recognizes the inter-dependence of the natural and built environment and that both benefit through a holistic planning approach. The BUE policy establishes the guiding principles of focus in areas of highest resource needs, flexibility to respond to emerging opportunities as a result of land use change in real time, and pursuing clean water goals in partnership with our communities.

The Plan establishes the District as a regional water planning agency. The Plan provides rationale for subwatershed-based planning and prioritization by which to focus implementation efforts for the 2018-2027 Plan cycle. The District has prioritized the subwatersheds of Minnehaha Creek, Six Mile Creek-Halsted Bay and Painter Creek-Jennings Bay based on a combination of resource needs and opportunities for management of some of the State's most prized recreational natural resources of Lake Minnetonka and Minnehaha Creek – including the Minneapolis Chain of Lakes.

In addition to these focused planning and implementation efforts, the District's approach watershed-wide is to remain responsive to opportunities created by local land use change or partner initiatives. The District's responsive approach relies on early and effective coordination by the District's communities to help identify opportunities to integrate plans and investments. As opportunities arise, the District will evaluate them against the resource needs and priorities defined for each subwatershed in the District's Plan and determine the appropriate response. The District has a wide range of services it can mobilize to address resource needs and support partner efforts, including data collection and diagnostics, technical and planning assistance, permitting assistance, education and capacity building, grants, and capital projects.

Integration of land use and water planning is the primary focus of the LWMP requirements set forth in the District's Plan. To effectively integrate the goals of MCWD and its LGUs in a way that maximizes community benefits and effectively leverages public funds, the District has invited a partnership framework with its communities. In addition to the legally required elements of LWMPs, as defined in State statute and rules, the MCWD Plan requires communities to propose a coordination plan which describes how the LGU and MCWD will share information and work together to integrate land use and water planning. Specifically, the purpose of a MCWD/LGU coordination plan is to:

1. Establish a framework to be informed as to current LGU land use and infrastructure planning and enable early coordination of land use and water resources management
2. Foster LGU development regulation that integrates water resource protection before plans are fixed
3. Identify and capitalize on project opportunities for improved water resources outcomes while maximizing other public and private goals

As established in the District's Plan, MCWD will prioritize implementation efforts and resource deployment based on its established priorities and LGU commitment to coordination. This commitment is demonstrated through the coordination plan and its implementation by the LGU.

St. Louis Park LWMP Summary:

The City of St. Louis Park (City) has submitted its LWMP for MCWD review and approval. District staff reviewed the LWMP and provided detailed comments regarding the goals and requirements of the District's Plan for consideration and incorporation into the LWMP.

The City occupies approximately 10.8 square miles with 9.6 square miles in the MCWD. The remaining portion is part of the Bassett Creek Watershed Management Commission. The major receiving waterbody is Minnehaha Creek, which is impaired for fecal coliform bacteria, chloride, low dissolved oxygen, and fish and macroinvertebrate communities. Lakes in the City include Cobblecrest, Hannan, Meadowbrook, and Twin. Cobblecrest and Twin are impaired for nutrients. The District's Plan identified the Minnehaha Creek subwatershed as a priority subwatershed in which the District will focus its implementation efforts for the 2018-2027 plan cycle. The primary management strategies identified for this subwatershed are stormwater management, stream restoration, and restoration of wetlands and ecological corridors.

St. Louis Park is considered to be fully developed. The population projections included in the City's comprehensive plan show slow, steady growth for the community. Growth will be accomplished primarily through redevelopment of certain sites. The City and MCWD have a history of partnership through the work in the Minnehaha Creek Greenway. In addition to continued collaboration in the Greenway, the City's plan identifies several water quality improvement projects, including regional stormwater treatment on City park land, which may present partnership opportunities over the next plan cycle.

As a required element of the LWMP, the City has developed a MCWD-City Coordination Plan which serves as a framework to support ongoing communication and promote value-added collaboration between the City and MCWD. In its coordination plan, the City has committed to:

- Annual Meeting - Meet annually to review plan implementation progress, land use planning efforts, capital improvement plans, regulatory coordination and pending redevelopment, and areas for improved coordination.
- Partnership Opportunities – Coordinate on known partnership opportunities identified by the MCWD, including Southwest Light Rail Transit trail connection, Oxford-Louisiana drainage area improvements, Louisiana Avenue improvements, Target Knollwood planning, and Twin Lake subwatershed improvements.
- CIP Planning and Coordination – Annually review and discuss partnership opportunities for water quality improvement projects identified in the City's 10-year capital improvement plan.
- Operations and Maintenance – Continue to coordinate with MCWD on the operations and maintenance of shared capital investments at Twin Lakes Park and the Minnehaha Preserve.
- Regulatory Coordination – Route requests for significant land use approvals to MCWD during the concept plan phase or soon after, invite MCWD to pre-application meetings, support MCWD in addressing compliance issues, and require documentation of MCWD permits before issuing City permits.
- Public Outreach and Education – Continue to collaborate on public outreach, educational activities, and workshops, including programming throughout the Minnehaha Creek Greenway.
- Reporting and Data Sharing – Transmit a copy of its annual Municipal Separate Storm Sewer System (MS4) report to MCWD and notify MCWD of updates to road, park, and small area plans.

The City proposes to retain implementation authority for MCWD's Erosion Control Rule and concurs that the MCWD will continue to apply its other rules within City boundaries. A memorandum of understanding (MOU) was executed in 2016 outlining the City's obligations regarding regulatory authority, and this MOU is still in effect and included in the City's plan. The City will continue to defer Local Government Unit authority for the Wetland Conservation Act to MCWD.

Recommendation:

There is one outstanding requirement that has not been met, which is for the City to provide an inventory of property owned by the City. The City is in the process of developing a map to meet this requirement but asked that staff proceed with bringing the plan forward for approval with the condition that the map be added.

Staff has verified that the LWMP meets all other requirements of Minnesota Statutes §103B.235, Minnesota Rules 8410.0160, and the MCWD Watershed Management Plan and recommends approval with the condition that the City add an inventory of City-owned property.

Attachments:

1. St. Louis Park Map
2. St. Louis Park Coordination Plan
3. St. Louis Park LWMP (via website)

RESOLUTION

RESOLUTION NUMBER: 19-068

TITLE: Approval of St. Louis Park Local Water Management Plan

WHEREAS, on January 11, 2018, the MCWD adopted its Watershed Management Plan (WMP) pursuant to Minnesota Statutes §103B.231 and Minnesota Rules 8410, which describes how the MCWD will fulfill its responsibilities under the Metropolitan Surface Water Management Act for implementation over the period 2018-2027, and which is guided by the organizational strategy and approach defined through the Balanced Urban Ecology policy; and

WHEREAS, the Balanced Urban Ecology policy prioritizes partnership with the land use community to integrate policy, planning, and implementation in order to leverage the value created when built and natural systems are in harmony; and

WHEREAS, the Balanced Urban Ecology policy rests on the guiding principles of focusing in areas of highest resource needs, being flexible to respond to opportunities that arise through land use changes, and working in partnership to achieve the MCWD's goals; and

WHEREAS, on watershed district adoption of its WMP, cities and towns (local government units or LGUs) within the watershed must prepare local water management plans (LWMPs) that meet content requirements of Minnesota Statutes §103B.235, Minnesota Rules 8410.0160 and the WMP; and

WHEREAS, the LWMP is a primary tool to provide a framework for increased early coordination of land use and water planning through the coordination plan that is a required component of the LWMP and the content of which is described in the WMP, Appendix A; and

WHEREAS, the MCWD will prioritize implementation efforts and resource deployment based on its established priorities and LGU commitment to coordination as demonstrated through the coordination plan and its implementation by the LGU; and

WHEREAS, the City of St. Louis Park (City) has revised its LWMP and submitted it to the MCWD for review and approval; and

WHEREAS, MCWD staff reviewed the draft LWMP, provided detailed written comments on the LWMP, and thereafter worked with City staff to achieve the development of a proposed LWMP for consideration by the MCWD Board of Managers; and

WHEREAS, the Metropolitan Council has reviewed the LWMP and provided its written comments to the MCWD in a letter on November 30, 2018, and the MCWD has fully considered the comments; and

WHEREAS, the City wishes to retain water resource regulatory authority within the meaning of Minnesota Statutes §103B.211, subd. 1(a)(3), and assert sole permitting jurisdiction with respect to activities subject to MCWD's Erosion Control Rule; and

WHEREAS, the City's ordinances and official controls regarding Erosion Control were reviewed and found to provide protection of water resources at least as effective as the MCWD rules; and

WHEREAS, a memorandum of understanding (MOU) was executed in 2016 describing the City's obligations regarding regulatory authority, and this MOU is still in effect and included in Appendix A of the City's LWMP; and

WHEREAS, the MCWD will continue to exercise its present authority with respect to all District rules except Erosion Control under authority provided by MCWD Rules and Minnesota Department of Natural Resources, and otherwise exercise its permitting and approval authority in accordance with the terms of Minnesota Statutes §103B.211, subd. 1(a)(3); and

WHEREAS, the LWMP states that the City elects for the District to continue to act as the Local Government Unit responsible to implement the Minnesota Wetland Conservation Act; and

WHEREAS, the LWMP contains a coordination plan that meets the standards set forth in the MCWD WMP, Appendix A; and

WHEREAS, the MCWD WMP requires that the LWMP contain an inventory of real property owned by the City, and this has not yet been provided; and

WHEREAS, the MCWD has determined that the final revised LWMP meets the requirements of Minnesota Statutes § 103B.235, Minnesota Rules 8410.0160, and is consistent with the MCWD WMP including Appendix A, "Local Water Plan Requirements" with the exception of the property inventory;

NOW, THEREFORE, BE IT RESOLVED, that the MCWD hereby approves the City of St. Louis Park Local Water Management Plan with the condition that the City incorporate the required inventory of City-owned property into the LWMP; and

BE IT FURTHER RESOLVED, that the Board approves the associated coordination plan and adopts it on behalf of the MCWD; and

BE IT FINALLY RESOLVED that the City is to adopt and implement its LWMP within 120 days, and to notify the MCWD within 30 days thereafter that it has done so.

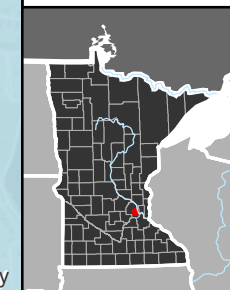
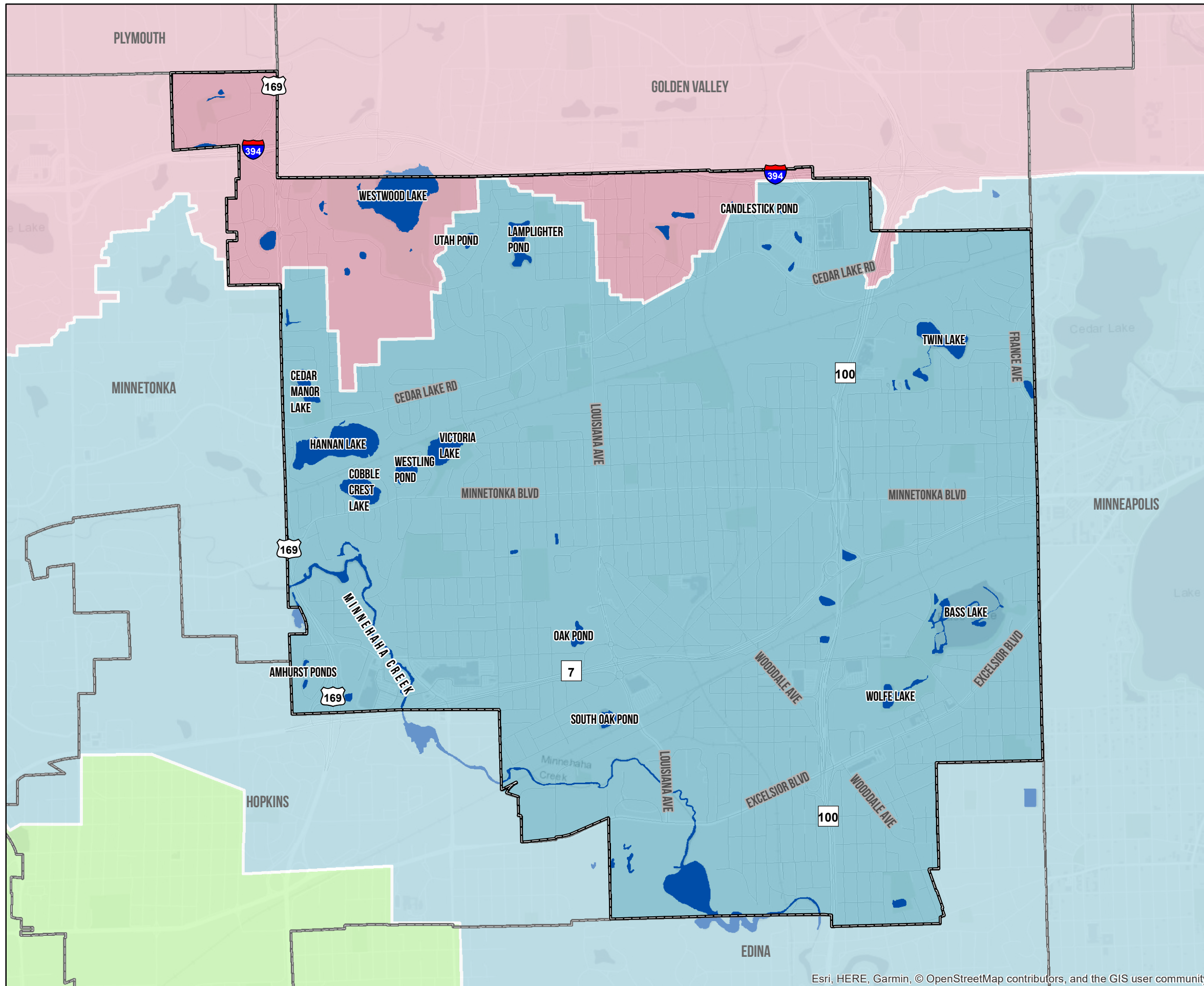
Resolution Number 19-068 was moved by Manager _____, seconded by Manager _____.
Motion to adopt the resolution ___ ayes, ___ nays, ___ abstentions. Date: _____.

Secretary Date: _____.

**FIGURE 2-9:
WATERSHEDS**

LEGEND

- Bassett Creek Watershed Management Commission
- Minnehaha Creek Watershed District
- Nine Mile Creek Watershed District
- City Boundary
- Lakes



| |
|------------------|
| Scale: As Shown |
| Drawn By: KAT |
| Checked By: |
| Proj. #: 03259 |
| Date: 2018.11.08 |





Experience **LIFE** in the Park



Surface Water Management Plan

Water Resources | City of St. Louis Park

Executive Summary

City of St. Louis Park Surface Water Management Plan

Located in Hennepin County just west of Minneapolis, the 10.7-square-mile City of St. Louis Park is a fully developed suburban community. The population of St. Louis Park is approximately 48,000 residents, making it the 20th largest city in Minnesota. St. Louis Park contains a variety of physical and water resources including several wetlands and small lakes, wooded areas, parks, and recreational lands, as well as the Minnehaha Creek corridor.

Two watershed management organizations (WMOs) cover St. Louis Park, each with its own governing body: the Bassett Creek Watershed Management Commission (BCWMC) and the Minnehaha Creek Watershed District (MCWD).

This local Surface Water Management Plan (SWMP) was prepared in accordance with Minnesota Statute 103B.235 and Minnesota Rules 8410 and is intended to replace the 2009 plan. The purpose of this SWMP includes objectives outlined in Minnesota Statute 103B.201 for metropolitan water management programs. According to the statute, the purposes of these water management programs are to:

- protect, preserve, and properly use natural surface and groundwater storage and retention systems;
- minimize public capital expenditures needed to correct flooding and water quality problems;
- identify and plan for means to effectively protect and improve surface and groundwater quality;
- establish more uniform local policies and official controls for surface and groundwater management;
- prevent the erosion of soil into surface water systems;
- promote effective groundwater recharge;
- protect and enhance fish and wildlife habitats and water recreational facilities; and
- secure the other benefits associated with the proper management of surface and groundwater.

This plan meets the policies and requirements of each of the WMOs within the city as well as other local, state, and federal agencies.

During the update of the SWMP, the city implemented a robust outreach and engagement plan that complemented the City of St. Louis Park's 2040 comprehensive plan and municipal separate storm sewer system (MS4) stormwater pollution prevention plan program (SWPPP) updates. Table E-1 below summarizes the outreach and engagement efforts undertaken to ensure that the SWMP-drafting team incorporated information and ideas from a diverse group of stakeholders.

Table E-1: SWMP Development Outreach and Engagement Plan

| Shareholder Group | Purpose | Engagement Approaches/Timeline |
|----------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Resident/public | Inform and educate | <ul style="list-style-type: none"> <input type="checkbox"/> Website updates (December 2017 and February, April, May, or June 2018, as appropriate) <input type="checkbox"/> Open house (Jan 9, 2018, 6–8 p.m.) <input type="checkbox"/> Tabling with fact sheets (e.g., at the West Metro Home Remodeling Fair: February 11, 2018, 10:30 a.m.–3 p.m.; Earth Day: April 22, 2018; Arbor Day: April 27, 2018; and Spring Cleanup Day: June 9, 2018, 8 a.m.–1 p.m.) |
| | Gather input | <ul style="list-style-type: none"> <input type="checkbox"/> Neighborhood planning workshops: “Your Voice Matters!” (November 2017 and April 2018—comprehensive plan item) <input type="checkbox"/> Web survey (January 2018) <input type="checkbox"/> Open house (Jan 9, 2018, 6–8 p.m.) <input type="checkbox"/> Tabling with fact sheets (e.g., at the West Metro Home Remodeling Fair: February 11, 2018, 10:30 a.m.–3 p.m.; Earth Day: April 22, 2018; Arbor Day: April 27, 2018; and Spring Cleanup Day: June 9, 2018, 8 a.m.–1 p.m.) <input type="checkbox"/> “Water and Coffee” discussion sessions (June 26, 2018) |
| Advisory partners | Inform and educate | <ul style="list-style-type: none"> <input type="checkbox"/> Website updates (December 2017 and February, April, May, or June 2018, as appropriate) |
| | Gather input | <ul style="list-style-type: none"> <input type="checkbox"/> Open house (Jan 9, 2018, 6–8 p.m.) <input type="checkbox"/> Web survey (January 2018) |
| | Involve | <ul style="list-style-type: none"> <input type="checkbox"/> Collaborative meetings to evaluate and assess SLP goals, policies, and strategies (September 2017, December/January 2018, February/March 2018) |
| | Consult | <ul style="list-style-type: none"> <input type="checkbox"/> Collaborative meetings on watershed commission and district’s standards (January 2018) <input type="checkbox"/> Implementation activities (June/July 2018) |
| Interdepartmental partners | Inform and educate, gather input, involve, and consult | <ul style="list-style-type: none"> <input type="checkbox"/> Monthly interdepartmental meetings; project team will provide agenda topics approximately one week before every meeting to allow departments to prepare for and participate in them (meetings held on the second Wednesday of each month). |
| Regulatory partners | Inform and educate, gather input, and consult | <ul style="list-style-type: none"> <input type="checkbox"/> Topic-specific meetings/conference calls with regulatory agencies to ensure the project team is interpreting its requirements correctly <input type="checkbox"/> Regulatory plans review (August/September 2018) |
| Leadership partners | Inform and educate | <ul style="list-style-type: none"> <input type="checkbox"/> Leadership briefings |

| Shareholder Group | Purpose | Engagement Approaches/Timeline |
|-------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Involve | <input type="checkbox"/> Council study session (September 24, 2018, 6:30 p.m.) <input type="checkbox"/> Council approval session (October 15, 2018, 7:30 p.m.) |

The St. Louis Park SWMP sets the course for the city’s management of surface water and stormwater within the city. It sets goals and policies for the city and its resources, provides data and other background information, assesses both city-wide and specific issues, and lists implementation tasks to achieve these goals. Additionally, the SWMP provides information regarding how the city might fund the implementation program. The SWMP is organized into six major chapters, as follows:

Contents

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| | Executive Summary |
| Chapter 1 | Introduction |
| Chapter 2 | Physical Environment and Land Use |
| Chapter 3 | Existing and Potential Water Resources-Related Problems |
| Chapter 4 | Goals and Policies |
| Chapter 5 | Implementation Program |
| Chapter 6 | References |

Chapter 2 provides technical information describing the surface and subsurface conditions of the city. Most of **Chapter 2** is devoted to presenting a city-wide inventory, including land use, climate and precipitation, topography, soils, geology, groundwater, MnDNR public waters, wetlands, surface water resource monitoring information, floodplain information, unique features and scenic areas, pollutant sources, major drainage basins, and overall drainage patterns. **Chapter 2** also includes several maps, such as city-wide maps of land use, MnDNR public waters, wetlands, drainage basins, and maps showing the drainage patterns for each major drainage basin. **Chapter 2** also includes several tables containing information such as precipitation data and water quality information.

Chapter 3 presents a summary of the general and specific water resource-related issues, problems, and challenges facing the City of St. Louis Park. These issues include water quality, stormwater runoff rate and volume, wetlands, Minnehaha Creek and erosion and sedimentation issues.

By way of its National Pollution Discharge Elimination System (NPDES) Phase-II MS4 permit, the City of 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. **Chapter 4** of the plan presents the city’s goals and policies toward meeting these goals. The following paragraphs summarize the key goals from **Chapter 4**.

Surface Water Quality Goals:

1. Manage surface water resources within St. Louis Park, with input from the public, so that the beneficial uses of wetlands, lakes, and streams remain available to the community, including aesthetic appreciation, wildlife observation, and boating.
2. Maintain or improve the quality of water in lakes, wetlands, Minnehaha Creek, and rivers within or immediately downstream of St. Louis Park, such as the Minneapolis chain of lakes, Bassett Creek and ultimately the Mississippi River.
3. Manage surface water on a regional basis to protect designated waterbodies and meet regional water quality standards in concert with the watershed organizations and the Metropolitan Council.
4. Reduce illicit discharge to the city's storm sewers and receiving waters.
5. Work to meet the phosphorous load reductions required by the city's NPDES permit, the BCWMC, and the MCWD for the City of St. Louis Park.

Chapter 4 also addresses local, state, and federal water regulations, nondegradation and total maximum daily load (TMDL) issues, and WMO requirements. The city's policies require the implementation of best management practices (BMPs) and include public education programs to better preserve surface water resources within the city (discussed in Chapter 5).

Stream Goals:

1. Maintain or enhance the natural beauty, public access, and wildlife habitats value of streams running through St. Louis Park.
2. Implement stream restoration measures wherever feasible to maintain health, safety, and ecological integrity.
3. Minimize the volume of stormwater runoff entering streams.

With these goals in mind, the policies include evaluating opportunities to increase recreation opportunities, reducing runoff from impervious surfaces, and cooperating with WMOs to implement stream restoration projects.

Wetlands Goal:

1. Protect and restore wetlands to improve or maintain their functions and values in accordance with the Minnesota Wetland Conservation Act (WCA) and the city's Wetland Management Plan.

This goal reflects the continuing role of the MCWD and BCWMC as the local government units (LGUs) responsible for administering the Wetland Conservation Act. The policies of the city conform to and support the rules and regulations of the WMOs.

Surface Water Quantity and Flooding-related Goals:

1. Manage the rate and volume of runoff entering the lakes, Minnehaha Creek and wetlands within the City of St. Louis Park.
2. Manage floodplain areas to minimize flooding and protect the functions of the floodplain.
3. Protect the public from flooding through measures that ensure public safety and prevent inundation of occupied structures.
4. Minimize flooding potential in a cost-effective manner.

Under these goals, city policies require compliance with the stormwater standards and criteria of the WMOs and this SWMP. These policies also address issues such as stormwater system maintenance and floodplain management.

Groundwater Goals:

1. Protect groundwater quality and quantity to preserve it for sustainable and beneficial purposes.
2. Manage surface water runoff to meet requirements for groundwater protection from Hennepin County, the Minnesota Pollution Control Agency (MPCA), and/or the Minnesota Department of Health (MDH).
3. Promote proper well abandonment.

The city's policies regarding groundwater include the continued implementation of the city's Wellhead Protection Plan, the promotion of infiltration BMPs where feasible, and cooperation with other agencies to promote the protection and monitoring of groundwater resources.

Erosion and Sedimentation Goal:

1. Prevent sediment from entering the city's surface water resources and minimize and control the erosion and sedimentation in drainageways within the city.

Under this goal, the SWMP includes policies regarding the submission of erosion and sediment control plans, compliance with WMO policies, MPCA NPDES construction stormwater permit, inspection of construction sites, and ensuring proper construction site debris storage and waste disposal.

Recreation, Habitat, and Shoreland Management Goals:

1. Protect and enhance wildlife habitats within St. Louis Park.
2. Maintain and enhance recreational facilities within St. Louis Park.
3. Preserve or enhance the ecological functions of shoreland areas within St. Louis Park.

Policies for these goals include encouraging the maintenance of natural, open spaces and riparian buffers and cooperating with other agencies to promote the use and protection of watershed resources.

Education and Public Involvement Goals:

1. Involve and educate residents of the city in water resource-related issues.
2. Offer programs, educational opportunities, and information that facilitate an understanding of water resource issues in St. Louis Park and downstream.

With respect to these goals, the SWMP's policies call for the city to implement education and public involvement-related BMPs identified in the city's SWPPP for its NPDES Phase-II MS4 permit.

Funding Goal:

1. Provide sufficient funding to implement measures and policies contained in this plan.

Adequate funding is essential for the city to implement its SWMP policies. Under this goal, the city's policies call for the continued use of the city's stormwater utility fee as well as the exploration of additional funding methods and opportunities.

Chapter 5 of the SWMP describes the city's implementation program to address the issues that have been identified in the SWMP, including a discussion of the following aspects:

- Water quality/NPDES Phase-II MS4 permit
- Operation and maintenance of the stormwater system
- Specific BCWMC and MCWD-related tasks
- Education and public involvement
- Costs of implementation program
- Funding sources for implementation program
- Design standards
- Local controls and regulatory responsibilities
- Specific implementation program items

Chapter 6 of the SWMP includes the references (e.g., plans, reports, studies, websites) that the team used for the development of this SWMP.

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City of St. Louis Park Surface Water Management Plan

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List of Acronyms

Glossary

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Chapter 2.0 Physical Environment and Land Use

Chapter 3.0 Existing and Potential Water Resource-Related Problems

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Chapter 6.0 References

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List of Acronyms

| | |
|--------------|-----------------------------------------------|
| ac | Acre |
| AIS | Aquatic Invasive Species |
| ATP | Aquifer Test Plan |
| BCWMC | Bassett Creek Watershed Management Commission |
| BMPs | Best management practices |
| BWSR | Minnesota Board of Water and Soil Resources |
| CAMP | Citizen-Assisted Monitoring Program |
| CD | County ditch |
| CFS | Cubic feet per second |
| CFR | Code of Federal Regulations |
| Chla | Chlorophyll-a |
| CIP | Capital Improvement Program |
| CJDN | Jordan Sandstone |
| CAMP | Citizen Assisted Monitoring Program |
| CLMP | Citizen Lake Monitoring Program |
| CLP | Clean Lakes Program |
| CMTS | Mt. Simon Sandstone |
| COE | United States Army Corps of Engineers |
| CSW | Construction stormwater general |
| CUP | Conditional use permits |
| CWA | Clean Water Act |
| CWI | County Well Index |
| CWL | Clean Water Legacy |
| CWRMP | Comprehensive Water Resources Management Plan |
| DCIA | Directly connected impervious area |
| DNR or MnDNR | Minnesota Department of Natural Resources |

| | |
|--------|--------------------------------------------------|
| DS | Downstream |
| DWSMA | Drinking water supply management area |
| EAW | Environmental assessment worksheet |
| EIMS | Environmental Information Management System |
| EIS | Environmental impact statement |
| EMC | Event Mean Concentration |
| EPA | U.S. Environmental Protection Agency |
| EQB | Minnesota Environmental Quality Board |
| EQIP | Environmental Quality Incentives Program |
| ERA | Emergency response area |
| ERPs | Enforcement response procedures |
| ESC | Erosion and sediment control |
| FEMA | Federal Emergency Management Agency |
| FF | Flood fringe district |
| FIRM | Flood insurance rate map |
| FIS | Flood insurance studies |
| FP | General floodplain district |
| ft. | Feet |
| FW | Floodway district |
| IDDE | Illicit discharge detection and elimination |
| in | Inch |
| gal/yr | Gallons/year |
| GIS | Geographic information system |
| GP | General permit |
| H&H | Hydrology and hydraulic |
| HHPLS | Hydrologic/Hydraulic and Pollutant Loading Study |
| IWMZ | Inner wellhead protection management zone |
| ISTS | Individual sewage treatment system |

| | |
|--------|-------------------------------------------------------|
| JD | Judicial ditch |
| k | Hydraulic conductivity |
| LA | Load allocation |
| lbs. | Pounds |
| LCA | Local cooperation agreement |
| LCCMR | Legislative-Citizen Commission on Minnesota Resources |
| LIDAR | Light detection and ranging |
| LGU | Local government unit |
| LOP | Letter of permission |
| LULC | Land use and land cover |
| LWMP | Local water management plan |
| m | Meter |
| MAISRC | Minnesota Aquatic Invasive Species Research Center |
| MCMs | Minimum control measures |
| MCWD | Minnehaha Creek Watershed District |
| MDA | Minnesota Department of Agriculture |
| MDH | Minnesota Department of Health |
| MEP | Maximum extent practicable |
| Mg/L | Milligram per liter |
| MGS | Minnesota Geological Survey |
| MGY | Million gallons per year |
| MIDS | Minimal impact design standards |
| MnDNR | Minnesota Department of Natural Resources |
| MnDOT | Minnesota Department of Transportation |
| MnRAM | Minnesota Routine Assessment Method |
| MPCA | Minnesota Pollution Control Agency |
| MS4 | Municipal separate storm sewer system |
| MSL | Mean sea level |

| | |
|-------|-------------------------------------------------|
| MSP | Minneapolis/St. Paul |
| NAWCA | North American Wetlands Conservation Act |
| NCHF | North Central Hardwood Forest |
| NOAA | National Oceanic and Atmospheric Administration |
| NPDES | National pollutant discharge elimination system |
| NRCS | Natural Resources Conservation Service |
| NURP | Nationwide Urban Runoff Program |
| NWI | National wetlands inventory |
| NWPs | Nationwide permits |
| OHWL | Ordinary high water level |
| OPDC | Prairie du Chien Group |
| PCA | Project cooperation agreement |
| PE | Professional engineer |
| PLS | Public Land Survey |
| PPB | Parts per billion |
| PWI | Public waters inventory |
| PWS | Public water supply |
| RFP | Request for proposal |
| RFPE | Regulatory flood protection elevation |
| ROC | Recreation outdoor center |
| SD | Secchi depth |
| SDS | State disposal system |
| sf | Square feet |
| SLP | Saint Louis Park |
| SOP | Standard operating procedures |
| SSTS | Subsurface septic treatment system |
| SWB | Soil water balance |
| SWCD | Soil and Water Conservation District |

| | |
|-------|------------------------------------------|
| SWCS | Soil and Water Conservation Society |
| SWMM | Storm Water Management Model |
| SWMP | Surface Water Management Plan |
| SWPPP | Storm Water Pollution Prevention Program |
| SWUDS | State water use data system |
| SWUF | Stormwater utility Fund/Fee Program |
| T | Transmissivity |
| TAC | Technical advisory committee |
| TMDL | Total maximum daily load |
| TP | Total phosphorus |
| TP-40 | Technical Report 40 |
| TSS | Total suspended solids |
| UMN | University of Minnesota |
| US | Upstream |
| USDA | United States Department of Agriculture |
| USFWS | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |
| VIC | Voluntary investigation and cleanup |
| VOCs | Volatile organic compounds |
| VSMP | Volunteer Stream Monitoring Program |
| WCA | Wetland Conservation Act |
| WHEP | Wetland Health Evaluation Project |
| WHNC | Westwood Hills Nature Center |
| WHP | Wellhead protection |
| WHPA | Wellhead protection area |
| WHPP | Wellhead protection plan |
| WLA | Waste load allocation |
| WMO | Watershed management organization |

| | |
|------|-------------------------------------|
| WMP | Wetland management plan |
| WOMP | Watershed Outlet Monitoring Program |
| WRMP | Water resources management plan |
| yr | Year |
| °F | Degrees Fahrenheit |

100-year Flood: The flood event that has a 1 percent annual probability of being equaled or exceeded in any given year. This flood is a result of the critical duration 1-percent chance storm falling on the watershed. This is also commonly called the “1-percent chance flood.”

Algae: Simple, rootless plants that grow in bodies of water in relative proportion to the amount of nutrients available. Algal blooms, or sudden growth spurts, can adversely affect water quality.

Aquifer: A saturated permeable geologic unit that can transmit significant quantities of water under ordinary hydraulic gradients.

Authorized Enforcement Agency: Employees or designees of the City or other governing authorities designated to enforce an ordinance

Base Flood Elevation: The elevation of the “regional flood”, which is used in the flood insurance survey.

Basement: Any area of structure, included crawl spaces, having its floor or base subgrade (below ground level) on all four sides, regardless of the depth of excavation below ground level.

Best Management Practices (BMPs):

1. Practices that can be used to control urban nonpoint source pollution.
2. Schedules of activities, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to stormwater, receiving waters, or stormwater conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

City: The City of St. Louis Park, including any employees, agents, contractors or designees.

Clean Water Act: The Federal Pollution Control Act (33 U.S.C. § 1251 et seq.), and any subsequent amendments thereto.

CWRMP: The Comprehensive Water Resources Management Plan or Surface Water Management Plan on record in the City offices.

Data Element: A specific type of information required by the Minnesota Department of Health to prepare a wellhead protection plan.

Design Storm: A rainfall event of specific return frequency and duration (e.g., a storm with a two-year frequency of occurrence and 24-hour duration) that is used to calculate runoff volumes and peak discharge rates.

Detention: The temporary storage of storm runoff that settles pollutants via gravity and is used to control peak discharge rates.

Detention Pond: An impoundment that is normally dry but is used to store water runoff until it is released from the structure and reduce peak discharge from stormwater runoff.

Discharge: Any substance entering the stormwater system by any means.

Drinking Water Supply Management Area (DWSMA): The area delineated using identifiable landmarks that reflects the scientifically calculated wellhead protection area boundaries as closely as possible (Minnesota Rules, part 4720.5100, subpart 13).

Drinking Water Supply Management Area Vulnerability: An assessment of the likelihood that the aquifer within the DWSMA is subject to impact from land and water uses within the wellhead protection area. It is based upon criteria that are specified under Minnesota Rules, part 4720.5210, subpart 3.

Emergency Response Area (ERA): The part of the wellhead protection area that is defined by one-year time of travel within the aquifer that is used by the public water supply well (Minnesota Rules, part 4720.5250, subpart 3). It is used to set priorities for managing potential contamination sources within the DWSMA.

Equal degree of encroachment: A method of determining the location of floodway boundaries so that floodplain lands on both sides of a stream are capable of conveying a proportionate share of flood flows.

Erosion:

1. The wearing away of the lands or structures by running water, glaciers, wind, and/or waves.
2. Any process that wears away the surface of the land by the action of water, wind, ice or gravity.
Erosion can be accelerated by the activities of people and nature.

Erosion Control: Methods employed to prevent erosion. Examples include soil stabilization practices, horizontal slope grading, temporary or permanent cover, and construction phasing.

Erosion Control Plan: A plan detailing erosion control during construction activity as defined in the SWMP, Appendix M.

Eutrophication: The natural or artificial process of nutrient enrichment whereby a waterbody's oxygen content lessens as it becomes filled with aquatic plants.

Evapotranspiration: Water that has evaporated and transpired from soil and plant surfaces.

Flood: A temporary increase in the flow or stage of a stream or in the stage of a wetland or lake that results in the inundation of normally dry areas.

Flood frequency: The frequency for which it is expected that a specific flood state or discharge may be equaled or exceeded.

Flood fringe: The portion of the Special Flood Hazard Area (one percent annual chance flood) located outside of the floodway. Flood fringe is synonymous with the term "floodway fringe" used in the Flood Insurance Study for Hennepin County, Minnesota.

Flood Insurance Rate Map (FIRM): An official map of a community, on which the Administrator has delineated both the special hazard areas and the risk premium zones applicable to the community.

Flood Prone Area: Any land susceptible to being inundated by water from any source.

Floodplain: Lowland area adjoining waterbodies that are susceptible to an inundation of water during a flood.

Flood proofing: A combination of structural provisions, changes or adjustments to properties and structures subject to flooding, primarily for the reduction or elimination of flood damages.

Floodway: The bed of a wetland or lake and the channel of a watercourse and those portions of the adjoining floodplain which are reasonably required to carry or store the regional flood discharge.

Geology: The science that examines the origin, history, and structure of the Earth as it is recorded in rocks, along with the forces and processes now operating to modify rocks.

Groundwater: Water underneath the ground surface that is under positive pressure.

Hazardous Materials: Any material, including any substance, waste or combination thereof, which because of its quantity, concentration; or, physical, chemical, or infectious characteristics, may cause or significantly contribute to a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Hydrology: The applied science concerned with the waters and waterbodies of the Earth in all their states—their occurrences, distribution, and circulation through the unending hydrologic cycle of precipitation, runoff, stream flow, infiltration, storage, evaporation, and reprecipitation.

Illicit Connections:

1. This is either 1) any drain or conveyance, whether on the surface or subsurface, which allows an illicit discharge to enter the stormwater system or 2) any drain or conveyance connected from a commercial or industrial and use to the stormwater system which has not been documented in plans, maps, or equivalent records and approved by an authorized enforcement agency.
2. Any direct or indirect non-stormwater discharge to the stormwater system, except as exempted in Section 12-157 of this ordinance.

Illicit Discharge:

1. Any discharge to the municipal separate storm sewer system that is not composed entirely of stormwater, except for discharges allowed under a NPDES permit or waters used for firefighting operations.
2. Any direct or indirect non-stormwater discharge to the stormwater system, except as exempted in Section 12-157 of this ordinance

Impervious Area: Impermeable surfaces such as pavement or rooftops that prevent the infiltration of water into the soil.

Industrial Activity: Activities that are subject to NPDES Industrial Permits as defined in 40 CFR, Section 122.26 (b)(14).

Infested Waters: waterbodies that host invasive species.

Infiltration: The entrance of water into the soil or other porous materials through interstices.

Inner Wellhead Management Zone (IWMZ): The land that is within 200 feet of a public water supply well (Minnesota Rules, part 4720.5100, subpart 19). The public water supplier must manage the IWMZ to help protect it from sources of pathogen or chemical contamination that may cause an acute health effect.

Inundation Period: Time during which flood water is temporarily stored in the wetland, exceeding the wetland's natural elevation level.

Judicial Ditch: A public drainage system established under Chapter 106 of the Minnesota Statutes and under the jurisdiction of the district court or a watershed management organization.

Land Disturbing Activity: Any activity which changes the volume or peak flow discharge rate of rainfall runoff from the land surface.

Landlocked Lake or Basin: An area with an outlet that is significantly higher than the normal water level of the lake, pond, or wetland.

Lowest Floor: The lowest floor of the lowest enclosed area (including basement).

Nationwide Urban Runoff Program (NURP): A study initiated by the EPA in 1978 to develop a consistent database and set of recommendations to be used for planning decisions about nonpoint pollution issues. This study included 28 projects across the United States that were completed independently under the direction of the EPA. This study has been used extensively in both the characterization of stormwater quality and as a guide for the implementation of management alternatives for stormwater treatment. The most-often cited management option derived from this study is a detention basin referred to as a NURP pond. The NURP study provided recommendations for the size and shape of detention ponds to provide pollutant removal efficiency.

New Construction: Structures, including additions and improvements, and placement of manufactured homes, for which the start of construction commenced on or after the effective date of an ordinance.

No Net Loss: Zero reduction in the area and value of a wetland from existing conditions.

Nonpoint Source Pollution:

1. Pollution originating at a variety of nonlocalized sources, such as street runoff, septic systems, atmospheric deposition, or groundwater.
2. Pollution from any source other than any discernable, confined and discreet conveyances, and shall include but not be limited to pollutants from agricultural, silvicultural, mining, construction, subsurface disposal and urban runoff sources.

Non-Stormwater Discharge: Any discharge to the stormwater system that is not composed entirely of stormwater.

NPDES Permit: A National Pollutant Discharge Elimination System Stormwater discharge permit issued by the MPCA that regulates discharges of pollutants to waters of the United State, whether the permit is applicable on an individual, group, or general area-wide basis.

Nutrients: Fertilizer, particularly phosphorus and nitrogen (the two most common components that run off in sediment).

Obstruction: Any dam, wall, wharf, embankment, levee, dike, pile, abutment, projection, excavation, channel modification, culvert, building, wire, fence, stockpile, refuse, fill, structure or matter in, along, across or projecting into any channel, watercourse or regulatory floodplain which may impeded, retard or change the direction of the flow of water, either in itself or by catching or collecting debris carried by such water.

One Hundred Year Floodplain: Lands inundated by the “regional flood”.

Ordinary High Water Level: The boundaries of public waters and wetlands, this refers to the elevation delineating the highest water level that has been maintained for a sufficient period of time to leave evidence upon the landscape. This is commonly the point at which natural vegetation changes from predominantly aquatic to predominantly terrestrial. For watercourses, the ordinary high water level comprises the elevation of the top of the channel’s bank. For reservoirs and flowages, the ordinary high water level is the operating elevation of the normal summer pool.

Peak Discharge or Flow: The maximum instantaneous rate of flow during a storm, usually in reference to a specific design storm event.

Permanent Stabilization Plan: A written plan to establish permanent vegetation to prevent erosion of soil.

Person: Any individual, association, organization, partnership, firm, corporation or other private or public entity recognized by law and acting as either the owner or as the owner’s agent.

Pollutant: Anything which causes or contributes to pollution.

Precipitation: The total, measurable supply of all forms of falling moisture including dew, rain, mist, snow, hail, and sleet; usually expressed as depth of liquid water on a horizontal surface per day, month, or year, and often designated in terms of daily, monthly, or annual precipitation.

Premises: Any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

Public Waters: Any waters as defined in Minnesota Statutes, Section 103G.

Reach: Longitudinal segments of a stream defined by natural or manmade restrictions. In an urban area, the segments of the stream between two consecutive road crossings typically constitute a reach.

Recharge: Replenishment of a groundwater system by natural or artificial means.

Recurrence Interval: The average interval of time, based on a statistical analysis of actual or representative stream flow records, that can be expected to elapse between floods equal to or greater than a specified stage or discharge. The recurrence interval is generally expressed in years.

Regional flood: A flood which is representative of large floods known to have occurred generally in Minnesota and reasonably characteristic of what can be expected to occur on an average frequency in the magnitude of the 1% chance or 100-year recurrence interval. Synonymous with the term “base flood” used in the flood insurance survey.

Regulatory Flood Protection Elevation (RFPE): An elevation not less than two feet above the elevation of the regional flood plus any increases in flood elevation caused by encroachments on the floodplain that result from designation of a floodway.

Repetitive Loss: Flood related damages sustained by a structure on two separate occasions during a ten year period for which the cost of repairs at the time of each such flood event on the average equals or exceeds 25% of the market value of the structure before the flood occurred.

Retention: The holding of runoff in a basin without release except by means of evaporation, infiltration, or emergency bypass.

Riparian: A relatively narrow strip of land that borders a stream or river and often coincides with the maximum water surface elevation of the 100-year storm.

Runoff: That portion of the precipitation that is not absorbed by deep strata but finds its way into the surface water system after meeting the demands of evapotranspiration.

Secchi Disc: A circular plate used to measure the transparency or clarity of water by noting the greatest depth at which it can be visually detected. Its primary use is in the study of lakes.

Sediment: Solid matter carried by water, sewage, or other liquids.

Shoreland: Land located within the following distances from public water: 1,000 feet from the ordinary high water level of a lake, pond, or flowage; and 300 feet from a river or stream, or the landward extent of a floodplain designated by an ordinance on a river or stream, whichever is greater.

Special Flood Hazard Area: A term used for flood insurance purposes synonymous with “One Hundred Year Floodplain”.

Start of Construction: The actual start of construction, repair, reconstruction, rehabilitation, addition, placement or other improvement that occurred before the permit’s expiration date.

Stormwater: Any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation.

Stormwater Facility: Anything within the stormwater system that collects, conveys or stores stormwater.

Stormwater Management: The use of structural or non-structural practices that are designed to reduce stormwater runoff pollutant loads, discharge volumes, peak flow discharge rates and detrimental changes that affect water quality and habitat.

Stormwater Management Plan: A plan which describes how runoff and associated water quality impacts resulting from the development will be controlled or managed.

Stormwater Pollution Prevention Plan (SWPPP): A document which describes BMPs and activities to be implemented by a person or business to identify sources of pollution or contamination at a site and the actions to eliminate or reduce pollutant discharges to stormwater, stormwater systems and/or receiving waters to the maximum extent practicable.

Stormwater System: Facilities by which stormwater is collected and/or conveyed.

Structure:

1. Anything constructed or erected on the ground or attached to the ground or on-site utilities, including, but not limited to, buildings, factories, sheds, detached garages, cabins, manufactured homes and other similar items.
2. Anything manufactured, constructed, or erected, which is normal attached to or positioned on land, including portable structures, earthen structures, roads, parking lots or paved storage areas.

Substantial Damage: Damage of any origin sustained by a structure where the cost of restoring the structure to its before damaged condition would equal or exceed 50% of the market value of the structure before the damage occurred.

Substantial Improvement: Within any consecutive 365-day period, any reconstruction, rehabilitation (including normal maintenance and repair), repair after damage, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the “start of construction” of the improvement.

Swale: A natural depression or A wide, shallow ditch used to temporarily store, route, or filter runoff.

Wastewater: Any water or other liquid, other than uncontaminated stormwater, discharged from a facility.

Waterbodies: Natural and manmade depressions, stormwater conveyances, and storage facilities, including wetlands, lakes, ponds, streams, and rivers.

Watercourse: A stream or body of water, or a natural or artificial channel for the passage of stormwater.

Watershed: A geographical area that collects precipitation and provides runoff to a particular collector, such as a stream, lake, or marsh.

Waters of the U.S.: Any water in the United States per definition as specified 33 CFR 328.a.

Wellhead Protection (WHP): A method of preventing well contamination by effectively managing potential contamination sources in all or a portion of the well's recharge area.

Wellhead Protection Area (WHPA): The surface and subsurface area surrounding a well or well field that supplies a public water system, through which contaminants are likely to move toward and reach the well or well field (Minnesota Statutes, section 102I.005, subdivision 24).

Well Vulnerability: An assessment of the likelihood that a well is at risk to human caused contamination, either due to its construction or indicated by criteria that are specified under Minnesota Rules, part 4270.5550, subpart 2.

Wetland: A translational area between terrestrial and aquatic systems where the water table is usually at or near the surface or where the land is covered by shallow water. A more specific definition of wetland can be found in Minnesota Statute 103G.005.

CHAPTER 1.0 Introduction

City of St. Louis Park Surface Water Management Plan

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1.1 Location and History

Located in Hennepin County just west of Minneapolis, the 10.7-square-mile city of St. Louis Park is a fully developed suburban community. The population of St. Louis Park is approximately 48,800 residents, making it the 20th-largest city in Minnesota. St. Louis Park contains a variety of natural resources including several wetlands and small lakes, wooded areas, parks, and recreational lands, as well as the Minnehaha Creek corridor.

Two watershed management organizations cover St. Louis Park, each with its own governing body: the Bassett Creek Watershed Management Commission (BCWMC) and the Minnehaha Creek Watershed District (MCWD).

St. Louis Park's population has been relatively stable since 1980. Currently, nearly all of the city is developed. St. Louis Park's land use comprises predominantly low-density residential areas with interspersed park and open areas. Commercial, office, industrial, and other high-density land use generally occur along the major transportation corridors nearby such as Interstate 394, Highway 7, Excelsior Boulevard, Highway 100, and Highway 169.

St. Louis Park has a long and interesting history, from when the land was settled by Dakotah and Ojibway Indians to its inclusion in the 1803 Louisiana Purchase, its settlement by European and American-born farmers in the 1850s, its progression from a township to a village in 1886, and finally to becoming an incorporated city in 1954.

In 1851, Indian tribes signed an agreement allowing settlement of lands west of Fort Snelling, and by the 1850s, farmers began settling in the area that is now St. Louis Park. By 1873, two railroads passed through St. Louis Park, connecting the flour mills in Minneapolis with the grain fields in the west. Community leaders believed that the railroad would help transform the village into a center of trade and industry. In 1886, the area known as Elmwood was incorporated into the village of St. Louis Park. Originally, the village center was located at the intersection of the Minneapolis and St. Louis railroad (now the Canadian Pacific railroad) and Wooddale Avenue. However, the original concentric pattern was eventually outgrown by the rising population of Minneapolis.

In the 1890s, St. Louis Park's commercial development was concentrated in the village center. However, this development was limited by the financial panic of 1893 and the depression of the late 1890s. By the end of World War I, only seven scattered retail stores operated within St. Louis Park. Street cars limited local enterprise, too, in that they provided easy access to more reliable commercial opportunities in Minneapolis. The lumber baron Thomas Barlow Walker and other wealthy industrialists incorporated the Minneapolis Land and Investment Company, which started to develop St. Louis Park for industrial, commercial, and residential use. They sought to maintain Minneapolis' economic advantage over St. Paul. In 1892, Walker's company platted about 1,000 acres using a layout influenced by George Pullman's "model city." This subdivision plan, called the "rearrangement of St. Louis Park," was organized around a grid of

streets, street car lines, railroads, and railroad spurs that served the needs of a growing industrial suburb.

Development occurred rapidly in the early 1890s but slowed with the downward turn of the economy. However, despite the financial panic of 1893, marked by the collapse of railroad companies and bank failures, land speculation continued, and subdivision of land occurred in sporadic and erratic patterns. In 1933, Carol W. Hurd headed a committee to rectify the inconsistent street naming that these erratic subdivisions caused. The city's current street naming conventions are the result of Hurd's effort.

Vigorous home-building occurred in the later 1930s but came to a halt with World War II. Following the war, in the late 1940s and the 1950s, 60 percent of the city's residential housing stock was constructed. However, the later subdivisions no longer used the grid pattern typical of the older sections of St. Louis Park. Rather, these new developers utilized the new suburban ideals of cul-de-sacs and curvilinear streets. Most of the recent residential developments in St. Louis Park are not single-family homes but multiunit apartment and condominium buildings.

As transportation shifted to the automobile in the 1940s, the retail and service sectors followed suit. In the 1940s, Lilac Way, the first shopping center in the state, was constructed on the northeast corner of Highway 100 and Excelsior Boulevard. It was demolished in the late 1980s for a redevelopment project. Just south of this area, the Miracle Mile Mall was constructed in 1950 and still prospers today.

In 1956, Knollwood Mall was constructed. It was one of the largest shopping centers in the western suburbs until the construction of the Southdale and Ridgedale Malls in Edina and Minnetonka, respectively. Another significant commercial development to occur in St. Louis Park is the Excelsior and Grand redevelopment project located on Excelsior Avenue between France Avenue and Highway 100. Completed in 2007, Excelsior and Grand is a mixed-use development with first-floor commercial areas and multifamily residential living spaces on the floors above. Conveniently located just west of downtown Minneapolis, The West End is an up-tempo mixed-use development approximately 40 acres located at the southwest corner of I-394 and Highway 100. The West End development include The Shops at West End: 350,000-square-foot lifestyle center, 30,000-square-foot office (completed 2009), Flats at West End: 119-unit apartment building (completed 2013), Millennium at West End Apartments: 158 units (completed 2015), Central Park West: 5 buildings of apartments, a hotel, office spaces and multifamily residential properties to be completed between 2017 – 2022. In general, the city plans to manage land use in the future by increasing the number of multifamily and mixed-use developments.

Some of the city's first parks were dedicated by the original subdividers of the city. Other lands became parks and open spaces through tax forfeiture. These lands were essentially low, wet areas with soil that was unstable for building purposes. Overall, park land was not acquired according to any overall plan or system. In the 1950s, city officials recognized that the city's population growth was occurring at a faster rate than the community could manage. In 1959,

the city had its first park bond sale to acquire land and improve its parks and open spaces. Today, the city has 72 parks and open space areas that span over 820 cumulative acres.

Because much of the city developed before many major standards and regulations related to wetlands, water quantity, and water quality were implemented, the city has had to retroactively update its surface water management and treatment infrastructures. As this redevelopment occurs, stormwater management practices can be incorporated into the system.

In 2001, the city developed its first “City of St. Louis Park Comprehensive Water Resource Management Plan.” The document established a stormwater management plan for the city, integrating flood control with wetland and water quality needs.

1.1.1 City of St. Louis Park: Vision

In 1994, St. Louis Park undertook its first visioning process, “Vision 1.0: A Community of Choice for a Lifetime,” to capture ideas from citizens on the overall direction of the city. At the time, citizens were concerned about a lack of a downtown and wanted more sidewalks and bike paths, among other things. It made a decisive move toward determining its own destiny. Over the next ten years, the city worked to build the rec center and aquatic center, Wolfe Park, the amphitheater, Excelsior and Grand, the St. Louis Park parks and trails plan, housing opportunities, and stronger neighborhoods. Since the success of Vision 1.0, the city continues to reevaluate and update its vision every decade with greater community involvement.

In 2005 and 2006, teams consisting of participants from throughout the community worked for six months to develop a community-wide strategic action plan called “Vision 2.0: Discover, Dream, Design.” This effort was aimed at creating a unique community that people would want to call home. The groups involved in developing the plan included representatives from the government, schools, businesses, community organizations, religious institutions, and neighborhoods. The purpose of Vision 2.0 was to develop goals for the future of St. Louis Park as well as the action steps, timelines, and potential partnerships. The focus of Vision 2.0 was to consider eight major community components: arts and culture, the environment, transportation, gathering places, sidewalks and trails, housing, community events, and diversity.

Because the environment is one of these eight major components, St. Louis Park vows to remain committed to being a leader in environmental stewardship. One goal is to increase environmental consciousness and responsibility in all areas of city business. This includes encouraging green building designs, the creation of open spaces, and environmental innovations.

“Vision 3.0: A Place for All People” was launched and completed in 2017, with a major focus on engaging as many citizens as possible. In Vision 3.0, residents reported that they valued “care [for] and enjoyment of the natural environment,” and they identified “climate change” as a top issue facing the city. They recommended that the city “continue to lead in environmental stewardship and ensure access to green space for [the] future.” For more

information about Vision 3.0, see the following website: <https://www.stlouispark.org/our-city/about-us/vision-st-louis-park>.

1.2 Purpose and Scope

The Surface Water Management Plan (SWMP) is a local water management plan prepared in accordance with Minnesota Statute 103B.235 and Minnesota Rules 8410. The purpose of the SWMP includes those purposes listed in Minnesota Statute 103B.201 for metropolitan water management programs:

- to protect, preserve, and responsibly use natural surfaces, groundwater storage, and retention systems;
- to minimize the public capital expenditures needed to correct flooding and water quality problems;
- to identify and plan for a means to effectively protect and improve surface and groundwater quality;
- to establish more uniform local policies and official controls for surface and groundwater management;
- to prevent erosion of the soil into surface water systems;
- to promote effective groundwater recharge;
- to protect and enhance fish and wildlife habitats and water recreational facilities; and
- to secure other benefits associated with proper management of surface and ground water.

The SWMP meets the policies and requirements of the Minnehaha Creek Watershed District and Bassett Creek Watershed Management Commission, as well as other local, state, and federal agencies. This SWMP was designed to further the city's vision statements, guiding goals and policies toward surface water management, preservation, and capital improvement program and plans.

Those vision statements are as follows:

- Ensure every person understands the stormwater and natural systems and where their water goes and encourage people to change their actions to positively influence those systems.
- Incorporate a city-wide, integrated, and collaborative approach to maximizing stormwater and natural system opportunities through landuse changes.
- Collaborate beyond expectations to further define and utilize our resources and better manage stormwater and our natural systems to revitalize and connect our community and guarantee our future resilience.
- Position natural systems in balance with the built environment to place the community as a vibrant, resilient regional land use and water resource management leader.

1.3 Plan Organization

The SWMP sets the course for the city’s management of surface water and stormwater. It provides data and other background information, outlines the applicable regulations, assesses city-wide and specific issues, sets city-wide surface water goals and policies, and lists implementation tasks to achieve the goals. It also provides information regarding the funding of the implementation program. The SWMP is organized into six major chapters, summarized as follows:

Executive Summary: The executive summary provides the highlights of the SWMP, including the SWMP purpose and scope, goals, policies, and implementation tasks.

Chapter 1.0 Introduction: Chapter 1 provides general background information on the city’s history of surface water management, including a summary of water management agreements and Minnesota regulatory framework.

Chapter 2.0 Physical Environment and Land Use: Chapter 2 provides technical information describing the surface and subsurface conditions of the city. Most of this chapter presents a city-wide inventory of climate and precipitation, topography, soils, geology, groundwater, public waters, wetlands, surface water monitoring information, floodplain information, unique features and scenic areas, pollutant sources, major basins, and overall drainage patterns. Chapter 2 also includes a number of maps, such as city-wide maps of land use, Minnesota Department of Natural Resources (MnDNR) public waters, wetlands, and drainage basins, as well as maps showing the drainage patterns for each major drainage basin. It also includes a number of tables such as precipitation information and water quality information.

Chapter 3.0 Existing and Potential Water Resource-Related Problems: Chapter 3 assesses challenges the city faces in managing stormwater in a fully built environment on behalf of the public. This section discusses the overall adequacy of the city’s ordinances and official controls, jurisdictional issues, education and public involvement program, maintenance, and funding.

Chapter 4.0 Goals and Policies: Chapter 4 presents the goals and policies of the city. It describes the components of the city’s SWMP implementation program, including its National Pollutant Discharge Elimination System (NPDES), its Phase-II municipal separate storm sewer system (MS4) permit, information on the operation and maintenance of stormwater systems, and information about education and public involvement.

Chapter 5.0 Implementation Program: Chapter 5 presents funding, ordinance implementation and official controls, implementation priorities, detailed implementation plan, and budget.

Chapter 6.0 References: Chapter 6 lists the documents and other references used in the preparation of the SWMP.

1.4 Plan Update and Amendment Procedures

This SWMP guides the City of St. Louis Park's activities through 2027 or until it is superseded by the adoption and approval of a subsequent SWMP. The city will begin the process of updating this plan one to two years before its expiration date. The updated plan will meet the requirements of applicable Minnesota laws and rules, the BCWMC, and the MCWD.

The city must revise this SWMP through an amendment prior to the next update of the plan if minor changes are required, BCWMC or MCWD updates their respective watershed management plans or if problems arise that are not addressed in the SWMP. However, this SWMP remains in full effect until an updated SWMP can be approved by the BCWMC and the MCWD.

Any significant changes to this SWMP must be approved by the BCWMC, the MCWD and Metropolitan Council. Minor changes to this SWMP will not require WMO approval and can be made by city staff, but WMOs must be promptly informed. The city considers minor changes to be those that do not modify the goals, policies, or commitments identified in the SWMP.

Examples of minor changes include the following:

- the inclusion of new or corrected hydrologic modeling results and mapping, as long as the changes do not significantly affect the rate or quality of intercommunity stormwater runoff;
- adjustments to subwatershed boundaries, provided that the changes will have no significant impact on the rate or quality in which stormwater runoff is discharged from the city boundaries;
- the inclusion of new/updated water quality monitoring data;
- minor changes to the city's implementation program, such as added or removed projects, schedule changes, and revised cost estimates, as long as there are no intercommunity impacts of such changes and so long as the changes stem from the goals and policies listed in the SWMP; and
- revisions to the city's design guidelines and standards to reflect the new BCWMC and MCWD rules, and other applicable regulations if the changes do not result in less stringent requirements.

If it is unclear whether a proposed SWMP change is minor or not, the city will bring the issue to the BCWMC and the MCWD for determination. The city's amendment procedure for significant changes to the SWMP is as follows:

1. **Preparation:** City staff prepare and review the SWMP amendment.
 - Significant changes shall be made known to the following parties:
 1. The city manager, director of inspections, engineering director, community development director, and operations and recreation director

2. The City of St. Louis Park engineering department, community development department, and operation and recreation department.
3. All affected watershed management organizations in Hennepin County, and the Metropolitan Council
2. **Consideration:** The city council will consider the SWMP amendment as prepared by staff. The council can either approve or deny submitting the amendment for WMO review and approval. If the city council votes to submit the amendment for WMO approval, the council also needs to determine when/if a public hearing or other public process should be undertaken.
3. **Submission, Review, and Approval:** The proposed SWMP amendment is submitted to the BCWMC and the MCWD for review and approval. The review process for a SWMP amendment is the same as it was for the original SWMP. The WMOs have 60 days to review and comment on the proposed SWMP amendment.
4. **Adoption:** If both WMOs approve the SWMP amendment, the city council will adopt the SWMP amendment.

1.5 Water Resources-Related Agreements

The City of St. Louis Park has entered into several surface water-related agreements over the years that have affected how the city manages its surface water. These agreements include:

1. Cooperative Agreement for Vegetation Management at Twin Lakes Park, City of St. Louis Park, April 19, 2010
2. Reach 20 Restoration Project Cooperative Agreement 2012
3. Easement between City of St. Louis Park and Minnehaha Creek Watershed District related to the Minnehaha Preserve (Reach 20), Doc. No. T5032867, January 14, 2013
4. Reach 20 Restoration Project Second Cooperative Agreement, December 12, 2013
5. A Joint and Cooperative Agreement for the Establishment of a Bassett Creek Watershed Management Organization to Plan, Control and Provide for the Development of Bassett Creek, August 29, 2014.
6. Cooperative Agreement, City of St. Louis Park and Minnehaha Creek Watershed District, Powell Road Stormwater Diversion Project, January 29, 2015
7. Memorandum of Understanding between Minnehaha Creek Watershed District and the City of St. Louis Park for Local Water Planning and Regulation, January 19, 2016
8. 2017 Water Education Activities Letter of Understanding between Bassett Creek Watershed Management Commission and the City of St. Louis Park, February 21, 2018.

The agreement is included in **Appendix A**.

1.6 Regulatory Framework/Agency Responsibilities

Various units of government are involved in water-resource related activities, including the City of St. Louis Park, watershed management organizations, the Metropolitan Council, Hennepin County, the MnDNR, the Minnesota Board of Water and Soil Resources (BWSR), the Minnesota Pollution Control Agency (MPCA), the Minnesota Department of Health (MDH), the Minnesota Environmental Quality Board (EQB), the Minnesota Department of Transportation (MnDOT), and the US Army Corps of Engineers (COE).

1.6.1 City of St. Louis Park

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. To this end, St. Louis Park creates and implements regulatory programs that accomplish these aims. This SWMP serves as the city's guide for operating and maintaining the city's stormwater system. It also maps out the general direction the city will take in planning for the future.

The city intends to continue its implementation of the following water resource-related elements of the St. Louis Park code of ordinances as well as the city's stormwater pollution prevention program, its wetland management plan, and its floodplain district ordinance.

The city requires permits and/or approvals for land use modifications that result in land disturbance (including redevelopment), depending on the type of project. See **Chapter 5** for a complete list of permits and approvals potentially required by the City of St. Louis Park.

The BCWMC and MCWD act as the local government unit (LGU) responsible for administering the wetland conservation act (WCA) in St. Louis Park.

The city is responsible for informing developers and other project applicants regarding the city's requirements. It is their responsibility to comply with BCWMC, MCWD, and other regulatory agencies.

The city is required to meet the conditions of its NPDES MS4 permit and to implement the St. Louis Park Stormwater Pollution Prevention Program (SWPPP). The city continues to actively engage the MPCA and others to keep its permit and implementations up to date regarding technology and regulations.

More information is available at the city's website: www.stlouispark.org.

1.6.2 Watershed Management Organizations

The Metropolitan Surface Water Management Act (Chapter 509, as per the laws of 1982, Minnesota Statute Section 103B.201 to 103B.255, as amended) establishes requirements for watershed management organizations to prepare watershed management plans within the Twin Cities Metropolitan Area. The law requires these plans to focus on the purpose of these organizations, which is to:

- protect, preserve, and responsibly use natural surfaces, groundwater storage, and retention systems;
- minimize public capital expenditures needed to correct flooding and water quality problems;
- identify and plan for means to effectively protect and improve surface and groundwater quality;
- establish more uniform local policies and official controls for surface and groundwater management;
- prevent erosion of soil into surface water systems;
- promote effective groundwater recharge;
- protect and enhance fish and wildlife habitats and water-based recreational facilities; and
- secure other benefits associated with the proper management of surface and ground water.

The city lies within two watershed management organizations, each with its own governing body: the BCWMC and the MCWD, as described below.

1.6.2.1. Bassett Creek Watershed Management Commission (BCWMC)

The BCWMC encompasses land within nine communities: St. Louis Park, Crystal, Golden Valley, Medicine Lake, Minneapolis, Minnetonka, New Hope, Plymouth, and Robbinsdale. The BCWMC's current Watershed Management Plan was adopted by the commission in September 2015. The BCWMC's plan sets the vision and guidelines for managing surface water within its boundaries.

The BCWMC does not issue formal permits. Instead, the member cities must implement the BCWMC's development policies. The BCWMC or its staff sends a letter of approval to each member city, stating that each proposed project meets the requirements of the BCWMC plan. This occurs prior to the city issuing its construction permit or other approval permit. The BCWMC also reviews applications to the MnDNR for public waters work and appropriations permits.

The BCWMC provides leadership and assists member communities with certain water management issues. It also coordinates intercommunity stormwater runoff planning and design. The BCWMC reviews local water management plans for conformance with its goals, policies, and rules and for the sake of intercommunity consistency.

More information is available at the BCWMC website: www.bassettcreekwmo.org.

1.6.2.2. Minnehaha Creek Watershed District (MCWD)

The MCWD consists of 27 cities and 2 townships on the western edge of the Twin Cities area. The MCWD adopted its most recent watershed management plan, the Minnehaha Creek Watershed District Comprehensive Water Resources Management Plan, on January 11, 2018.

The MCWD is a political subdivision created under state law and exists to pursue water resource management purposes set forth in Minnesota Statutes 103B.201 and 103D.201. The mission of MCWD is to collaborate with public and private partners to protect and improve land and water for future generations. As established through the Water Management Plan, MCWD's organizational philosophy recognizes that the natural environment is an integral component of vibrant communities and creates a sense of place, provides vital connections, and enhances social and economic value. This philosophy stems from the MCWD's Balanced Urban Ecology policy. The Balanced Urban Ecology Policy is grounded in the principles of focusing on high priority projects, partnership to pursue watershed management goals, and exercising flexible when considering the needs of its partners. MCWD is especially interested in the partnership with St. Louis Park due to significant, ongoing land use planning and development in the City. Through this Plan cycle, coordination and holistic planning between St. Louis Park and MCWD will continue, to pursue Greenway expansion, regional stormwater management, flood management while leveraging the asset value of St. Louis Park's natural resources to enhance community connections and the built environment.

The MCWD maintains a regulatory program that requires development projects and some redevelopment projects to treat and control the rate of stormwater discharge using a variety of BMPs. Development and water resource-related projects must apply for and receive MCWD permits before work can begin. The City of St. Louis Park assumes sole erosion control permitting responsibility within the MCWD watershed. For projects requiring a permit under the MCWD's rules, a permit must be obtained from the MCWD.

More information is available at the MCWD website: www.minnehahacreek.org.

1.6.3 Metropolitan Council

The Metropolitan Council (Council) provides regional planning and wastewater services (i.e., collection and treatment) for the seven-county metropolitan area. It also reviews and comments on watershed management plans, local water management plans, and local comprehensive land use plans. It also maintains the following programs:

- The Watershed Outlet Monitoring Program (WOMP) with BCWMC
- The Citizen-Assisted Monitoring Program (CAMP)
- The Environmental Information Management System (EIMS)

- The Regional Master Water Supply Plan for the Metropolitan Area

In 2015, the Council adopted the 2040 Water Resources Policy Plan (WRPP) which presents policies and strategies focused on supporting prosperity, livability, equity, sustainability, and stewardship, outcomes identified in Thrive MSP 2040. The WRPP highlights the importance water resources management plays in achieving economic growth, competitiveness, and high quality of life. The WRPP provides regional strategy for balancing demands of growth with the protection and management of our lakes, rivers, streams, wetlands, and groundwater through integrated planning for wastewater, water supply, and surface water management.

More information is available at the Metropolitan Council’s website: www.metrocouncil.org.

1.6.4 Hennepin County

Hennepin County plays a role in surface and groundwater protection and management through implementation of its Natural Resources Strategic Plan (2015 through 2020). Since 2014, the county has taken the lead role in delivering soil and water conservation services throughout the county with all duties and authorities of the Soil and Water Conservation District. The county’s goals, objectives, and strategies include working to protect and restore lakes, rivers, streams, and wetlands; to preserve the health of aquatic ecosystems; to meet applicable standards for fishing and recreation; and to ensure that water supplies are sustainable.

The county offers a variety of programs that provide funding and technical assistance to projects for surface and groundwater protection plans. The county monitors and enforces rules regarding subsurface septic treatment systems (SSTS) and administers a well-sealing, cost-share program.

More information is available at the Hennepin County website: <https://www.hennepin.us>.

1.6.5 Minnesota Department of Natural Resources (MnDNR)

The MnDNR Ecological and Water Resources Division manages water resources through a variety of programs in its water resources, groundwater, floodplain management, and climatology sectors. The MnDNR administers the public waters work permit program, the water appropriation permit program, the dam safety permit program, the aquatic plant management control permit program, and other fishery-related permits.

More information is available at the MnDNR website: www.dnr.state.mn.us.

1.6.6 Minnesota Board of Water and Soil Resources (BWSR)

The BWSR oversees the state’s watershed management organizations (joint powers, county, and watershed district organizations) and the state’s soil and water conservation districts, and it administers rules for WCA and metropolitan-area watershed management.

The BWSR also provides funding to LGUs to deliver soil and water conservation services. Grant funds from the BWSR support and increase the local capacity to implement programs and leverage ongoing partnerships with cities and WMOs.

More information is available at the BWSR website: www.bwsr.state.mn.us.

1.6.7 Minnesota Pollution Control Agency (MPCA)

The MPCA administers the State Discharge System/NPDES Permit Program (e.g., point source discharges of wastewater), the NPDES General Stormwater Permit Program for Construction Activity, the NPDES General Industrial Stormwater Permit Program, the NPDES Phase-I and Phase-II Stormwater MS4 Permit Programs, and the individual sewage treatment system regulations (per Minnesota Rules 7080). The MPCA also reports the state’s “impaired waters” to the U.S. Environmental Protection Agency (EPA) and facilitates the development of total maximum daily load reports and implementation plans.

The MPCA administers and enforces laws relating to pollution of the state’s waters, including groundwater, as well as Section 401 of the Clean Water Act—the Water Quality Certification program, which is primarily administered by the COE. Section 401 certification is required to obtain a federal permit for any activity that will result in a discharge to navigable waters in the United States. Formal applications for 401 certifications must be sent to the MPCA. The MPCA also monitors ambient groundwater quality and administers septic system design and maintenance standards.

More information is available at the MPCA website: www.pca.state.mn.us.

1.6.8 Minnesota Department of Health (MDH)

The MDH is the official state agency responsible for addressing environmental health matters, including groundwater protection. The MDH administers the Well Management Program, the Wellhead Protection Program, and the Safe Drinking Water Act. The MDH also issues fish-consumption advisories. The MDH is responsible for preventing pollution of water supplies to ensure safe drinking water sources and to limit public exposure to contaminants. Through implementation of the federal Safe Drinking Water Act, the MDH conducts the Public Water Supply Program, which allows it to monitor groundwater quality and train water supply system operators. As part of its role in wellhead protection, the MDH developed a guidance document called “Evaluating Proposed Stormwater Infiltration Projects in Drinking Water Supply Management Areas” (MDH, 2016).

More information is available at the MDH website:
<http://www.health.state.mn.us/divs/eh/water/index.html>.

1.6.9 Minnesota Environmental Quality Board (EQB)

The EQB is made up of nine agency heads from the departments of administration, agriculture, commerce, employment and economic development, health, natural resources, transportation, the BWSR, and the MPCA, and as well as citizen members. The agency

provides leadership and coordination across agencies on priority environmental issues that are multijurisdictional and multidimensional as well as opportunities for public access and engagement through the state’s environmental review program including environmental assessment worksheets (EAWs) and environmental impact statements (EISs).

More information is available at the EQB website: www.eqb.state.mn.us.

1.6.10 Minnesota Department of Transportation (MnDOT)

As part of the 2003 and subsequent NPDES permits, the MnDOT metro district was required to develop and implement a SWPPP to reduce the discharge of pollutants from the storm sewer system to the maximum extent practicable.

The primary goal of MnDOT is to develop and implement its SWPPP program so that it is consistent with other permitted entities and to ensure uniform regulatory environments for the public. Any work done on or affecting MnDOT property must be approved by MnDOT.

More information is available at the MnDOT website: <http://www.dot.state.mn.us>.

1.6.11 U.S. Army Corps of Engineers (COE)

The COE administers the Section 10 of the Rivers and Harbors Act and Sections 401 and 404 of the Federal Clean Water Act Permit Program and the Section 404 Permit Program.

Section 404: Authorizations. The Federal Clean Water Act requires that anyone who wants to discharge dredged or fill material into U.S. waters, including wetlands, must first obtain a Section 404 permit from the COE. Examples of activities that require a Section 404 permit include construction of boat ramps, placement of riprap for erosion protection, placing fill in a wetland, building a wetland, construction of dams or dikes, stream channelization, and stream diversion.

When Section 404 permit applications are submitted to the COE, the applications are typically posted to the U.S. Fish and Wildlife Service, the U.S. Forest Service, the EPA, and other federal agencies to review and provide comments on the application. The COE evaluates permit requests for the potential impact to various functions and values of the wetland.

Section 401: Water Quality Certifications. A Section 401 water quality certification may be granted if an applicant demonstrates that a proposed activity “will not violate Minnesota’s water quality standards or result in adverse long-term or short-term impacts on water quality.” Greater protection is given to a category of waters designated as “outstanding resource value waters.” The waters in this category have received this designation because of their exceptional value. These include scientific and natural areas; wild, scenic, and recreational river segments; and calcareous fens.

More information is available at the COE website: www.usace.army.mil.

Chapter 2.0 Physical Environment and Land Use

City of St. Louis Park Surface Water Management Plan

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Chapter 2.0 Physical Environment and Land Use

This chapter of the SWMP provides a technical description of the City of St. Louis Park and its water resources. General concepts and data related to climate and precipitation, topography, soils, geology, and land use are discussed. In addition, the following water resources data are discussed: surface water resources, stormwater systems, wildlife habitat, pollutant sources, water quality and quantity and groundwater resources

Having a complete understanding of the physical environment helps identify management issues, resolve problems, and provides the basis for the city’s goals, policies, and implementation strategies.

2.1 Climate and Precipitation

Because of its location near the center of the North American continent, St. Louis Park (and Minnesota at large) has a continental climate, meaning that it experiences a wide variation in climate conditions (e.g., droughts, floods, heat, and cold).

The mean annual temperature for St. Louis Park is 46.8°F, as measured at the Minneapolis-St. Paul (MSP) airport (1987–2017). Mean monthly temperatures vary from 16.3°F in January to 74.1°F in July (1987–2017). Extreme temperatures on record include a high of 105°F on July 31, 1988, and a low of -32°F on February 2, 1996. For the period of 1987–2017, the average date for the latest occurrence of freezing temperatures is April 25, whereas the average date for the first autumn frost is October 12. The average frost-free period (growing season) is 170 days. **Table 2-1** summarizes precipitation data measured at the MSP airport. Average total annual precipitation (1987–2017) is 32.0 inches and has ranged from a low of 19.9 inches in 1988 to a high of 40.3 inches in 2016. The mean monthly precipitation (1987–2017) varies from 0.83 inches in February to 4.69 inches in July. From May to September, the growing season months, the average rainfall (1987–2017) is 20.15 inches, or about 63 percent of the average annual precipitation. Average annual evapotranspiration is 34.6 inches (1987–2017). Table 2-1 and Figure 2-2 show the average monthly precipitation measured at the MSP airport. Figure 2-1 shows the average monthly maximum and minimum temperatures measured at the MSP airport.

Table 2-1: Precipitation Summary—Minneapolis-St. Paul Airport

| Month | Total Precipitation (Inches) | | | | Snow (Inches) | |
|-------|------------------------------|--------------|--------------|-------------------|---------------|--------------|
| | Mean | Max. Year | Min. Year | One-day Max | Mean | Max Year |
| Jan. | 0.84 | 2.39 1996 | 0.12 1990 | 0.90 1/17/1990 | 10.2 | 33.3 1999 |
| Feb. | 0.83 | 2.11 2012 | 0.03 1987 | 0.85 2/20/2011 | 8.6 | 19.7 2004 |
| Mar. | 1.77 | 3.88 1990 | 0.41 1994 | 1.52 3/27/1998 | 8.8 | 22.7 1989 |

Chapter 2.0 Physical Environment and Land Use

| Month | Total Precipitation (Inches) | | | | Snow (Inches) | |
|-----------------|------------------------------|---------------|---------------|--------------------|---------------|-----------------|
| | Mean | Max. Year | Min. Year | One-day Max | Mean | Max Year |
| Apr. | 2.86 | 6.99 2001 | 0.15 1987 | 2.59 4/6/2006 | 3.1 | 20.2 2002 |
| May | 3.57 | 9.17 2012 | 0.15 1987 | 2.58 5/24/2012 | 0.0 | 0.5 2013 |
| Jun. | 4.65 | 11.02 2014 | 0.13 1988 | 4.13 6/19/2014 | 0.0 | N/A |
| Jul. | 4.69 | 13.98 1987 | 1.07 1988 | 9.15 7/23/1987 | 0.0 | N/A |
| Aug. | 4.17 | 10.11 2016 | 0.35 2003 | 3.19 8/19/1997 | 0.0 | N/A |
| Sep. | 3.07 | 8.43 1991 | 0.95 2011 | 2.59 9/15/1992 | 0.0 | N/A |
| Oct. | 2.5 | 5.95 2009 | 0.55 1999 | 4.61 10/4/2005 | 0.9 | 8.2 1991 |
| Nov. | 1.77 | 5.45 1996 | 0.08 2002 | 1.85 11/1/1991 | 7.3 | 46.9 1991 |
| Dec. | 1.24 | 3.28 2010 | 0.28 1997 | 1.16 12/11/2010 | 11.5 | 33.6 2011 |
| Annual | 31.98 | 41.65 2016 | 19.93 1988 | 9.15 7/23/1987 | 49.0 | 86.6 2010–11 |
| May–Sep. | 20.15 | 28.02 2002 | 10.09 1996 | 9.15 7/23/1987 | 0.0 | N/A |

Source: Minnesota DNR Climate Data, https://www.dnr.state.mn.us/climate/historical/acis_stn_meta.html

Figure 2-1: Average Monthly High and Low Temperatures at Minneapolis-St. Paul International Airport (1987–2017)

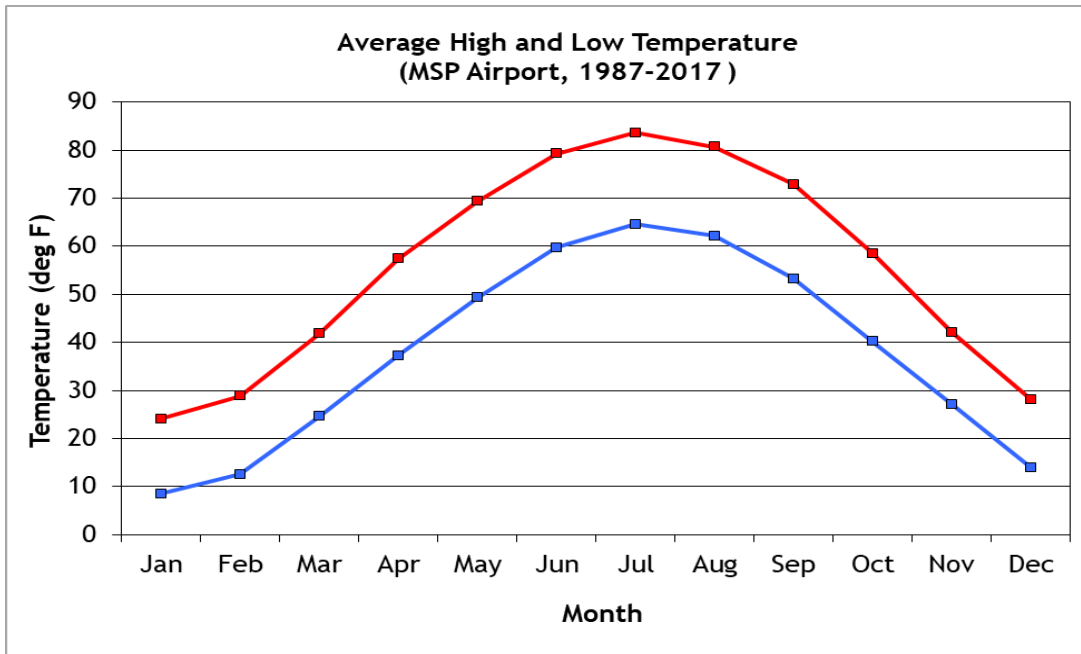
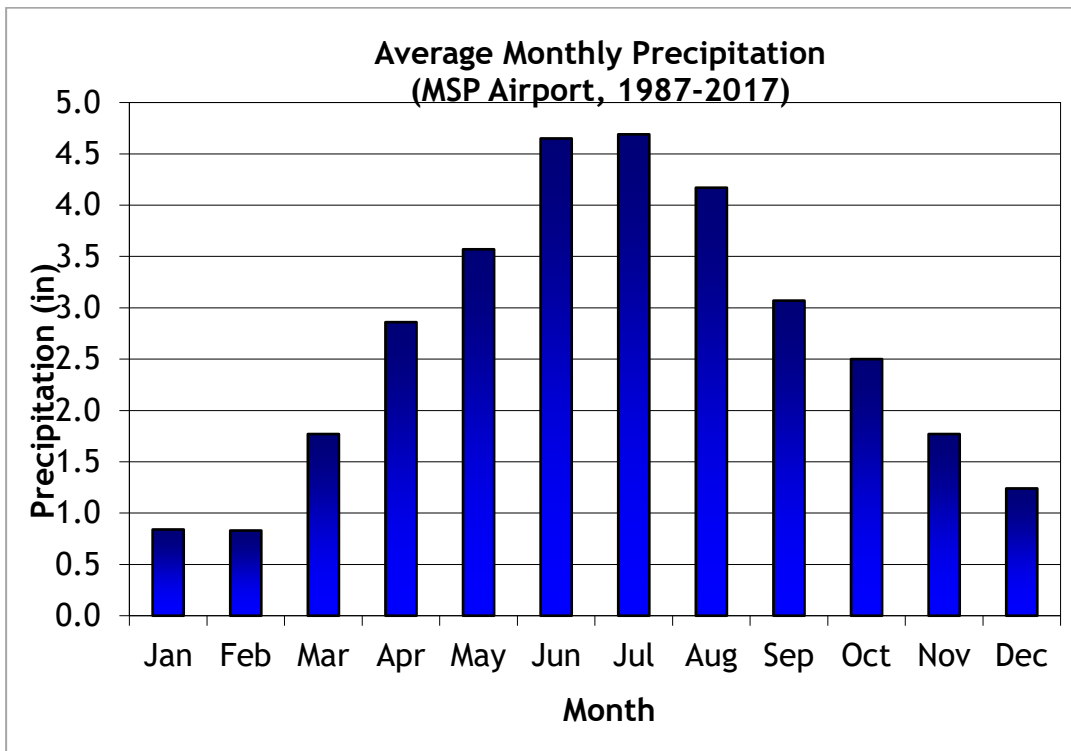


Figure 2-2: Average Monthly Precipitation for Minneapolis-St. Paul International Airport (1987–2017)



Average annual snowfall (1987–2017) is 49.0 inches at the MSP airport. Extreme snowfall records range from 86.6 inches during the 2010–2011 season to 17.4 inches at MSP during the 1986–1987 season.

The amount, rate, and type of precipitation are important in determining flood levels and stormwater runoff rates, all of which impact water resources. In urbanized watersheds, shorter-duration events tend to play larger roles in predicting high water levels in basins. Shorter-duration events are generally used by hydrologists to study local issues (e.g., sizing catch basins, storm sewer pipes.). Longer-duration events are generally used by hydrologists to study regional issues such as predicting high water levels for regional basins and basins that have no outlets (i.e., landlocked basins) or those that have small outlets relative to their watershed size.

Extremes of precipitation and snowmelt are important for design of flood control systems. The National Weather Service has data on extreme precipitation events that can be used to aid in the design of flood control systems. Extremes of snowmelt and rainstorms that occur with snowmelt in early spring most often affect major rivers, the design of large stormwater storage areas, and landlocked basins. Extremes of precipitation most often affect the design of conveyance facilities.

In contrast with stormwater drainage facilities, stormwater quality treatment systems are designed based on the smaller, more frequent storms. These more frequent storms account for most of the annual pollutant loadings from urban watersheds. Analysis of National Weather Service rainfall data (1987–2017) from the MSP station found that almost 95 percent of storms produced one inch or less of rainfall.

Technical Paper 40 (TP-40), which was developed by the National Oceanic and Atmospheric Administration (NOAA) and initially published in 1961, was the key document used by hydrologists and designers of hydraulic structures (e.g., storm sewer infrastructure, detention ponds, etc.). TP-40 was developed using less recorded precipitation data, with a smaller time range and fewer precipitation stations. A recent increase in large storm events had scientists questioning if the document was underprojecting rainfall depths, so an updated document was developed. NOAA Atlas 14 Volume 8 (commonly known as Atlas 14) was developed by the Hydrometeorological Design Studies Center within the Office of Hydrologic Development of the NOAA's National Weather Service (Perica et al. 2013). Atlas 14 used denser precipitation data networks than the previous document had as well as a greater period of record, new statistical approaches, and new spatial interpolation and mapping techniques to develop new precipitation frequency estimates. Atlas 14 is now the primary source of precipitation information in the Midwest. See Table 2-2 for the Atlas 14 rainfall depths used in St. Louis Park.

Table 2-2: Atlas 14 Rainfall Depths for City of St. Louis Park, MN

| Storm Event | Depth, inches |
|------------------------------------------|---------------|
| 50% annual probability (2-year) 24-hour | 2.9 |
| 10% annual probability (10-year) 24-hour | 4.3 |
| 1% annual probability (100-year) 24-hour | 7.4 |

Climate information can be obtained from a number of sources, including the following sites:

- For climate information about the Twin Cities metropolitan area:
https://www.dnr.state.mn.us/climate/twin_cities/index.html
- For a wide range of Minnesota climate information: <http://climateapps.dnr.state.mn.us>
- For additional Minnesota climate information:
<https://www.dnr.state.mn.us/climate/index.html>

2.2 Topography

The area of St. Louis Park that is north of Minnetonka Boulevard is characterized by rolling uplands with intermittent ponds and wetlands. Areas in the southern portion of the city have nearly level and gently rolling topography. Some relatively large, flat areas are present along Minnehaha Creek. Figure 2-3 shows the areas of the city with slopes greater than 12 percent.

The elevations generally vary from 880 to 990 feet throughout the city. The highest point in the city is located at the Westwood Hills Nature Center, whereas the lowest area is located at the Bass Lake basin. The City of St. Louis Park has two-foot contour data coverage for the entire city. The contours were created based on LiDAR data of Twin Cities Metropolitan area, which was collected in 2011.

2.3 Soils

Soils information for the City of St. Louis Park is available in the Hennepin County Soil Survey (USDA-NRCS, 2004), which includes information concerning the classification of soils within St. Louis Park.

The infiltration capacities of soils affect the amount of direct runoff resulting from rainfall. The higher the infiltration rate for a given area of soil, the lower the potential for runoff from the land. Conversely, soils with low infiltration rates produce high runoff volumes and high peak discharge rates. Hydrologic grouping symbols A through D established by the Soil Conservation Service (now called the Natural Resources Conservation Service or NRCS) represent soils with high to low infiltration rates, respectively. The combination of these hydrologic groupings and land use are used to estimate the amount of runoff that will occur over a given area for a

particular rainfall amount. As land is developed for urban use, much of the soil is covered with impervious surfaces, and soils in the remaining areas are significantly disturbed and altered. Development often results in the consolidation of the soil and tends to reduce the infiltration capacities of otherwise permeable soils, resulting in significantly greater amounts of runoff.

Figure 2-4 shows the soils in St. Louis Park by hydrologic soil group. However, because of significant urban development, much of the city is categorized as having “undefined/urban soil.” The map intends to provide general guidance about the infiltration capacities of the soils throughout St. Louis Park. Soils and their respective infiltration capacity should be confirmed on a site-by-site and project-by-project basis.

2.4 Geology

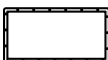




St. Louis Park is in the east central portion of Hennepin County. The general geology of Hennepin County, including St. Louis Park, has been studied, and the results are outlined in the *Geologic Atlas of Hennepin County, Minnesota* (Minnesota Geological Survey [MGS] Atlas C-4, 1992).

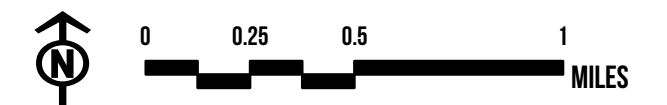
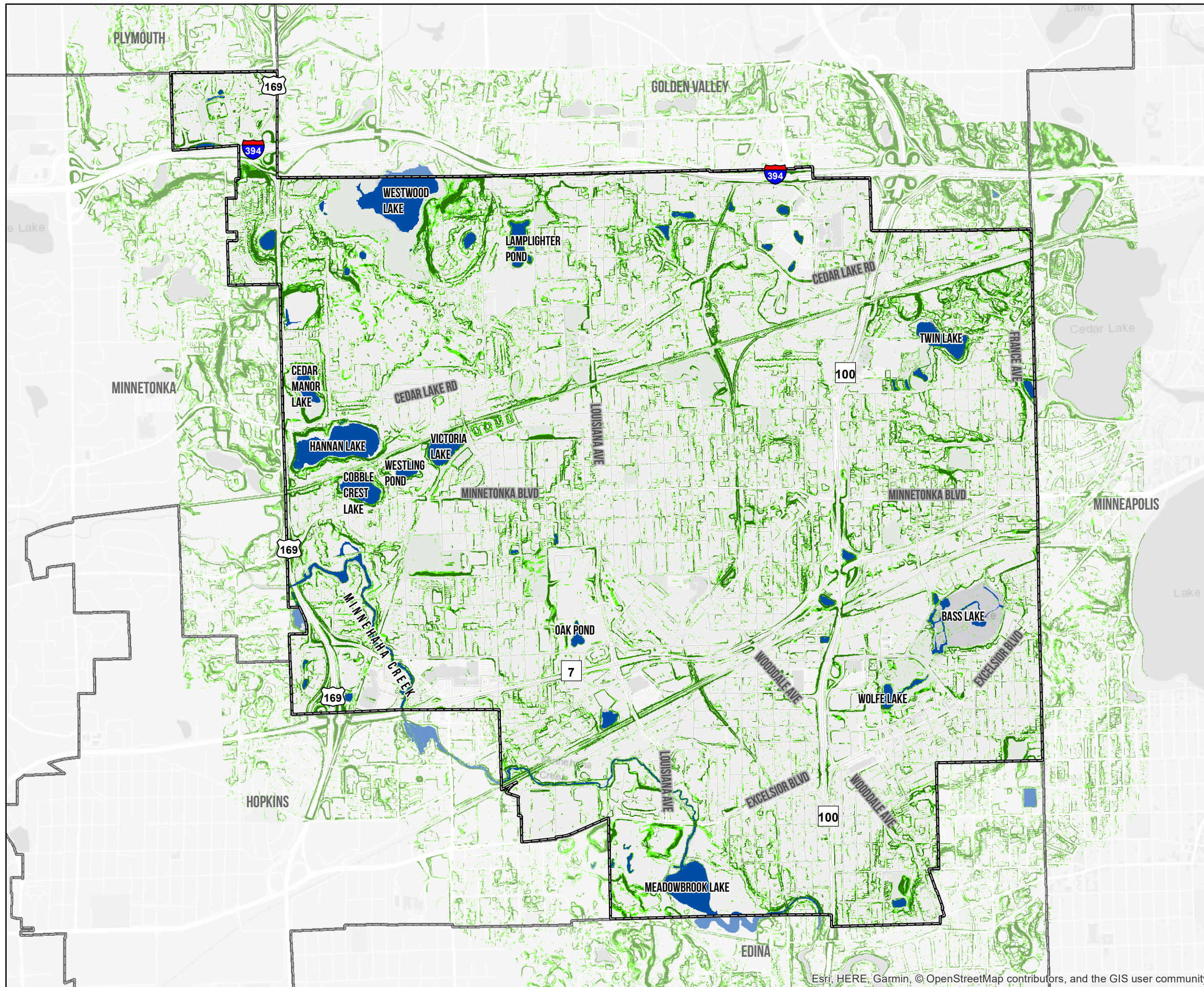
St. Louis Park is located in the Twin Cities structural basin. The bedrock beneath the city consists of Paleozoic sedimentary rocks that dip gently to the southeast. The uppermost bedrock unit for most of the city is Platteville Limestone and St. Peter Sandstone for the rest of the city. There are also a few buried valleys where the Prairie du Chien group comprises the top layer. The Plattville Formation is dominantly limestone and dolostone. The Glenwood Formation is dominantly shale. Together, they are as much as 34 feet thick, but generally the thickness is less than that because the upper part of the Platteville Formation is usually eroded at the uppermost bedrock unit. The St. Peter Sandstone is generally 145 to 155 feet thick in the Twin Cities where it is overlain by the Glenwood and Platteville Formations. The Prairie du Chien group is generally between 125 to 140 feet thick in the middle of the Twin Cities basin, where it is covered by St. Peter Sandstone. An MGS map entitled “Bedrock Geology of the Twin Cities Ten-County Metropolitan Area, Minnesota” further describes these bedrock layers.

The bedrock elevations in the area can vary, depending on the type, from 750 to 800 feet. The surficial geology of the city is comprised of a sand, loamy sand, and gravel outwash, which ranges in depth from 50 to 200 feet.

**FIGURE 2-3: SLOPES
GREATER THAN TWELVE PERCENT**

LEGEND

-  City Boundary
-  Slope Less than 12%
-  Slope Between 12% and 18%
-  Slope Greater than 18%
-  Lakes

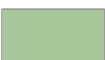
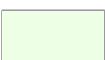
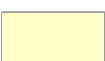



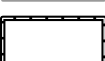



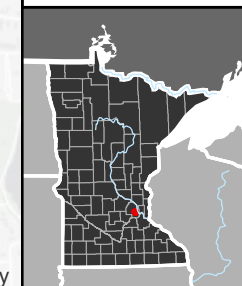
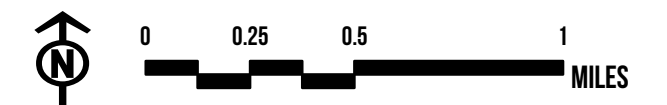
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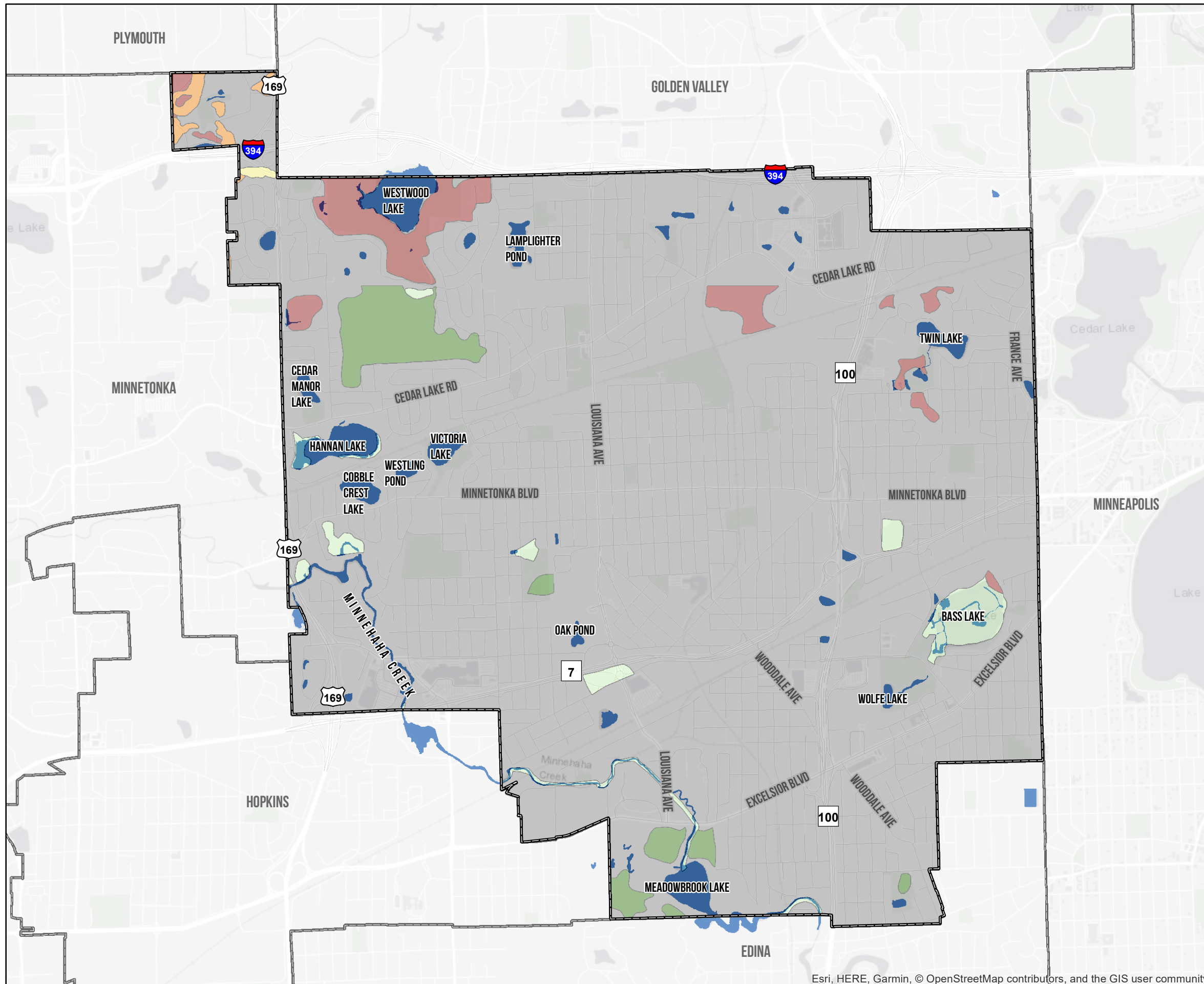
**FIGURE 2-4:
HYDROLOGIC SOIL GROUPS**

LEGEND

-  A - High Infiltration Rate
-  A/D - High Infiltration Rate (if drainage system in place)
-  B - Moderate Infiltration Rate
-  C - Slow Infiltration Rate
-  C/D - Slow/Very Slow Infiltration Rate
-  Undefined/Urban Soils
-  City Boundary
-  Lakes



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2.5 Groundwater

This section summarizes the finding of the city's 2015 Part-1 Wellhead Protection Plan Update.

The growing population in the Twin Cities metropolitan area has put increased pressure on groundwater supplies. Increased impervious surfaces also reduce the amount of groundwater recharge. The City of St. Louis Park obtains its entire water supply from nine primary groundwater wells and one emergency backup well. The wells draw water from the Prairie du Chien, Mount Simon, and Jordan aquifer formations. Municipal Wells 4, 8, and 10 are multiaquifer wells, open to both the Prairie du Chien and Jordan aquifers. Wells 14, 15, and 16 are completed in the Jordan sandstone, and Wells 11, 12, and 13 are open to the Mount Simon aquifer. Well 6, the emergency well, is open to both the Prairie du Chien and Jordan aquifers. The city has no immediate plans to replace or add municipal wells or utilize any other sources of water supply because existing groundwater wells appear to adequately meet the city's current and projected water demands.

The MDH is responsible for the protection of groundwater supplies and aims to prevent contaminants from entering the recharge zones of public water supply wells. This can result in the restriction of certain stormwater best management practices (BMPs) for areas with high potential vulnerability to protect groundwater supplies.

The MDH Source Water Protection Vulnerability rating for St. Louis Park's municipal wells determine that Wells 8, 11, 12, and 13 are not vulnerable to contaminants from land and water use. Wells 4, 6, 10, 14, 15, and 16 were found to be vulnerable because the well water either had a detection of tritium, or a nearby well within the same aquifer had a detection of tritium. The overall quality of groundwater in St. Louis Park is good. No contaminants were detected at levels that violated federal drinking water standards. Some contaminants were detected in trace amounts, but these were below legal limits.

Figure 2-5 shows groundwater sensitivity areas within St. Louis Park. More information about the wellhead protection area delineation and the well and drinking water supply management area (DWSMA) vulnerability assessments can be found in the City of St. Louis Park Part I Wellhead Protection Plan Update (Source Water Solutions, LLC, February 2015) and in **Appendix C**.

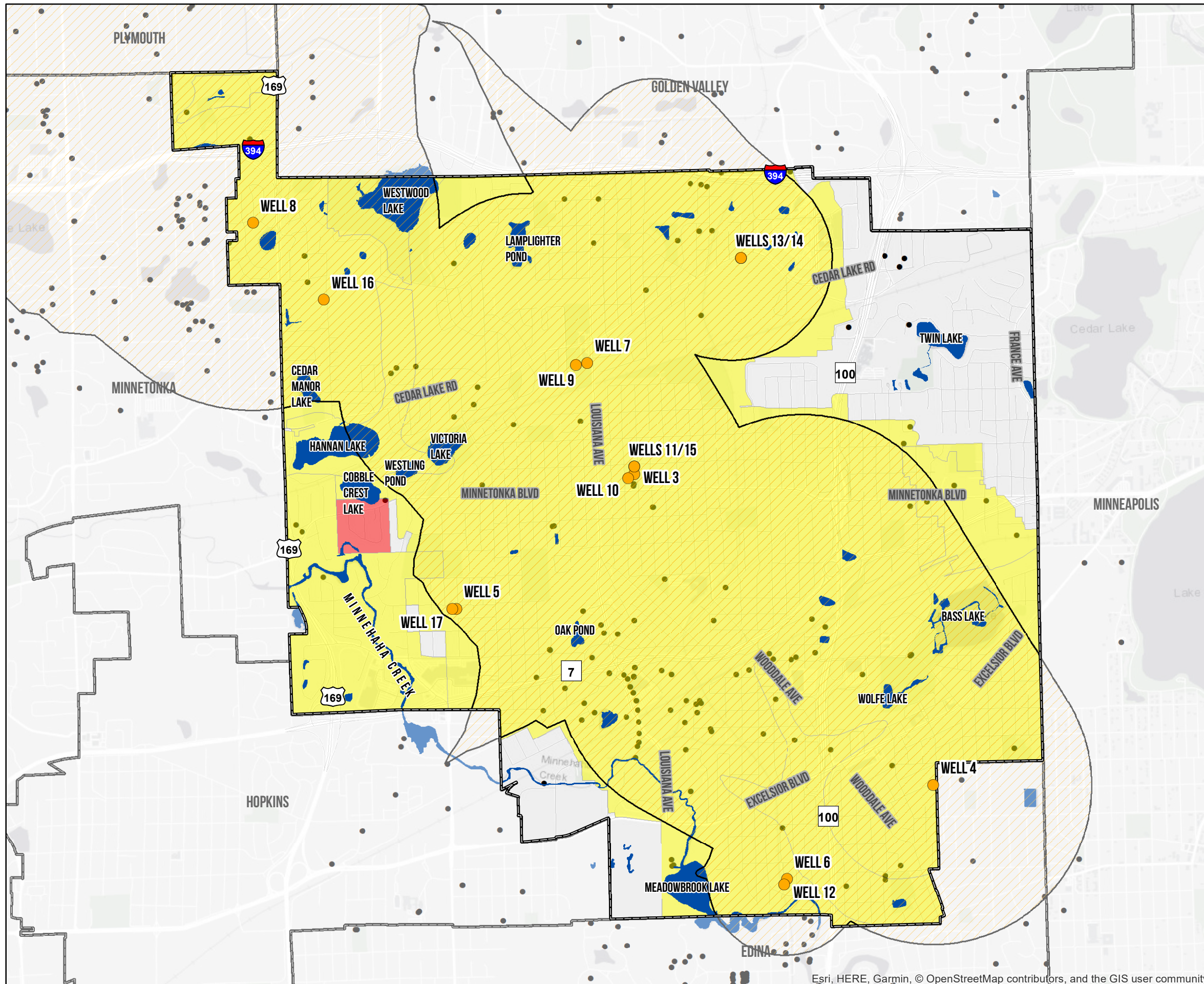
FIGURE 2-5: GROUNDWATER SENSITIVITY TO POLLUTION

LEGEND

- Municipal Wells
 - Private Wells
- DWSMA Vulnerability**
- High
 - Moderate
 - Low
 - City Boundary
 - Lakes



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2.6 Surface Water System

St. Louis Park’s surface water system consists of a combination of natural lakes, ponds, wetlands, and a creek, along with stormwater infrastructure, open channels, and constructed ponds.

2.6.1 Public Waters

The MnDNR designates certain water resources as public waters to indicate those lakes, wetlands, and watercourses over which the MnDNR has regulatory authority. By statute, the definition of public waters includes “public waters” and “public wetlands.” Public wetlands include all type-3, -4, and -5 wetlands (as defined by the U.S. Fish and Wildlife Service) that are 2.5 acres or more in size in incorporated areas.

The MnDNR uses county-scale maps to show the general location of public waters and wetlands under its regulatory authority. These maps are commonly known as public waters inventory (PWI) maps. The regulatory boundaries of these waters and wetlands are called ordinary high-water level (OHWL). PWI maps are available on a county-by-county basis. Additionally, county-by-county lists of these waters are available in tabular form.

The PWI maps and lists are available on the MnDNR Public Waters Inventory webpage: www.dnr.state.mn.us/waters/watermgmt_section/pwi/maps.html.

Public waters are identified with a number and the letter P. Public wetlands are identified with a number and the letter W. Table 2-3 summarizes the MnDNR public waters in St. Louis Park along with the associated OHWL, in cases where they are known. Figure 2-6 shows the location of PWI waterbodies and watercourses within the City of St. Louis Park.

Table 2-3: MnDNR Public Waters in St. Louis Park

| Waterbody Name | MnDNR Public Waters Number | OHWL (feet) ¹ |
|------------------------|----------------------------|--------------------------|
| <i>Public Waters</i> | | |
| Westwood | 27071100 | 887.8 |
| Unnamed (Kilmer) | 27072700 | NA |
| Hannan | 27005200 | NA |
| Unnamed (Cobblecrest) | 27005300 | NA |
| Victoria | 27005100 | NA |
| Lamplighter Park | 27071000 | NA |
| Unnamed (Oak Pond) | 27066000 | NA |
| Twin | 27065600 | 871.3 |
| Unnamed (Quentin Pond) | 27065700 | 871.3 |
| Bass | 27001500 | NA |

¹ National Geodetic Vertical Datum or NGVD, 1929











Chapter 2.0 Physical Environment and Land Use

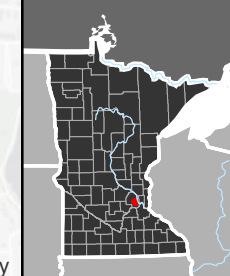
| Waterbody Name | MnDNR Public Waters Number | OHWL (feet) ¹ |
|-----------------------------------|----------------------------|--------------------------|
| Wolfe Park | 27066400 | 872.9 |
| Meadowbrook | 27005400 | NA |
| <i>Public Wetlands</i> | | |
| Unnamed (Shelard Pond) | 27073000 | NA |
| Unnamed (Crestview Wetland) | 27071200 | NA |
| Unnamed (Cedar Manor) | 27071300 | 899.1 |
| Unnamed (Westling Pong) | 27071400 | NA |
| Unnamed (Minnehaha Creek Wetland) | 27071500 | NA |
| Unnamed (Cedar Lake Road Wetland) | 270108700 | NA |
| Unnamed (Cedar Lake Road Wetland) | 27065800 | NA |
| Unnamed (Triangle Wetland) | 27065900 | NA |
| Unnamed (South Oak) | 27066100 | NA |
| Unnamed (Methodist Wetland) | 27066200 | NA |
| Unnamed (Excelsior Wetland) | 27066300 | NA |
| <i>Public Watercourses</i> | | |
| Minnehaha Creek | 27003600 | NA |

Source: DNR Lake Finder Website

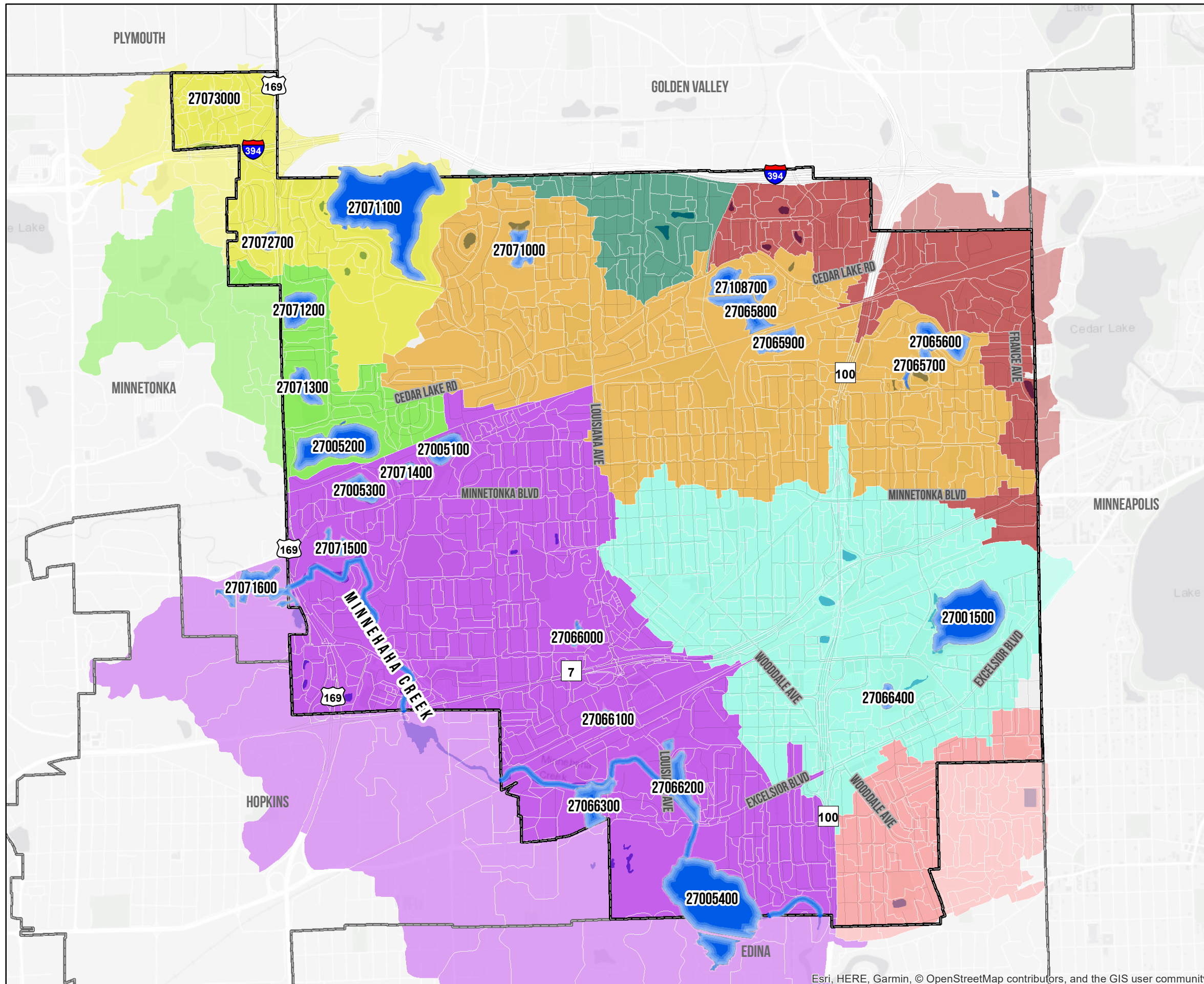
FIGURE 2-6: PUBLIC WATERS INVENTORY (PWI)

LEGEND

-  Minnesota Public Waters
-  01-Westwood Lake District (740 acres)
-  02-Golden Valley District (219 acres)
-  03-Hannan Lake District (605 acres)
-  04-Minnehaha Creek District (3,783 acres)
-  05-Twin Lake District (1,636 acres)
-  06-Minneapolis District (649 acres)
-  07-Bass Lake District (1,362 acres)
-  08-Edina District (497 acres)
-  City Boundary



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2.6.2 Public Ditches

Judicial ditches and county ditches are public drainage systems established under Chapter 103E of Minnesota Statutes and are under the jurisdiction of the county or a WMO. Judicial ditches and county ditches within St. Louis Park include county ditches 14, 17, and 29, which are located in the MCWD, and judicial ditch 6, which is located in the BCWMC watershed. The authority for the ditches within the MCWD was transferred from Hennepin County to the MCWD, which is now responsible for the maintenance of these ditches, while ditches within the BCWMC remain under the authority of Hennepin County.

County Ditch #14: This ditch was established prior to 1908 and originally connected a wetland northwest of Bass Lake to Bass Lake. It then traveled out of Bass Lake to the east and flowed to the southwest corner of Bde Maka Ska. The portion of the ditch that exists within St. Louis Park has been converted into a storm sewer.

County Ditch #17: This ditch was established in 1908 and was intended to drain a large wetland complex in St. Louis Park, Minneapolis, and Edina. The alignment extends from what is now the intersection of Morningside and Browndale to the outlet of Bde Maka Ska around 37th Street. It has been entirely converted into a storm sewer that does not follow the exact path of the ditch but receives drainage from the same area.









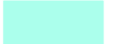


County Ditch #29: This ditch begins around Minnetonka Boulevard and Highway 100 and runs east to its end near the railroad tracks. The ditch has been completely converted into a storm sewer that generally follows the alignment of the former ditch.

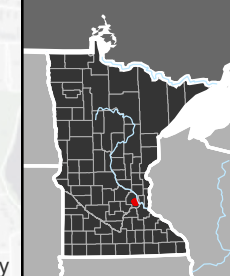
Judicial Ditch #6: This ditch began in the City of St. Louis Park and drained areas on the east side of Westwood Lake and the area between Lamplighter Pond and the railroad. This system drained to the north into Golden Valley and Bassett Creek. This ditch has been completely converted into a storm sewer that no longer follows the alignment of the original ditch system. Much of this system now drains to the south and eventually discharges to Minnehaha Creek.

Figure 2-7 shows the location of public (judicial and county) ditches within the City of St. Louis Park.

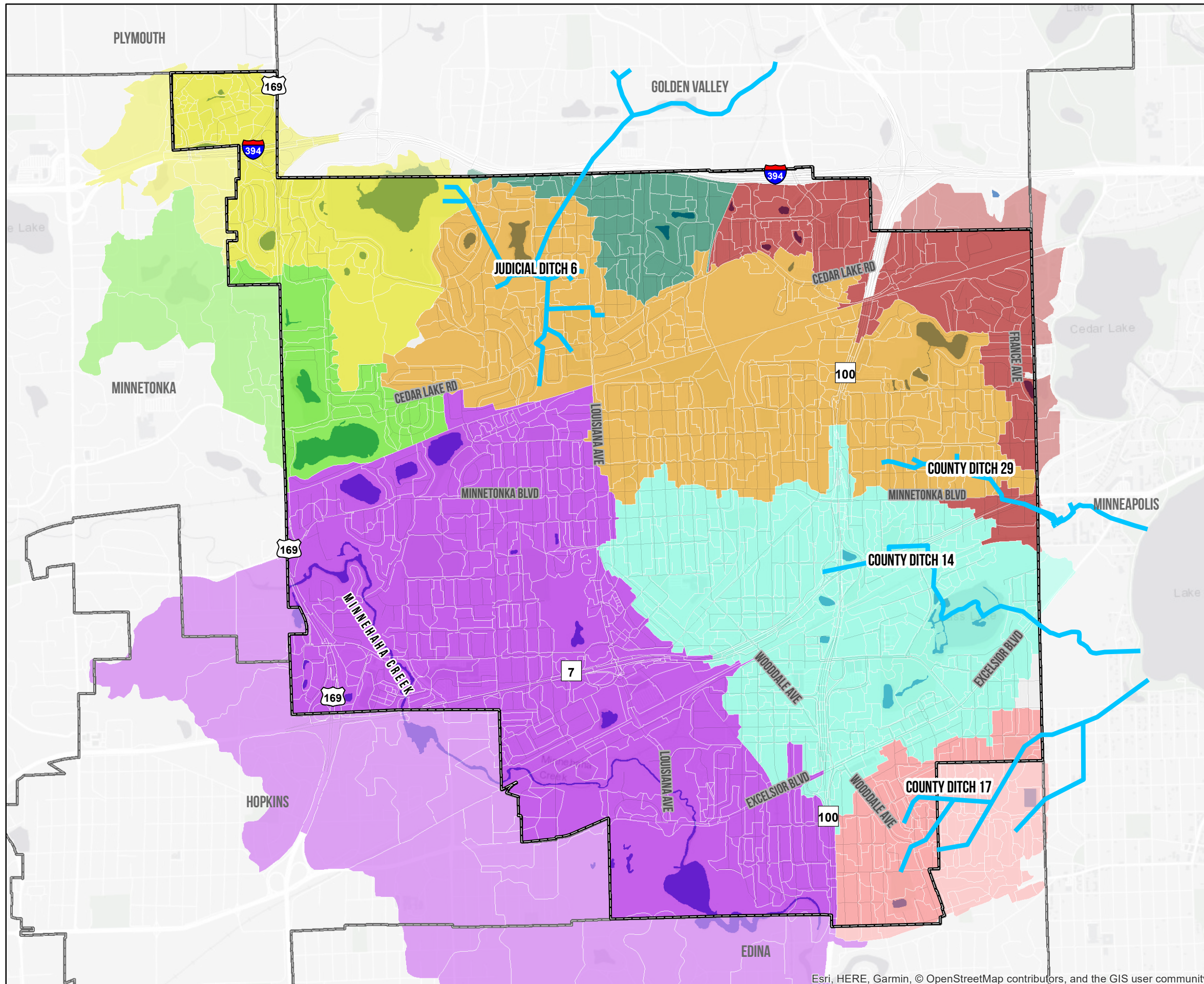
**FIGURE 2-7:
PUBLIC DITCHES**

LEGEND

-  Public Ditches
-  Minnesota Public Waters
-  01-Westwood Lake District (740 acres)
-  02-Golden Valley District (219 acres)
-  03-Hannan Lake District (605 acres)
-  04-Minnehaha Creek District (3,783 acres)
-  05-Twin Lake District (1,636 acres)
-  06-Minneapolis District (649 acres)
-  07-Bass Lake District (1,362 acres)
-  08-Edina District (497 acres)
-  City Boundary



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2.6.3 Streams

Minnehaha Creek is the primary stream within the city. The mainstem of the creek enters St. Louis Park from the west, just south of the intersection of Highway 169 and Minnetonka Boulevard. It flows through the southwest portion of the city before passing through Meadowbrook Lake and entering the City of Edina. Approximately 3.3 stream miles of Minnehaha Creek flow through St. Louis Park. Minnehaha Creek ultimately drains into the Mississippi River.

2.6.4 Wetlands

In 2001, WSB & Associates, Inc. developed a Wetland Management Plan (WMP) for St. Louis Park. The WMP provides a way for the city to manage its wetlands and ensure that wetlands are considered during development review and city-wide planning to balance protection of wetlands with the development and growth of the city.

Wetlands in the city are inventoried and classified into two management categories according to the function and value of the wetlands: Manage I and Manage II. Typically, Manage I wetlands are higher-quality wetlands, wetlands that serve a specific purpose, or wetlands located primarily on public lands. All other wetlands are classified as Manage II.

Management standards based on the wetland classifications were also developed. Most of the wetlands in St. Louis Park are subject to the WCA. MCWD, BCWMC, and MnDOT are LGUs under the WCA, which means they are the permitting authority for any draining or filling of wetlands.









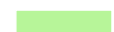



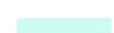
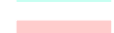


More information about wetland policies and issues can be found in the City of St. Louis Park Wetland Management Plan (City of St. Louis Park (WSB), 2001) and is also in **Appendix D**.

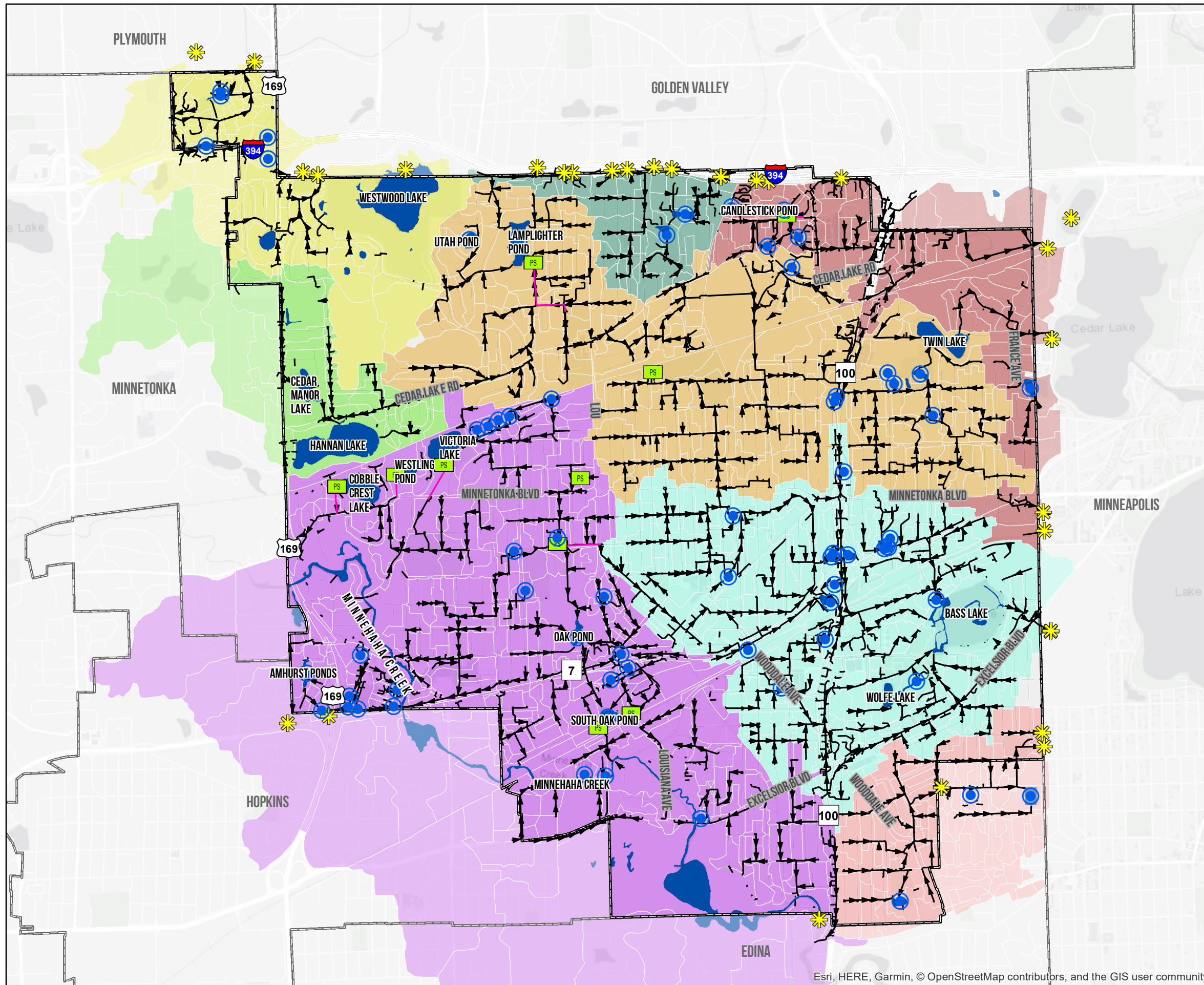
2.7 Stormwater System

The St. Louis Park stormwater system consists of approximately 110 miles of underground pipe that range in size from 12 in. to 102 in., 11 stormwater lift stations, 22 lakes and ponds, and over 3,000 catch basins. Ninety percent of the city streets are serviced by curbs and gutters. The City is developing and maintains a GIS geodatabase of storm sewer coverage for the entire city. This process includes obtaining manhole, catch basin, and pipe information for the entire city. Figure 2-8 shows the city's surface and stormwater systems.



FIGURE 2-8: SURFACE WATER SYSTEM

LEGEND

-  Intercommunity Flow Locations
 -  Stormwater BMPs and Wet Ponds
 -  Stormwater Lift Stations
 -  Stormwater Discharge Points
 -  Storm Mains (Gravity)
 -  Storm Mains (Pressure)
 -  01-Westwood Lake District (740 acres)
 -  02-Golden Valley District (219 acres)
 -  03-Hannan Lake District (605 acres)
 -  04-Minnehaa Creek District (3,783 acres)
 -  05-Twin Lake District (1,636 acres)
 -  06-Minneapolis District (649 acres)
 -  07-Bass Lake District (1,362 acres)
 -  08-Edina District (497 acres)
 -  City Boundary
-  0 0.25 0.5 1 MILES



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2.8 Watersheds and Drainage Patterns

The natural drainage pattern for the City of St. Louis Park is fairly well-defined. There are two major watersheds within the city, Minnehaha Creek and Bassett Creek. These two watersheds are shown on Figure 2-9. Each of these watersheds are an active watershed management organization, as previously discussed.

These two major watersheds are subdivided into eleven drainage districts, based on the city's regional lakes, which are then further subdivided into smaller catchments (Figure 2-9). Figure 2-10 shows the major watersheds, drainage districts, developed during the most previous 2009 update to the surface water management plan, and based on surface drainage patterns, and major waterbodies in the city.

In addition to these internal drainage districts, the city receives and discharges runoff from neighboring communities (Minnetonka, Plymouth, Edina, Minneapolis), including MnDOT right-of-way (I-394, TH 5, TH 7, TH 100, and TH 169).

As part of this SWMP update, the drainage district boundaries have been updated based on newly available data, including the MnDNR LiDAR data for Hennepin County and recent topographic surveys by city staff.

2.8.1 Bass Lake Drainage District

The Bass Lake drainage district is a 1,362-acre watershed on the east side of the City, bounded by the Twin Lake district to the north and the Minnehaha Creek district to the west. It receives stormwater runoff from TH 100 and CP Railway corridors that bisect the watershed. Major water features include Bass Lake, Wolfe Pond, Cattail Pond, remnants of County Ditch 14, and several MnDOT stormwater ponds. The drainage district ultimately discharges to the City of Minneapolis via the Bass Lake outlet and storm sewer systems (County Ditch 14). The Bass Lake drainage district is connected to the Minnehaha Creek district by the stormwater lift station on Oregon Avenue. It also receives flow from the Twin Lake district via a 30-in RCP at Colorado Ave and Minnetonka Blvd.

Known flood-prone areas include: Problem Area 15 (SW corner of Brunswick Ave and 33rd St), Beltline Blvd & 35th St, 4725 Hwy 7, Bass Lake, City Hall, Cattail Pond.

2.8.2 Edina Drainage District

The Edina drainage district is a 497-acre watershed located in the southeast corner of the City, with roughly half the watershed located in the City of Edina. It is bounded to the north by the Bass Lake drainage district and the west by the Minnehaha Creek drainage district. It is primarily residential with several parks. Major water features include Browndale Pond and Weber Pond in the City of Edina and remnants of County Ditch 17. Stormwater enters the storm sewer system and the City of Edina at Yale Gardens Park, flows through the City of Edina's storm sewer (County Ditch 17) to Weber Pond and is outlet back into the City of St. Louis Park at Minikada Vista Park.

Known flood-prone areas include: Browndale Park and Morningside Road.

2.8.3 Golden Valley Drainage District

The Golden Valley watershed discharges to MnDOT right-of-way, storm sewer and to the City of Golden Valley. It is a 219-acre watershed comprising of primarily residential and commercial land uses, bounded by I-394 to the north and the Canadian Pacific (CP) Railway corridor to the east. Major water features in this drainage district include Otten Pond and Hampshire Pond and remnants of Judicial Ditch 6.

Known flood-prone areas include: Otten Pond

2.8.4 Hannan Lake Drainage District

The Hannan Lake drainage district is a 605-acre watershed which includes direct runoff from the City of Minnetonka and MnDOT right-of-way. This watershed is bounded by the Burlington Northern Santa Fe (BNSF) railroad to the south and the Westwood Lake Drainage District to the north and bisected by Trunk Highway 169. Major water features include Cedar Manor Lake and Hannan Lake. Uniquely this watershed has two land-locked features, the landlocked wetland to the east of TH 169 connected to a large wetland in the City of Minnetonka by a MnDOT culvert, and Hannan Lake itself.

The City provided the MCWD regional XPSWMM model as a basis for the development of this SWMP modeling in this watershed. The MCWD model has been refined within the City of St. Louis Park to reflect the city's stormwater infrastructure and updated topography (2013 MnDNR LiDAR), as well as to include any MnDOT drainage entering the city from TH 169 and stormwater from the City of Minnetonka. The City of Minnetonka was also contacted and provided input on the infrastructure entering the City of St. Louis Park.

Known flood-prone areas include: Land-Locked Wetland, Cedar Manor Lake, Hannan Lake

2.8.5 Minneapolis Drainage Districts

The Minneapolis drainage district is comprised of three subwatersheds in the City of St. Louis Park with a total area of 649 acres that discharge to the City of Minneapolis at several locations. The Minneapolis watersheds receive stormwater from TH 5, TH 7, TH 100, and TH 394, as well as outlet flows from Bass Lake and Twin Lakes. The Minneapolis watersheds ultimately discharge to Brownie Lake, Cedar Lake, Bde Maka Ska, and Weber Pond. In most cases, the Minneapolis drainage district discharges directly to the City of Minneapolis' storm sewer. The City of Minneapolis was contacted however is in the process of developing new hydraulic models at this time and does not have any information to provide to assist with the development of this SWMP modeling and identification of tailwater conditions in the storm sewer. It is assumed that the storm sewer is at capacity.

Major water features in this drainage district include Candlestick Pond, Cedar Meadows Pond, and several private stormwater ponds. There is one stormwater lift station in the Minneapolis

drainage district at Candlestick Pond to provide an artificial outlet for the pond and reduce flooding to neighboring homes.

Known flood-prone areas include: Candlestick Pond

2.8.6 Minnehaha Creek Drainage District

The Minnehaha Creek Drainage District is the largest watershed in the city with 3,783 acres that covers the southwest corner of the City and receives flows Minnehaha Creek, upstream municipalities, and stormwater runoff from MnDOT right-of-way. The watershed is bounded by Trunk Highway 100 to the east, BNSF railroad to the north, and bisected by MnDOT TH 169 and TH 7. The Minnehaha watershed ultimately discharges to the City of Edina via Minnehaha Creek at TH 100. Major water features include Minnehaha Creek, Cobble Crest Lake, Westling Pond, Victoria Lake, Oregon Pond, Sumter Sediment Basin, Oak Pond, and South Oak Pond. There are seven stormwater lift stations in the Minnehaha Creek drainage district to move pump stormwater runoff from low-lying areas to the creek.

The city provided the MCWD regional XPSWMM model as a basis for the development of the current SWMP modeling in this watershed. The MCWD model has been refined within the City of St. Louis Park to reflect the city's stormwater infrastructure and updated topography (2013 MnDNR LiDAR), as well as to include any MnDOT right-of-way drainage entering the City and stormwater from the City of Minnetonka. The City of Minnetonka was also contacted to provide input on the infrastructure entering the City of St. Louis Park.

Known flood-prone areas include: 34th Street Bridge, 36th Street Bridge, 6851 Oxford St, Boone Ave, Cobble Crest Lake, Lake St & Monitor St, Oak Hill Park, 3117 Hillsboro Ave/Minnehaha Creek Wetlands, Methodist Hospital Campus, Meadowbrook Golf Course, Oak Pond, Oregon Ave & Hwy 7 Frontage, Oregon Pond, Westling Pond; Victoria Way new development

2.8.7 Twin Lakes Drainage District

The Twin Lakes drainage district is a 1,636-acre watershed that is located in the northeast corner of the City. It is loosely bounded by the Westwood Lake and Bass Lake drainage districts and receives stormwater runoff from MnDOT TH 100 and the CP and BNSF railroad corridors. Major water features include Utah Pond, Lamplighter Pond, Boneyard Ditch, Twin Lakes Sediment Basin, and Twin Lake, as well as remnants of Judicial Ditch 6 and County Ditch 29. There are two stormwater lift stations in the Twin Lakes watershed; one at Lamplighter Pond and one at Nelson Park to alleviate surface flooding.

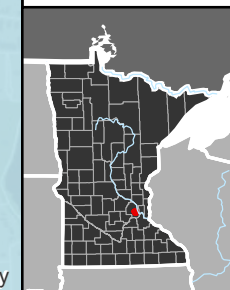
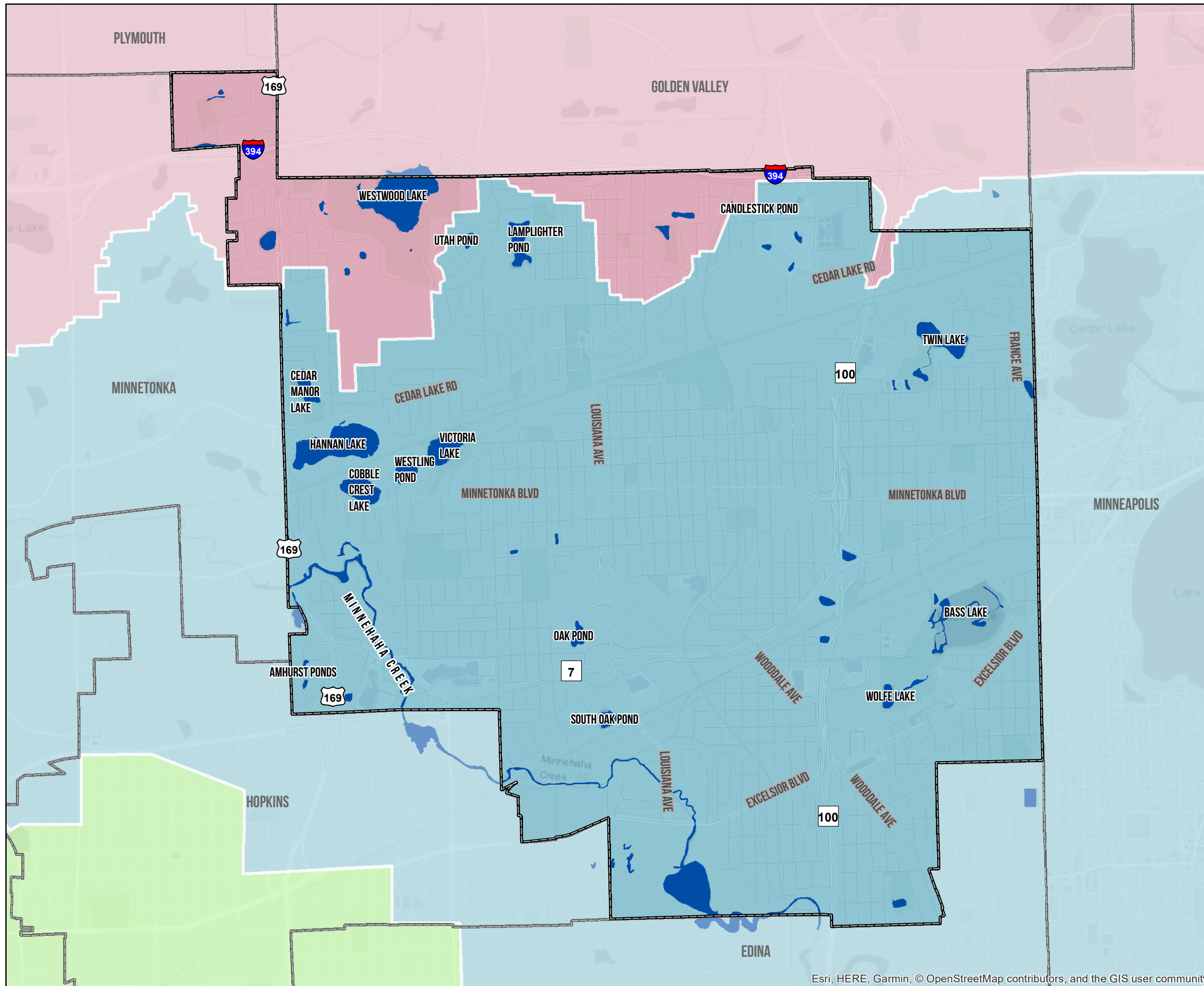
The Twin Lakes model interacts with the Bass Lake model by discharge via a 30-in RCP at Colorado Ave and Minnetonka Blvd. The Twin Lakes model also discharges to the Minneapolis models via the Twin Lakes outlet.

Known flood-prone areas include: Lamplighter Pond, Twin Lakes, Peace Presbyterian Church gardens, 2710 Monterey Ave, Northeast Boneyard Ditch.

**FIGURE 2-9:
WATERSHEDS**

LEGEND

- Bassett Creek Watershed Management Commission
- Minnehaha Creek Watershed District
- Nine Mile Creek Watershed District
- City Boundary
- Lakes















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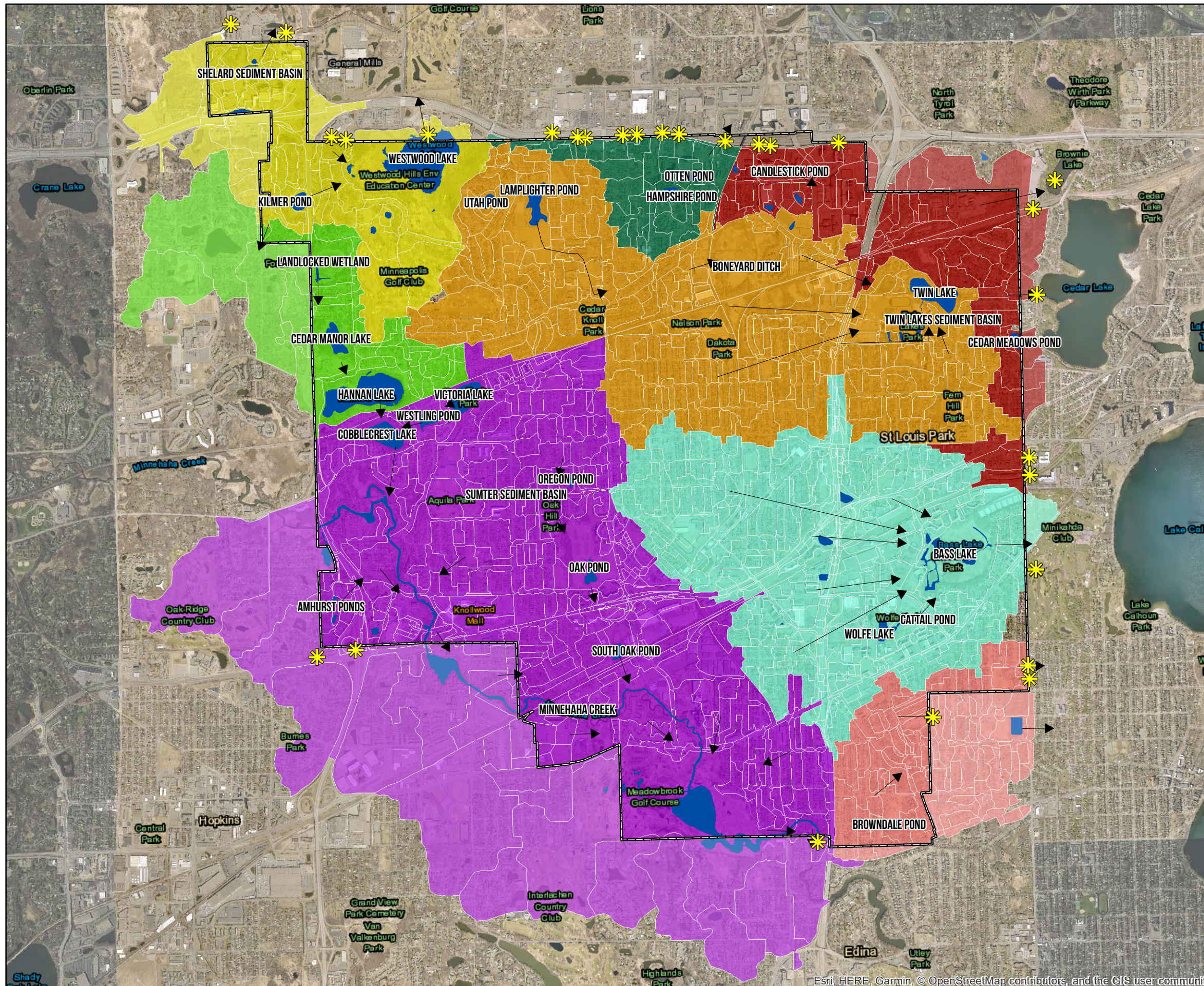
FIGURE 2-10: DRAINAGE DISTRICTS, SUBWATERSHEDS & DRAINAGE PATTERNS

LEGEND

-  01-Westwood Lake (740 acres)
-  02-Golden Valley (219 acres)
-  03-Hannan Lake (605 acres)
-  04-Minnehaha Creek (3,783 acres)
-  05-Twin Lake (1,636 acres)
-  06-Minneapolis (649 acres)
-  07-Bass Lake (1,362 acres)
-  08-Edina (497 acres)
-  Intercommunity Flow Locations
-  Flow Arrows
-  City Boundary
-  Lakes



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2.8.8 Westwood Lake Drainage District

The Westwood Lake drainage district is a 740-acre watershed located in the northwest corner of the City of St. Louis Park. It includes Kilmer Pond, Shelard Sedimentation Basin, and Westwood Lake as major water features. This watershed is one of two drainage districts entirely within the Bassett Creek WMC and flows into Bassett Creek directly in the north and indirectly via the Westwood Lake outfall to Golden Valley and their municipal storm sewer.

The City provided the Bassett Creek WMC regional XPSWMM model as a basis for the development of the current SWMP modeling in this watershed. The BCWMC model has been refined within the City of St. Louis Park to reflect the City’s stormwater infrastructure and updated topography (2013 MnDNR LiDAR), as well as to include any MnDOT drainage from TH 169 and TH 394.

The Westwood Lake watershed model has been combined with the Plymouth watershed from the previous SWMP study. This is due to the fact there are several connections between these two watersheds that may affect water elevations.

The Westwood Lake model interacts with the BCWMC model on both the upstream and downstream boundaries. It also receives discharge from the MnDOT right-of-way and Cities of Golden Valley, Minnetonka, and Plymouth.

Known flood-prone areas include Kilmer Pond and Westwood Lake.

2.8.9 Intercommunity Flows

There are several intercommunity flows into and out of the City of St. Louis Park, summarized in the following table (Table 2-4).

Table 2-4: Intercommunity Peak Discharge Rates (cfs)

| To | 100-Year (ATLAS 14) | 10-Year (ATLAS 14) | 100-Year (TP40) | 10-Year (TP40) |
|-----------------------------------------|---------------------|--------------------|-----------------|----------------|
| City of Minneapolis/ Bass Lake | 127.2 | 70.5 | 150.0 | 0.0 |
| City of Minneapolis/Edina | 275.9 | 155.6 | 189.9 | 126.6 |
| City of Edina | 409.5 | 243.05 | 299.48 | 207.78 |
| City of Golden Valley/ Bassett Creek | 353.14 | 273.83 | 294.28 | 246.74 |
| City of Golden Valley | 142.89 | 83.11 | 99.49 | 68.85 |
| City of Minneapolis | 169.31 | 100.94 | 114.49 | 82.42 |
| City of Minneapolis/ Brownie Lake | 404.11 | 318.43 | 337.52 | 295.16 |
| City of Minneapolis/ Cedar Lake | 177.48 | 136.86 | 156.09 | 128.02 |
| MnDOT | 243.58 | 164.42 | 201.21 | 145.13 |

| To | 100-Year (ATLAS 14) | 10-Year (ATLAS 14) | 100-Year (TP40) | 10-Year (TP40) |
|--------------------------------------|---------------------|--------------------|-----------------|----------------|
| MnDOT/Golden Valley | 322.32 | 218.3 | 256.43 | 176.77 |
| City of Golden Valley | 127.2 | 70.5 | 150.0 | 0.0 |
| City of Minneapolis | 275.9 | 155.6 | 189.9 | 126.6 |
| City of Minneapolis/ Brownie Lake | 409.5 | 243.05 | 299.48 | 207.78 |
| City of Minneapolis/ Cedar Lake | 353.14 | 273.83 | 294.28 | 246.74 |
| MnDOT/Minneapolis | 142.89 | 83.11 | 99.49 | 68.85 |
| MnDOT/Golden Valley | 169.31 | 100.94 | 114.49 | 82.42 |

2.9 Water-based Recreation Areas

The City of St. Louis Park has 52 parks and open space areas that cover more than 790 acres. About 50 percent of this area comprises open water or wetlands. Additionally, there are about 290 acres of privately-owned golf courses and another 165 acres of open spaces associated with schools and community centers.

Lakes, ponds, and creeks are often key attractions in public parks. Examples within St. Louis Park include Bass Lake, Isaac Walton League/Creekside Park, Minnehaha Creek, Twin Lakes Park, Westwood Hills Nature Center, and Wolfe Park Lake, all of which are presented below in Table 2-5. All water-based recreation in St. Louis Park is limited to noncontact, passive recreation activities, such as canoeing, fishing, hiking and walking on trails around the waterbodies, and wildlife and aesthetic viewing. Figure 2-11 shows the location of these recreational areas as well as the official public access points to lakes and creeks within the City of St. Louis Park.

Table 2-5: St. Louis Park Water-based Recreation Areas

| Water and Natural Resource Recreation Areas in St. Louis Park |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bass Lake is a significant part of the city’s stormwater system, acting as both a detention and water quality treatment pond. This waterbody also provides significant wildlife habitats and the walking and biking trails around the lake that provide recreation opportunities. |
| Isaac Walton League/Creekside Park is primarily used as a canoe landing and launching site along Minnehaha Creek. |

Water and Natural Resource Recreation Areas in St. Louis Park

Minnehaha Creek and Parkway. Minnehaha Creek is not only a main drainageway through the city; it also offers a corridor of natural habitats within an urban setting, and it provides recreational opportunities such as hiking, canoeing, and nature observation. Throughout the city, much of the land bordered by the creek is publicly owned.

Minnehaha Creek Parkway provides two canoe landing and creek access locations. These access locations include crossings at Louisiana Avenue and at 37th Street. The city, along with other communities along Minnehaha Creek, has worked with the MCWD to create a detailed canoe map to increase public awareness and use of the creek.

Twin Lakes Park includes a lake and wetland that are major components of the drainage system in the northern portion of the city, providing flood control as well as water quality treatment. Water from the Twin Lakes eventually drains to Cedar Lake and the Minneapolis Chain of Lakes.

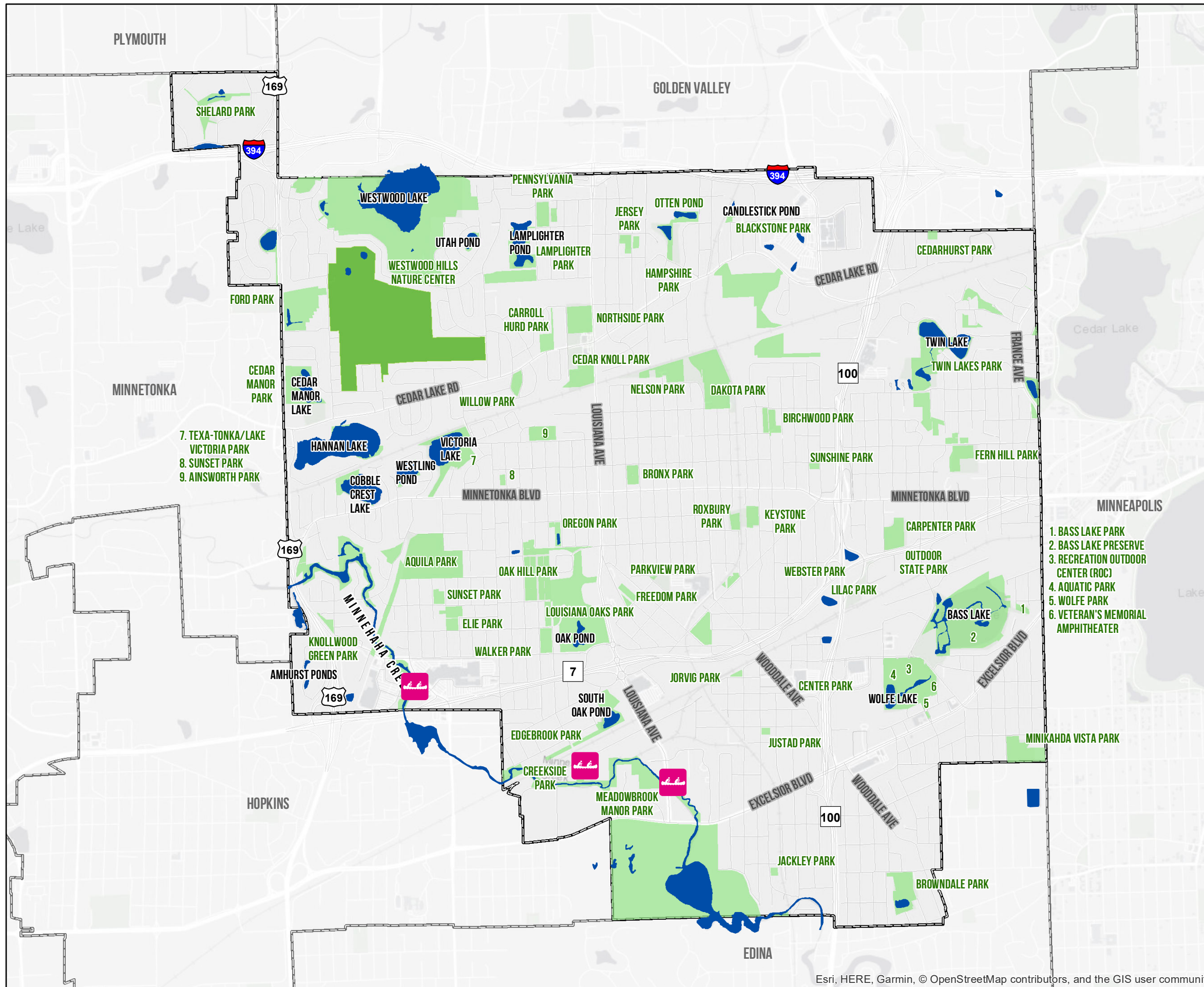
Westwood Hills Nature Center is owned and operated by the City of St. Louis Park. It encompasses a total of 150 acres, of which 90 acres are wetlands. Westwood Hills Nature Center is composed of 60 percent wetland (including one small lake), 35 percent woodland, and 5 percent grassland/prairie. The center conducts year-round programs for visitors of all ages to increase their understanding and appreciation of our natural world and aspects of surface water quality and quantity management. There are three miles of walking and hiking trails, including a loop around Westwood Lake.

Wolfe Park is part of the recent town center development called Park Commons. The park includes a variety of recreational opportunities, such as the REC Center, which offers indoor ice rinks, an outdoor recreation center known as the ROC, and an amphitheater. There are several ponds in the park that provide stormwater detention and create recreational opportunities such as outdoor ice skating in the winter. In addition, there are walking and biking trails throughout the park.

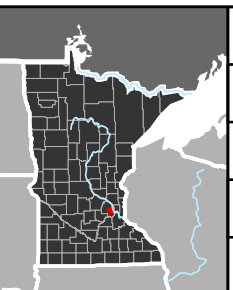
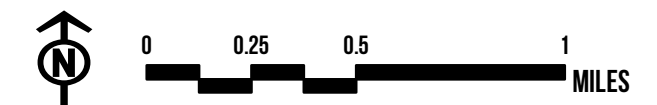
FIGURE 2-11: RECREATION AREAS AND PUBLIC ACCESS

LEGEND

-  Paddling Access
-  Golf Courses
-  Park and Open Space
-  Lakes
-  City Boundary



1. BASS LAKE PARK
2. BASS LAKE PRESERVE
3. RECREATION OUTDOOR CENTER (ROC)
4. AQUATIC PARK
5. WOLFE PARK
6. VETERAN'S MEMORIAL AMPHITHEATER



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2.10 Wildlife and Aquatic Habitat

The waterbodies and open spaces interspersed throughout the city provide habitats for numerous fish and wildlife species, including birds, mammals, and reptiles. Ducks and geese are present in large numbers in the lakes, wetlands, and open water areas. Vegetative cover in the undeveloped open areas support many mammalian species such as deer, raccoon, squirrels, chipmunks, and rabbits. The numerous wetlands in St. Louis Park provide habitats for a variety of aquatic species, including snakes, turtles, and frogs.

2.10.1 Fisheries

Wolfe Lake, Westwood Lake, and Lamplighter Pond are stocked regularly with several species of fish. Through a partnership with Fishing in the Neighborhood, an MnDNR program, the city can provide fishing piers and annually stock fish such as bluegills, crappies, northern pike, largemouth bass, and yellow perch. Wolfe Lake was stocked with black crappie and bluegill in 2015, yellow perch in the spring of 2016, and northern pike in the fall of 2016. Westwood Lake was stocked with bluegill in 2015 and 2016. Lamplighter Lake was stocked with black crappie and bluegill in 2015 and with bluegill and pumpkinseed in 2016 and 2017.

A fish survey was conducted in July 2017 at Wolfe Lake. Bluegill, pumpkinseed, and largemouth bass were found in high abundance. Northern pike and black crappie were moderately abundant. Black bullheads and white suckers were found in low abundance.

A fish survey was conducted in October 2009 at Meadowbrook Lake in the Minnehaha Creek corridor. A total of 12 fish species were sampled, including black crappie, dogfish, and pumpkinseed. Black bullheads were the dominant fish species, with a population well above the normal range. Overall, the survey was dominated by low-oxygen-tolerant species like bullheads, carp, and dogfish. This likely has an adverse impact on water quality in the creek and in shallow, connected lakes like Meadowbrook Lake.

2.10.2 Invasive Aquatic Species

Several lakes in St. Louis Park are considered “infested waters” by the MnDNR because they contain aquatic invasive species (AIS). AIS are introduced to new locations, where they are able to rapidly spread, outcompete native species and cause harm to the native habitats. For example, Twin Lake, Wolfe Lake, and Minnehaha creek contain Eurasian watermilfoil. Minnehaha Creek also contains flowering rush, and the creek between Minnetonka and Lake Nokomis contains zebra mussels.

In order to prevent their spread through local lakes, a rapid response plan has been created to contain AIS and eliminate them from threatening local lakes (Barr, 2018). This response plan only works when it is used for AIS which are detected early in their infestation or

before it is distributed widely in a lake (Barr, 2018). Barr, on behalf of the BCWMC, has prepared a report “BCWMC Aquatic Invasive Species Rapid Response Plan”, which identified “Priority 1” lakes – those with public access or adjacent public land – and lays out a framework for response to newly detected AIS (2018). Westwood Lake is a Priority 1 lake in St. Louis Park (Barr, 2018).

The AIS Rapid Response Plan for Westwood Lake developed by Barr is as follows:

1. Notify MnDNR of AIS infestation and MnDNR then verifies the infestation.
 - a. BCWMC/SLP/WHNC: The first entity to find or be notified of AIS infestation contacts MnDNR and other agencies (BCWMC/SLP/WHNC).
 - b. MnDNR: verifies infestation.
2. Communicate the infestation to stakeholders (including those downstream) and the public.
 - a. SLP/WHNC: In conjunction with or immediately following MnDNR press release, communicates infestation to all stakeholders and the public.
 - b. MnDNR: Issues press release prior to or in conjunction with stakeholder communication.
3. Monitor the extent of the infestation.
 - a. BCWMC/SLP/WHNC: The entity taking the lead depends on the scale of the project. For small projects, SLP performs the monitoring or hires a contractor. For larger projects, BCWMC hires a contractor to perform the monitoring.
 - b. MnDNR: Collaborates with SLP, BCWMC and MAISRC.
 - c. MAISRC: Collaborates with SLP, BCWMC and MnDNR on monitoring design.
4. Determine if isolation of the infestation is necessary and if so, isolate the AIS.
 - a. BCWMC/SLP/WHNC/MnDNR: Make a uniform decision after collaborating as needed with MAISRC. SLP implements quarantine for small projects; BCWMC implements for large projects.
5. Collaborate with MnDNR, MAISRC and stakeholders to determine what rapid response treatment or removal method is appropriate.
 - a. For small projects, SLP will make the decision after considering recommendations from BCWMC/MnDNR/MAISRC.

- b. For large projects, BCWMC will make the decision after considering recommendations from SLP/MnDNR/MAISRC.
6. Obtain a treatment/removal permit from MnDNR.
 - a. BCWMC: Works with MnDNR to obtain treatment/removal permit for large projects.
 - b. SLP/WHNC: Works with MnDNR to obtain treatment/removal permit for small projects.
 - c. MnDNR: Works with BCWMC/SLP/WHNC to issue treatment/removal permit.
 - d. MAISRC: Collaborates with BCWMC/SLP/WHNC/MnDNR to provide technical information.
7. If required (by MnDNR permit), perform additional pre-treatment monitoring.
 - a. For small projects, SLP/WHNC performs the monitoring or hires a contractor.
 - b. For large projects, BCWMC hires a contractor to perform the monitoring.
 - c. MnDNR: Collaborates with BCWMC/SLP/WHNC/MAISRC regarding monitoring requirements of the permit.
 - d. MAISRC: Collaborates with BCWMC/SLP/WHNC/MnDNR regarding monitoring design.
8. Hire a contractor to perform the AIS rapid response treatment or removal.
 - a. For a small project, SLP/WHNC hires the contractor to perform the treatment/removal.
 - b. For a large project, it will be a collaborative effort with BCWMC taking the lead.
9. Fund the AIS treatment/removal.
 - a. BCWMC: Partners with Hennepin County and SLP to fund larger projects.
 - b. SLP/WHNC: Seeks Hennepin County AIS rapid response monies if available. If they are not available and the project is small SLP funds it. For larger projects, SLP partners with BCWMC and Hennepin County to fund it.
 - c. Hennepin County: Considers providing AIS rapid response grand funding if available.

10. Perform, or hire a contractor to perform, post-treatment monitoring to determine the effectiveness of the treatment/removal.
 - a. For a small project, SLP/WHNC performs the monitoring or hires a contractor.
 - b. For a large project, BCWMC hires a contractor to perform the monitoring.
 - c. MnDNR: Collaborates with BCWMC/SLP/WHNC/MAISRC regarding monitoring requirements of the permit.
 - d. MAISRC: Collaborates with BCWMC/SLP/WHNC/MnDNR regarding monitoring design.
11. Communicate information about the treatment/removal and its effectiveness to stakeholders (including those downstream) and the public.
 - a. BCWMC: Collaborates with SLP/WHNC/MnDNR.
 - b. SLP/WHNC: Communicates about the AIS infestation and management after collaborating with BCWMC and MnDNR.
12. Design and implement an education program to help prevent future AIS infestation.
 - a. Collaboration between SLP/WHNC and BCWMC.
 - i. SLP/WHNC takes the lead to educate City staff.
 - ii. SLP/WHNC collaborates with BCWMC to obtain available education materials to disseminate.
 - b. MnDNR: Provides any available education materials to SLP.
 - c. MAISRC: May provide available education materials to SLP.

(Barr, 2018: “BCWMC Aquatic Invasive Species Rapid Response Plan”)

2.10.3 Unique Features and Scenic Areas

Westwood Hills Nature Center is a unique and scenic area in the City of St. Louis Park. The center, which is nestled in an urban setting, houses a large variety of wildlife including deer, raccoon, waterfowl, egrets, blue herons, mink, red fox, grey squirrel, red squirrel, flying squirrel, painted and snapping turtles, American toads, barred owls, great horned owls, Cooper’s hawks, and bats.

The MnDNR Natural Heritage Program and Nongame Wildlife Program maintain a database of rare plant and animal species and significant natural features. This database does not include any records of rare species or ecosystems found in St. Louis Park. Other

information was reviewed to determine whether other unique features are present in St. Louis Park. Based on this review, no “outstanding resource value waters” (Minnesota Rules, 7050.0180), no designated Scientific and Natural Areas (Minn. Stat. 86A.05), no State Wildlife Management Areas (Minn. Stat. 86A.05), and no State Aquatic Management Areas (Minn. Stat. 86A.05) are located within the city of St. Louis Park.

2.11 Pollutant Sources

2.11.1 Groundwater Contamination Hazards

There are currently two EPA superfund sites within the city that have resulted in significant groundwater contamination (MPCA, 2006). The first site is the Reilly Tar site. This 80-acre site was the location of the old Republic Creosote operation from 1917–1972. There, extensive soil and groundwater contamination occurred, resulting from the discharge of contaminated wastewater overland to wetlands adjacent to Minnehaha Creek as well as from spills. Six of St. Louis Park’s municipal wells were closed due to the contamination of the Prairie du Chien-Jordan aquifer by polynuclear aromatic hydrocarbons. The city continues to monitor the groundwater in several different aquifers.

Additionally, the city continues to run gradient control wells, to pump and treat the groundwater. Between 2011 and 2014, the EPA conducted an extensive study into possible vapor intrusion from site contamination on properties on and near the site. EPA and its contractors took samples from indoor air; soil gas beneath the basements and foundations; and off-site, background soil gas, and the results showed no danger to humans from vapor intrusion. All of the contaminants detected in the indoor air were graded to be within EPA’s acceptable ranges (EPA, 2015).

The second site is the Schloff Chemical site. This was the site of a chemical supply company that primarily distributed bulk 1,1,2,2, -Tetrachloroethylene. The soil, ground, and surface waters are contaminated with volatile organic compounds (VOCs). Interim remedial actions were implemented by Schloff Chemical, and the MPCA implemented the final remedial actions and conducted the operations and maintenance of the site. The Unterdruck-Verdampfer-Brunnen wells and equipment were removed, and several monitoring wells were abandoned. The MPCA is studying the site further to evaluate the effects of natural attenuation at this site.

2.11.2 Hazardous Waste and Materials

Figure 2-12 shows the approximate location of registered storage tanks, hazardous waste generators, leaking above- and below-ground tanks, dump sites, and Voluntary Investigation and Cleanup (VIC) sites, as obtained from the Hennepin County Department of Environmental Services. The original data source is the MPCA. The Hennepin County

Department of Environmental Services should be contacted for details about specific sites, because many of the sites have been cleaned up or are in the clean-up process now.

The MPCA VIC Program provides technical assistance and administrative and/or legal assurances for individuals or businesses seeking to investigate or clean up contaminated property and to bring contaminated land back into productive use. The City of St. Louis Park's Hazardous Materials Emergency Response Plan establishes procedures for the migration of hazardous material incidents (i.e., a spill, leak, or release of a hazardous material). The city's fire department is responsible for the implementation of this plan.

2.12 Water Quality

Historically, as the city developed, the city's lakes and ponds have been used for stormwater runoff detention in association with flood protection efforts. Unfortunately, the urbanization of a watershed often accelerates the degradation of waterbodies through a natural process known as eutrophication. Nonpoint source pollution associated with stormwater runoff creates adverse impacts; the degree of impact depends on the waterbody's natural ability to remove, absorb, or process the pollutants through chemical, physical, or biological processes. Poor water quality usually indicates a situation where the resource receives more nutrients or other pollutants than can be processed naturally.

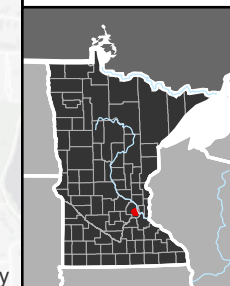
The water quality management activities in the city have included the inventorying and monitoring of the water resources to provide an understanding of the water quality of the city's waterbodies. Waterbodies that are managed as lakes are classified based on the MPCA's shallow and deep lake criteria, which establish water quality goals and standards that, if met, will help prevent additional waterbodies from being listed on the MPCA 303(d) impaired waters list.

Additionally, the pollutant loading from all the key waterbodies within the city were modeled using the recently updated city-wide EPA SWMM modeling. This evaluation was used to estimate pollutant loads to the impaired waterbodies in the city as well as provide a baseline to determine the pollutant removal efficiencies of the waterbodies future water quality improvement projects. and regional BMPs. Additionally, the model can be used to evaluate the impact of proposed development and BMPs on pollutant load reductions.

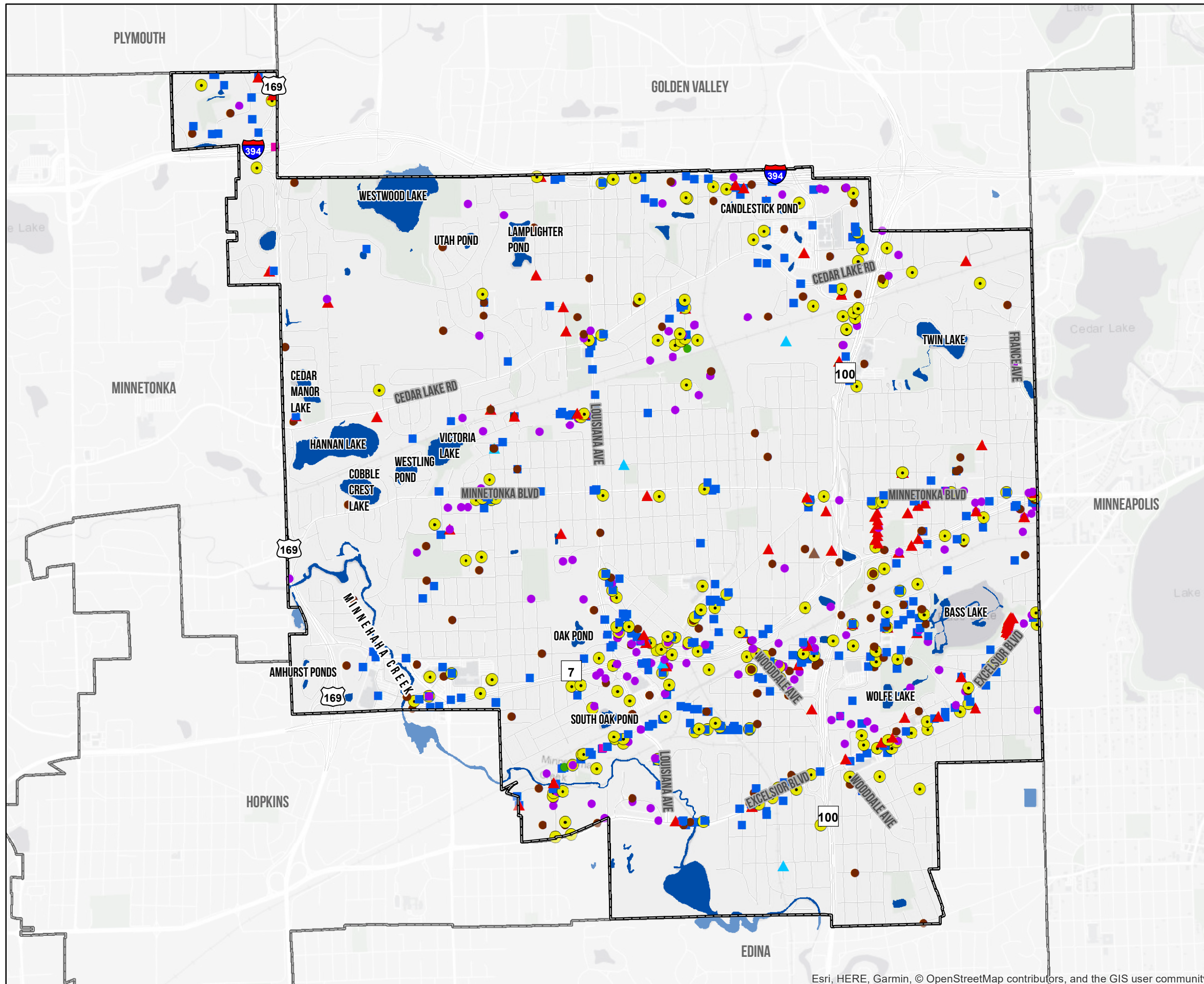
**FIGURE 2-12:
HAZARDOUS WASTE SITES**

LEGEND

-  Multiple Programs
-  Air Quality
-  Hazardous Waste
-  Investigation and Cleanup
-  Solid Waste
-  Stormwater
-  SSTS
-  Tanks
-  Water Quality
-  Lakes
-  City Boundary



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2.12.1 Water Quality Monitoring

The quality of water resources within the City of St. Louis Park has been monitored by a variety of agencies. These groups include BCWMC, MCWD, and the Metropolitan Council Citizen Assisted Monitoring Program (CAMP). Figure 2-13 shows the location of the various water quality (as well as water quantity) monitoring sites within St. Louis Park.

General information about lakes and monitoring data can also be found at the Mn <https://www.dnr.state.mn.us/lakefind/index.html>.

2.12.1.1 BCWMC

The BCWMC has performed detailed water quality monitoring of Westwood Lake. This detailed monitoring includes evaluation of chemically -based water quality parameters as well as biota such as zooplankton, phytoplankton, and macrophytes. Water quality samples were collected monthly from April through September. The water quality parameters that were monitored included dissolved oxygen, temperature, specific conductance, pH, Secchi disc transparency, total phosphorus, soluble reactive phosphorus, total nitrogen, and chlorophyll-a. Biota sampling for zooplankton and phytoplankton occurred monthly from April through September. Macrophyte surveys were completed in June and August. The most recent water quality data for Westwood Lake is summarized in the BCWMC 2015 Lake Water Quality Study: Westwood Lake (BCWMC, 2016). For more information related to the water quality monitoring performed by BCWMC, see www.bassettcreekwmo.org/projects/all-projects/westwood-lake-water-quality-improvement-project.

2.12.1.2 MCWD

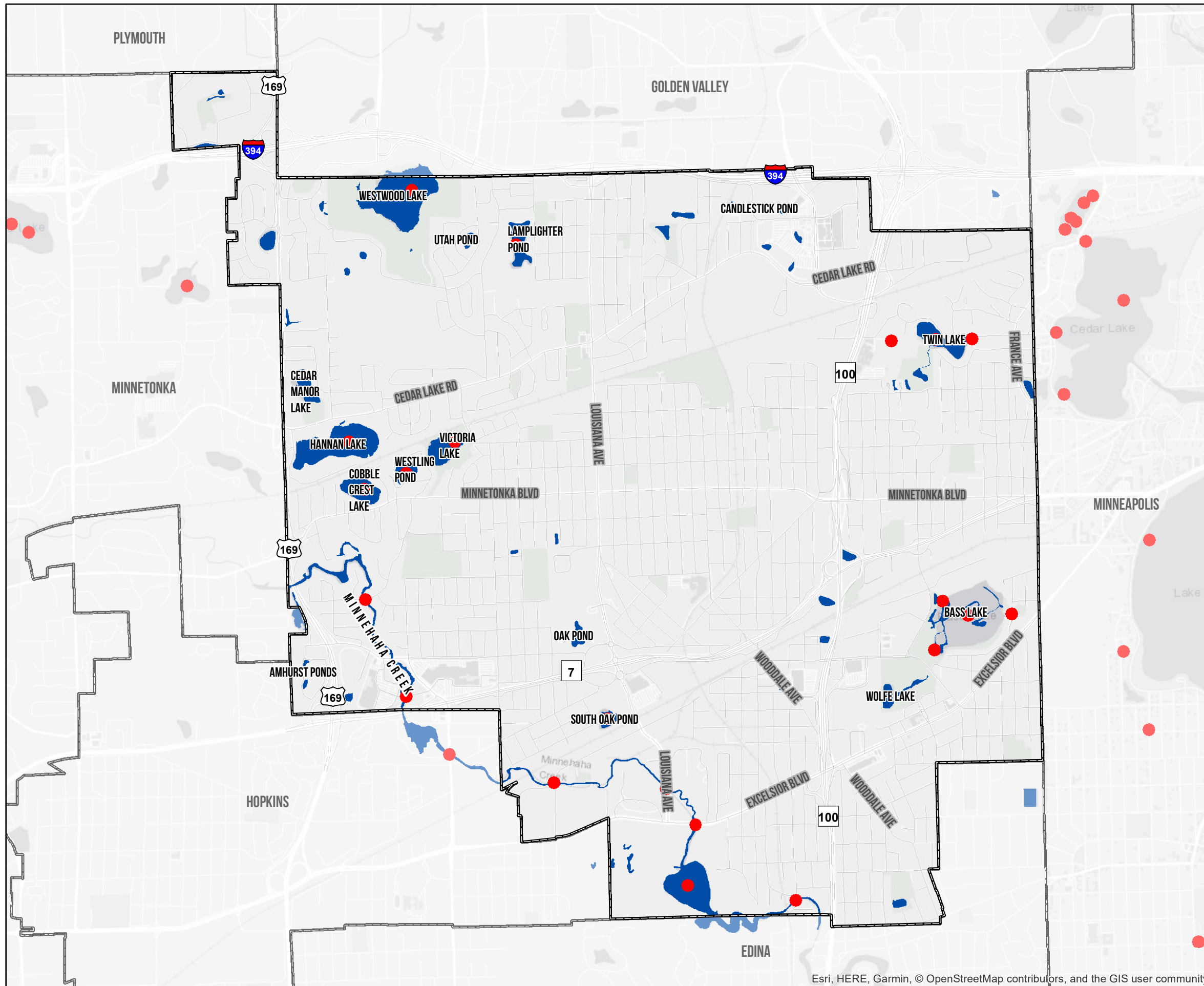
MCWD does not monitor any of the lakes or wetlands within the City of St. Louis Park. However, the MCWD does monitor water quality at 10 stations along the length of Minnehaha Creek, including two within the City of St. Louis Park. The first station is located at the 34th Street crossing (MCWD ID: CMH02). The second station is at the Excelsior Boulevard crossing (MCWD ID: CMH11).

Each year, from mid-March through mid-October, MCWD staff collect weekly grab samples and analyzes them for a variety of parameters including dissolved oxygen, total phosphorus, total suspended solids, and chloride. The MCWD staff also performs biweekly testing for the presence of *E. coli* bacteria.

FIGURE 2-13: WATER QUALITY AND QUANTITY MONITORING

LEGEND

- Monitoring Sites
- Lakes
- City Boundary



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In 2013, the MPCA collected aquatic macroinvertebrates in Minnehaha Creek from Lake Minnetonka to the Mississippi River and from five tributary streams to Lake Minnetonka. These same sites were monitored in 2003 by MCWD.

In 2015, selected sites from Minnehaha Creek and the tributary streams to Lake Minnetonka were monitored again. The 2015 results had some variation from 2013 but overall were similar in showing the impact of urbanization and stream channelization in this area. The results of this study can be found in the Macroinvertebrate Assessment report (MCWD, 2015).

More information about the water quality monitoring the MCWD performs is available at www.minnehahacreek.org/project?field_city_tid=All&field_project_type_tid=781.

2.12.1.3 Other Monitoring Programs

The Metropolitan Council's CAMP has been collecting water quality data on several Twin Cities metropolitan area lakes since 1980. On a biweekly basis (April–October), citizen volunteers collect a surface water sample for laboratory analysis of total phosphorus, total Kjeldahl-nitrogen, chlorophyll-*a*, and a Secchi transparency measurement, and they provide some information about each lake's physical and recreational condition. Five lakes within St. Louis Park have been monitored as part of the CAMP program: Cobblecrest, South Oak, Twin, Bass, and Westwood Lakes.

For more information about the CAMP program, please see the following website: <https://metro council.org/Wastewater-Water/Services/Water-Quality-Management/Lake-Monitoring-Analysis.aspx>.

2.12.2 Water Quality Management Classification

MPCA, MnDNR, MCWD, and BCWMC have all established their own methods of classifying water resources based on their water quality. St. Louis Park will manage its waterbodies using the MPCA's criteria if they are stricter than the criteria outlined by the WMOs; otherwise, the WMO water quality criteria will apply. The City of St. Louis Park is located in the North Central Hardwood Forest (NCHF) ecoregion of Minnesota and manages its lakes based on the criteria for this ecoregion.

Table 2-6 provides a summary of the major waterbodies within the City of St. Louis Park, their physical characteristics, a summary of the most recent water quality data, and the water quality management classifications and goals set by the various agencies. More detailed information on each of the management classification systems is included in the following sections.

2.12.2.1 Watershed Management Organization Classification

Each WMO has developed its own method to classify waterbodies based on their water quality, desired uses, and water quality goals. Table 2-7 summarizes each of the WMOs' water quality classification systems. MCWD is in the process of revamping its waterbodies classification system to the ecosystem evaluation assessment program or E-Grade. The information presented is what currently exists for waterbodies in the City

Table 2-6: Summary of Physical Characteristics, Water Quality, and Management Classifications for Water Resources in St. Louis Park, MN

| Waterbody Name | Waterbody Physical Characteristics | | Most Current Water Quality Conditions | Waterbody Classification by Regulatory Agency | | | | |
|----------------|------------------------------------|------------------|------------------------------------------------------------------------------------------|-----------------------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------|----------------------------------|----------------------------------------|
| | Surface Area (Acres) | Max Depth (feet) | | City Water Quality Goals | Watershed Organization & Classification | MPCA Shallow Classification & Criteria | MPCA 303(d) Impaired Waters List | City Wetland Management Classification |
| Westwood | 92.8 | 5.0 | Year of Record: 2007 [TP] = 47 µg/L [Chla] = 11.6 µg/L SD = 1.3 m | TP < 45 µg/L Chla < 20 µg/L SD > 1.4 m | BCWMC Priority 1 - Shallow lake TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | NCHF -- Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | N/A | Manage I |
| Cobblecrest | 8.5 | N/A | Year of Record: 2007 [TP] = 168.5 µg/L [Chla] = 126.4 µg/L SD = 0.3 m | TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | MCWD/2006 F TP > 152 µg/L Chla > 77 µg/L SD < 0.7 m | NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | Yes - See Table 2-8 | Manage II |
| Twin | 12.4 | N/A | Year of Record: 2007 [TP] = 154.1 µg/L [Chla] = 62.1 µg/L SD = 0.5 m | TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | MCWD/2006 D TP = 62-152 µg/L Chla = 48 - 77 µg/L SD = 1.2 - 0.7 m | NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | Yes - See Table 2-8 | Manage II |
| Bass | 52.2 | N/A | Year of Record: 2006 ² [TP] = 195.5 µg/L [Chla] = 12 µg/L SD = 0.9 m | TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | N/A | NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | N/A | Manage I |
| Hannan | 34.6 | N/A | Year of Record: 1991 ⁷ [TP] = 220 µg/L [Chla] = 205 µg/L SD = 0.25 m | TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | N/A | NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | N/A | Manage II |
| Victoria | 9.2 | N/A | N/A | TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | N/A | NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | N/A | Manage II |
| Lamplighter | 7.6 | N/A | N/A | TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | N/A | NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | N/A | Manage II |

| Waterbody Name | Waterbody Physical Characteristics | | Most Current Water Quality Conditions | Waterbody Classification by Regulatory Agency | | | | |
|--------------------------|------------------------------------|------------------|---------------------------------------|-----------------------------------------------|-----------------------------------------|----------------------------------------------------------------|----------------------------------|----------------------------------------|
| | Surface Area (Acres) | Max Depth (feet) | | City Water Quality Goals | Watershed Organization & Classification | MPCA Shallow Classification & Criteria | MPCA 303(d) Impaired Waters List | City Wetland Management Classification |
| Wolfe | 2.5 | N/A | N/A | TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | N/A | NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | N/A | Manage II |
| Meadowbrook ³ | 74.6 | N/A | N/A | TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | N/A | NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | N/A | Manage I |
| Unnamed | 2.8 | N/A | N/A | TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | N/A | NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | N/A | Manage II |
| Unnamed | 2.7 | N/A | N/A | TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | N/A | NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | N/A | Manage II |
| Unnamed | 10.6 | N/A | N/A | TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | N/A | NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m | N/A | Manage II |
| Minnehaha Creek | N/A | N/A | N/A | N/A | - | N/A | Yes - See Table 2-8 | - |

Table 2-7: Summary of the WMO Water Quality Classification Systems

| Water Quality Category | Desired Recreational Use | Desired Total Phosphorus Concentration (µg/L) | Desired Chlorophyll- <i>a</i> Concentration (µg/L) | Desired Secchi Disc Depth (meters) |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------|------------------------------------|
| Priority 1 - Deep lake | N/A | 40 | 14 | 1.4 |
| Priority 1 - Shallow lake | N/A | 60 | 20 | 1 |
| Priority 2 - Shallow lake | N/A | 60 | 20 | 1 |
| Minnehaha Creek Watershed District | | | | |
| A | Crystal clear, beautiful. These lakes are exceptional and are enjoyed recreationally without question or hesitation. | < 23 | < 10 | > 3 |
| B | These lakes generally have good water quality, but algae may limit swimming, particularly toward the end of summer. | 23 - 32 | 10 - 20 | 3.0 - 2.2 |
| C | Average quality. Swimming, boating, and fishing may be undesirable relatively early in the season. Algae blooms occasionally. | 32 - 68 | 20 - 48 | 2.2 - 1.2 |
| D | These lakes have severe algae problems. People are generally not interested in recreation on these lakes. | 68 - 152 | 48 - 77 | 1.2 - 0.7 |
| F | Not enjoyable. Such a lake would have severe limitations to recreational use. | > 152 | > 77 | < 0.7 |


a. BCWMC

The BCWMC classifies waterbodies into four levels based on desired water quality goals and recreational uses. The degree to which a waterbody can support a particular recreational use is primarily controlled by the quality of the water. The BCWMC established goals for total phosphorus and chlorophyll-*a* concentrations as well as for Secchi depth, because these are the parameters that are typically used to determine water quality. Level -I waterbodies have good water quality that supports all recreational uses, whereas Level -IV classifications indicate very poor water quality with uses primarily for runoff management.

b. MCWD




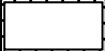
The MCWD's lake water quality rating is based on the standards established by the Metropolitan Council. This system assigns a water quality grade to each waterbody based on the summer average total phosphorus and chlorophyll-a concentrations as well as the Secchi depth. The total grade for the waterbody is the average of the grades for each of the three parameters. Grades are an indicator of the perceived condition of the open waterbody but are not a water quality goal. A grade of A indicates very good water quality, whereas a grade of F indicates very poor water quality.

As mentioned, the MCWD is in the process of migrating to the E-Grade system for classifying waterbodies. The MCWD felt its current method of grading the health of its waters only provides a partial picture of lake health by looking only at three factors: phosphorus, chlorophyll and water clarity. The E-grade would consider biodiversity, habitat diversity, nutrient cycling, recreation potential and flood control. The E-grade release for resources within the City is unknown.

Several waterbodies in the City of St. Louis Park are included on the MPCA 2018 draft impaired waters [303(d)] list. These waterbodies include Twin Lake, Cobblecrest Lake, and Minnehaha Creek. Typically, impaired waters are listed as such when they exceed the MPCA ecoregion eutrophication criteria for a given waterbody. Waterbodies on the impaired waters list are required to have a total maximum daily load (TMDL) assessment completed that addresses the causes and sources of the impairment and provides a waste load allocation (WLA) needed to restore them. Figure 2-14 shows the location of the impaired waters within the City of St. Louis Park, and Table 2-8 includes a summary of the impaired lakes, including the reason for impairment. 

**FIGURE 2-14:
IMPAIRED WATERS**

LEGEND

-  Impaired Streams
-  Impaired Lakes
-  Lakes
-  City Boundary

MINNEHAHA CREEK SUMMARY:

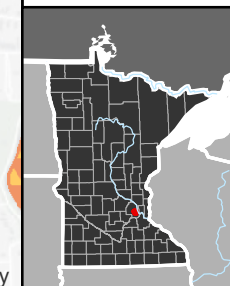
Impaired uses: Recreation
 TMDL needed for: Dissolved Oxygen, Fish Bioassessments, Aquatic Macro-Invertebrate Bioassessments
 TMDL Approved For: Chlorides, Fecal Coliform

TWIN LAKE SUMMARY:

Impaired Uses: Aquatic Recreation
 TMDL Needed For: Nutrients

COBBLE CREST LAKE SUMMARY:

Impaired Uses: Aquatic Recreation
 TMDL Needed For: Nutrients



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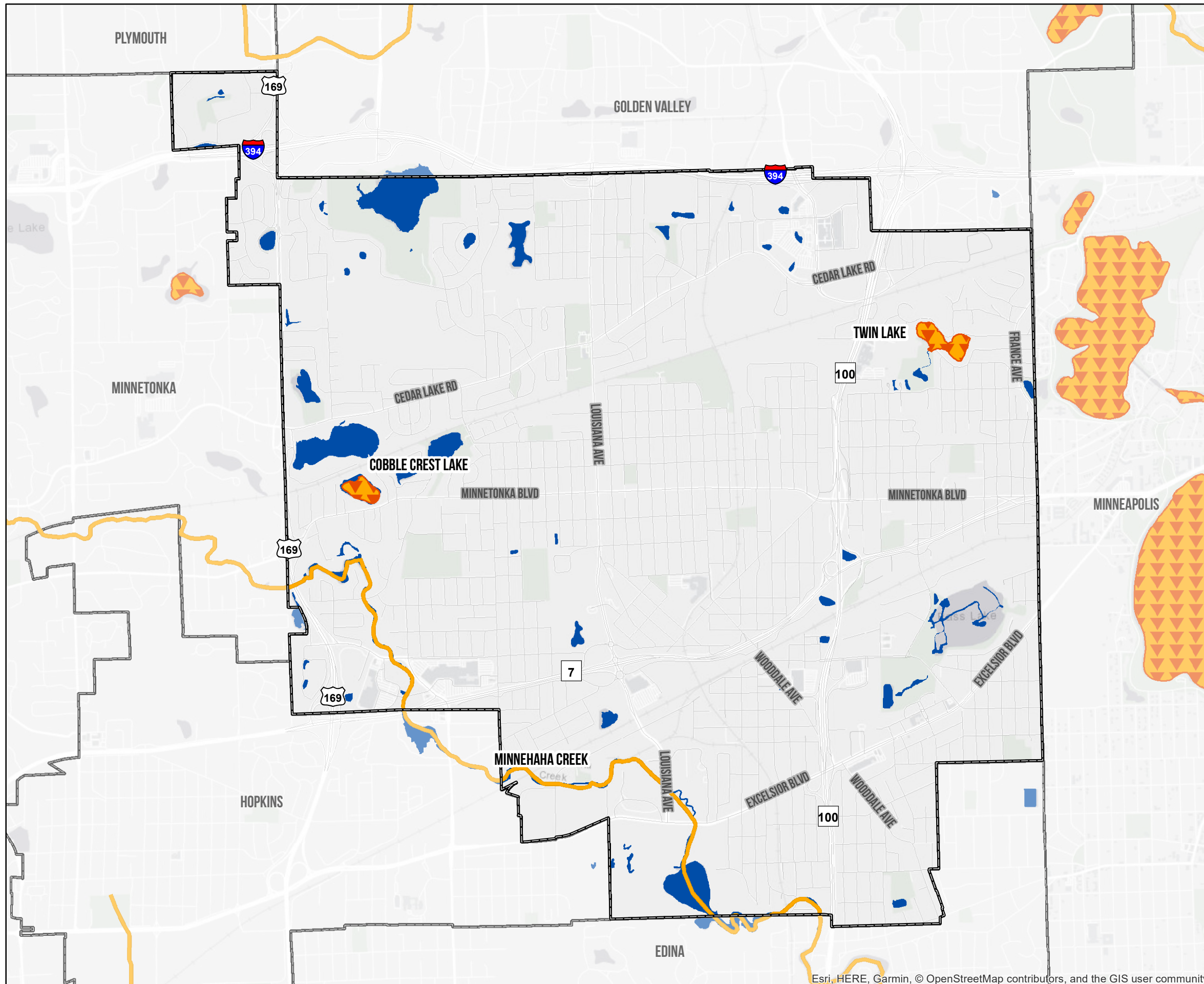


Table 2-8: Summary of Impaired Waterbodies in St. Louis Park, MN

| Waterbody | Reach | Affected Use | Pollutant/ Stressor | Year Listed | Target Completion |
|------------------|--------------------------------------|--------------------|--------------------------------------------------|-------------------|-------------------|
| Twin Lake | Lake | Aquatic Recreation | Nutrient/Eutrophication Biological Indicators | 2006 | 2017 |
| Cobblecrest Lake | Lake | Aquatic Recreation | Nutrient/Eutrophication Biological Indicators | 2008 | 2017 |
| Minnehaha Creek | Lake Minnetonka to Mississippi River | Aquatic Life | Fish Bioassessments | 2004 | 2012 |
| | | Aquatic Recreation | Fecal Coliform | 2008 | 2013 |
| | | Aquatic Life | Chloride | 2008 | 2016 |
| | | Aquatic Life | Dissolved Oxygen | 2010 ² | 2012 |
| | | Aquatic Recreation | Nutrients | 2004 | 2013 |

2.12.3 Water Quality Modeling

The City of St. Louis Park and WMOs have undertaken many water quality modeling efforts that have been used to estimate the water quality of stormwater runoff and water bodies within the city. Previous efforts have provided a patchwork of models across the city, including a P8 (Program for Predicting Polluting Particle Passage through Pits, Puddles, and Ponds) model developed by BCWMC for their 2015 Watershed Management Plan, which includes total flow and phosphorus loadings for Westwood Lake and northern portions of the City. The following sections summarize the most recent water quality modeling efforts.

2.12.3.1 City-Wide Water Quality Modeling

As part of the development of this SWMP, the entire City of St. Louis Park was modeled using EPA SWMM to estimate pollutant loading from each subwatershed as well as the pollutant removal efficiencies of the impaired waterbodies. The city provided all available hydrologic and hydraulic models for this SWMP update. As part of the modeling update, discussed in Section 2.13.3, a water quality component was included in the EPA SWMM models. Using monitoring data from MPCA and MCWD to verify results where available, these updated city-wide models may now be used to evaluate the current pollutant loads entering waterbodies and the effectiveness of potential water quality treatment projects. Using an open-source software such as EPA SWMM, will allow city staff to update the models as needed in the future. The results from the water quality analysis are provided in Appendix F.

2.12.3.2 City-wide MS4 Nondegradation Modeling

The MPCA requires select NPDES MS4s, including St. Louis Park, to complete a nondegradation analysis for the time periods between 1988 to the 2007 and between 2007 to 2020. St. Louis Park quantified the change in stormwater discharge loading during these time periods in terms of average annual flow volume, total suspended solids (TSS), and total phosphorus (TP). A simple method was used to estimate stormwater and pollutant loadings for 1988, current conditions (defined by land use data from 2000/2002), and 2020. This method analyzes land use and imperviousness to estimate water and pollutant loads. Additionally, a P8 water quality model was used to assess the benefits that expected future BMP implementation will have on flow volume, TSS, and total phosphorus loading.

The city developed the loading model to estimate the treatment required between 2007 and 2020 so that runoff volumes and pollutant loads from the city will not exceed that of the 1988 baseline loading conditions. For more information about this modeling, see the

City of St. Louis Park Nondegradation Report Submittal to the Minnesota Pollution Control Agency for Selected MS4 Permit Requirements (December 2007), which can be found in **Appendix E**.

2.13 Water Quantity/Flooding

This section discusses the water quantity monitoring programs that exist within the City of St. Louis Park. It also discusses the flood insurance studies that indicate flood levels along major water courses and WMO flood criteria that must be followed to meet regional flood control goals. The hydrologic modeling efforts of the city and the WMOs are also presented.

2.13.1 Water Quantity Monitoring

Water quantity monitoring programs include the operation of continuous flow gauging stations, manual flow measurements, and the measurement of water levels in lakes and wetlands. All water quantity monitoring data within the City of St. Louis Park are currently collected by the two WMOs within the city.

The BCWMC is responsible for the monitoring of water levels on the primary lakes within the Bassett Creek watershed. In the City of St. Louis Park, this includes Westwood Lake.

The MCWD maintains two monitoring stations within of St. Louis Park. The first station is located at the 34th Street crossing (MCWD ID: CMH02). The second station is at the Excelsior Boulevard crossing (MCWD ID: CMH11). Both stations monitor flow as well as water quality parameters. Information about the monitoring done by MCWD can be found here: www.minnehahacreek.org/data-center.

2.13.2 Flood Insurance Studies

The current effective FEMA Flood Insurance Study (FIS) for the City of St. Louis Park is dated November 6, 2016. The current effective Flood Insurance Rate Maps (FIRMs) for the City of St. Louis Park are dated November 4, 2016. The FIS and FIRMs are available on the FEMA Flood Map Service Center website: msc.fema.gov/portal/home.

2.13.3 Hydrologic and Hydraulic Modeling

The City of St. Louis Park has had numerous H&H models developed over the years, including HEC-2 models of Minnehaha Creek used by FEMA for the original Flood Insurance Study of 1979. More recently the WMOs have developed regional models using XP-SWMM, including modeling for the proposed Southwest Corridor Light Rail project. Unfortunately, despite this wealth of information, no single and comprehensive city-wide model existed until the development of this SWMP.

2.13.3.1 City Modeling

a. City-wide Model

For this SWMP, the disparate H&H models were combined, standardized, and updated with available as-built information, the city's GIS data, and recently completed MnDOT projects. The models were developed in EPA SWMM to allow city staff to update the models as new and redevelopment occurs, as well as to evaluate potential benefits and impacts of proposed stormwater projects. It is the city's goal to be able to use these models to support the continued update and maintenance of FEMA's Flood Insurance Rate Maps.

The city-wide models were used to quantify the 10-year and 100-year 24-hour design storm events using both NOAA's Atlas 14 and TP40 rainfall data for comparison. The modeling efforts included the delineation of watersheds and subwatersheds throughout the city. The results of the model are used to estimate flood elevations on waterbodies and low-laying areas within the city as well as to evaluate the capacity of the existing storm sewer conveyance system.

The results from these models are provided in **Appendix F**.

b. City Updates

Since the previous SWMP was completed, the city has undergone several major construction projects, including MnDOT reconstruction projects on TH 7, TH 100, and US 169. In 2017, the city installed a new underground stormwater treatment facility at Carpenter Park to provide water quality treatment for 40 acres of residential and commercial land, for the benefit of Bass Lake.

2.13.3.2 Watershed Management Organization Modeling

Both the BCWMC and the MCWD have performed hydrologic and hydraulic modeling within the City of St. Louis Park.

a. BCWMC

The BCWMC, in conjunction with the COE, developed a HEC-1 model of the entire Bassett Creek watershed decades ago. The district was broken down into several watersheds of a relatively large scale, focusing mainly on the contributing areas to the larger flood storage areas. In 2012 and 2013, the BCWMC converted and updated the HEC models to XP-SWMM.

In 2017 the XP-SWMM model was updated again to incorporate more detailed subwatershed, storage, and storm sewer information for the watershed, including the major ponds and wetlands. The updated model, referred to as the Phase-2 XP-

SWMM model update, increased the number of subwatersheds from 55 to approximately 1,160. This model was developed to fully capture and route the Atlas 14 100-year design storm event. The model was calibrated at several locations, and the calibrated model was used to estimate the Atlas 14 100-year flood elevations along the Bassett Creek system and within the contributing watershed.

The Phase-2 XP-SWMM model is intended for use by the BCWMC, member cities, and other entities to evaluate projects and make informed watershed management decisions.

b. MCWD

From 2001 to 2003, the MCWD completed its Hydrologic/Hydraulic and Pollutant Loading Study (HHPLS) of the existing conditions within the watershed. This study included the development of an XP-SWMM model for the entire Minnehaha Creek watershed to evaluate flows, hydraulics, flooding, and structures. The watershed was broken up into several large drainage districts, including much of the City of St. Louis Park. These drainage districts were further broken down into many smaller subwatersheds.

2.14 Land Use










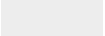



St. Louis Park is designated by the Metropolitan Council as a “developed community” geographic planning area in the 2040 Regional Development Framework. In general, St. Louis Park is fully developed, with the major land use being residential. The population projections included in the city’s current comprehensive plan show slow, steady growth for the community. Growth will be accomplished primarily through redevelopment of certain sites. Existing and projected land use within the City of St. Louis Park are shown in Figure 2-15 and Figure 2-16, respectively.

St. Louis Park is committed to being a connected and engaged community. The city’s land use plan is guided by the idea of creating a “livable community” that uses the best design practices from the past and the present to build a connected community that contains housing, schools, shops, workplaces, water resources, parks, and civic facilities essential to the daily life of the city’s citizens. As stated in Metropolitan Council 2040 Water Resources Policy Plan, “Water resources has strategic important in achieving economic growth, competitiveness and high quality of life”. To achieve this goal, the land use plan provides guidance for the community’s desired land use patterns, mix of uses, density, site and building design, and neighborhood planning. It also includes policies and encourages strategies that promotes the livability of the city and region through access to adequate water supplies for drinking and promoting the protection and restoration of water resources for recreational use.

Although many redevelopment parcels and adjacent street patterns may not be conducive to the city's goals, there is a need to find ways to adapt these principles without compromising their general intent. Rather than just looking within the boundaries of the project, redevelopment will consider how pedestrians, residents, and nearby workers will be affected. The intent of the land use plan is for all development to add to and fit into the larger context of the street, neighborhood, and community.

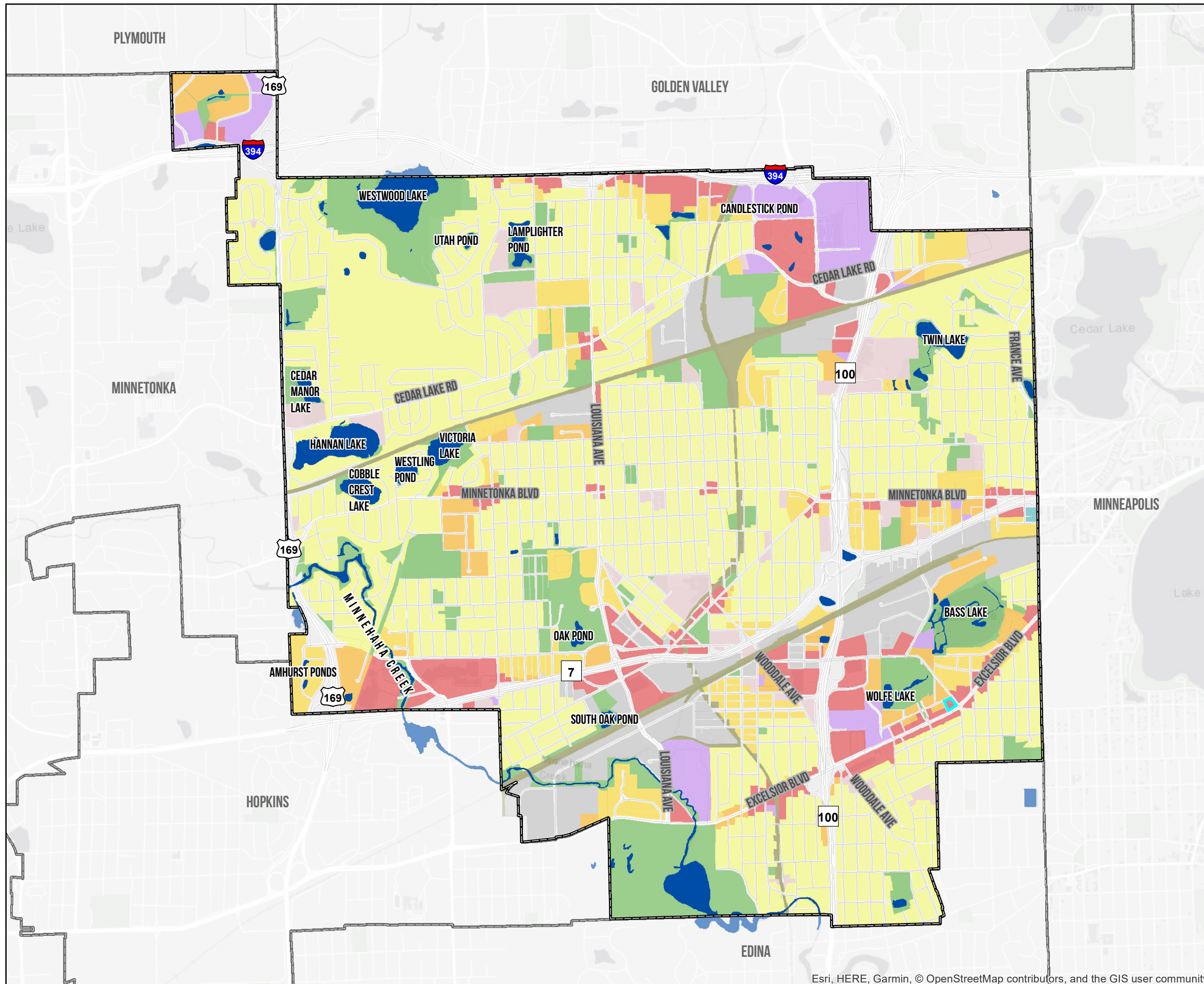
**FIGURE 2-15:
EXISTING LAND USE**

LEGEND

-  Civic
-  Commercial
-  Industrial
-  Mixed Use
-  Office
-  Parks and Open Space
-  Low Density Residential
-  Medium Density Residential
-  High Density Residential
-  Right-of-Way
-  Railroad
-  Lakes
-  City Boundary



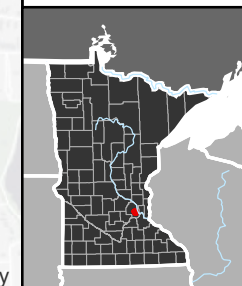
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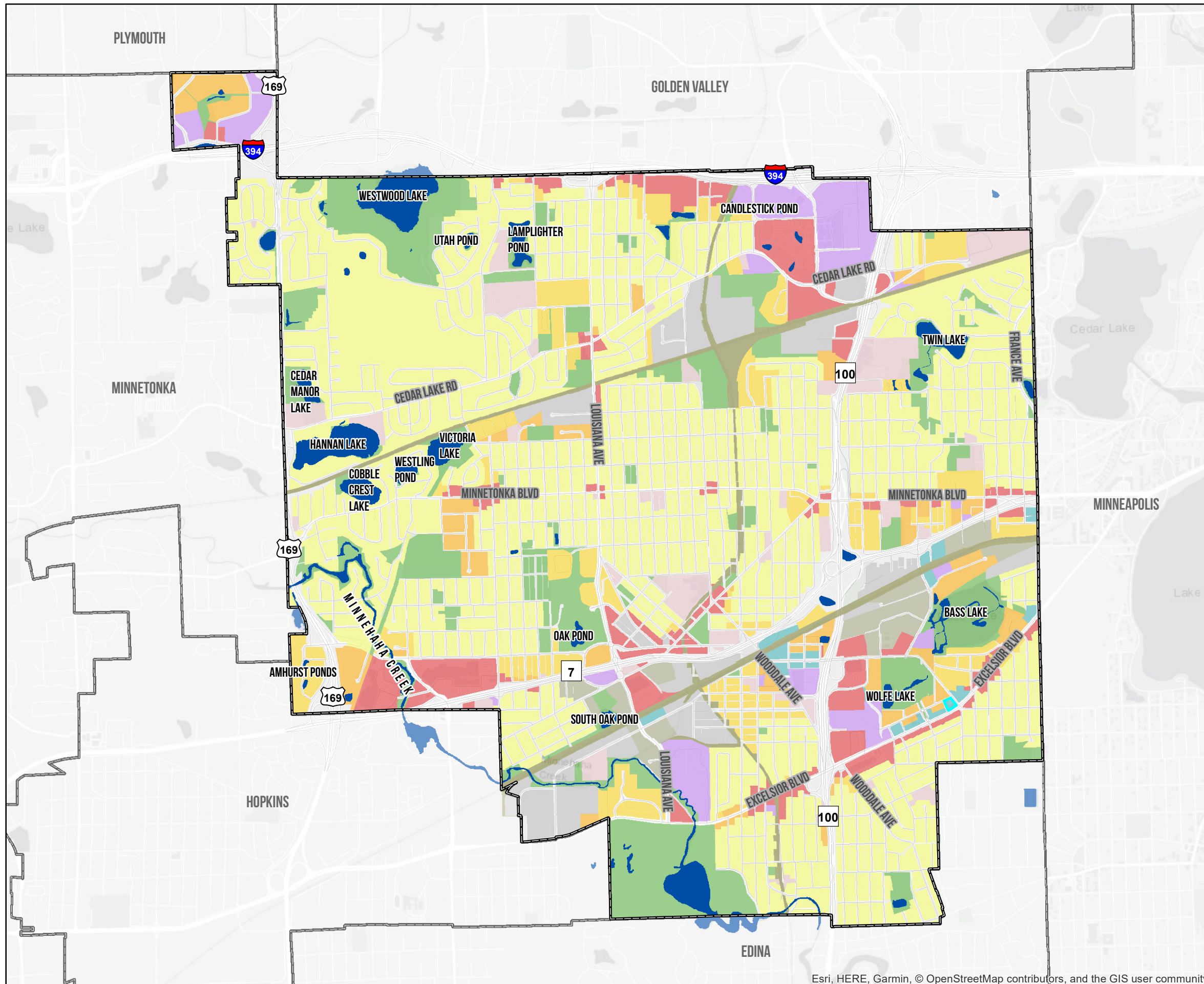
**FIGURE 2-16:
FUTURE LAND USE**

LEGEND

-  Business Park
-  Civic
-  Commercial
-  Industrial
-  Mixed Use
-  Office Park
-  Park and Open Space
-  Low Density Residential
-  Medium Density Residential
-  High Density Residential
-  Right-of-Way
-  Railroad
-  Lakes
-  City Boundary



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Chapter 3.0 Existing and Potential Water Resource-Related Problems

City of St. Louis Park Surface Water Management Plan

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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)

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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 | | | | |
|-----------------|----------------------|-------------|---------------------|-------|------------|-----|-----|
| | | | High | Moist | Mid | Dry | Low |
| 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 | 588 | 285 | 104 | 28 | 8 |
| Lake Hiawatha | Phosphorus | Individual | 333 lbs./yr. | | 3 lbs./day | | |

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| 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

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- 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.

3.0 Existing and Potential Water Resource-Related Problems

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 |

3.0 Existing and Potential Water Resource-Related Problems

| 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.

CHAPTER 4.0 Goals and Policies

City of St. Louis Park Surface Water Management Plan

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Chapter 4.0 Goals and Policies

This chapter presents the goals and policies developed for the management of water resources within St. Louis Park. Goals are provided for water quality, flood control, groundwater protection, and erosion and sedimentation control. Goals propose the desired end, policies provide the means to achieve the goals, and ordinances allow for implementation of the policies. The implementation program discussed in **Chapter 5** provides more specific detail on how these goals and policies will be implemented.

4.1 Surface Water Quality

Goals:

1. Manage surface water resources within the City of St. Louis Park, with input from the public, so that the beneficial uses of wetlands, lakes, and streams remain available to the community, including aesthetic appreciation, wildlife observation, swimming, and boating.
2. Maintain or improve the quality of water in lakes, wetlands, streams, and rivers within or immediately downstream of the City of St. Louis Park.
3. Manage surface water on a regional basis to protect designated waterbodies and meet regional water quality standards in concert with the watershed organizations and the Metropolitan Council.
4. Reduce illicit discharge to the city's storm sewers and receiving waters.
5. Work to meet the phosphorous load reductions required by the city's NPDES permit, the BCWMC, and the MCWD for the City of St. Louis Park.

To work toward these goals, the City of St. Louis Park will do the following:

Policy 4.1.1: Work to meet or exceed all water-related regulations that apply as promulgated by the Federal Government, the State of Minnesota, Hennepin County, the Minnesota Pollution Control Agency (MPCA), the Bassett Creek Watershed Management Commission (BCWMC), Minnehaha Creek Watershed District (MCWD), and the Metropolitan Council.

Policy 4.1.2: Implement all aspects of the city's NPDES Phase- II MS4 permit SWPPP (see **Appendix B**) and nondegradation report (see **Appendix E**) as feasible.

Policy 4.1.3: Require development to comply with the conditions and policies of the city's SWPPP (see **Appendix B**), nondegradation report (see **Appendix E**), and the SWMP.

Policy 4.1.4: Continue to use the MCWD to permit activities within the city that fall under the jurisdiction of these agencies.

Policy 4.1.5: Coordinate with the BCWMC on the implementation of the BCWMC AIS Rapid Response Plan for Westwood Lake.

Policy 4.1.6: Cooperate with the MPCA, the BCWMC, the MCWD, and other stakeholders in the preparation and implementation of TMDL studies for waterbodies in the city or waterbodies that receive water directly from the city that are on the MPCA's current or future impaired waters [303(d)] list.

Policy 4.1.7: Cooperate with the WMOs in water quality monitoring, modeling, and planning to protect priority resources; provide city staff for surveying; provide information on storm drainage features, topographic information, and inventory data; serve as a liaison between the WMO and city residents; and implement prescribed education programs and BMPs.

Policy 4.1.8: Work with stakeholders to manage waterbodies and work toward attaining MPCA, BCWMC, MCWD, and city water quality goals.

Policy 4.1.9: Manage stormwater consistent with the water quality standards (see Chapter 2).

Policy 4.1.10: Work with the BCWMC and the MCWD to implement the WMO capital improvement programs based on feasibility, prioritization, and available funding.

Policy 4.1.11: Require that temporary and permanent stormwater basins incorporate recommendations from the Nationwide Urban Runoff Program (NURP).

Policy 4.1.12: Strive to meet water quality goals for phosphorus, bacteria and chloride and other pollutants of concern.

Policy 4.1.13: Review and maintain the water quality management classification (see Chapter 2) of the city's waterbodies.

Policy 4.1.14: Reduce phosphorus loading from development and redevelopment sites by 50 percent, in accordance with city and watershed management organizations standards/rules.

Policy 4.1.15: Explore the feasibility of providing regional stormwater treatment facilities to treat stormwater runoff from multiple redevelopment sites; if feasible, construct and/or install these facilities as opportunities arise and as funding allows; seek grants, cost-share funds, and so on from regional, state, and federal agencies as well as other sources (e.g., watershed management organizations) to support the funding of these projects.

Policy 4.1.16: Continue the cash-dedication policy requiring developers to pay into a fund to cover costs for the installation and/or construction of regional stormwater treatment facilities.

Policy 4.1.17: Promote a reduction in runoff rates from new developments.

Policy 4.1.18: Use existing natural retention and detention areas for stormwater management to maintain and/or improve existing water quality to the extent possible.

Policy 4.1.19: Continue to require BMPs such as wet and dry detention ponds, underground storage, bio-engineering techniques, infiltration basins, trenches, and rain gardens, as physical conditions allow.

Policy 4.1.20: Encourage homeowners to apply stormwater BMPs on their individual properties.

Policy 4.1.21: Update surface water quality modeling of major subwatersheds and diagnose potential problems, as resources allow.

Policy 4.1.22: Continue the implementation of procedures for site plan review that incorporate reduction of potential water quality impacts.

Policy 4.1.23: Work to reduce phosphorus (and other pollutants of concern) loading to receiving waters per requirements of the city's NPDES permit, the BCWMC, and the MCWD.

Policy 4.1.24: Continue to implement, inspect and enforce its ordinances and SWPPP tasks regulating illicit discharge to the stormwater system.

Policy 4.1.25: Update storm drainage systems based on appropriate surface water quantity and quality modeling, as opportunities allow; the design shall consider potential flood, wetland, and surface water quality impacts to upstream and downstream areas.

Policy 4.1.26: Ensure stormwater collection and management systems are maintained, as resources allow.

Policy 4.1.27: Inspect, maintain, operate, and clean structural, publicly owned BMPs such as sedimentation and detention structures as needed to preserve the intended performance.

Policy 4.1.28: Continue and develop a regular pond cleaning and dredging schedule.

Policy 4.1.29: Continue street-sweeping program and vacuum cleaning of settlement devices and manholes as described in the city SWPPP.

Policy 4.1.30: Adopt the lake classification scheme and set goals according to the information provided in Chapter 2.

Policy 4.1.31: Coordinate with the BCWMC and MCWD to develop a comprehensive chloride management plan as part of the city's SWPPP compliance efforts.

4.2 Streams

Goals:

1. Maintain or enhance the natural beauty, public access, and wildlife habitat value of the Minnehaha Creek running through St. Louis Park.
2. Implement stream restoration measures in partnership with MCWD wherever feasible to maintain health, safety, and ecological integrity.
3. Minimize the volume of stormwater runoff entering streams.

To work toward these goals, the City of St. Louis Park will do the following:

Policy 4.2.1: Continue to evaluate opportunities to enhance recreational opportunities and access to streams.

Policy 4.2.2: Reduce areas of impervious surfaces by considering changes to city ordinances and policies; encourage the use of innovative materials to reduce impervious surfaces and enhance infiltration.

Policy 4.2.3: Implement a streambank stabilization program using bioengineering and natural products in partnership with the WMOs as opportunities arise.

Policy 4.2.4: Cooperate with the MCWD on the implementation of stream restoration projects.

4.3 Wetlands

Goal:

1. Protect and restore wetlands to improve or maintain their functions and values in accordance with the Minnesota Wetland Conservation Act and the city's Wetland Management Plan.

To work toward these goals, the City of St. Louis Park will do the following:

Policy 4.3.1: Continue to defer LGU authority for administration of the Wetland Conservation Act (WCA) to the MCWD and BCWMC.

Policy 4.3.2: Manage wetlands in a way that is consistent with the city's Wetland Management Plan (see **Appendix D**) and other local, state, and federal wetland regulations.

Policy 4.3.3: Maintain and periodically update the wetland inventory data and the wetland management classifications provided in the St. Louis Park Wetland Management Plan (see **Appendix D**).

Policy 4.3.4: Work to achieve zero net loss of wetland quantity, quality, and biological diversity.

Policy 4.3.5: Work to protect wetlands from chemical, physical, biological, or hydrological changes so as to prevent significant adverse impacts to the following designated wetland functions: maintaining biological diversity, preserving wildlife habitat, providing recreational opportunities, erosion control, groundwater recharge, low flow augmentation, stormwater retention, stream sedimentation, and aesthetic enjoyment, as specified in Minnesota Rules 7050.

Policy 4.3.6: Improve or enhance wetlands when feasible.

Policy 4.3.7: Require that the normal elevation of all wetlands be maintained at the existing invert elevation level or at the established wetland elevation level.

Policy 4.3.8: Require avoidance of wetland hydrologic impacts by maintaining proper inundation periods and storm bounce.

Policy 4.3.9: Continue to coordinate with other agencies involved in the protection of wetlands.

4.4 Surface Water Quantity and Flooding

Goals:

1. Manage the rate and volume of runoff entering rivers, streams, lakes, and wetlands within the City of St. Louis Park.
2. Manage floodplain areas to minimize flooding and protect and restore the functions of the floodplain.
3. Protect the public from flooding through measures that ensure public safety and prevent inundation of occupied structures.
4. Minimize flooding potential in a cost-effective manner.

To work toward these goals, the City of St. Louis Park will do the following:

Policy 4.4.1: Require that stormwater conveyance systems, in design and function, follow the standards and criteria specified by the city engineer.

Policy 4.4.2: Manage the rate and volume of runoff in general accordance with the stormwater management criteria set by the BCWMC and the MCWD and as presented in this SWMP.

Policy 4.4.3: Continue to use the MCWD to permit activities within the city that fall under the jurisdiction of these agencies.

Policy 4.4.4: Require new and redevelopment to apply best management practices to reduce the rate and volume of stormwater runoff to the maximum practical extent.

Policy 4.4.5: Promote and support a reduction in runoff volumes and seek opportunities to retrofit sites under redevelopment with low impact development techniques.

Policy 4.4.6: Consider assuming authority for the three county ditches (#14, #17, and #29) located within the City of St. Louis Park.

Policy 4.4.7: Maintain, clean, and replace public storm drainage systems as needed to preserve the design capacity, as feasible.

Policy 4.4.8: Seek opportunities to reduce flows in storm drainage systems that experience capacity problems (i.e., through reductions in stormwater runoff rates and volumes).

Policy 4.4.9: Require owners of private stormwater systems to maintain, clean, and replace systems as needed to preserve design capacity.

Policy 4.4.10: Notify the BCWMC of any proposed maintenance to Westwood Lake, which is part of the BCWMC's designated trunk system.

Policy 4.4.11: Allow outlets from landlocked basins only when such outlets are consistent with state and federal regulations and when the downstream, riparian, and habitat impacts of such outlets have been analyzed and no detrimental impacts have resulted.

Policy 4.4.12: Review development and redevelopment proposals for consistency with this plan.

Policy 4.4.13: Continue to implement its Floodplain District ordinance (Chapter 36, Article IV, Division 9) and manage activities within the floodplain in accordance with state and federal regulations as well as criteria set by the BCWMC and the MCWD.

Policy 4.4.14: Require all new permanent structures located within or around the 100-year floodplain to meet the following minimum building elevations outlined in the Floodplain District ordinance (Chapter 36, Article IV, Division 9) and BCWMC's standards.

Policy 4.4.15: Continue to participate in the National Flood Insurance Program and seek opportunities to improve the City's level of flood protection and readiness.

Policy 4.4.16: Maintain zero net loss of floodplain storage and manage floodplains to maintain critical 100-year flood storage volumes.

Policy 4.4.17: For areas within the city where the city's modeled flood elevation is higher than the established Flood Insurance Study elevation, use the city's designated floodplain elevation for the application of floodplain regulations.

Policy 4.4.18: Evaluate flood control in conjunction with minimization of impacts to wetland areas and surface water quality management.

Policy 4.4.19: Continue to prohibit expansion of existing nonconforming land uses within the floodplain unless they are fully floodproofed in accordance with existing codes and regulations.

Policy 4.4.20: Obtain flood and drainage easements as well as easements for maintenance access and emergency overflow routes during development and/or building permit processes.

Policy 4.4.21: Correct existing flooding problems within available funding constraints by upgrading the storm drainage system, flood protection, or acquiring the property; develop and follow operation and maintenance plans to minimize flooding potential around landlocked areas.

Policy 4.4.22: Assist the BCWMC, the MCWD, and other agencies with development and distribution of educational materials or support programs that provide information regarding floodplain locations, protection, and floodplain land use and land alteration restrictions.

Policy 4.4.23: Review and update the city's floodplain ordinance to be consistent with the requirements of the watershed management organizations and this plan.

4.5 Groundwater

Goal:

1. Protect groundwater quality and quantity to preserve it for sustainable and beneficial purposes.
2. Manage surface water runoff to meet requirements for groundwater protection from Hennepin County, the MPCA, and/or the MDH.

To work toward these goals, the City of St. Louis Park will do the following:

Policy 4.5.1: Continue implementation of the City of St. Louis Park Wellhead Protection Plan (WHPP).

Policy 4.5.2: Cooperate with the Minnesota Department of Health (MDH), Hennepin County, and other agencies to periodically assess the vulnerability of groundwater used for drinking water supplies.

Policy 4.5.3: Promote the infiltration of stormwater and resulting groundwater recharge where it is feasible and does not pose a threat to groundwater quality; develop infiltration systems in accordance with the MDH's Evaluating Proposed Storm Water Infiltration Projects in Vulnerable Wellhead Protection Areas (2007), and the MPCA's Minnesota Stormwater Manual (2005) for guidance for potential stormwater hotspots.

Policy 4.5.4: Work to see that groundwater quality is not sacrificed to manage surface water; design holding ponds, wetlands, and other surface water storage areas to protect groundwater.

Policy 4.5.5: Avoid watershed diversion to sustain water levels in other watersheds and surface water.

Policy 4.5.6: Cooperate with Hennepin County Health Department to ensure that abandoned wells are properly sealed according to the MDH Well Code.

Policy 4.5.7: Cooperate with other agencies to promote and coordinate groundwater monitoring and inventorying.

Policy 4.5.8: Cooperate with efforts to educate the general public concerning the importance and proper use of BMPs to prevent contamination of groundwater supplies.

Policy 4.6.9: Share groundwater elevation data with WMOs.

4.6 Erosion and Sedimentation

Goal:

1. Prevent sediment from entering the city's surface water resources and to minimize and control the erosion and sedimentation in drainageways within the city.

To work toward this goal, the City of St. Louis Park will do the following:

Policy 4.6.1: Require land use planning and development that minimizes sediment yield through compliance with established city, BCWMC, and MCWD policies.

Policy 4.6.2: Continue to require and review erosion and sedimentation control plans for all new development and redevelopment to ensure consistency with the NPDES General Stormwater Permit for Construction Activity, MPCA's Minnesota Stormwater Manual (2008 update), the city's NPDES MS4 Permit and Storm Water Pollution Prevention Program, and the city's erosion control ordinance (Chapter 12, Division, Article V, Sections 12–156), as amended.

Policy 4.6.3: Continue to actively administer the program for controlling sediment erosion from single-family home construction sites.

Policy 4.6.4: Inspect construction sites and provide enforcement for conformance to the site's approved erosion and sediment control plans.

Policy 4.6.5: Continue its program to control construction site debris storage and waste disposal.

Policy 4.6.6: Continue to enforce its tree protection ordinance.

Policy 4.6.7: Continue and enhance its street-sweeping program.

Policy 4.6.8: Require the installation of treatment devices or other devices that do not flush sediment during large precipitation events in lieu of sump manholes, where appropriate.

4.7 Recreation, Habitat, and Shoreland Management

Goals:

1. Maintain and enhance recreational facilities within St. Louis Park.
2. Protect and enhance fish and wildlife habitats within St. Louis Park.
3. Preserve or enhance the ecological function of shoreland areas within St. Louis Park.

To work toward these goals, the City of St. Louis Park will do the following:

Policy 4.7.1: Work to support, to the extent practical, the efforts of the MnDNR, the COE, EPA, and the USFWS in promoting public enjoyment and protection of fish, wildlife, and recreational resource values in the watershed.

Policy 4.7.3: Encourage landowners to maintain wetlands, open spaces, and natural areas for the benefit of wildlife, recreations, and aesthetics.

Policy 4.7.4: Continue to seek opportunities to enhance and restore wetlands based on its Wetland Management Plan.

Policy 4.7.5: Require infiltration of runoff from developed and redeveloped areas creating new impervious surfaces.

Policy 4.7.6: Prevent fertilizers from entering waters through planting vegetation, creating berms, and/or altering grades.

Policy 4.7.7: Limit excavation and grading activities near waterbodies.

Policy 4.7.8: Prevent the water resource impacts of development and redevelopment by requiring appropriate structure setbacks from water.

Policy 4.7.9: Encourage riparian vegetation along creeks, streams, and wetlands.

Policy 4.7.10: Maintain, enhance, and provide new open spaces and/or habitats as part of wetland creation or restoration, stormwater facility construction, development, redevelopment, and other appropriate projects.

4.7.11: Encourage compliance with the state of Minnesota's Shoreland Management requirement through implementation of the city stormwater management design guidelines in Appendix M.

4.8 Education and Public Involvement

Goals:

1. Involve and educate the residents of the city in water-resource-related issues.
2. Offer programs, educational opportunities, and information that facilitate an understanding of water resource issues in St. Louis Park and downstream.

To work toward these goals, the City of St. Louis Park will do the following:

Policy 4.8.1: Continue the educational components outlined in the city's Stormwater Pollution Prevention Program via regular articles in the city newsletter, instructional classes at local schools, presentations to neighborhood groups and businesses, and via the city's website.

Policy 4.8.2: Develop and implement a strategic education program that identifies key water resource stakeholder groups and outlines an educational strategy for each group.

Policy 4.8.3: Continue to support and facilitate existing volunteer programs in St. Louis Park such as the CAMP, the Volunteer Stream Monitoring Program (VSMP), and the WHEP.

Policy 4.8.4: Seek new opportunities for collaboration with volunteer groups.

Policy 4.8.5: Continue and improve the surface water quality monitoring program for city lakes and streams.

Policy 4.8.6: Educate St. Louis Park residents about household BMPs to protect the city's water resources.

4.9 Funding

Goal:

1. Provide sufficient funding to implement measures and policies contained in this plan.

To work toward this goal, the City of St. Louis Park will do the following:

Policy 4.9.1: Continue to use a combination of funding sources to fund the stormwater-related activities identified in this plan. The city will use its stormwater utility fee for stormwater infrastructure maintenance and repair, implementation of the city's NPDES Phase-II MS4 SWPPP requirements (including education), and implementation of larger projects (e.g., flood mitigation, pipe replacement), as funding allows. The city will use its general fund, bonds, and funding from other sources (e.g., developers, tax increment financing, state aid funds, grants) to complete larger projects. In situations where funding is inadequate, the city will defer the proposed projects.

Policy 4.9.2: Consider increasing stormwater utility fees to increase the available funding for implementation of stormwater-related activities.

Policy 4.9.3: Seek grant programs to leverage city contributions.

Chapter 5.0 Implementation Program

City of St. Louis Park Surface Water Management Plan

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Chapter 5.0 Implementation Program

This chapter provides details of the City of St. Louis Park's programs and regulations that affect water resources management within the city. The plans, ordinances, and programs referenced in this chapter are intended as a resource for staff, residents, and people doing business in St. Louis Park.

This chapter describes the City of St. Louis Park's implementation program addressing the issues identified in the SWMP, including operation and maintenance of the stormwater system, education and public involvement, funding of the implementation program, design standards, ordinance implementation and official controls, and potential projects, and the implementation program.

5.1 Water Quality/NPDES Phase- II MS4 Permit

The City of St. Louis Park is federally required to obtain and maintain an MS4 permit and SWPPP for managing nonpoint source stormwater discharge. During each year of the five-year permit cycle, the city must hold an annual public meeting. At this meeting, the city distributes educational materials and presents an overview of the MS4 program and the city's SWPPP. The city also solicits oral and written statements and considers them for inclusion into the SWPPP. The city must submit an annual report to the MPCA. This annual report summarizes the following:

- **Status of Compliance with Permit Conditions:** The annual report contains an assessment of the appropriateness of the BMPs and the city's progress toward achieving the identified measurable goals for each of the minimum control measures. This assessment is based on results collected and analyzed, inspection findings, and public input received during the reporting period.
- **Work Plan:** The annual report lists the stormwater activities that will be undertaken in the next reporting cycle.
- **Modifications to the SWPPP:** The annual report identifies any changes to BMPs or measurable goals for any of the minimum control measures.
- **Notice of Coordinated Activities:** A notice is included in the annual report for any portions of the permit for which a government entity or organization outside of the MS4 is being utilized to fulfill any BMP contained in the SWPPP.

The SWPPP BMP implementation program is incorporated into the city's overall stormwater implementation and maintenance programs, as presented in Table 5-1 and **Appendix B**.

5.2 Operation and Maintenance of Stormwater Systems

The City of St. Louis Park is responsible for maintenance of its stormwater system, which includes pipes, constructed ponds, pumps, lakes, wetlands, ditches, swales, and other drainageways.

Other units of government are responsible for maintaining the stormwater systems under their control. MnDOT is responsible for maintaining the storm sewers located along Interstate 394, Highway 7, Highway 100, and Highway 169. Hennepin County is responsible for maintaining ditches, culverts, storm sewer catch basins, and leads in county roads such as Minnetonka Boulevard (CR 5), Excelsior Boulevard (CR 3), and CR 25 (old Highway 7 east of Highway 100), but the city is responsible for maintaining the trunk storm sewer lines.

Owners of private stormwater facilities are responsible for properly maintaining their facilities, so they remain consistent with the original performance design standards. The city also requires maintenance agreements for private stormwater facilities, as outlined in the city's Stormwater, Soil Erosion, and Sedimentation ordinance (Environmental and Public Health 12-151).

City crews sweep the city streets at least twice each year, once in early spring (April) and then again in the autumn after the leaves fall. Critical streets and direct deposit areas are swept more frequently on an as-needed basis. Additional street sweeping of other areas is performed as needed and as resources allow. The city (or its contractor) also cleans out accumulated sediment from storm sewers.

For safety reasons and to prevent pipe plugging, trash racks are typically installed on storm sewer and culvert inlets. These trash racks prevent people from entering the pipes and keep large debris from becoming lodged in the pipes. If not inspected and maintained, the trash racks can become plugged with debris such as branches, leaves, and other materials carried by storm flows. Plugged or even partially plugged trash racks can result in additional flooding. The city recognizes the importance of periodic removal of collected debris from its trash racks and inlets.

Stormwater ponding and water quality treatment facilities perform a desirable function by settling sediment out of the stormwater. However, if accumulated sediments are not periodically removed, such basins can experience a significant loss in necessary stormwater detention capacity, sediment storage volume, and groundwater recharge. Therefore, the City of St. Louis Park will periodically inspect stormwater storage basins and water quality treatment facilities to look for excessive sediment buildup and collected debris. If problems are noted, maintenance is ordered and performed.

For sedimentation basins, the thresholds for maintenance are triggered once sediment deposition reaches a point greater than is allowed under the design's standard criteria or when such deposition begins to have a substantial effect on the water quality or holding capacity of the pond. For planning purposes, it is often assumed that such dredging may occur every 10 to 20 years. However, basins that treat runoff from construction or redevelopment areas may need to be cleaned more frequently due to the increased quantity of sediment loads.

In general, vegetation in existing ponding facilities should be allowed to grow naturally on the side slopes of the basins and should not be mowed. This practice allows ponding facilities to act like natural wetland areas by providing nearby upland wildlife with proper habitats.

Riprap areas along banks, in overflow swales, or around storm sewer or culvert outlets frequently need maintenance due to vandalism, natural degradation, or a combination thereof. Riprap is placed in those locations to prevent damage that would result from highly erosive flow velocities. If not periodically maintained, erosion will occur, resulting in pipe damage, downstream sediment problems, and potential safety issues. The city will inspect riprap areas as part of its regular stormwater outfall inspections (as governed by the MS4 permit) and perform the necessary maintenance.

The city maintains information about stormwater facilities to assist in determining maintenance requirements. The city will notify owners of public and private stormwater facilities of the need to conduct periodic maintenance as part of the private maintenance agreements.

The city will continue and expand upon its operation and maintenance activities to ensure that the city's stormwater system functions as designed (see **Appendix B**). The city also performs a host of good housekeeping BMPs aimed at pollution prevention. In addition, they periodically assess the performance of maintenance programs (in compliance with SWPPP requirements) and revise maintenance programs or develop new maintenance practices as necessary. The city's stormwater maintenance strategy will continue to be assessed with respect to the goals and standards of the MCWD, the BCWMC, Hennepin County, and applicable regulatory agencies.

5.3 Specific WMO Tasks

The BCWMC and MCWD Comprehensive Water Resources Management Plans require the City of St. Louis Park to address specific items as part of this SWMP's implementation program (see Table 5-2).

5.4 Education and Public Involvement

During the update of this SWMP, the city hosted an open house, conducted a survey, and facilitated a "water and coffee" discussion, all of which was focused on engaging the public and acquiring input from residents about what they know, what they wanted to know, and how they wanted to be reached in the future. The information gleaned from those connections directly influenced updates to the City of St. Louis Park's education and communication programs. Specifically, as a result, the city will develop and distribute an electronic newsletter, continue building its social media presence, and produce articles for the local newspapers on natural resources successes and challenges. Details about the educational program and plan can be found in the city's SWPPP, which is presented as **Appendix B** of this SWMP.

The city's website is located at: www.stlouispark.org

5.5 Cost of Implementation Program

The estimated costs of the individual elements of the City of St. Louis Park's stormwater implementation program are included in Table 5-1 and [Appendix B](#).

5.6 Funding of Implementation Program

This section discusses the city's existing and possible future mechanisms for funding its implementation program. The city intends to use stormwater utility as the primary funding source for stormwater system operation and maintenance as well as for most stormwater-related projects and studies. Additional funding sources might be used when deemed appropriate or necessary. If funding is not available, the city will defer certain projects to a later date.

5.6.1 Stormwater Utility

Minnesota Statute 444.075 allows cities to establish and implement stormwater utilities. Under a utility system, a stormwater utility fee is charged against all parcels within the city. The fees are usually proportionate to the amount of runoff each parcel of land contributes to a drainage system, often determined by the amount of impervious area per parcel. Many cities currently use this funding mechanism, including the City of St. Louis Park. The city's stormwater utility fee is designed to be used for routine maintenance and repairs to the stormwater system, investigative studies, education programs, and to review and/or revise city ordinances. This will be used to pay for as many stormwater projects as possible.

5.6.2 Other Funding Sources

5.6.2.1 General Taxes

The City of St. Louis Park provides additional funds for stormwater system operation and maintenance through the use of general tax funds. The city's general fund is used to pay for elements of stormwater system maintenance and occasional one-of projects. Typical maintenance tasks include street sweeping and storm sewer cleaning. Maintenance is part of the city's street budget. The city intends to avoid large increases in general tax funds applied to stormwater system maintenance and improvement.

5.6.2.2 Ad Valorem Taxes

Although not proposed at this time, other special taxing authorities are available, such as those via Minnesota Statute 103B.241, which allows the city to levy a tax to pay for projects identified in the city's surface water management plan. The city may accumulate these levy proceeds as an alternative to issuing bonds to finance projects. Minnesota Statute 103B.245 allows the city to establish a watershed management tax district in the city to pay for water management facilities described in the plan (including maintenance). The tax district must be established by an ordinance and must be included in the city's plan. Similar to Minnesota Statute 103B.241, this statute allows the city to either accumulate funds or issue bonds to pay for these important projects.

5.6.2.3 Special Assessments

Special assessments can be used to finance special services, ranging from maintenance to construction improvement projects, and are levied against properties benefiting from the special services. The philosophy of this method is that the benefited properties pay in relation to the benefits received. The city does not typically use special assessments to pay for stormwater projects. The disadvantages of using special assessments include the difficulty of determining and proving the benefits of these projects, the city's relative inability to assess runoff contributions, and many rigid procedural requirements.

5.6.2.4 Watershed Funding

The BCWMC funds capital improvement projects that are identified in the BCWMC capital improvement program. These projects are constructed by member cities. The member cities are reimbursed for these projects by the BCWMC.

5.6.2.5 State Funding Sources

In addition to stormwater utility fees, taxes, assessments, and the other funding sources, the City of St. Louis Park could obtain funding from various state sources, such as grant and loan programs. The following paragraphs list various state-funded sources grouped according to the state agency that administers the various funding programs.

The BWSR administers several grant programs, some of which could be applied to cities. Applicable BWSR grant programs include Clean Water Legacy (CWL) funding and local water management challenge grants (Minnesota Statute 103B.3369). Other applicable programs include cost-share grants and special projects or "turn-back" monies, but BWSR funding is available only through the local soil and water conservation district (SWCD).

The MPCA administers the CWL fund program, Watershed Resource Restoration grants (EPA-funded Section-319 program), and the Minnesota Water Pollution Control Revolving Loan Fund.

The MnDNR administers many grant programs that could be appropriate for the City of St. Louis Park, including the Flood Hazard Mitigation Grant Assistance Program, local grants program, trail grants program, the cooperative water recreation program, and dam safety program. However, funding for many of these programs changes after each legislative session. The MnDNR prepares individual fact sheets for each grant program.

Other state funding programs include the Legislative-Citizen Commission on Minnesota Resources (LCCMR) funds for nonurgent demonstration and research projects, the Minnesota Department of Trade and Economic Development's Contaminant Cleanup Development Grant Program, the Minnesota Department of Transportation State Aid Funds, and federal transportation funds.

5.6.2.6 Federal Funding Sources

The City of St. Louis Park could also receive funding from various federal sources, a few of which are discussed in the following paragraphs.

The EPA has discretionary funds available through each division and program area and administers the Clean Lakes Program (CLP), which was established by Section 314 of the Clean Water Act; the CLP is similar to the MPCA's CWP program. The EPA also administers the 604b grant program, which targets water quality improvements in urban areas, and the Environmental Education Grant, which finances local environmental education initiatives.

The COE administers the Planning Assistance to States (section 22) Program, the Project Cooperation Agreement (PCA) Program, also known as the LCA (Local Cooperation Agreement) Program for construction of flood control projects, the Section-14 Bank Protection Program, the Flood Plain Management Services Program, and the Aquatic Plant Control Program, and it provides many GIS products through its Army Geospatial Center.

The U.S. Fish and Wildlife Service administers the North American Wetlands Conservation Fund as part of the North American Wetlands Conservation Act (NAWCA).

The Natural Resource Conservation Service (NRCS) has funds available for technical assistance on various surface water projects, operations, maintenance, inspections, and repairs. The NRCS also administers the Environmental Quality Incentives Program (EQIP), which was established through the 1996 Farm Bill Program.

The Federal Emergency Management Agency (FEMA) has funds available to restore areas (including water resources) that have been damaged or destroyed by a disaster and proactively prepare for future floods by buying out repetitively flooded homes.

5.6.2.7 Private Funding Sources

In addition to state and federal funding sources, some private funding sources may be available.

Ducks Unlimited and Pheasants Forever funds are available for projects that enhance, create, or protect waterfowl or pheasant habitats.

Individual entities that want to provide wetland mitigation in compliance with the WCA may have funds and/or technical resources available to them to restore or create wetland function and value that is lost or is intended to be destroyed.

5.6.3 Levy Limit Constraints

The city's stormwater utility fee funds routine maintenance and repairs to the stormwater system, investigative studies, education programs, and stormwater projects. Additionally, some elements of regular stormwater system maintenance are funded by general tax funds (i.e., property taxes). The city hopes to avoid increasing the amount of general tax funds used for stormwater-related tasks. The city also seeks to avoid using ad valorem taxes or special assessments to pay for stormwater projects.

5.6.4 Effect on Other City Funding Needs

The stormwater utility fee can sometimes provide assistance in financing stormwater capital improvements as resources allow. However, if funding from the stormwater utility is

insufficient to complete proposed stormwater projects, those projects will be deferred to a later date, when possible, to avoid drawing from the general tax fund or special assessments.

5.6.5 Impact on Households

The city's stormwater utility generated approximately \$2.8 million in 2017. The stormwater utility rates vary by land use but include a rate of \$21.83 per quarter per single-family residence. The city plans to increase the stormwater utility rates in the future based on planned 10-year programming and capital project needs.

5.7 Local Controls and Regulatory Responsibilities

The City of St. Louis Park actively manages stormwater to protect life, property, waterbodies within the city, and receiving waters downstream of the city. It creates and implements regulatory programs that accomplish these aims and intends to continue the implementation of the regulations and programs contained in this section.

The city is nearly fully developed, and as such, most of the changes occurring within the city that may impact stormwater management will proceed in the form of redevelopment.

Redevelopment will provide the primary opportunity to upgrade the city's stormwater management system, restore and improve natural resources, and add or expand recreational opportunities. The city will continue to be proactive in using the controls at its disposal to ensure that opportunities presented by redevelopment to improve the stormwater systems and implement the policies of this plan are not lost.

All redevelopment occurring within the City of St. Louis Park must also comply with the standards and rules established by the MCWD and the BCWMC. The city has also established policies designed to promote stormwater system improvements through redevelopment. The city will seek opportunities to retrofit sites under redevelopment with low-impact development techniques, and it continues to require BMPs, such as wet and dry detention ponds, underground storage, bioengineering techniques, infiltration basins, trenches, and rain gardens, as physical conditions allow. The highly developed nature of the city limits opportunities for stormwater system enhancements. Despite this, the city will continue to evaluate the feasibility of regional ponding facilities designed to treat runoff.

Regulations and land use controls used by the city including water resource-related plans, ordinances, standards, guidelines, and permits are presented below.

- The St. Louis Park NPDES Phase-II MS4 Stormwater Pollution Prevention Program (2008)— (see **Chapter 5.1** and **Appendix B**)
- The Wetland Management Plan (see **Appendix D**)
- Floodplain Management Regulations (see **Appendix J**)
- Development and redevelopment performance standards (See **Appendix M1** - Erosion and Sediment Control Plans Guidelines and **Appendix M2** - Stormwater Management Requirements)

- City of St. Louis Park, Minnehaha Creek Watershed District and Bassett Creek Watershed Management Commissions Coordination Plan Framework (see **Appendix N**)
- The St. Louis Park City Code of Ordinances
 - Zoning ordinance (Chapter 36, Division 11) which includes provisions for floodplain protection
 - Stormwater regulations (Chapter 12, Article V) including the following:
 - Erosion control requirements (Section 12-156)
 - Illicit connection and discharge (Section 12-157)
 - Stormwater construction and maintenance requirements (Section 12-158)
 - Wetland protection (Section 12-159)
 - Subdivision standards (Chapter 26)
 - Landscaping ordinance (Section 36-364) with tree protection and planting provisions
 - Fertilizer application regulation ordinance (Section 34-213)
 - Vegetation ordinance (Section 34-114)
 - Stormwater utility ordinance (Chapter 32, Article IV)

5.8 Implementation Program

The city maintains a 10-year CIP on municipal projects, including stormwater infrastructure rehabilitation, maintenance, and management. Every year, all aspects of the CIP are evaluated for relevance, priority, and budgetary considerations and adjusted accordingly. The process generally begins in April, with a review of the CIP by division leads in the engineering, parks and recreation, and public works departments as well as the city manager. This process takes approximately six weeks and concludes with a presentation to and approval by the city council. During the process, division leads and their community liaisons, reach out to their partners to discuss the status of existing opportunities and to identify new ones. This adaptive process allows the city to adjust the CIP for new opportunities and move others to different positions as St. Louis Park and its partners change their priorities. Table 5-1 provides a comprehensive list of the projects, studies, programs, and official controls that comprise the city's implementation program. Table 5-1 was developed by reviewing existing information, identifying potential and existing problems, developing goals and policies, and assessing the need for programs, studies, and/or projects, taking into consideration the needs identified by the MCWD and the BCWMC. Table 5-1 may require revision as new issues or needs arise. Such revisions may require a plan amendment (see **Chapter 1**).

Table 5-1: 2018–2027 Proposed Implementation Plan for the City of St. Louis Park, MN

| Project Name/Description | Cost | Year | Funding Source |
|---------------------------------------------------------------------------------------------------------------|-----------|----------|----------------|
| Program and Administration | | | |
| Review and update the CIP | \$5,000 | Annually | SWUF |
| Maintain hydrology and hydraulic (H&H) and water quality modeling tools | \$15,000 | Annually | SWUF |
| Maintain the stormwater system operations and maintenance program | \$500,000 | Annually | SWUF |
| Continue active participation in watershed management organizations' activities located within St. Louis Park | \$10,000 | Annually | SWUF |
| Review development and redevelopment plans | \$25,000 | Annually | SWUF |
| Maintain the Stormwater Education Program | \$5,000 | Annually | SWUF |
| Continue environmental programming at Westwood Hills Nature Center (WHNC) | \$350,000 | Annually | SWUF |
| Review and revise the education plan | \$2,000 | Annually | SWUF |
| Evaluate public education and outreach strategies | \$3,000 | Annually | SWUF |
| Implement and coordinate the communications plan | \$3,000 | Annually | SWUF |
| Facilitate the MS4 Employee Training Program | \$2,000 | Annually | SWUF |
| Participate in Clean Water Minnesota | \$ 3,000 | Annually | SWUF |
| Maintain the Rainwater Rewards Program | \$35,000 | Annually | SWUF |
| Coordinate household cleanup events | \$3,000 | Annually | SWUF |

5.0 Implementation Program

| Project Name/Description | Cost | Year | Funding Source |
|---------------------------------------------------------------------------------------------------------------------|-------------|----------|------------------|
| Coordinate and facilitate volunteer opportunities | \$5,000 | Annually | SWUF |
| Maintain the city's storm sewer map | \$15,000 | Annually | SWUF |
| Maintain the Regulatory Control Program | \$5,000 | Annually | SWUF |
| Maintain the Illicit Discharge Detection and Elimination Program | \$10,000 | Annually | SWUF |
| Coordinate illicit discharge inspection training and inspections | \$2,000 | Annually | SWUF |
| Host and facilitate illicit discharge webpage and reporting | \$3,000 | Annually | SWUF |
| Implement the Wellhead Protection Plan | \$50,000 | Annually | Operations /SWUF |
| Maintain Enforcement Response Procedures (ERP) | \$2,000 | Annually | SWUF |
| Review and revise the site plan review procedures | \$3,000 | Annually | SWUF |
| Coordinate and facilitate construction sites and erosion control inspections | \$15,000 | Annually | SWUF |
| Coordinate erosion control inspection training | \$5,000 | Annually | SWUF |
| Review and revise design and construction standards | \$3,000 | Annually | SWUF |
| Review and revise review and approval procedures | \$3,000 | Annually | SWUF |
| Coordinate development agreements | \$10,000 | Annually | SWUF |
| Coordinate and facilitate the long-term operation and maintenance of BMPs | \$25,000 | Annually | SWUF |
| Review impaired waters with approved total maximum daily loads (TMDLs) and applicable waste load allocations (WLAs) | \$10,000 | Annually | SWUF and Grants |
| Maintain the Municipal Operations and Maintenance Program | \$2,000,000 | Annually | Operations /SWUF |

| Project Name/Description | Cost | Year | Funding Source |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------|-------------------|
| Maintain the Municipal Street Sweeping Program | \$1,500,000 | Annually | Operations /SWUF |
| Conduct annual inspections of all structural pollution control devices | \$10,000 | Annually | SWUF |
| Continue the quarterly Stockpile, Storage, and Material Handling Program | \$3,000 | Annually | SWUF |
| Manage the Fertilizer, Pesticide, and Herbicide Application Program | \$5,000 | Annually | Parks / SWUF |
| Maintain the Street Deicing Program | \$150,000 | Annually | Operations /SWUF |
| Maintain the Fleet and Building Maintenance Program | \$400,00 | Annually | Facilities |
| Maintain the Hazardous Material Storage and Recycling Program | \$5,000 | Annually | Facilities |
| Assess stormwater treatment effectiveness | \$15,000 | Annually | SWUF |
| Coordinate facilities inventory | \$5,000 | Annually | Facilities / SWUF |
| Capital Improvement Projects | | | |
| Edgewood Business Park Project: This study will evaluate the significant flooding of the businesses and adjacent properties at Edgewood Avenue South near 23rd Street. The study area is known to experience excessive flooding of streets, parking lots, and businesses during large rainfall events. This study will examine options to prevent these businesses from being flooded from high rainfall events. The recommendations of this report will be incorporated into the design of the 2019 Pavement Management Project. | \$1,430,000 | 2018-2019 | SWUF |
| Sumter Pond Rehabilitation Project: The rehabilitation and maintenance plan presented in Stormwater Pond Evaluation and Prioritization Report (St. Louis Park, 2011) is based on current MPCA requirements aimed at improving the water quality of impaired waters. Specifically, the basis for this recommended capital improvement is the removal of suspended solids (sediment) and phosphorous from waters exiting the city. The engineering staff has updated the scope of the needs outlined in Stormwater Pond Evaluation and Prioritization Report (St. Louis Park, 2011). Engineering, permitting, and cost details have been updated to reflect current stormwater regulations and goals. This proposed work is necessary to provide for the continued and/or improved treatment of surface water as it flows through Sumter Pond. | \$275,000 | 2019 | SWUF |
| Wetland Inventory Update: This project consists of surveying and updating the city's wetland inventory and wetland management plan. | \$190,000 | 2019 | SWUF |

| Project Name/Description | Cost | Year | Funding Source |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------|----------------|
| <p>Aquila Park WQ Improvements Project: As a part of the 2018 Surface Water Management Plan Update, we have identified strategic opportunities for regional stormwater treatment across the city. The purpose of this project is to utilize existing public space in Aquila Park for stormwater treatment and volume control via infiltration. This project will provide stormwater treatment by trapping nutrients and sediments from the city’s storm sewer system as well as promoting stormwater volume reduction by the use of infiltration. This project will meet the City of St. Louis Park’s current requirements imposed by the MPCA and the MCWD, which are designed to improve the water quality of impaired waters. Specifically, the basis for this recommended capital improvement is the removal of suspended solids (sediment) and phosphorous from waters exiting the city, reducing the TMDL. This project is meant to properly maintain and/or improve our existing natural stormwater infrastructure.</p> | \$1,650,000 | 2020 | SWUF |
| <p>Klodt Pond WQ Project: This project, located near the Beltline Station area, may have some redevelopment credit potential. This project will remove accumulated sediment within the pond and review opportunities for stormwater filtration retrofit.</p> | \$165,000 | 2020 | SWUF |
| <p>Louisiana Station Area Project: The purpose of this project is to provide a water quality filter system in the area of the existing lift station at South Oak Pond and to remove phosphorus and sediment from the stormwater prior to being discharged into Minnehaha Creek. This project will help the city meet the future water quality standards (TMDL) for Minnehaha Creek as they pertain to the reduction of phosphorus and total suspended solids.</p> | \$90,000 | 2021 | SWUF |
| <p>Minnehaha Creek Equalizer Pipe Project: This meander of Minnehaha Creek was cut off before a rail line was constructed in the 1930s. The rail line was removed in the 1960s, and a sanitary sewer was installed along the same alignment. This area becomes inundated during periods of high water along the creek and overtops the existing berm, leaving the water no exit. The standing water become stagnant, produces algae, and emits odors that affect wildlife and adjacent residents. The project consists of installing one-direction equalizer pipes to the creek meander that was cut off years ago between Hillsboro Avenue and 31st Street to allow the area to reach water levels that will naturally equalize it.</p> | \$82,500 | 2021 | SWUF |

| Project Name/Description | Cost | Year | Funding Source |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------|----------------|
| <p>Louisiana Oaks and South Oak Pond WQ Project: South Oak Pond appears to have been excavated out of a historic wetland. By 1937, the region around South Oak Pond was already highly disturbed, with soil disturbance and numerous paved and unpaved road crossings, but it appears that the area that is now South Oak Pond was a historic wet meadow. It appears to have been hydrologically connected to the stream to the south. By 1957, perhaps under naturally wetter conditions, inundated conditions are more apparent, and the shape suggests it may have been excavated. Residential development had occurred in the immediate vicinity by this time. Surrounding soils consist of extensive “urban land-Udorthents, wet substratum, 0–2 percent slopes,” indicating that the area may have been a wetland or historic floodplain prior to development. The pond is mapped by NWI as a freshwater pond. Today, the shape of the pond is unnaturally triangular, further suggesting that if it were a historic wetland or natural pond, it may have been excavated to increase its capacity.</p> <p>The purpose of this project is to provide a water quality filter system in the area of the existing lift station at South Oak Pond to remove phosphorus and sediment from the stormwater prior to being discharged into Minnehaha Creek. This project will help the city meet the future water quality standards (TMDL) for Minnehaha Creek as they pertain to the reduction of phosphorus and total suspended solids.</p> | \$385,000 | 2021 | SWUF |
| <p>Westdale Sediment Basin Rehabilitation Project: This proposed work is necessary to provide for the continued and/or improved treatment of surface water as it flows through the Westdale sediment basin into Westwood Lake and beyond. The rehabilitation and maintenance plan presented in Stormwater Pond Evaluation and Prioritization Report (St. Louis Park, 2011) is based on current MPCA requirements that are aimed at improving water quality (impaired waters). Specifically, the basis for this recommended capital improvement is the removal of suspended solids (sediment) and phosphorous from waters exiting the city. This project is meant to address the need to properly maintain and/or improve our existing natural stormwater infrastructure.</p> | \$275,000 | 2021 | SWUF |
| <p>Ainsworth Park WQ Improvements Project: As a part of the 2018 Surface Water Management Plan Update modeling effort, we have identified strategic opportunities for regional stormwater treatment across the city. The purpose of this project is to utilize existing public space in Ainsworth Park for stormwater treatment and volume control by filtration and infiltration. This project will provide stormwater treatment by trapping nutrients and sediments from the city’s storm sewer system as well as promoting stormwater volume reduction by the use of infiltration. This project will meet the City of St. Louis Park’s current requirements imposed by the MPCA and the MCWD, which are designed to improve the water quality of impaired waters. Specifically, the basis for this recommended capital improvement is the removal of suspended solids (sediment) and phosphorous from waters exiting the city, reducing the TMDL. This project is meant to address the need to properly maintain and/or improve our existing natural stormwater infrastructure.</p> | \$1,650,000 | 2022 | SWUF |

| Project Name/Description | Cost | Year | Funding Source |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------|----------------|
| <p>Otten Pond Rehabilitation Project: Otten Pond appears to have been excavated out of a historic wetland. In 1937, historic aerial photography shows that the entire area was bounded by the roadways to the north and east. It appears to have been wet meadow that was hydrologically connected to the large wetland system to the southeast. By 1957, earthwork was occurring in this wet meadow, and the surrounding area was developed. Otten Pond remained as a shrubby, wooded wetland remnant. Today, the oblong shape of this pond clearly suggests that it was a man-modified excavation intended to provide drainage for the surrounding development. The soils are “urban land–Udorthents, 0–6 percent slopes,” which reflects the disturbed nature of native soils; the original soil type is not known. The pond is recognized by NWI as a freshwater pond. The topography is level around the pond, further suggesting this area was wet meadow prior to development. The level topography also allowed for the establishment and/or persistence of wetland hardwood and herbaceous species, which are present today around the perimeter.</p> <p>This proposed work is necessary to provide for continued and/or improved treatment of surface water as it flows through Otten Pond. The rehabilitation and maintenance plan presented in Stormwater Pond Evaluation and Prioritization Report (St. Louis Park, 2011) is based on current MPCA requirements aimed at improving water quality (impaired waters). Specifically, the basis for this recommended capital improvement is the removal of suspended solids (sediment) and phosphorous from waters exiting the city. This project is meant to properly maintain and/or improve our existing natural stormwater infrastructure.</p> | \$275,000 | 2022 | SWUF |
| <p>Shelard Sediment Basin WQ Improvement Project: In order to meet the city’s MS4 Stormwater Discharge permit and local water quality requirements, existing stormwater facilities must be regularly maintained, opportunities for retrofit and water quality improvements must be explored, and upland areas must be maintained. This project removes accumulated sediment within the pond and evaluates opportunities for stormwater filtration retrofit.</p> | \$82,500 | 2023 | SWUF |
| <p>Lamplighter Pond Rehabilitation Project: The purpose of this project is to provide a water quality filter system in the area of the existing lift station at South Oak Pond to remove phosphorus and sediment from the stormwater prior to being discharged into Minnehaha Creek. This project will help the city meet future water quality standards (TMDL) for Minnehaha Creek as they pertain to the reduction of phosphorus and total suspended solids. The rehabilitation and maintenance plan presented in Stormwater Pond Evaluation and Prioritization Report (St. Louis Park, 2011) is based on current MPCA requirements aimed at improving water quality (impaired waters). Specifically, the basis for this recommended capital improvement is the removal of suspended solids (sediment) and phosphorous from waters exiting the city. This project is meant to properly maintain and/or improve our existing natural stormwater infrastructure.</p> | \$220,000 | 2024 | SWUF |

| Project Name/Description | Cost | Year | Funding Source |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------|----------------|
| <p>Keystone Park WQ Improvement Project: This project will provide stormwater treatment by trapping nutrients and sediments from the city’s storm sewer system as well as promoting stormwater volume reduction by the use of infiltration. This project will meet the City of St. Louis Park’s current requirements imposed by the MPCA and the MCWD, which are designed to improve the water quality of impaired waters. Specifically, the basis for this recommended capital improvement is the removal of suspended solids (sediment) and phosphorous from waters exiting the city reducing the TMDL. This project is meant to properly maintain and/or improve our existing natural stormwater infrastructure.</p> | \$1,650,000 | 2024 | SWUF |
| <p>Lake Street Basin WQ Improvement Project: This project will provide stormwater treatment by trapping nutrients and sediments from the city’s storm sewer system as well as promoting stormwater volume reduction by the use of infiltration. This project will meet the City of St. Louis Park’s current requirements imposed by the MPCA and the MCWD, which are designed to improve the water quality of impaired waters. Specifically, the basis for this recommended capital improvement is the removal of suspended solids (sediment) and phosphorous from waters exiting the city reducing the TMDL. This project is meant to properly maintain and/or improve our existing natural stormwater infrastructure.</p> | \$1,650,000 | 2026 | SWUF |
| <p>Hampshire Pond WQ Improvement Project: To meet the city’s requirements for a MS4 Stormwater Discharge Permit and local water quality requirements, existing stormwater facilities must be regularly maintained, opportunities for retrofit and water quality improvements must be explored, and upland areas must be maintained. This project removes accumulated sediment within the pond and assesses opportunities for stormwater filtration retrofit.</p> | \$165,000 | 2027 | SWUF |
| <p>Webster Park WQ Improvement Project: As part of the 2018 Surface Water Management Plan Update, we have identified strategic opportunities for regional stormwater treatment across the city. The purpose of this project is to utilize existing public space in Webster Park for stormwater treatment and volume control by infiltration. This project will provide stormwater treatment by trapping nutrients and sediments from the city’s storm sewer system as well as promoting stormwater volume reduction by the use of infiltration. This project will meet the City of St. Louis Park’s current requirements imposed by the MPCA and the MCWD, which are designed to improve the water quality of impaired waters. Specifically, the basis for this recommended capital improvement is the removal of suspended solids (sediment) and phosphorous from waters exiting the city, reducing the TMDL. This project is meant to properly maintain and/or improve our existing natural stormwater infrastructure.</p> | \$1,650,000 | 2028 | SWUF |

Table 5-2: Watershed Management Organizations Specified SWMP Inclusion for the City of St. Louis Park, MN

| Required by | WMO Requirement | Addressed in SWMP |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| BCWMC | Local controls must be implemented within two years of adoption of the BCWMC Plan (September 2017). Two BCWMC policies require specific ordinances: floodplain standards in Policy 4.2.2-39 and shoreland regulations in Policy 4.2.8-80. Ordinances and/or controls may also be needed to appropriately implement the following BCWMC policies (the referenced BCWMC policies are included in an attached table): water quality: 4.2.1-3, 4.2.1-12, 4.2.1-13, 4.2.1-15; flooding and rate control: 4.2.2-29, 4.2.2-31, 4.2.2-32, 4.2.2-34, 4.2.2-35, 4.2.2-36, 4.2.2-38, 4.2.2-39; groundwater management: 4.2.3-48; erosion and sediment control: 4.2.4-51, 4.2.4-54, 4.2.4-55; stream restoration and protection: 4.2.5-64; wetland management: 4.2.6-65, 4.2.6-66, 4.2.6-68, 4.2.6-69; recreation, habitat, and shoreland management: 4.2.8-80, 4.2.8-89; and administration: 4.2.10-112, 4.2.10-113, 4.2.10-120, 4.2.10-121. | Chapters 1, 3 and 5 |
| BCWMC | The SWMP (also known as the LWMP) must outline the city's permitting process, including the preliminary and final platting process. The SWMP must describe the city's collaborative role in the BCWMC review of development and improvement projects, as described in Section 5.1.1.1 of the BCWMC Plan. | Chapter 1 |
| BCWMC | The SWMP must include an assessment of problems affecting the city that are identified in Section 3 of the BCWMC Plan. These issues are related to water quality, water quantity, flooding, floodplain management, erosion and sedimentation management, stream management, wetlands, habitats, shoreland areas, invasive species management, groundwater, education and outreach, and maintenance of stormwater systems. | Chapter 3 |
| BCWMC | The SWMP must include proposed corrective actions for issues identified in the SWMP. Proposed corrective actions must be consistent with the individual and collaborative roles of the BCWMC and the city at large. Corrective actions may include policies, action items, or implementation items within the SWMP. | Chapter 4; Appendices B, C, D, E and F |
| BCWMC | The SWMP must describe the city's existing and proposed ordinances, permits, and procedures addressing erosion and sediment control. | Chapters 3 and 4 |
| BCWMC | Goals, policies, and activities (e.g., strategies, actions) included in the SWMP must be consistent with the BCWMC goals and policies, as identified in Section 4 of the BCWMC Plan. Specific policies in the BCWMC Plan that should be included or referenced among SWMP policies, strategies, or actions include water quality: 4.2.1-3, 4.2.1-5, 4.2.1-11, 4.2.1-12, 4.2.1-13, 4.2.1-15, 4.2.1-16; flooding and rate control: 4.2.2-22, 4.2.2-23, 4.2.2-24, 4.2.2-29, 4.2.2-31, 4.2.2-32, 4.2.2-34, 4.2.2-35, 4.2.2-36, 4.2.2-38, 4.2.2-39; groundwater management: 4.2.3-48, 4.2.3-50; erosion and sediment control: 4.2.4-51, 4.2.4-54, 4.2.4-55, 4.2.4-56; stream restoration and protection: 4.2.5-62, 4.2.5-64; wetland management: 4.2.6-65, 4.2.6-66, 4.2.6-68, 4.2.6-69, 4.2.6-70, 4.2.6-72; public ditches: 4.2.7-77; recreation, habitat and shoreland management: 4.2.8-80, 4.2.8-85, 4.2.8-89; and administration: 4.2.10-106, 4.2.10-112, 4.2.10-113, 4.2.10-118, 4.2.10-119, 4.2.10-120, 4.2.10-121, 4.2.10-122. | Chapter 4 |

| Required by | WMO Requirement | Addressed in SWMP |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| BCWMC | The SWMP must assess the need for maintenance of local storm sewer systems under city jurisdiction, including public works facilities and natural conveyance systems. The SWMP must reference the city's responsibilities related to management of local storm sewer systems. (The SWMP may reference the city's MS4 permit if the current permit clearly describes the required information.) | Chapter 5; Appendix B |
| BCWMC | The SWMP must adopt the BCWMC waterbody classification system (as per Section 2.7.2.2 of the BCWMC plan). The LMWP must assess the need for a local waterbody management classification system and, if needed, correlate the system to the BCWMC waterbody classification system. | Chapter 2 |
| BCWMC | The SWMP must assess the need for other water quality and water quantity management programs, if necessary, in addition to existing programs already described in the SWMP (or included in the city's SWPPP and referenced in the SWMP). | Chapter 3; Appendix B |
| BCWMC | The SWMP implementation table shall include BCWMC projects located within the city, to the extent those projects are known. | Chapter 5, Table 5.1 |
| BCWMC | <p>The SWMP is required to conform to Minnesota Statute 103B.235. Minnesota Statute 103B.235 (Subp. 2) includes specific requirements for SWMP contents:</p> <ul style="list-style-type: none"> (a) Describe existing and proposed physical environment. (b) Define drainage areas and the volumes, rates, and paths of stormwater runoff existing and proposed physical environment. (c) Identify areas and elevations for stormwater storage adequate to meet performance standards established in the watershed plan. (d) Define water quality and water quality protection measures adequate to meet performance standards established in the watershed plan. (e) Identify regulated areas. (f) Set forth an implementation program, including a description of official controls and, as appropriate, a capital improvement program. | The SWMP and its appendices comply with these requirements. |

| Required by | WMO Requirement | Addressed in SWMP |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| BCWMC | <p>The SWMP is required to conform to Minnesota Rules 8410. According to Minnesota Rules 8410.0160 Subp. 3, the SWMP must include the following components:</p> <ul style="list-style-type: none"> (a) An executive summary that summarizes the highlights of the local water plan (b) Summaries of appropriate water resource management-related agreements that have been entered into by the local community, including joint powers agreements related to water management that the local government unit may be party to between itself and watershed management organizations, adjoining communities, or private parties. (c) Descriptions of the existing and proposed physical environment and land use; definitions of drainage areas and the volumes, rates, and paths of stormwater runoff; and data incorporated by reference. (d) An assessment of existing or potential water resource-related problems for only those areas within the corporate limits of the city. (e) Inclusion of a local implementation program for the year in which the local water plan extends. This program must describe nonstructural, programmatic, and structural solutions to issues identified in the SWMP. The program must be prioritized, and it shall <ul style="list-style-type: none"> ▪ include areas and elevations for stormwater storage adequate to meet performance standards or official controls established in WMO plans; ▪ define water quality protection methods that are adequate to meet performance standards and/or official controls in WMO plans and identify regulated areas; ▪ clearly define the city’s responsibilities of the city that are distinct from those of WMOs for carrying out the implementation components; ▪ describe official controls and any changes to official controls relative to requirements of WMO plans; ▪ include a table that briefly describes each component of the implementation program and clearly details the schedule, estimated costs, and funding sources for each component including annual budget totals; and ▪ include a table for a capital improvement program that sets forth, by year, details of each contemplated capital improvement and includes details of schedules, estimated costs, and funding sources. | <p>The SWMP and its appendices comply with these requirements.</p> |
| BCWMC: Water quality | <p>Member cities shall classify other waterbodies according to the BCWMC classification system and include this information in their local water management plans.</p> | Chapter 2 |
| BCWMC: Water quality | <p>The BCWMC and the member cities will implement the improvement options listed in the BCWMC’s CIP (Table 5-3) to address the water quality of priority waterbodies based on feasibility, prioritization, and available funding (see Policy 110 regarding CIP prioritization criteria).</p> | Chapter 5 |

| Required by | WMO Requirement | Addressed in SWMP |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| BCWMC: Water quality | The BCWMC will coordinate monitoring efforts with other programs, including member city monitoring, the Metropolitan Council Citizen-Assisted Monitoring Program (CAMP), the Watershed Outlet Monitoring Program (WOMP), Three Rivers Park district monitoring, Minneapolis Park and Recreation Board monitoring, the MPCA Citizen Lake Monitoring Program (CLMP), and the Hennepin County River Watch Program. | Chapters 2 and 4; Appendices B |
| BCWMC: Water quality | The BCWMC requires all stormwater to be treated in accordance with the MPCA’s Minimal Impact Design Standards (MIDS) performance goal for new development, redevelopment, and linear projects. If the MIDS performance goal is not feasible and/or not allowed for a proposed project, the project proposer must implement the MIDS flexible treatment options, as shown in the MIDS Design Sequence Flow Chart, or a BCWMC-approved alternative. | Chapter 4 |
| BCWMC: Water quality | The BCWMC will review projects and developments to evaluate compliance with the MPCA’s MIDS, performance goals, triggers, and flexible treatment options (which are adopted by the commission as BCWMC water quality management standards) if the projects are located in member cities that have not adopted the MIDS performance goals, triggers, and flexible treatment options, or at the request of the member city. For projects located in member cities that have adopted the MIDS performance goals, triggers, and flexible treatment options, the member cities shall review projects for conformance with MIDS water quality treatments standards, unless commission review is requested by the member cities. | Chapter 4 |
| BCWMC: Water quality | Member cities shall not allow the drainage of sanitary sewage or nonpermitted industrial wastes onto any land or into any watercourse or storm sewer discharging into Bassett Creek. | N/A (Water from the city does not drain directly into Bassett Creek) |
| BCWMC: Water quality | The BCWMC will maintain a water quality model (e.g., P8) for the watershed. Each year, member cities shall provide the BCWMC with plans for BMPs constructed within their city. The BCWMC will update the model annually to incorporate completed BCWMC capital improvements and BMP information provided by the member cities. The BCWMC will develop a summary report of the water quality model results and provide that report to the member cities to assist in their MS4 reporting. | Chapters 3, 4 and 5; Appendices B and F |
| BCWMC: Flooding and rate control | During the first five years of plan implementation, the BCWMC will work with the member cities to determine responsibilities for major rehabilitation and replacement of the BCWMC Flood Control Project features and establish the associated funding mechanisms. | Chapters 4 and 5 |
| BCWMC: Flooding and rate control | The BCWMC will finance major maintenance and repair of water level control and conveyance structures that were part of the original BCWMC Flood Control Project on the same basis as the original project. New road crossings of the creek that were installed as part of the project will be maintained by the city where the structure is located. | Chapters 4 and 5 |

| Required by | WMO Requirement | Addressed in SWMP |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| BCWMC: Flooding and rate control | Member cities shall be responsible for routine maintenance and repair of BCWMC Flood Control Project structures located within each city. Each member city shall be responsible for routine cleaning of these structures, including the removal of debris, brushing, and tree removal. | Chapters 4 and 5 |
| BCWMC: Flooding and rate control | Member cities must implement the BCWMC's development policies, including minimum building elevations of at least two feet above the 100-year flood level for new and redeveloped structures, as outlined in the BCWMC's Requirements for Improvements and Development Proposals document (BCWMC, 2015, as revised). | Chapters 4 and 5; Appendices J, K and M |
| BCWMC: Flooding and rate control | The BCWMC and member cities must require rate control in conformance with the Flood Control Project system design and this plan. The BCWMC requires cities to manage stormwater runoff so that future peak flow rates leaving development and redevelopment sites are equal to or less than existing rates for the 2-year, 10-year, and 100-year events. | Chapters 4 and 5; Appendices J, K and M |
| BCWMC: Flooding and rate control | The BCWMC requires the retention of on-site runoff from development and redevelopment projects consistent with the MPCA's MIDS performance goals. These include the retention of (a) 1.1 inches of runoff from impervious areas for new development creating more than one acre of new impervious areas; (b) 1.1 inches of runoff from new or fully reconstructed impervious areas for redevelopment creating one or more acres of new or fully redeveloped impervious areas; and (c) 0.55 inch of runoff from new or fully reconstructed impervious areas for linear projects creating one or more acres of new or fully redeveloped impervious area (or 1.1 inches from the net increase in impervious area—whichever is greater). If an applicant is unable to achieve the performance goals due to site restrictions, the MIDS flexible treatment options approach shall be used, following the MIDS design sequence flow chart. For all other projects, the BCWMC encourages the use of infiltration, filtration, or other abstraction of runoff from impervious areas for all development and redevelopment projects as a best practice to reduce stormwater runoff. | Chapter 4; Appendix J |
| BCWMC: Flooding and rate control | The BCWMC will allow only those land uses in the BCWMC-established floodplain that will not be damaged by floodwaters and will not increase flooding. Allowable types of land use include recreation areas, parking lots, temporary excavation and storage areas, public utility lines, agriculture, and other open spaces. | Chapter 4; Appendix J |
| BCWMC: Flooding and rate control | The BCWMC prohibits the construction of basements in the floodplain; construction of all other infrastructure within the floodplain is subject to BCWMC review and approval. | Chapter 4; Appendices J and M |
| BCWMC: Flooding and rate control | The BCWMC prohibits permanent storage piles, fences, and other obstructions in the floodplain that could collect debris or restrict flood flows. | Chapter 4; Appendix J |
| BCWMC: Flooding and rate control | The BCWMC requires that projects within the floodplain maintain zero net loss in floodplain storage and no increase in flood level at any point along the trunk system. The BCWMC prohibits expansion of existing nonconforming land uses within the floodplain unless they are fully floodproofed in accordance with codes and regulations. | Chapter 4; Appendix J |

| Required by | WMO Requirement | Addressed in SWMP |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| BCWMC: Flooding and rate control | The BCWMC requires member cities to maintain ordinances that are consistent with BCMWC floodplain standards. Member cities must submit ordinances to the BCWMC for review. | Chapters 4 and 5; Appendix J |
| BCWMC: Groundwater | To protect groundwater quality, the BCWMC requires infiltration practices to be implemented in accordance with the following guidance documents for determining the feasibility of infiltration: the NPDES General Construction Stormwater Permit (2013, as amended); the Minimal Impact Design Standards (MIDS) Design Sequence Flow Chart (2013, as amended); and the Minnesota Department of Health’s Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas (MDH, 2007). The BCWMC recommends that infiltration practices be designed with consideration for the following guidance documents: the BCWMC’s Requirements for Improvements and Development Proposals (BCWMC, 2015, as revised and the Minnesota Pollution Control Agency’s Minnesota Stormwater Manual (stormwater.pca.state.mn.us/index.php/Main_Page). | Chapters 3, 4 and 5; Appendices B, C, F, J, K and M |
| BCWMC: Groundwater | Member cities shall share groundwater elevation data, where available, with the BCWMC. | Chapter 4 |
| BCWMC: Erosion and sediment control | Member cities shall continue managing erosion and sediment control programs and ordinances as required by their NPDES MS4 permit and NPDES Construction Stormwater general permit. These programs must address the permitting and inspection of erosion controls; erosion and sediment control at individual building sites; and requirements and procedures for reviewing, approving, and enforcing erosion control plans. | Chapters 4 and 5; Appendices B, K and M |
| BCWMC: Erosion and sediment control | Member cities shall perform regular erosion and sediment control inspections for projects triggering BCWMC review and projects subject to BCWMC erosion and sediment control standards. Member cities will annually report to the BCWMC regarding compliance with BCWMC standards as part of annual MS4 reporting or as requested by the commission. | Chapter 5; Appendices B, K and M |
| BCWMC: Erosion and sediment control | The BCWMC requires local water management plans to describe existing and proposed city ordinances, permits, and procedures that address erosion and sediment control. | Chapter 5; Appendices B, K and M |
| BCWMC: Streams | Member cities are responsible for funding maintenance and repairs that are primarily aesthetic. | Chapter 4 and 5 |
| BCWMC: Streams | Member cities shall maintain and enforce buffer requirements adjacent to priority streams for projects that will result in more than 200 yards of cut or fill or more than 10,000 square feet of land disturbance. Buffer widths adjacent to priority streams must be at least 10 feet or 25 percent of the distance between the ordinary high-water level and the nearest existing structure, whichever is less. Allowable land uses and vegetative criteria for buffers are specified in the BCWMC’s Requirements for Development and Redevelopment (BCWMC, 2015, as amended). Member cities may allow exemptions for public recreational facilities parallel to the shoreline (e.g., trails) up to 20 feet in width, with that width being added to the required buffer width. | N/A |

| Required by | WMO Requirement | Addressed in SWMP |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BCWMC: Wetlands | The BCWMC requires member cities to inventory, classify, and determine the functions and values of their wetlands, either through a comprehensive wetland management plan or as required by the Wetland Conservation Act (WCA). Member cities shall maintain a database of wetland functions and corresponding value assessments. The BCWMC encourages member cities to complete comprehensive wetland management plans as part of their local water management plans or as an implementation task identified in their local water management plans. Completed comprehensive wetland management plans shall be submitted to the BCWMC for review and comment. | Chapter 4; Appendix D |
| BCWMC: Wetlands | The BCWMC requires member cities to develop and implement wetland protection ordinances that consider the results of wetland functions and value assessments, and which are based on comprehensive wetland management plans, if available. For wetlands classified as “Preserve” or “Manage 1,” member cities shall implement standards for bounce, inundation, and runout control as per BWSR guidance. Member cities are encouraged to apply these standards to other wetland classifications as well. | Chapter 4; Appendix D |
| BCWMC: Wetlands | <p>Member cities shall maintain and enforce buffer requirements for projects containing more than one acre of new or redeveloped impervious area. Average minimum buffer widths are required according to the MnRAM classification (or similar classification system):</p> <ul style="list-style-type: none"> ▪ an average of 75 feet and minimum of 50 feet from the edge of wetlands is classified as “Preserve”; ▪ an average of 50 feet and minimum of 30 feet from the edge of wetlands is classified as “Manage 1”; ▪ an average of 25 feet and minimum of 15 feet from the edge of wetlands is classified as “Manage 2” or “Manage 3.” <p>Allowable land uses and vegetative criteria for buffers are specified in the BCWMC’s Requirements for Development and Redevelopment (BCWMC, 2015, as amended). Member cities may allow exemptions for public recreational facilities parallel to the shoreline (e.g., trails) up to 20 feet in width; that width is to be added to the required buffer width.</p> | Chapter 4; Appendix D |
| BCWMC: Wetlands | Chapter 4; Appendix D | Chapter 4; Appendix D |
| BCWMC: Wetlands | The BCWMC will serve as the LGU responsible for administering the WCA for member cities as requested. (Currently, Medicine Lake, Robbinsdale, and St. Louis Park participate). | Chapter 4; Appendix D |
| BCWMC: Wetlands | The BCWMC requires that member cities annually inspect wetlands classified as “Preserve” for terrestrial and emergent aquatic invasive vegetation such as buckthorn and purple loosestrife and attempt to control or treat invasive species when feasible. | Chapter 4; Appendix D |

| Required by | WMO Requirement | Addressed in SWMP |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| BCWMC: Public ditches | The BCWMC will manage abandoned or transferred public ditches that are part of the trunk system as per the policies of this plan. Member cities will be responsible for management of abandoned or transferred public ditches that are not on the trunk system but are currently part of their municipal drainage systems. | Chapter 2 |
| BCWMC: Recreation, habitat, and shoreland | Member cities are responsible for shoreland regulation and are required to adopt MDNR-approved shoreland ordinances in accordance with the MDNR’s priority phasing list. | Chapter 4; Appendix M |
| BCWMC: Recreation, habitat, and shoreland | Member cities shall consider opportunities to maintain, enhance, or provide new open spaces and/or habitats as part of wetland creation or restoration, stormwater facility construction, development, redevelopment, and other appropriate projects. | Chapter 4 |
| BCWMC: Recreation, habitat, and shoreland | Member cities shall adopt state buffer and/or shoreland management requirements for public waters in incorporated areas if and when they are promulgated. | Section 4.8 Appendix M |
| MCWD | A summary of water resource management-related agreements, including the joint-power agreements into which the LGU has entered with watershed management organizations, adjoining LGUs, private parties or others. | Chapter 1; Appendix A |
| MCWD | <p>According to Minnesota Rule 8410.0160, a local plan must include the following components:</p> <ul style="list-style-type: none"> ▪ maps of current and projected land use; ▪ maps of drainage areas under current and future planned land use with paths, rates, and volumes of stormwater runoff; ▪ a stormwater conveyance map meeting standard of the current MS4 general permit and indicating an outfall or a connection at the LGU boundary; ▪ an inventory of public and private stormwater management facilities including the location, facility type, and party responsible for maintenance (e.g., landowner, homeowner’s association, LGU, other third party); ▪ a listing and summary of existing or potential water resource-related problems wholly or partly within LGU corporate limits. (A problem assessment consistent with Minnesota Rules 8410.0045, Subp. 7, must be completed for each). | The SWMP and its appendices comply with these requirements. |
| MCWD | Minnesota Rules (8410.0160) requires that the local plan include (a) an executive summary stating highlights of the local water plan and (b) a statement of the process to amend the local plan. The latter must be consistent with Minnesota Statute 103B.235. | The SWMP and its appendices comply with these requirements. |

| Required by | WMO Requirement | Addressed in SWMP |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| MCWD | <p>The LGU is invited to identify any District assistance or coordination that would benefit its implementation of any particular program. The following should be specifically addressed:</p> <ul style="list-style-type: none"> ▪ The NPDES MS4 Stormwater Program ▪ The Total Maximum Daily Load Program ▪ Federal and state anti-degradation requirements ▪ Safe Drinking Water Act/state wellhead protections ▪ The National Flood Insurance Program ▪ State floodplain management laws ▪ State shoreland management laws ▪ The Minnesota Wetland Conservation Act | Chapter 3, 4 and 5; Appendices B, C, D, E, F, J, K and M |
| MCWD | <p>Minnesota Rules 8410.0160 requires that the local plan contain a local implementation program. According to the state rule, the program must</p> <ul style="list-style-type: none"> ▪ describe nonstructural, programmatic, and structural solutions to water resource problems identified; ▪ present these implementation elements in a table that briefly describes each element, details the schedule, estimated cost and funding sources for the element, and includes annual budget totals; ▪ explain, within this table, a capital improvement program that sets forth, by year, details of each contemplated capital improvement including schedules, estimated costs, and funding source; and ▪ prioritize implementation elements consistent with the principles of Minnesota Rules 8410.0045, Subpart 1.A, and district priorities as described in the WMP and communicated to the LGU. | Chapter 5 |

Chapter 6.0 References

City of St. Louis Park Surface Water Management Plan

Chapter 6.0 References

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- Bassett Creek Watershed Management Commission (Barr Engineering). 2017 “Bassett Creek Bassett Creek Hydrologic and Hydraulic Analyses: Phase 2 XPSWMM Model Report”
- Bassett Creek Watershed Management Commission. 2016 "BCWMC 2015 Lake Water Quality Study: Westwood Lake"
<http://www.bassettcreekwmo.org/projects/all-projects/westwood-lake-water-quality-improvement-project>
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- COE website: www.usace.army.mil
- DNR Lake Finder Website <https://www.dnr.state.mn.us/lakefind/index.html>
- DNR Public Waters Inventory webpage
- DNR website www.dnr.state.mn.us
- EPA, 2015 <https://www.epa.gov/>
- EQB website: www.eqb.state.mn.us
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COOPERATIVE AGREEMENT

CONTRACT NO.

40-10

**For Vegetation Maintenance
At Twin Lakes Park, City of St. Louis Park** CITY OF ST. LOUIS PARK

The parties to this Cooperative Agreement are the **Minnehaha Creek Watershed District** ("District"), a watershed district created pursuant to Minnesota Statutes Chapter 103D; and the **City of St. Louis Park** ("City"), a municipal corporation of the State of Minnesota.

Recitals and Statement of Purpose

WHEREAS on November 23, 1994, the District and the City, along with the City of Minneapolis and Hennepin County, entered into a "Cooperative Agreement for a Clean Water Partnership Project" ("Clean Water Partnership Agreement") to improve water quality in the Minneapolis Chain of Lakes; and

WHEREAS pursuant to the Clean Water Partnership Agreement, the partners have constructed water quality/wetland basins in Twin Lakes Park adjacent to Twin Lakes and taken other actions to improve the water quality in those lakes and provide other water resource benefits; and

WHEREAS under the Clean Water Partnership Agreement, the District assumed the responsibility to prepare a plan for maintenance of the improvements and the City assumed responsibilities for implementing the plan; and

WHEREAS the project provided for the planting and maintenance of aquatic and riparian vegetation, which vegetation is in need of present and ongoing maintenance; and

WHEREAS the District finds that the improvements, including the aquatic and riparian vegetation, provide regional water resource benefits and is willing to maintain that vegetation, and the City concurs in the District's proposal to do so;

WHEREAS the City and District find that it is appropriate and efficient for the District to be responsible for sediment removal from the constructed basins;

NOW THEREFORE the City and the District enter into this Agreement to document the responsibilities to be assumed by each party; establish procedures to carry out these responsibilities; and facilitate communication and cooperation between the parties to ensure that aquatic and riparian vegetation associated with the Twin Lakes clean water project and the project basins are properly maintained to achieve the water resource goals of those projects.

AGREEMENT

1. This Agreement concerns the areas in Twin Lakes Park and adjacent to Twin Lake as delineated on Exhibits A and B, attached hereto and incorporated herein.
2. The District, at its cost, will prepare a vegetation management plan for the subject areas. The District and the City will cooperate in the District's preparation of the plan.
3. On City and District approval of the plan, the District, at its cost, will assume responsibility for vegetation management in the subject areas in accordance with the plan. In its discretion, the District may enter into contracts and make other arrangements within its authority to carry out its responsibilities.
4. The District will obtain permits and approvals from the City as necessary to implement the vegetation management plan, but will not be subject to permit fees. The City will cooperate in processing needed permits and approvals. The City, as landowner, will cooperate as necessary in the District's obtaining of other permits and approvals as may be required to implement the plan.
5. The City will provide access and staging areas that are needed and reasonably convenient for any District management activity. Before performing any activity that may disrupt traffic or disturb adjacent lands or public use, the District will coordinate with the City to minimize these disruptions and disturbances in a way that does not substantially increase the cost of the work. The City will require grounds protection from heavy vehicles. The District must supply protection and in all cases will be responsible for removal of protection and restoration of the grounds.
6. The City will be responsible, at its cost, to notify the public of management activity to the extent the City and the District agree it is useful and appropriate to do so. The MCWD will provide at least 30 days notice to the City prior to the commencement of any scheduled maintenance. Any maintenance burning will be consistent with the procedures contained in City policies.
7. The District's responsibilities under this Agreement extend only to the vegetation within the subject areas. The District is not responsible for management of vegetation or landscaping outside of these areas and is not responsible for the maintenance of any structures or trails. The District remains responsible for major pond maintenance. The City retains all responsibilities associated with its role as landowner and land manager, including minor pond maintenance. The City will avoid any activity in the subject areas inconsistent with the vegetation management plan, and will take appropriate steps to prevent its personnel and contractors from engaging in any such activity.
8. The City and the District will meet at least annually to review activity under this Agreement. The District annually will provide an activity report to the City describing the work it has performed under the Agreement.

9. Each party acts under this Agreement pursuant to its own authority, and neither party acts as the agent or representative of the other. Each party shall indemnify, defend and hold harmless the other party, its officers, employees, agents and representatives from any and all actions, costs, damages and liabilities of any nature to the degree they are the result of any action or inaction that is the basis for the first party's liability in law or equity. Nothing in this Agreement creates any rights in any third party; waives any defense, immunity or liability limit either party may have with respect to third parties; or otherwise waives any provision of Minnesota Statutes chapter 466, as it may be amended or recodified, or other applicable law.

10. This Agreement is effective when it has been fully executed by both parties, and will terminate five years from the date it takes effect. The Agreement may be amended only by a writing executed by both parties.

11. The failure of either party to insist on the strict performance by the other party of any obligation or to exert a right under this Agreement does not waive the party's right in the future to do so. A waiver on one or more occasion of any obligation or right under the Agreement will not be construed to waive any subsequent obligation or right.

12. All communications under this Agreement shall be directed to the District Administrator, on behalf of the District, and the Environmental Coordinator, on behalf of the City, except as either otherwise may provide in writing.

IN WITNESS WHEREOF, the parties hereto have executed this Cooperative Agreement.

MINNEHAHA CREEK WATERSHED DISTRICT,
a political subdivision of the State of Minnesota,

James B. Collins
President

2-4-2010
Date

APPROVED AS TO FORM AND EXECUTION

[Signature]
Attorney

CITY of ST. LOUIS PARK,
a municipal corporation of the State of Minnesota,

[Signature]
Mayor

[Signature]
City Manager

4/19/10
Date

4/19/10
Date

APPROVED AS TO FORM AND EXECUTION

[Signature]
Attorney

**COOPERATIVE AGREEMENT
for the Minnehaha Creek Reach 20 Restoration Project
in the City of St. Louis Park**

CITY OF ST. LOUIS PARK

The parties to this agreement are the City of St. Louis Park ("City"), a home rule charter city in the state of Minnesota, and the Minnehaha Creek Watershed District ("MCWD"), a watershed district created pursuant to Minnesota Statutes Chapter 103D (together "the Parties").

Purpose

The purpose of this agreement is to coordinate the design, construction, and maintenance of a list of interrelated projects for the restoration of Reach 20 of Minnehaha Creek in St. Louis Park, including re-meandering the existing stream channel through its historic floodplain wetlands, and stormwater facilities that treat direct discharges of urban stormwater. A further description of the Project is provided in the Final Feasibility Study/Concept Design Report, October 18, 2011, which is attached to and incorporated into this Agreement as Exhibit A.

Recitals

WHEREAS, the MCWD and the City agree that Minnehaha Creek is a valued natural resource that has been adversely impacted by land use changes and increased discharge of stormwater and accompanying sediment and nutrients;

WHEREAS, the MCWD has adopted a watershed management plan in accordance with Minnesota Statutes Section 103B.231, and this plan identifies Reaches 19-21 as a capital improvement project;

WHEREAS, the MCWD's consulting engineer has prepared a feasibility study for the restoration of Minnehaha Creek, Reach 20, and the MCWD's engineer and the City's engineer have reviewed the preliminary flood surface profile and concurred that the proposed restoration of Reach 20 would result in no net increase of the 100 year flood surface elevation;

WHEREAS, following a duly noticed public hearing on November 3, the MCWD Board of Managers on November 10, 2011 ordered the Reach 20 capital improvement project with a total estimated project cost of \$1,311,890;

WHEREAS, in cooperation with the MCWD, the City successfully applied for and has received a Clean Water Fund Shoreland Improvement Grant from the State of Minnesota Board of Water and Soil Resources in the amount of \$300,000 to contribute for this project; and

WHEREAS, the City and the MCWD now desire to proceed in cooperation to facilitate the design and construction of this project;

THEREFORE, the parties agree to the following, intending to be legally bound:

Agreement

1. Term

1.1 *Effective date.* This Agreement is effective when fully executed by the Parties.

1.2. *Expiration date.* December 31, 2013, or until all obligations have been satisfactorily fulfilled, whichever occurs first, with the exception of project maintenance responsibilities, which shall be ongoing unless or until modified by agreement of the parties.

2. Duties and Responsibilities

2.1 *City:* The City will:

2.1.1 Review and provide comments and written approval of the plans and specifications for the Project, according to the schedule and process described below in Section 2.2.1;

2.1.2 Provide on or before August 1, 2012, easements for the MCWD's access onto City property for the construction and maintenance of the Project;

2.1.3 Provide City regulatory permits as appropriate for the Project, with its review completed concerning these permits on or before September 1, 2012; and

2.1.4 Contribute up to Three Hundred Thousand Dollars (\$300,000) through its Clean Water Fund Shoreland Improvement Grant from the State of Minnesota Board of Water and Soil Resources (BWSR) for grant-eligible costs of the Project. The City's funding obligation is limited solely to the Grant proceeds and if for any reason the grant proceeds are not available, the City shall have no obligation to fund the Project.

2.2 *MCWD:* The MCWD shall be the coordinator for the design and construction of the Project, and agrees to coordinate this process with the City as follows:

2.2.1 *Design.* The MCWD will retain a consulting engineer to prepare the design plans and specifications for each of the Project components.

2.2.1.1 *Plans and Specifications.* Plans and specifications prepared by the consulting engineer retained by the MCWD will include: detailed designs; plant and material lists; acceptable suppliers; facility maintenance plan for each of the improvements; a vegetation maintenance plan for each of the improvements; and interpretative signage.

2.2.1.2. *Trail Design.* The MCWD's consulting engineer will also prepare plans and specifications for recreational trails in the Project area, which shall be compatible with the other elements of the Project. It is understood by the parties that the MCWD will be responsible for these trail design costs, and further that, notwithstanding the preparation of this trail design, the MCWD is not obligated to provide funding or otherwise be responsible for the construction of these trails.

2.2.1.3 *30% Plans.* The MCWD consulting engineer shall prepare 30% plans with cost estimates for review and comment by the City, which comments shall be provided within 30 days of receipt of the plans.

2.2.1.4 *Final Plans, Specifications and Cost Estimate.* The MCWD's consulting engineer will prepare and certify final plans and specifications and prepare an engineer's cost estimate for the Project. The MCWD will submit these final plans, specifications, and cost estimate to the City for its review and approval, which approval shall be provided within 30 days of receipt and not unreasonably withheld.

2.2.1.5 *Consulting Engineer's Liability.* The MCWD's consulting engineer will warrant that it will perform its services in accordance with national standards of professional care. The MCWD's consulting engineer will indemnify, defend and hold harmless the MCWD and the City, their officers, board members, employees and agents from any and all actions, costs, damages and liabilities of any nature to the degree they are the result of the consulting engineer's or a subcontractor's professional negligence or other action or inaction by the consulting engineer or a subcontractor that is the basis for the consulting engineer's or a subcontractor's liability in law or equity.

2.2.2 *Property Acquisition.* The MCWD shall be responsible for acquiring any necessary property rights for the construction of the Project which are not on land owned by the City.

2.2.3 Construction. The MCWD will procure and manage construction and approve its engineer's certification of completion of the Project in accordance with the final plans and specifications approved by the City.

2.2.3.1 *Bid and Award.* The MCWD's consulting engineer will comply with all applicable state laws in the bidding process as well as in the award of the bid. The MCWD shall not award the bid to any contractor without the written approval of the City.

2.2.3.2 *Performance and Payment Bonds.* The MCWD shall secure from the contractor for the Project performance and payment bonds in the full amount of the contract and shall provide the City with copies of such bonds before the MCWD allows the contractor to perform any work related to the Project.

2.2.3.3 *Permits, Approvals and Coordination of Work.* The MCWD will provide in the contract for construction that all permits and approvals required for the construction of the Project will be obtained and that the contractor will be responsible for all coordination of site access and traffic control. The ordinary permit requirements of the parties will apply to any work under this agreement, except that processing and administrative fees and surety requirements will not apply to the parties. The City will cooperate in securing any permits or approvals from third parties.

2.2.3.4 *Project Monitoring.* The MCWD will give the City reasonable notice of pre-construction and construction meetings concerning the Project. The City and its authorized representatives may attend these meetings, inspect the Project at reasonable times, and review all related documents. All designs, written materials, technical data, survey data, models and model input data, research and any project design documents or other work in progress will be available for review and copying by the parties to this agreement except to the degree limited by law.

2.2.3.5 *Change Orders.* In the course of construction, the MCWD may order field changes to the design to meet site conditions, provided that the field change complies with the easements provided to the MCWD by the City. The MCWD will reasonably notify the City of any field change. The MCWD may proceed with a more substantial change in the Project relating to the floodplain, trails, roads, or easements, only with the written approval of the City or the City's failure to disapprove the change in writing within 10 days of written MCWD notification or if the change is prompted by unexpected circumstances and necessary to avoid frustration of or a substantial increase in the cost of the work.

2.2.3.6 Access. The MCWD shall have the right to reasonable access to the construction areas identified in the Project across other land of the City adjacent thereto. Such access routes shall be designated by the City as needed within a reasonable time following receipt of a written request from the MCWD, its contractor, agents or assigns for such temporary access rights.

2.2.3.7 Existing Utilities. The MCWD acknowledges that there are utilities located within the construction areas and will provide in the contract for construction that the contractor takes full responsibility for determining their location to prevent damage to or interference with any other utilities, and to determine that the location of the improvements in the Project is suitable for MCWD's purposes in completing the Project. The City will cooperate in providing to the contractor any information it possesses concerning utilities within the construction areas.

2.2.3.8 Damages. The MCWD, its employees, representatives, agents, or contractors shall take all reasonable precautions to prevent any damage to the construction areas and shall fully reimburse the City for any damages resulting from its use of the City property. The MCWD shall be responsible to the City for the cost of repairing any of the City's equipment or facilities on the City property that are damaged by the activities of the MCWD, its employees, representatives, agents or contractors.

2.2.3.9 Construction Area. The MCWD shall require the construction contractor to keep and maintain the construction area in a neat and orderly condition and remove all refuse and debris that may accumulate thereon.

2.2.3.10 Contractor's Liability. The MCWD's contractor will warrant that it will perform its services with due care. The MCWD's contractor will indemnify, defend and hold harmless the MCWD and the City, their officers, council members, employees and agents from any and all actions, costs, damages and liabilities of any nature to the degree they are the result of the contractor's or a subcontractor's negligence or other action or inaction by the contractor or a subcontractor that is the basis for the contractor's or the subcontractor's liability in law or equity.

2.2.3.11 Insurance. The MCWD shall require its contractors, at their sole expense, during the term of this agreement or any extension thereof to maintain commercial general liability insurance as follows:

2.2.3.11 (a) *Minimum limits of liability.*

\$500,000 per claimant.

\$1,500,000 per occurrence.

2.2.3.11 (b) *Coverages*

Bodily Injury

Property Damage

Personal Injury

Blanket Contractual

Fire Legal

2.2.3.11 (c) *Additional Requirements*

The commercial general liability insurance shall:

- i.* Name as additional insureds:
The City of St. Louis Park.
- ii.* Provide an endorsement thereon that the insurer will not give less than thirty (30) days written notice to the MCWD or the City in the event of material change in or cancellation of the liability insurance.
- iii.* MCWD will require that its contractor provide the City with a certificate of insurance that provides proof that the required coverage has been obtained, including a reference to the address of the City's property as well as to this Agreement.

2.2.3.12 *Signage.* The MCWD shall provide project signage as provided in Laws of Minnesota 2009, Chapter 172, and may procure, install and maintain indefinitely informational signage at the locations shown on the final construction plans, and will be afforded reasonable access by the City to do so.

2.2.3.14 *Compliance with Laws.* The MCWD shall comply with the laws and requirements of all federal, state, local and other governmental units in constructing the Project. The MCWD will

cooperate with the City in the City's fulfillment of its obligations under the BWSR Competitive Grants Program Grant Agreement for the Clean Water Fund Shoreland Improvement Grant.

2.2.4 Post Construction. Upon completion of construction, the MCWD shall at its sole expense restore the affected areas, exclusive of those actually occupied by a component of the Project, to substantially the same condition as existed prior to such construction.

3. Costs

3.1 Internal Costs. Each party shall be responsible for all of its internal costs, which are those costs involved in each party's performing its roles and responsibilities under this Agreement.

3.2 Contributions/Reimbursements.

3.2.1 MCWD. In addition to its internal costs associated with the Project, the MCWD shall contribute the costs of the design of the trail improvements, and any ordered Project costs that exceed the City's contribution as provided in Section 3.2.2 of this Agreement.

3.2.2 City. In addition to its internal costs associated with the Project, the City shall reimburse the MCWD up to a maximum of \$300,000.00 for design, construction and construction management costs incurred by the MCWD related to the Project and included in the approved work plan for the Clean Water Fund Shoreland Improvement Grant.

3.2.3 Trail Costs. It is understood by the parties that, notwithstanding the MCWD's preparation of trail design, the MCWD is not obligated to provide funding or otherwise be responsible for the construction of these trails. The City and the MCWD agree to cooperate in pursuing additional funding sources for the trail improvements.

3.3 MCWD Discretion. Notwithstanding any other provision of this Agreement, in its discretion the MCWD may choose not to construct one or more Project component. However, the City is not obligated to reimburse the MCWD for costs related to any component that is not substantially completed, unless such failure to substantially complete is caused by conditions beyond MCWD's control including, but not limited to, Acts of God, strikes or other combined action of workers, wars, floods, insurrections, failure of suppliers, contractors or subcontractors and/or any other cause occurring without MCWD's fault or negligence.

3.4 Additional Costs. The MCWD shall be solely responsible for any and all Project design, construction and construction management costs above the maximum reimbursement amount specified for the City (\$300,000).

4. Payment

4.1 By the MCWD. The MCWD shall be solely responsible for paying all design, construction and construction management costs incurred by the MCWD and related to the Project in a timely fashion subject to reimbursement payments from the City as provided herein.

4.2 By the City. The City shall consider reimbursement requests each month during the term of the Project. The MCWD will submit requests to the City for reimbursement along with supporting documentation shall be submitted on or before the 10th day of the month in order to be considered for the disbursement to be made on the 10th day of the following month. If the request and supporting documentation is satisfactory, the City shall reimburse the eligible project costs from available grant funds. The City may withhold 10% of the eligible project costs until such time as the MCWD's engineer has certified that the Project has been substantially completed by determining that the Project has been constructed or implemented in a manner that assures its long-term stability and functionality for the purpose(s) for which it was designed. The establishment of vegetation is not required for certification of substantial completion of a component of the Project.

5. Ownership

On certification of substantial completion of the Project, the ownership of the improvements and components, with the exception of those located on MCWD property, shall vest with the City.

6. Maintenance

Upon certification of substantial completion and the receipt of as-built plans for a Project component, the MCWD shall assume the obligation to maintain the Project component, including vegetation, in accordance with the maintenance plan to be developed by the MCWD's consulting engineer. "Substantial completion" does not require establishment of vegetation, and the obligation to maintain vegetation under the maintenance plan will not begin until the vegetation is established.

Subject to continuing rights to access the Project property for maintenance purposes, the MCWD's obligation to maintain Project components will remain in force for five years from the date on which this Agreement is fully executed and will renew automatically for five-year terms except as the parties, in writing, may amend this agreement to provide otherwise.

7. Independent Relationship

The City and the MCWD are independent entities in performing any action or discharging any responsibility under this Agreement. No manager, council member, employee, representative, agent, contractor or consultant of any party acts in any respect as the agent or representative of another. Nothing in this Agreement constitutes the agreement of any party to be liable for an act of omission of another within the meaning of Minnesota Statutes § 471.59, subdivision 1a(a). This Agreement does not create a joint powers board under Minnesota Statutes § 471.59, subdivision 11.

8. Effective Date

This Agreement is effective when fully executed by the parties. All obligations vesting before the expiration of this Agreement, specifically including but not limited to Sections 5, 6, 10, 11, and 12 shall survive expiration.

9. Notices

Any written communication required under this agreement shall be addressed to the other party as follows, except that the other party may change its address for notice by so notifying the other party in writing:

Minnehaha Creek Watershed District: MCWD Administrator
18202 Minnetonka Blvd.
Deephaven, MN 55391

City of St. Louis Park: City Manager
5005 Minnetonka Blvd.
St. Louis Park, MN55416

10. Assignment, Amendments, Waiver, and Complete Contract

10.1 *Assignment.* No party to this agreement may assign or transfer any rights or obligations under this agreement without the prior consent of the other party and a fully executed Assignment Agreement, executed and approved by the same parties who executed and approved this agreement or their successors in office.

10.2 *Amendments.* Any amendment to this agreement must be in writing and will not be effective until it has been executed and approved by the same parties who executed and approved the original agreement or their successors in office.

10.3 *Waiver.* If a party fails to enforce any provision of this agreement, that failure does not waive the provision or its rights to enforce it.

10.4 Complete Contract. This Agreement contains all the negotiations and agreements between the City and the MCWD. No other understanding regarding this agreement whether written or oral, may be used to bind either party.

10.5 City Authorization. The City Manager is authorized to provide all City approvals and authorizations necessary under this Agreement.

11. Liability

Each party agrees to hold harmless, defend and indemnify the other party from and against that portion of any and all liability, loss, claim, damage or expense (including reasonable attorneys' fees and disbursements) that the party may incur as a result of any act or omission of the first party in its performance under this Agreement that subjects it to liability. No action or inaction of a party under this Agreement creates a duty of care for the benefit of any third party. This Agreement creates no right in and waives no immunity, defense or liability limitation with respect to any third party or any other party to this Agreement.

12. Government Data Practices

The City and the MCWD must comply with the Minnesota Government Data Practices Act, Minn. Stat. ch. 13, as it applies to all data created, collected, received, stored, used, maintained, or disseminated under this agreement. The civil remedies of Minn. Stat. §13.08 apply to the release of the data referred to in this clause.

13. Recitals Incorporated

The recitals above are incorporated as binding terms of this agreement.

14. Time of the Essence

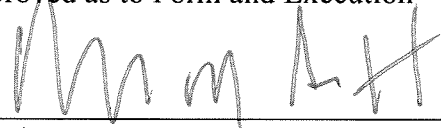
Time is of the essence in the fulfillment of the terms of this agreement.

IN WITNESS WHEREOF, the parties hereto execute and deliver this Agreement.

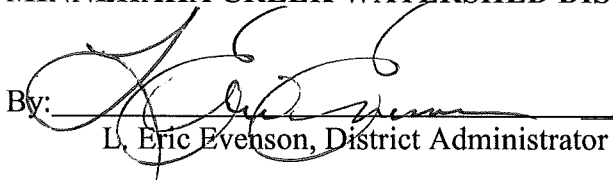
CITY OF ST. LOUIS PARK

By: 
Thomas K. Harmening, City Manager


Approved as to Form and Execution


City Attorney

MINNEHAHA CREEK WATERSHED DISTRICT

By: 
L. Eric Evenson, District Administrator

Approved as to Form and Execution


MCWD Attorney



Doc No **T5032867**

Certified, filed and/or recorded on
1/14/13 11:12 AM

Office of the Registrar of Titles
Hennepin County, Minnesota

Rachel Smith, Acting Registrar of Titles
Mark V. Chapin, County Auditor and Treasurer

Deputy 26

Pkg ID 908788C

Doc Name: Easement

Document Recording Fee \$46.00

Document Total \$46.00

Existing Certs

New Certs

605773

*Return to
Minnehaha Creek
Watershed Dist.*

This cover sheet is now a permanent part of the recorded document.

CONTRACT NO.**EASEMENT**

154-12

**On the Property of the City of St. Louis Park
Hennepin County, Minnesota**

CITY OF ST. LOUIS PARK

Legal description of Burdened Property:

Described in Attachment A and depicted in Exhibit B incorporated herein.

THIS EASEMENT is entered into between the City of St. Louis Park, a home rule charter city and political subdivision of the State of Minnesota ("City"); the Minnehaha Creek Watershed District, a special-purpose governmental body established under and with authorities specified at Minnesota Statutes Chapters 103B and 103D ("District") (together, the "parties").

Recitals

A. The City owns in fee simple certain real property within City boundaries and riparian to Minnehaha Creek, in Hennepin County, Minnesota, legally described in Attachment A hereto (the "Burdened Property").

B. In consideration of the payment of one dollar and other good and valuable consideration, and the mutual covenants and conditions set forth herein, the receipt and sufficiency of which hereby are acknowledged, the City conveys to the District and the District accepts an easement of both a perpetual and a temporary nature on the Burdened Property, as specifically set forth herein.

C. The City represents that there are no unrecorded or unregistered constraints on the City's legal capacity to convey this easement and each right conveyed to the District herein. The City has no actual knowledge of the storage or disposal of a hazardous material on or within the Easement Area. For the purpose of this paragraph, "hazardous material" means any asbestos, urea-formaldehyde foamed-in-place insulation, polychlorinated biphenyl, petroleum, crude oil or any other hazardous pollutant, waste, material or substance as defined in the federal Comprehensive Environmental Response Compensation and Liability Act of 1980, as amended, the Federal Resource Conservation and Recovery Act of 1976, as amended, or the Minnesota Environmental Response and Liability Act, as amended.

Easement

1. The easement here conveyed includes: (a) A temporary easement to realign and stabilize the bed and banks of Minnehaha Creek; construct trails and boardwalks

for non-motorized use, fencing and other related improvements; perform other hydrologic and ecosystem improvements including vegetation management; and install educational and informational signage (together, the "Project") ("Construction Easement"); and (b) A perpetual easement to inspect, maintain repair and , reconstruct the Project or parts thereof ("Permanent Easement").

2. Easement Description. The Permanent and Construction Easements are coincident with each other and the boundaries of these easements are coincident with the boundary of the Burdened Property ("Easement Area").

3. Construction Easement. The Construction Easement is a temporary easement on the Burdened Property to allow for Project construction activity. The City conveys to the District, until construction, demobilization and site stabilization are complete, an easement over the Easement Area for all purposes necessary or convenient for construction of the Project, including but not limited to: (a) channel realignment; structural and bioengineering installations; basins; trail and boardwalk facilities for non-motorized use; educational/informational signage; and vegetation; (b) labor; movement, operation and staging of equipment; materials stockpiling; and the placement and maintenance of erosion control and similar construction-phase site measures; and (c) ingress and egress to and from the Easement Area as well as areas within the construction limits located on adjacent land. At the close of active work, the District will stabilize exposed soils and ensure all trash, debris and excess materials are removed.

4. Permanent Easement. The City conveys to the District, appurtenant to Minnehaha Creek and its riparian lands as "waters of the state" that it is the District's statutory mandate to manage and protect, an easement in perpetuity to use, inspect, maintain ,repair and reconstruct Project elements, and maintain associated hydrologic, vegetative, structural and educational modifications to maintain and enhance the Project. This easement includes rights to ingress and egress over and across the trails and boardwalks; equipment staging and use; material stockpiling; maintenance and reestablishment of vegetation; and other rights as reasonably necessary or convenient for the work described.

5. Protection of Project. The City and District will not perform or knowingly allow others to perform acts within the Easement Area in violation of the specific terms of this easement or that would materially disturb the Project, impair its function, or interfere with the District's exercise of its rights under this easement. Notwithstanding the preceding sentence, the City may temporarily disturb the Project for any necessary public purpose, but will limit the disturbance to the extent reasonably necessary, and restore the Project substantially to its preexisting ecologic condition. The District will prepare a Project Management Plan for the Easement area for City review and approval. The Management Plan may include a list of uses and activities that are expected, allowed, discouraged, and prohibited. The Project

Management Plan will also provide for processes for District and City review and approval of exceptions.

6. Public Ownership Rights, Regulatory Authorities. The parties recognize that the rights in this easement may be subject to ownership, easement or servitude interests of the State of Minnesota in the bed or banks of Minnehaha Creek or adjacent lands. This easement does not replace or diminish the regulatory authority of any public body, including the Minnesota Department of Natural Resources, the District and the City, as it may apply to the Burdened Property or any activity on it. Notwithstanding, the City as fee owner will cooperate in any permits or approvals required for the Project. This includes but is not limited to executing and recording covenants or declarations that may limit activity within the Easement Area in ways other than or in addition to those set forth in this easement. The City does not hereby assume the cost of or responsibility to apply for any such approvals.

7. Reserved Rights. Subject to restrictions of record, the City reserves all rights accruing from the ownership of the Burdened Property not otherwise restricted or conveyed to the District herein, including without limitation the right to engage in or allow others to engage in all activities or uses of the Burdened Property that are not prohibited or limited by this Easement, and the right to sell or transfer all or part of the Burdened Property subject to this easement. Nothing in this easement creates any right in third parties or affects any immunity, defense or liability limit of a party with respect to a third party. As between the parties, only contract remedies are available for a breach of this easement.

8. Property Transfer. The City will inform the transferee of the existence of this easement in conjunction with any transfer of interest, including an easement or a leasehold interest, in all or part of the Burdened Property. The City will notify the District within fifteen (15) days of a transfer of all or any part of a property interest in the Burdened Property.

9. Taxes and Liens. The City retains all financial obligations, bears all costs and liabilities accruing from the fee ownership of the Burdened Property, and will pay all taxes and assessments levied against the Burdened Property. The District may, but is not obligated to, make any payment of taxes or assessments levied against the Burdened Property in place and on behalf of the City and will be reimbursed by the City for such amounts.

10. Indemnification. The MCWD hereby holds the City harmless, and will defend and indemnify the City, from and against any and all suits, actions, causes of actions, proceedings, claims, costs and damages arising out of the design, construction, operation or maintenance by the District of the Project, except to the extent resulting from an action or inaction of the City for which the City independently would be subject to liability.

11. Insurance. Each of the parties remains solely responsible to maintain liability and other insurance for its own use of and authority over the Burdened Property.

12. Waiver. A decision by a party not to exercise its rights of enforcement in the event of a breach of a term of this easement is not a waiver of such term, any subsequent breach of the same or any other term, or any of the party's rights under this easement. The delay or failure to discover a breach or to exercise a right of enforcement as to such breach does not impair or waive a party's rights of enforcement, all of which shall be cumulative and not exclusive.

13. Acts Beyond Party's Control. A party will not exercise its right of enforcement against another party for injury or alteration to the Burdened Property resulting from: (a) a cause beyond the reasonable control of that party, including without limitation fire, flood, a precipitation event with a statistical recurrence interval of 100 years or more, storm, and earth movement resulting from natural forces or the act of a third party; or (b) any prudent action taken by the party under emergency conditions to prevent, abate or mitigate significant injury or alteration resulting from such a cause.

14. Use and Assignment. The rights conveyed to the District under this easement are extended and limited to authorized District representatives, agents, contractors and subcontractors. The Project is intended in part for public recreational and educational use and this easement encompasses the ability of the public to use the Project. The District may assign this easement and any rights hereunder to another public body including but not limited to the City and may dedicate the trail as public right of way. Nothing in this easement is intended to allocate or should be read as allocating responsibility between the City and the District for day-to-day management of use of the trails or other public facilities on the Burdened Property or for day-to-day or periodic maintenance of the facilities or the Burdened Property.

15. Notices. Any notice or other communication that a party must give to another will be in writing and delivered to the following address, or other address as the party designates by written notice to the others:

To District:

Administrator
Minnehaha Creek Watershed District
18202 Minnetonka Boulevard
Deephaven MN 55391

To City:

ATTACHMENT A

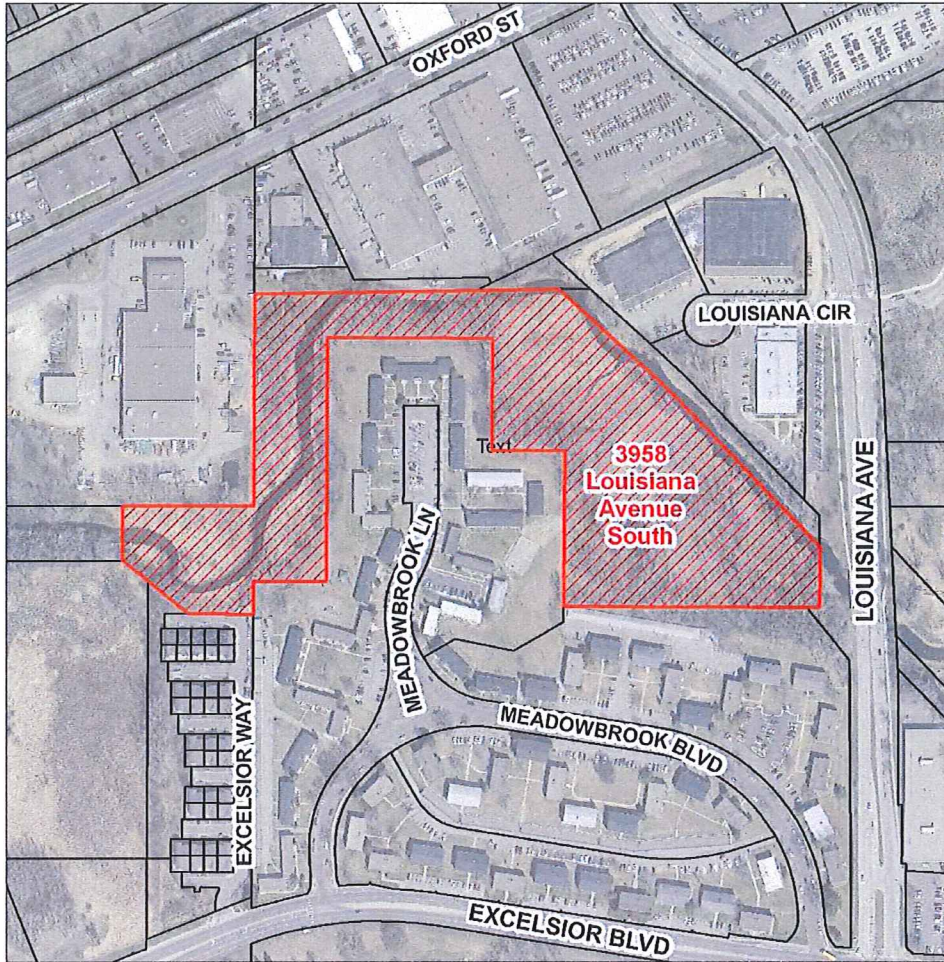
LEGAL DESCRIPTION, BURDENED PROPERTY

The Southwest Quarter of the Northeast Quarter of Section 20, Township 117, Range 21, except that part thereof platted as "Meadowbrook Manor" and except that part platted as "Creek Terrace Addition."

Also, Beginning at the Southeast Corner of RLS No. 1045, then west along the South Line Thereof to the East Line of the West 1012 Feet of the Southeast Quarter of the Northwest Quarter, then south along said East Line 130 Feet, then southeast to a Point 250 Feet south and 150 Feet west of the Point of Beginning, then east to the East Line of the Southeast $\frac{1}{4}$ of the Northwest $\frac{1}{4}$, then north to the Point of Beginning.

ATTACHMENT B

MAP DEPICTION, BURDENED PROPERTY



SECOND COOPERATIVE AGREEMENT
City of St. Louis Park and Minnehaha Creek Watershed District

CITY OF ST. LOUIS PARK

REACH 20 RESTORATION PROJECT

This Cooperative Agreement ("Agreement") is made by and between the Minnehaha Creek Watershed District, a watershed district with purposes and powers as set forth at Minnesota Statutes Chapters 103B and 103D (MCWD), and the City of St. Louis Park, a home rule charter city in the State of Minnesota (City).

Recitals

A. The MCWD and the City previously entered into a cooperative agreement (undated) to coordinate projects for the restoration and improvement of Reach 20 of Minnehaha Creek within the boundaries of the City ("1st Agreement").

B. In addition, on February 8, 2010 (accepted February 23, 2010), the City conveyed to the District a Conservation Easement filed for record with the Hennepin County Registrar of Titles as Document No. T4736855 and with the Hennepin County Office of the County Recorder as Document No. A9489642 ("Conservation Easement"), and on December 3, 2012 (accepted January 10, 2013), the City conveyed to the District an Easement filed for record with the Hennepin County Registrar of Titles as Document No. T5032867 ("Easement"), affording the District temporary and permanent easement rights to construct and maintain such restoration and improvement projects.

C. Pursuant to the 1st Agreement and aforementioned easements, and to the MCWD's April 2007 Water Management Plan Update (April 2007) (WMPU), the District has substantially completed a project to re-meander and stabilize the banks of Minnehaha Creek within Reach 20, establish vegetated riparian buffer, and construct other improvements to improve the water quality of Minnehaha Creek and manage stormwater flows into the creek.

D. Under the WMPU, the District also will seek opportunities to install trails in conjunction with its water resource enhancement projects to enhance educational and recreational opportunities consistent with its resource protection goals.

E. The MCWD and the City wish to provide for the installation and maintenance of riparian trails ("Trail Project") in conjunction with the Reach 20 restoration project and enter into this Agreement to coordinate efforts and clarify roles and responsibilities for the Trail Project.

THEREFORE the City and the MCWD agree as follows:

1.0 INTENT

1.1 Design plans and specifications for the Trail Project, prepared and signed by a professional engineering consultant to the MCWD, are included as Attachment A hereto and incorporated herein (the "Facilities"). The Facilities include bituminous trail, boardwalk, bridge crossings, canoe launch facilities, a pavilion and supporting structures such as, but not

limited to, fencing. The Facilities also may include short sections of trail to the indicated canoe launches composed of crushed rock, mulch or other material.

1.2 The parties intend that on completion of construction, the City will own, inspect and maintain the sections of bituminous trail, the eastern bridge crossing indicated on Attachment A, and the canoe launch facilities and trails. The parties expect that these sections will be part of local and regional pedestrian and bicycle trail facilities.

1.3 The parties intend that the MCWD will own, inspect and maintain the boardwalk sections of trail, the western bridge crossing and structures associated with the boardwalk sections of trail, including the pavilion. These facilities are intended to provide public access to the creek and its riparian environment and for primarily pedestrian use. However, the MCWD may allow these sections to be incorporated into a local or regional trail network as connections develop to the west of Meadowbrook Road.

1.4 The signed plans and specifications constitute a warranty by the professional engineering consultant that due care has been exercised in providing for the structural soundness of the design. They do not constitute a warranty as to the fitness of the bituminous trails or bridge crossings for the purpose of public use or the conformance of these Facilities to applicable laws or standards, including but not limited to the fitness of the alignment, width or location of structural features for use by bicycle, wheelchair or other transportation mode other than pedestrian use. As underlying fee owner and manager of public recreational lands within its municipal boundaries, the City accepts responsibility for the fitness and suitability of the facilities referenced in paragraph 1.2 for public use.

2.0 CONSTRUCTION

2.1 The MCWD may proceed to construct the Facilities. Before doing so, it will obtain all required permits and approvals. The City will cooperate as landowner and will not apply any fees to permits or approvals that it requires. The MCWD will manage the construction contract, but will give the City advance notice of all formal pre-construction and construction meetings, which the City may attend.

2.2 The MCWD's contract will require that:

- (a) The contractor name the City as an additional insured for general liability on a primary basis and for both ongoing work and completed operations;
- (b) The contractor will indemnify the City for the Contractor's negligent acts and those of its subcontractors.
- (c) The contractor will be responsible to determine the location of and protect all utilities;
- (d) The contractor will provide a performance bond for the completion of the Trail Project;
- (e) The contractor will comply with local requirements for traffic and site control; and
- (f) The contractor will restore or repair any damage to the City's lands, equipment or facilities resulting from the contractor's activities.

2.3 In part, the plans and specifications present typical alignment and cross-section, reflecting the MCWD's intent of a designer and staff presence during construction to conform the Facilities to site conditions and avoid unnecessary tree removal or other impacts to the surrounding environment. The MCWD in its judgment may direct such refinements with or without field directive, or by work change directive or change order. Notwithstanding, the City must concur in any material adjustment of the bituminous trail alignment or any narrowing of the bituminous surface to less than eight feet at any point. The City will communicate its decision on any proposed work change directive or change order without delay. The City engineer is authorized to make this decision on behalf of the City.

2.4 If a change order or work change directive relating to the Facilities that the City will own pursuant to paragraph 1.2 above will result in a contract cost allocated to the City in excess of the amount stated in subparagraph 4.2(b), the City will be responsible for the additional cost if the cause of the change was unforeseeable or if the City agrees to bear the cost.

2.5 The MCWD or the City may install informational signage within the Trail Project. The parties will cooperate as to signage location, size and content, pursuant to such other terms as may be set forth in the management plan referenced at paragraph 5.3, below. The parties further will cooperate so that any signage conditions applicable due to the use of state grant funds are met. Any signage will identify both parties as contributing partners to the Trail Project.

3.0 MAINTENANCE

3.1 On the designer's certification of substantial completion of the bituminous trail, eastern bridge crossing, canoe launch facilities, and launch approach trails, the City will own

those Facilities. The City will be responsible for both routine and long-term maintenance of those Facilities as it judges appropriate.

3.2 The MCWD will own the boardwalk sections and the western bridge crossing, and will be responsible for both routine and long-term maintenance of those Facilities as it judges appropriate.

3.3 The parties may coordinate or combine their maintenance activities in the interest of cost efficiency and other public purposes.

3.4 A party will not authorize any part of the Facilities for public motorized use. Otherwise, each party may specify conditions of public use of those Facilities that it owns, including but not limited to whether use will be specified to exclude bicycles and whether the Facilities will be seasonally maintained, and may use means within its authority to effect those specifications. Specifically but not exclusively, each party may use signage and barriers as it deems appropriate. Consistent with each party's discretion with respect to the Facilities it owns, the parties will coordinate so that the use conditions each specifies contribute to rational management of the Facilities as a whole. Each party also retains the discretion to reconstruct or remove the Facilities that it owns. The parties agree that any distinctions in or constraints on allowed uses made under this paragraph in order to align public use with the design of the Facilities, the capacity of a party, and that party's risk management judgments is non-discriminatory within the meaning of section 5 of the Conservation Easement.

3.5 The District will be responsible for inspection and maintenance of the structural condition of the boardwalk sections of trail and the western bridge crossing, in accordance with paragraph 1.3, above. As the fee owner of the underlying land and municipal land manager, the City will be responsible for day-to-day inspection and maintenance of the property where the trail project is located. This responsibility encompasses all matters not specifically related to the structural soundness and maintenance of the Facilities owned by the MCWD and includes, but is not limited to, sanitation, inspection for and addressing obvious hazards resulting from events such as severe weather, inappropriate or unlawful use, and law enforcement.

3.6 Each party may cross and recross the Facilities owned by the other party and may operate motorized equipment thereon to perform its roles and responsibilities under this Agreement. All maintenance and other activities will be performed in a manner that reasonably minimizes impact to the surrounding natural environment and to any prior-constructed improvements. In no event will maintenance disturb vegetation outside of a three-foot-wide corridor on either side of a trail. A party is responsible for any damage caused to the Facilities owned by the other party as a result of its activities under this section 3.0.

4.0 COST RESPONSIBILITIES and REMEDIES

4.1 The MCWD is responsible to make payments to the contractor in accordance with the terms of the construction contract.

4.2 On the designer's certification of substantial completion of the Facilities to be owned by the City pursuant to paragraph 1.2, above, the City will be responsible to:

(a) Reimburse the MCWD for any cost assumed by the City under paragraph 2.4, above; and

(b) Reimburse the MCWD for contract costs paid by the MCWD for construction of that part of the Facilities referenced in paragraph 1.2, above, not to exceed \$442,257.

If substantial completion is not achieved by the date stated in the contract documents, the MCWD may have reimbursement from the City for contract payments made. Notwithstanding, the City may withhold up to \$22,113 of its reimbursement obligation until final completion of paragraph 1.2 facilities.

4.3 Except as paragraphs 4.1 and 4.2, above, may provide otherwise, each party is responsible for the cost of performing its roles and responsibilities under this Agreement.

4.4 Each party agrees to hold harmless, defend and indemnify the other party from and against that portion of any and all liability, loss, claim, damage or expense (including reasonable attorney fees, costs and disbursements) that the indemnified party may incur as a result of the performance of this Agreement due to any negligent act or omission of the indemnifying party or any other act or omission that subjects it to liability in law or equity. Notwithstanding, this Agreement creates no right in and waives no immunity, defense or liability limit with respect to any third party or the other party to this Agreement. This Agreement is not a joint powers agreement under Minnesota Statutes §471.59 and nothing herein constitutes either party's agreement to be responsible for the acts or omissions of the other party pursuant to subdivision 1(a) of that statute.

4.5 Only contractual remedies are available for the failure of a party to fulfill the terms of this Agreement.

5.0 RELATION TO OTHER AGREEMENTS

5.1 The parties acknowledge that the Conservation Easement and Easement afford the MCWD all rights necessary for the MCWD to exercise its rights and perform its responsibilities under this Agreement and in the event of any ambiguity, will interpret the easements accordingly.

5.2 The parties concur that the Trail Project as constructed and maintained in accordance with this Agreement will not materially impair a Conservation Value within the meaning of paragraph 2.1(c) of the Conservation Easement.

5.3 The Conservation Easement and the Easement reference a management plan that the parties will agree to, specifying how they will manage the property on which the Trail Project is located and the improvements thereon. The management plan has not yet been put into place. The parties agree that the management plan will be consistent with the construction and maintenance of the Trail Project in accordance with this Agreement. Notwithstanding, if agreed to by the parties, the management plan may include terms that more closely

constrain maintenance of the Trail Project or other activity under this Agreement provided they do not make such activity materially more burdensome for a party.

5.4 This Agreement, and not the 1st Agreement, governs the coordination and work of the parties on the Trail Project.

6.0 GENERAL TERMS

6.1 Each communication under this Agreement will be made to the following representatives:

MCWD:

Project Manager, Reach 20 Trail Project
Minnehaha Creek Watershed District
15320 Minnetonka Boulevard
Minnetonka MN 55345-1503

City:

Sean Walther, Senior Planner
City of St. Louis Park
5005 Minnetonka Boulevard
St. Louis Park MN 55416

Contact information will be kept current. A party may change its contact by written notice to the other party.

6.2 This Agreement is effective on execution by both parties and will remain in effect indefinitely for successive five-year terms unless and until terminated by the parties by written amendment.

6.3 A party to this Agreement may not assign or transfer any right or obligation under this Agreement except by means of an assignment agreement executed by both parties.

6.4 Except as stated in section 5.0, above, this Agreement incorporates all terms and understandings of the parties concerning the Trail Project.

6.5 An amendment to this Agreement must be in writing and executed by the parties.

6.6 A party's failure to enforce a provision of this Agreement does not waive the provision or that party's right to enforce it subsequently.


6.7 The above Recitals are incorporated into this Agreement.

IN WITNESS WHEREOF the parties execute this Agreement by their authorized officers.

CITY OF ST. LOUIS PARK

By 
Its Mayor

Date: 11/18/13

By 
Its City Manager

Date: 11/18/13

MINNEHAHA CREEK WATERSHED DISTRICT

By James B. Callins
Its President

Date: 12-12-13

Approved for form and execution:


MCWD Counsel

**AMENDED JOINT AND COOPERATIVE AGREEMENT FOR THE
ESTABLISHMENT OF A BASSETT CREEK WATERSHED MANAGEMENT
ORGANIZATION TO PLAN, CONTROL AND PROVIDE FOR THE DEVELOPMENT
OF BASSETT CREEK
(Showing Changes Effective August 29, 2014)**

PREFACE

In 1968, the nine cities with land in the Bassett Creek watershed entered into a joint powers agreement which established the Bassett Creek Flood Control Commission. For the past 25 years the Commission, consisting primarily of citizen volunteers and city staff members who have volunteered their time, have worked long and hard to achieve the goals set forth when the commission was established. An overall watershed management plan was prepared and approved after public hearings. The Commission has received technical advice from the United States Army Corps of Engineers in their planning and has obtained the support and aid of all United States Senators and Congressional Representatives representing the member cities. In 1976 the Commission and the Corps of Engineers were successful in having Bassett Creek included in the 1976 Water Resources Development Act (Section 173 Public Law 94-587). The Board of Engineers for Rivers and Harbors submitted a favorable report to the Secretary of the Army on March 30, 1977. The Secretary of the Army has by letter under date of June 19, 1978 notified the U. S. Congress of the approval of the Chief of Engineers.

The Bassett Creek Flood Control Commission has participated with the Minnesota Department of Transportation, the Federal Highway Administration, the City of Minneapolis and the Corps of Engineers in the planning and construction of a deep tunnel in Minneapolis which is designed to carry Bassett Creek under a portion of the City of Minneapolis. The Commission has held hearings and approved and ordered upstream construction in the cities of Golden Valley, Plymouth, Minneapolis, and Crystal. The local share of these costs is being paid by the nine member communities pursuant to an agreement consistent with the funding requirements set forth in Articles VII and VIII of the joint powers agreement which has been in effect from 1968 to 1993. The prior joint powers agreement contained the following "Statement of Intent":

**STATEMENT OF INTENT REGARDING
AGREEMENT**

"Bassett Creek leaves Medicine Lake and flows generally eastward through the Village of Medicine Lake, Plymouth, Golden Valley and into the City of Minneapolis. In Minneapolis, the creek is channeled into a conduit and runs underground to the Mississippi River to its eventual outfall. As the creek runs through the aforementioned communities it collects storm waters and in effect acts as the storm sewer for a large densely populated area and large unpopulated area. It also carries waters channeled to it or naturally flowing to it from the Villages of Minnetonka and New Hope and the Cities of Crystal, Robbinsdale, and St. Louis Park.

For a long time the improvement and development of this creek to carry the increased quantity of storm water has been needed to allow for the orderly planning and development of

the up-stream communities who must rely on the creek as the outfall for storm waters collected or naturally flowing from areas within these communities. As the communities contributing water to the creek have grown, and the lands naturally draining into the creek have been covered with buildings and hard surfaced areas, the ability of the creek and its appurtenant facilities to accommodate the water has diminished. Studies have been conducted by the municipalities both individually and collectively and a study has been made by the United States Army Corps of Engineers. The threat of flood damage increases each year with the increased use of land in the watershed area.

The nine member communities have been meeting over a number of years in an effort to solve the storm water problems in the watershed drained by Bassett Creek. Each year it becomes more apparent that solutions must be sought to allow for a more orderly and efficient planning of the area and to allow the individual communities to plan storm sewer facilities which must be constructed to serve lands within the individual communities. It is also apparent to all nine municipalities that planning and construction to control the Bassett Creek cannot be done on the basis of each community looking at its individual problems. The creek downstream must be improved to accommodate the waters which will eventually be channeled and diverted to the outfall. To determine the downstream improvements it is necessary to know how much water will be contributed by the individual communities upstream and how much storm water will be retained in ponding areas upstream and the area of lands within the watershed which will be controlled by the individual communities as "open lands" and which will not contribute as much storm water as lands which are developed residentially, commercially, or for industrial purposes.

All of the nine communities within the Bassett Creek watershed recognize the aforesaid problems. In seeking solutions to the overall drainage problem it becomes apparent that the only way the problems can be solved is by joint planning, joint cooperation, joint financing and a sincere desire on the part of each community to solve the overall drainage problem within the watershed. This means that some agency, commission, district, corporation, political subdivision, or other vehicle must be found to plan and finance improvements to and to control the development of lands within the watershed. Chapter 112 of the Minnesota Statutes provides for the formation of a watershed district with the powers and duties of conserving and controlling water and watercourses within a watershed. The creation of such a district creates a new political subdivision with the power to sue or be sued, to incur debts, liabilities and obligations, to exercise the powers of eminent domain, to provide for assessments, to borrow money and issue bonds and to do all other acts necessary to carry out the powers vested in the district by said Chapter 112. The managers of the district would be appointed by the Minnesota Water Resources Board and subsequent appointments would be by the Board of County Commissioners of Hennepin County. It is the belief of the parties to this agreement that the creation of such a district would remove control one step further from the electorate and the residents of this watershed area who ultimately would pay the costs of the aforesaid improvements. It would also create another political subdivision which would have to plan and work with the individual parties to this agreement to solve the storm water and drainage problems within the watershed.

The purpose of this statement of intent regarding the agreement is to clarify and establish for any court of review or any arbitrator or for the elected successors to the representatives who have entered into this agreement, the reasons and purposes for this joint and cooperative agreement. The parties to this agreement realize that the success or failure of the Bassett Creek

Flood Control Commission created by this agreement is dependent upon the sincere desire of each member community to cooperate in the exercise of a joint power to solve a joint problem. Each party to this agreement pledges this cooperation."

It is the intent of this amended agreement to carry forward the same purposes as aforestated and to revise the Joint Powers Agreement to meet the mandates of Minnesota Statutes, Sections 103B. 201 through 103B. 251 and Minnesota Rules (Chapter 8410 relating to "Metropolitan Area Local Water Management". This amended agreement shall continue the existence of a Watershed Management Organization in accordance with the provisions of the Metropolitan Surface Water Management Act as set forth in Minnesota Statutes 1992 Sections 103B. 201 to and including 103B. 251. The organization hereby created shall have all of the powers and responsibilities set forth in said statutes for the Bassett Creek Watershed. The purpose of the organization shall be to assist the 9 member communities to preserve and use natural water storage and retention systems to:

1. Protect, preserve, and use natural surface and groundwater storage and retention systems;
2. Minimize public capital expenditures needed to correct flooding and water quality problems;
3. Identify and plan for means to effectively protect and improve surface water and groundwater quality;
4. Establish more uniform local policies and official controls for surface water and groundwater quality;
5. Prevent erosion of soil into surface water systems;
6. Promote groundwater recharge;
7. Protect and enhance fish and wildlife habitat and water recreational facilities;
8. To secure other benefits associated with the proper management of surface water.
9. To promote and encourage cooperation among member cities in coordinating local surface water and groundwater plans and to be aware of their neighbor's problems and to protect the public health, safety, and general welfare.
10. To continue the work of the Bassett Creek Water Management Commission and to carry out the plans, policies and programs developed by said Commission from 1968 to 1993.

JOINT AND COOPERATIVE AGREEMENT

The parties to this Agreement are governmental units of the State of Minnesota, all of which have lands which drain surface water into Bassett Creek and all of which have power to construct, reconstruct, extend and maintain storm water management facilities. This agreement is made pursuant to the authority conferred upon the parties by Minnesota Statutes 1992, Sections 471.59 and 103B. 201 to and including Section 103B. 251.

NAME

I.

The parties hereto create and establish the Bassett Creek Watershed Management Commission.

GENERAL PURPOSE

II.

The general purpose of this agreement is to provide an organization which can investigate, study, plan and control the construction of facilities to drain or pond storm waters, to alleviate damage by flood waters; to improve the creek channel for drainage; to assist in planning for land use; to repair, improve, relocate, modify, consolidate or abandon, in whole or in part, drainage systems within the watershed area; and to do whatever is necessary to assist in water conservation and the abatement of surface water and groundwater contamination and water pollution. In addition to the aforesated purposes, the organization hereby created shall serve as the organization for the Bassett Creek watershed and shall carry out all of the duties and responsibilities outlined in Minnesota Statutes, Section 103B. 201 through 103B. 251, both inclusive.

DEFINITIONS

III.

For the purposes of this agreement, the terms used herein shall have the meanings as defined in this article.

Subdivision 1. "Commission" means the organization created by this agreement, the full name of which is "Bassett Creek Watershed Management Commission." It shall be a public agency of its members.

Subdivision 2. "Board" means the Board of commissioners of the Commission, consisting of one commissioner or one alternate commissioner from each of the governmental units which is a party to this agreement and which shall be the governing body of the Commission.

Subdivision 3. "Council" means the governing body of a governmental unit which is a member of this Commission.

Subdivision 4. "Governmental Unit" means any city, county, or town.

Subdivision 5. "Member" means a governmental unit which enters into this agreement.

Subdivision 6. "Bassett Creek Watershed" means the area contained within a line drawn around the extremities of all terrain whose surface drainage is tributary to Bassett Creek and within the mapped areas delineated on the map filed with the Board of Water and Soil Resources originally filed pursuant to Minnesota Statutes, 473.877, Subd. 2 and as now amended by Minnesota Statutes, Chapter 103B.

MEMBERSHIP

IV.

The membership of the Commission shall consist of all of the following governmental units as shall elect, through resolution or ordinance adopted by their respective Councils, to become members:

City of Crystal

City of Golden Valley

City of Medicine Lake

City of Minneapolis

City of Minnetonka

City of New Hope

City of Plymouth

City of Robbinsdale

City of St. Louis Park

(The foregoing list is intended to include all governmental units which are presently partially or entirely within the Bassett Creek Watershed.)

No change in governmental boundaries , structure or organizational status shall affect the eligibility of any governmental unit listed above to be represented on the Commission, so long as such governmental unit continues to exist as a separate political subdivision.

BOARD OF COMMISSIONERS

V.

Subdivision 1. The governing body of the Commission shall be its Board. Each member shall be entitled to appoint one representative on the Board, and one alternate who may sit when the representative is not in attendance and said representative or alternate representative shall be called a "Commissioner".

Subdivision 2. The council of each member shall determine the eligibility or qualification of its representative on the Commission but the terms of each Commissioner shall be as established by this agreement.

Subdivision 3. The term of each Commissioner and Alternate Commissioner appointed by each member shall be three years and until their successors are selected and qualify and shall

commence on February 1, except that the terms of the Commissioners first appointed shall commence from the date of their appointment and shall terminate as follows:

- a. The Commissioners appointed by the Cities of Crystal, Golden Valley, and Medicine Lake shall terminate on February 1, 1994.
- b. The Commissioners appointed by the Cities of Minneapolis, Minnetonka, and New Hope shall terminate on February 1, 1995.
- c. The Commissioners appointed by the Cities of Plymouth, Robbinsdale, and St. Louis Park shall terminate on February 1, 1996.

Any vacancy shall be filled for the unexpired term of any Commissioner by the council of the governmental unit of the member who appointed said Commissioner. The Commission shall notify the Board of Water and Soil Resources of member appointments and vacancies within 30 days after the Commission is notified by a member. Each member agrees to publish a notice of vacancies resulting from the expiration of a Commissioner's or Alternate Commissioner's term or where a vacancy exists for any reason. Publication and notice shall be in accordance with Minnesota Statutes, Section 103B.227, Subds. 1 and 2, as they now exist or as subsequently amended.

Subdivision 4. The council of each member agrees that its representative commissioner will not be removed from the Board prior to the expiration of the Commissioner's term, unless said Commissioner consents in writing or unless said council has presented the Commissioner with charges in writing and has held a public hearing after reasonable notice to the Commissioner. A member may remove a Commissioner or an Alternate Commissioner for just cause or for violation of a Code of Ethics established by the Commission or by the Member City or for malfeasance, nonfeasance, or misfeasance. Said hearing shall be held by the Member City Council who appointed the Commissioner. A Commissioner or Alternate Commissioner who is an elected officer of a Member City who is not reelected may be removed by the appointing Member City at the appointing Member's discretion. Any decision by a Member to remove a Commissioner or Alternate Commissioner may be appealed to the Board of Water and Soil Resources. A certified copy of the Council's Resolution removing said Commissioner shall be filed with the Secretary of the Board of Commissioners and shall show compliance with the terms of this section.

Subdivision 5. Each member shall within 30 days of appointment file with the Secretary of the Board of Commissioners a record of the appointment of its Commissioner and Alternate Commissioner. The Commission shall notify the Board of Water and Soil Resources of Member appointments and vacancies within 30 days after receiving notice from the Member. Members shall fill all vacancies within 90 days after the vacancy occurs.

Subdivision 6. Commissioners shall serve without compensation from the Commission, but this shall not prevent a governmental unit from providing compensation for its Commissioner for serving on the Board, if such compensation is authorized by such governmental unit and by law. Commission funds may be used to reimburse a Commissioner or Alternate Commissioner for expenses incurred in performing Commission business and if authorized by the Board.

Subdivision 7. At the first meeting of the Board and in February of each year thereafter, the Board shall elect from its Commissioners a Chair, a Vice Chair, a Secretary, a Treasurer, and such other officers as it deems necessary to conduct its meetings and affairs. At the organizational meeting or as soon thereafter as it may be reasonably done, the Commission shall adopt rules and regulations governing its meetings. Such rules and regulations may be amended from time to time at either a regular or a special meeting of the Commission provided that a ten day prior notice of the proposed amendment has been furnished to each person to whom notice of the Board meetings is required to be sent; a majority vote of all eligible votes of the then existing members of the Commission shall be sufficient to adopt any proposed amendment to such rules and regulations.

The Board shall notify each Member City of the location and time of regular and special meetings called by the Board. A meeting shall be held at least annually, and all meetings shall be called and open to the public pursuant to Minnesota Statutes, Section 471.705, or as amended.

POWERS AND DUTIES OF THE BOARD

VI.

Subdivision 1. The Commission, acting by its duly appointed Board of Commissioners, shall as it relates to flood control, water quality, ground water recharge and water conservation or in its construction of facilities and other duties as set forth in Minnesota Laws have the powers and duties set out in this article.

Subdivision 2. It may employ such persons as it deems necessary to accomplish its duties and powers. Any employee may be on a full time, part time or consulting basis as the Board determines.

Subdivision 3. It may contract for space and for material and supplies to carry on its activities either with a member or elsewhere.

Subdivision 4. It may acquire necessary personal property to carry out its powers and its duties.

Subdivision 5. It shall develop an overall plan containing a capital improvement program within a reasonable time after qualifying, and said plan shall meet all of the requirements as established in Minnesota Statutes, Chapter 103B. Said overall plan shall establish a comprehensive goal for the development of Bassett Creek and shall establish a proposed procedure for accomplishing the purposes of the organization as set forth in Article II.

In preparing the overall plan, the Board may consult with the engineering and planning staff of each member governmental unit. It may consult with the Metropolitan Council and other public and private bodies to obtain and consider projections of land use, population growth, and other factors which are relevant to the improvement and development of the Bassett Creek watershed.

Said overall plan shall include the location and adequacy of the outlet or outfall of said Bassett Creek. The plan shall include the quantity of storage facilities and the sizing of an adequate outlet for all branch lateral storm sewers within the Bassett Creek watershed. The plan shall comply with state statutes and regulations promulgated and adopted by the Board of Water and Soil Resources.

Upon completion of the overall plan, or amendments thereto, the Board shall supply each member with a copy of the proposed plan and shall submit the plan for review and comment to Hennepin County, all soil and water conservation districts in Hennepin County and to all statutory and home rule charter cities having territory within the watershed. All governmental units which expect that substantial amendment of its local comprehensive plan will be necessary in order to bring their local water management into conformance with the Commission's watershed plan shall describe as specifically as possible, the amendments to the local plan which it expects will be necessary. The Commission shall hold a public hearing after 60 days mailed notice to the clerk of each member governmental unit. The mailed notice of the hearing shall be sent at the same time the plan is submitted to the members and to other governmental agencies. After such public hearing, the Board shall prescribe the overall plan which shall be the outline for future action by the Commission.

The Commission shall then submit the plan, any comments received and any appropriate amendments to the plan to the Board of Commissioners of Hennepin County. The County shall approve or disapprove projects in the capital improvement program which may require the provision of county funds pursuant to Minnesota Statutes Sections 103B. 251 or 103D. 901. The County shall have 60 days to complete its review. If the County fails to complete its review within 60 days the plan and capital improvement programs shall be deemed approved.

After completion of the review by Hennepin County, the plan and capital improvement program shall be submitted to the Metropolitan Council for its review. After completion of the review by the Metropolitan Council pursuant to Minnesota Statutes, Section 103B. 231, Subd. 8, the Commission shall submit the plan to the Minnesota Commissioner of Natural Resources and the Minnesota Pollution Control Agency for review and comment on the consistency of the plan with state laws and rules relating to water and related land resources and to the Board of Water and Soil Resources for review as provided in Minnesota Statutes, Section 103B. 231, Subd. 9.

After return of the plan, the Commission shall submit to each of its members a copy of the plan and all comments of the reviewing authorities. The Commission shall wait for at least 30 days for comments from the members. The Commission shall adopt the overall plan within 120 days after approval of the plan by the Board of Water and Soil Resources. The Commission shall then implement the approved plan and approved capital improvement program by resolution of the Commission as hereinafter set forth. The adoption of said overall plan shall be only upon a favorable vote of a majority of all eligible votes of the then existing members of the Commission. A copy of the adopted plan shall be filed with the clerk of each member governmental unit. Upon notice and hearing as provided for in adopting the overall plan, said plan may be amended by the Board on its own initiative or on the petition of any member governmental unit.

The review provisions set forth in this section are those required by Minnesota Statutes, Section 103B.231. If the law is amended, approvals shall be as required by law and the provisions contained in this section shall be amended accordingly.

Subdivision 6. It shall make necessary surveys or utilize other reliable surveys and data and develop projects to accomplish the purposes for which the Commission is organized.

Subdivision 7. It may cooperate or contract with the State of Minnesota or any subdivision thereof or federal agency or private or public organization to accomplish the purposes for which it is organized.

Subdivision 8. It may order any member governmental unit or units to construct, clean, repair, alter, abandon, consolidate, reclaim or change the course or terminus of any ditch, drain, storm sewer, or water course, natural or artificial, within the Bassett Creek watershed.

Subdivision 9. It may order any member governmental unit or units to acquire, operate, construct or maintain dams, dikes, reservoirs and appurtenant works or other improvements necessary to implement the overall plan.

Subdivision 10. It shall regulate, conserve and control the use of storm and surface water and groundwater within the Bassett Creek watershed.

Subdivision 11. It may contract for or purchase such insurance as the Board deems necessary for the protection of the Commission.

Subdivision 12. It may establish and maintain devices for acquiring and recording hydrological and water quality data within the Bassett Creek watershed.

Subdivision 13. It may enter upon lands within or without the watershed to make surveys and investigations to accomplish the purposes of the Commission. The Commission shall be liable for actual damages resulting therefrom but every person who claims damages shall serve the Chairman or Secretary of the Board of Commissioners with a Notice of Claim as required by Chapter 466.05 of the Minnesota Statutes.

Subdivision 14. It shall provide any member governmental unit with technical data or any other information of which the Commission has knowledge which will assist the governmental unit in preparing land use classifications or local water management plans within the watershed.

Subdivision 15. It may provide legal and technical assistance in connection with litigation or other proceedings between one or more of its members and any other political subdivision, commission, Board or agency relating to the planning or construction of facilities to drain or pond storm waters or relating to water quality within the Bassett Creek watershed. The use of commission funds for litigation shall be only upon a favorable vote of a majority of the eligible votes of the then existing members of the Commission.

Subdivision 16. It may accumulate reserve funds for the purposes herein mentioned and may invest funds of the Commission not currently needed for its operations, in the manner and subject to the laws of Minnesota applicable to statutory cities.

Subdivision 17. It may collect monies, subject to the provisions of this agreement, from its members, Hennepin County and from any other source approved by a majority of its Board.

Subdivision 18. It may make contracts, incur expenses and make expenditures necessary and incidental to the effectuation of these purposes and powers and may disburse therefor in the manner hereinafter provided.

Subdivision 19. It shall cause to be made an annual audit by a certified public accountant or the state auditor of the books and accounts of the Commission and shall make and file a report to its members at least once each year including the following information:

- a. the approved budget;
- b. a reporting of revenues;
- c. a reporting of expenditures;
- d. a financial audit report or section that includes a balance sheet, a classification of revenues and expenditures, an analysis of changes in final balances, and any additional statements considered necessary for full financial disclosure;
- e. the status of all Commission projects and work within the watershed; and
- f. the business transacted by the commission and other matters which affect the interests of the commission.

Copies of said report shall be transmitted to the clerk of each member governmental unit.

Subdivision 20. Its books, reports and records shall be available for and open to inspection by its members at all reasonable times.

Subdivision 21. It may recommend changes in this agreement to its members.

Subdivision 22. It may exercise all other powers necessary and incidental to the implementation of the purposes and powers set forth herein and as outlined and authorized by Minnesota Statutes, Sections 103B. 201 through 103B. 251.

Subdivision 23. It shall cooperate with the State of Minnesota, the Commissioner of Natural Resources and the Director of the Division of Waters, Soils and Minerals of the Department of Natural Resources in obtaining permits and complying with the requirements of Chapter 103G of the Minnesota Statutes.

Subdivision 24. Each member reserves the right to conduct separate or concurrent studies on any matter under study by the Commission.

Subdivision 25. It shall establish a procedure for establishing citizen or technical advisory committees and to provide other means for public participation.

METHOD OF PROCEEDING

VII.

Subdivision 1. The procedures to be followed by the Board in carrying out the powers and duties set forth in Article VI, Subdivisions 5, 6, 7, 8, 9, and 10, shall be as set forth in this article.

Subdivision 2. The Commissioners shall be the same as those serving as Commissioners and Alternate Commissioners for the predecessor Bassett Creek Water Management Commission. The Board shall immediately proceed to revise the overall plan as set forth in Article VI, Subdivision 5 or as required by state statute. Upon adoption of said overall plan, the Board shall proceed to implement said plan, and this implementation may be ordered by stages.

Subdivision 3. The Bassett Creek Watershed Management Commission shall be the successor to the Bassett Creek Water Management Commission as constituted under the prior Joint Powers Agreement. All personal property, money, bank accounts, records or any other thing of value and on hand with the Bassett Creek Water Management Commission shall be transferred to the Bassett Creek Watershed Management Commission.

Subdivision 4. The location and adequacy of the outlet for Bassett Creek shall be determined and the Commission shall then prepare plans which will provide capacity to outlet the surface waters which will be collected within the Bassett Creek watershed. In determining the necessary capacity for said outlet, the Commission shall take into consideration the quantity of land within the watershed which each member governmental unit has to pond or act as a reservoir for surface waters. It shall consider only lands which are under public ownership or under public control and that will be perpetually dedicated to acting as a reservoir for surface waters. The Commission may require from each member governmental unit a commitment in writing of the lands which shall be so dedicated, including a legal description of the gross area and the capacity in acre feet of water storage. No project which will channel or divert additional waters to Bassett Creek shall be commenced by any member governmental unit prior to approval of the Board of the design of an adequate outlet or of adequate storage facilities. The adequacy of said outlet shall be determined by the Board after consultations with its professional engineers.

Subdivision 5. All construction, reconstruction, extension or maintenance of Bassett Creek including outlets, lift stations, dams, reservoirs, or other appurtenances of a surface water or storm sewer system which involve construction by or assessment against any member governmental unit or against privately or publicly owned land within the watershed shall follow the statutory procedures outlined in Chapter 429 of the Minnesota Statutes except as herein modified. The Board shall secure from its engineers or some other competent persona report advising it in a preliminary way as to whether the proposed improvement is feasible and as to whether it shall best be made as proposed or in connection with some other improvement and the estimated cost of the improvement as recommended and the proposed allocation of costs between members.

The Board shall then hold a public hearing on the proposed improvement after mailed notice to the clerk of each member governmental unit within the watershed. The Commission

shall not be required to mail or publish notice except by said notice to the clerk. Said notice shall be mailed not less than 45 days before the hearing , shall state the time and place of the hearing, the general nature of the improvement, the estimated total cost and the estimated cost to each member governmental unit. The Board may adjourn said hearing to obtain further information, may continue said hearing pending action of the member governmental units or may take such other action as it deems necessary to carry out the purposes of this Commission.

To order the improvement, in accordance with the powers and duties established in Article VI, Subdivisions 7, 8 and 9, a resolution setting forth the order for a capital improvement project shall require a favorable vote by two-thirds of all eligible votes of then existing Board of the Commission. In all cases other than for capital improvement projects, a majority vote of all eligible members of the Board shall be sufficient to order the work. The order shall describe the improvement, shall allocate in percentages the cost allocation between the member governmental units, shall designate the engineers to prepare plans and specifications, and shall designate the member who will contract for the improvement in accordance with Subdivision 7 of this Article.

After the Board has ordered an improvement or if the hearing is continued while the member governmental units act on said proposal, it shall forward said preliminary report to all member governmental units with an estimated time schedule for the construction of said improvement. The Board shall allow an adequate amount of time , and in no event less than 45 days, for each member governmental unit to conduct hearings, in accordance with the provisions of the aforesated Chapter 429 or the charter requirements of any city, or to ascertain the method of financing which said member governmental unit will utilize to pay its proportionate share of the costs of the improvement. Each member governmental unit shall ascertain within a period of 90 days the method it shall use to pay its proportionate share of the costs.

If the Commission proposes to utilize Hennepin County's bonding authority as set forth in Minnesota Statutes, Section 103B. 251, or if the Commission proposes to certify all or any part of a capital improvement to Hennepin County for payment, then and in that event all proceedings shall be carried out in accordance with the provisions set forth in said Section 1038.251.

The Board shall not order and no engineer shall prepare plans and specifications before the Board has adopted a resolution ordering the improvement. The Board may order the advertising for bids upon receipt of notice from each member governmental unit who will be assessed that it has completed its hearing or determined its method of payment or upon expiration of 90 days after the mailing of the preliminary report to the members.

Subdivision 6. Any member governmental unit being aggrieved by the determination of the Board as to the allocation of the costs of said improvement shall have 30 days after the commission resolution ordering the improvement to appeal said determination. Said appeal shall be in writing and shall be addressed to the Board asking for arbitration. The determination of the member's appeal shall be referred to a Board of Arbitration. The Board of Arbitration shall consist of three persons; one to be appointed by the Board of Commissioners, one to be appointed by the appealing member governmental unit, and the third to be appointed by the two so selected. In the event the two persons so selected do not appoint the third person within 15 days after their appointment, then the Chief Judge of the District Court of Hennepin County shall

have jurisdiction to appoint, upon application of either or both of the two earlier selected, the third person to the Board of Arbitration. The third person selected shall not be a resident of any member governmental unit and if appointed by the Chief Judge said person shall be a registered professional engineer. The arbitrators' expenses and fees, together with the other expenses, not including counsel fees, incurred in the conduct of the arbitration shall be divided equally between the Commission and the appealing member.

Arbitration shall be conducted in accordance with the Uniform Arbitration Act, Chapter 572 of the Minnesota Statutes.

Subdivision 7. Contracts for Improvements. All contracts which are to be let as a result of the Board's order to construct, repair, alter, reclaim or change the course or terminus of any ditch, drain, storm sewer, or watercourse, or to acquire, operate, construct or maintain dams, dikes, reservoirs or their appurtenances or to carry out any of the other provisions of the plan as authorized by Minnesota Statutes, and for which two or more member governmental units shall be responsible for the costs, shall be let in accordance with the provisions of Section 429.041 of the Minnesota Statutes. The bidding and contracting of said work shall be let by any one of the member governmental units, as ordered by the Board of Commissioners, after compliance with the statutes. All contracts and bidding procedures shall comply with all the requirements of law applicable to contracts let by a statutory city in the State of Minnesota.

The Commission shall not have the authority to contract in its own name for any improvement work for which a special assessment will be levied against any private or public property under the provisions of Chapter 429 or under the provisions of any City charter. These contracts shall be awarded by action of the council of a member and shall be in the name of a member governmental unit. This section shall not preclude the Commission from proceeding under Minnesota Statutes, Section 103B. 251.

Subdivision 8. Contracts with Other Governmental Bodies. The Commission may exercise the powers set forth in Article VI, Subdivision 7, but said contracts for a capital improvement shall require a favorable vote of two-thirds majority of the eligible votes of the then existing members of the Commission.

Subdivision 9. Supervision. All improvement contracts awarded under the provisions of Subdivision 7 of this Article shall be supervised by the member governmental unit awarding said contract or said member governmental unit may contract or appoint any qualified staff member or members of the Commission to carry out said supervision, but each member agrees that the staff of this Commission shall be authorized to observe and review the work in progress and the members agree to cooperate with the Commission staff in accomplishing the purposes of this Commission.

Representatives of the Commission shall have the right to enter upon the place or places where the improvement work is in progress for the purpose of making reasonable tests and inspections. The staff of this Commission shall report and advise and recommend to the Board on the progress of said work.

Subdivision 10. Land Acquisition. The Commission shall not have the power of eminent domain. The member governmental units agree that any and all easements or interest in land which are necessary will be negotiated or condemned in accordance with Chapter 117 of the Minnesota Statutes by the unit wherein said lands are located, and each member agrees to acquire the necessary easements or right of way or partial or complete interest in land upon order of the Board of Commissioners to accomplish the purposes of this agreement. All reasonable costs of said acquisition shall be considered as a cost of the improvement. If a member governmental unit determines it is in the best interests of that member to acquire additional lands, in conjunction with the taking of lands for storm and surface drainage or storage, for some other purposes, the costs of said acquisition will not be included in the improvement costs of the ordered project. The Board in determining the amount of the improvement costs to be assessed to each member governmental unit may take into consideration the land use for which said additional lands are being acquired and may credit the acquiring municipality for said land acquisition to the extent that it benefits the other members of this agreement. Any credits may be applied to the cost allocation of the improvement project under construction or the Board if feasible and necessary may defer said credits to a future project.

If any member unit refuses to negotiate or condemn lands as ordered by the Board, any other member may negotiate or condemn outside its corporate limits in accordance with the aforesaid Chapter 117. All members agree that they will not condemn or negotiate for land acquisition to pond or drain storm and surface waters within the corporate boundaries of another member within the Bassett Creek watershed except upon order of the Board of this Commission.

The Commission shall have authority to establish land acquisition policies as a part of the overall plan. The policies shall be designed to equalize costs of land throughout the watershed. Said policy is contained in the existing watershed management plan and may be continued in any revised overall plan required by Minnesota Statutes.

Subdivision 11. Pollution Control and Water Quality. The Commission shall have the authority and responsibility to protect and improve water quality in the watershed as this is one of the main purposes set forth in the Surface Water Management Act. All member governmental units agree that they will refuse to allow the drainage of sanitary sewage or industrial wastes onto any land or into any watercourse or storm sewer draining into Bassett Creek. The Board may investigate on its own initiative and shall investigate upon petition of any member all complaints relating to pollution of surface water or groundwater draining into or affecting Bassett Creek or its tributaries. Upon a finding that the creek or surface waters or groundwater are being polluted, the Board shall order the member governmental unit to abate this nuisance and each member agrees that it will take all reasonable action available to it under the law to alleviate the pollution and to assist in protecting and improving the water quality of surface water and groundwater in the watershed.

Subdivision 12. Local Water Management Plans. The Commission shall have power and authority to review the members' local water management plans, capital improvement programs and official controls required by Minnesota Statutes Section 103B. 235 and/or by rules promulgated and adopted by the Board of Water and Soil Resources. The members also understand that the overall plan and capital improvement program required for the entire watershed must consist of the local parts in the plan and therefore every effort shall be made by

the Commission to coordinate the local plans with the watershed's overall plan. The members further understand and agree that upon completion and approval of the overall plan required by Minnesota Statutes 103B. 231, each member will be required to present their local management plan to the Commission as required by Minnesota Statutes, Section 103B. 235. It is therefore important that each member provide the Commission with their best effort to coordinate and plan for the individual member's local plan at the same time the watershed overall plan is being assembled.

FINANCES

VIII.

Subdivision 1. The Commission funds may be expended by the Board in accordance with this agreement and in accordance with the procedures as established by law and in the manner as may be determined by the Board. The Board shall designate one or more national or state bank or trust companies, authorized by Chapters 118 and 427 of the Minnesota Statutes to receive deposits of public moneys and to act as depositories for the Commission funds. In no event shall there be a disbursement of Commission funds without the signature of at least two Board members, one of whom shall be the Treasurer or his Authorized Deputy Treasurer. The Treasurer shall be required to file with the Secretary of the Board a bond in the sum of at least \$10,000 or such higher amount as shall be determined by the Board. The Commission shall pay the premium on said bond.

Subdivision 2. The members agree to contribute all cash, bank deposits, and other assets held by the Bassett Creek Water Management Commission to the new Bassett Creek Watershed Management Commission to carry out the purposes of the Commission. Each member governmental unit has contributed its proportionate share of said funds based on the net tax capacity and area of all taxable property within the Bassett Creek watershed.

Subdivision 3. Each member agrees to contribute each year to a general fund, said fund to be used for general administration purposes including, but not limited to: salaries, rent, supplies, development of an overall plan, insurance, and bonds, and to purchase and maintain devices to measure hydrological and water quality data. Said funds may also be used for normal maintenance of the facilities, but any extraordinary maintenance or repair expense shall be treated as an improvement cost and processed in accordance with Subdivision 4 of this Article. The annual contribution by each member shall be based fifty percent (50%) on the net tax capacity of all property within the watershed and fifty percent (50%) on the basis of the total area of each member within the boundaries of the Watershed each year to the total area in the Bassett Creek watershed. In no event shall any assessment require a contribution to exceed one-half of one percent of the net tax capacity within the watershed.

Subdivision 4.

(a) An improvement fund shall be established for each improvement project instituted under Article VII, Subdivision 3. Each member agrees to contribute to said fund its proportionate share of the engineering, legal and administrative costs as determined by the amount to be assessed against each member as a cost of the improvement. The Board shall submit in writing a

statement to each member, setting forth in detail the expenses incurred by the Commission for each project.

Each member further agrees to pay to or contract with the member governmental unit awarding said contract for the improvement, its proportionate share of the cost of the improvement in accordance with the determination of the Board under Article VII, Subdivision 5. The member awarding the contract shall submit in writing copies of the engineer's certificate authorizing payment during construction and the member being billed agrees to pay its proportionate share of said improvement costs within 30 days after receipt of the statement. The member awarding the contract shall advise other contributing members of the tentative time schedule of the work and the estimated times when the contributions shall be necessary.

(b) Notwithstanding the provisions of paragraph (a) of this subdivision, the Commission may by a vote of 2/3rds of all eligible votes of the then existing members of the Commission decide to proceed to fund all or any part of the cost of a capital improvement contained in the capital improvement program of the plan pursuant to the authority and subject to the provisions set forth in Minnesota Statutes, Section 103B. 251. The Commission and Hennepin County may establish a maintenance fund to be used for normal and routine maintenance of an improvement constructed in whole or in part with money provided by Hennepin County pursuant to Minnesota Statutes, Section 103B. 251. The levy and collection of an ad valorem tax levy for maintenance shall be by Hennepin County based upon a tax levy resolution adopted by a majority vote of all eligible members of the Commission and remitted to the County on or before the date prescribed by law each year. If it is determined to levy for maintenance, the Commission shall be required to follow the hearing process established by Minnesota Statutes, Section 103D. 915 and 103D. 921 and acts amendatory thereof and in addition thereto. Mailed notice shall be sent to the Clerk of each member municipality at least 30 days prior to the hearing.

Subdivision 5. On or before July 1 of each year, the Board shall adopt a detailed budget for the ensuing year and decide upon the total amount necessary for the general fund. Budget approval shall require a favorable vote by a majority of all eligible votes of the then existing members of the Board.

The Secretary of the Board shall certify the budget on or before July 1 to the clerk of each member governmental unit together with a statement of the proportion of the budget to be provided by each member. The Council of each member agrees to review the budget, and the Board shall upon notice from any member received prior to August 1, hear objections to the budget, and may, upon notice to all members and after a hearing, modify or amend the budget, and then give notice to the members of any and all modifications or amendments.

Each member agrees to provide the funds required by the budget and said determination shall be conclusive if no member enters objections in writing on or before August 1. If no objections are submitted to the Board, each member agrees to provide the funds approved by the Board, after the Board has conducted the aforementioned hearing. Modifications or amendments to the original budget require a favorable vote by a majority of all eligible voters of then existing members of the Board.

The budget shall not in any event require any member to contribute in excess of one-half of one percent of the net tax capacity of all taxable property within the watershed and within said members corporate boundaries.

The schedule of payments by the members shall be determined by the Board in such a manner as to provide for an orderly collection of the funds needed.

Upon notice and hearing, the Board by a favorable vote of a majority of all eligible votes of then existing members may adopt a supplemental budget requiring additional payments by the members within 60 days of its adoption but in no event shall the budget require any member to contribute in excess of one-half of one percent of the net tax capacity of all taxable property within the watershed or within any member's corporate boundaries in any one calendar year.

Members' attention is drawn to Minnesota Statutes, Section 103B. 245, which authorizes a Watershed Management Tax District to be created within each member City to pay the costs of planning and for the purpose of paying capital costs and/or normal and routine maintenance of facilities.

Subdivision 5. Cost Allocation. All capital costs incurred by the Commission shall be apportioned to the respective members on either (1), (2), or (3) of the following bases:

- (1) A negotiated amount to be arrived at by the members who have lands in the subdistrict responsible for the capital improvement.
- (2)
 - (a) Fifty percent of all capital costs or the financing thereof shall be apportioned to each member on the basis of the real property valuation net tax capacity of each member within the boundaries of the watershed each year to the total real property valuation net tax capacity in the Bassett Creek watershed area governed by this Agreement.
 - (b) Fifty percent of all capital costs or the financing thereof shall be apportioned to each member on the basis of the total area of each member within the boundaries of the watershed each year to the total area in the Bassett Creek watershed area governed by this Agreement.
 - (c) Capital costs allocated under the 50% area/50% net tax capacity formula herein set forth may be varied by the Commission by a 2/3rds vote if:
 - (1) any member community receives a direct benefit from the capital improvement which benefit can be defined as a lateral as well as a trunk benefit, or
 - (2) the capital improvement provides a direct benefit to one or more members which benefit is so disproportionate as to require in a sense of fairness a modification in the 50/50 formula.
 - (d) Credits to any member for lands acquired by said member to pond or store storm and surface water shall be allowed against costs set forth in Subsections (a), (b), and (c) of this Section.
- (3) If the project is constructed and financed pursuant to Minnesota Statutes, Section 103B. 251, the members understand and agree that said costs will be levied on all taxable property in the watershed as set forth in the statute.

MISCELLANEOUS PROVISIONS

IX.

Subdivision 1. The Commission shall not have the power to issue certificates, warrants or bonds.

Subdivision 2. The Commission shall not have the power of eminent domain and shall not own any interest in real property. All interests in lands shall be held in the name of the corporate member wherein said lands are located.

Subdivision 3. The Commission shall not have the power to levy a special assessment upon any privately or publicly owned land. All such assessments shall be levied by the member wherein said lands are located. It shall have the power to require any member to contribute the costs allocated or assessed according to the other provisions of this agreement.

Subdivision 4. Each member agrees that it will not directly or indirectly collect or divert any additional surface water to the Mississippi River or its tributaries from any subdistrict or subtrunk without a permit from the Board of Commissioners. Permits may be granted by the Board for a member to proceed with the construction or reconstruction of improvements within the individual corporate members' boundaries and at its sole cost upon a finding:

- (a) that there is an adequate outlet; and
- (b) that said construction is in conformance with the overall plan; and
- (c) that the construction will not adversely affect other members of this agreement.

Subdivision 5. Any member who is more than 60 days in default in contributing its share to the general fund shall have the vote of its Board member suspended pending the payment of its proportionate share.

Any member who is more than 60 days in default in contributing its proportionate share of the cost of any improvement to the contracting member shall upon application of the contracting member have the vote of its Board member suspended, pending the payment of its proportionate share.

Any Board member whose vote is under suspension shall not be considered as an eligible member as such membership affects the number of votes required to proceed on any matter under consideration by the Board.

DURATION

X.

Subdivision 1. Each member agrees to be bound by the terms of this agreement until January 1, 2025, and it may be continued thereafter at the option of the parties.

Subdivision 2. This agreement may be terminated prior to January 1, 2025, by the unanimous consent of the parties. If the agreement is to be terminated, a notice of the intent to

dissolve the Commission shall be sent to the Board of Water and Soil Resources and to Hennepin County at least 90 days prior to the date of dissolution.

Subdivision 3. In addition to the manner provided in Subdivision 2 for termination, any member may petition the Board to dissolve the agreement. Upon 90 days notice in writing to the clerk of each member governmental unit and to the Board of Water and Soil Resources and to Hennepin County, the Board shall hold a hearing and upon a favorable vote by a majority of all eligible votes of then existing Board members, the Board may by Resolution recommend that the Commission be dissolved. Said Resolution shall be submitted to each member governmental unit and if ratified by three-fourths of the councils of all eligible members within 60 days, said Board shall dissolve the Commission allowing a reasonable time to complete work in progress and to dispose of personal property owned by the Commission.

DISSOLUTION

XI.

Upon dissolution of the Commission , all property of the Commission shall be sold and the proceeds thereof, together with monies on hand, shall be distributed to the eligible members of the Commission. Such distribution of Commission assets shall be made in proportion to the total contribution to the Commission as required by the last annual budget.

EFFECTIVE DATE

XII.

This agreement shall be in full force and effect upon the filing of a certified copy of the resolution approving said agreement by all nine members. Said resolution shall be filed with the Chair of the existing Bassett Creek Watershed Management Commission (presently W. Peter Enck of the City of New Hope), who shall notify all members in writing of its effective date and shall set the date for the next meeting to be conducted under this amended Joint Powers Agreement.

IN WITNESS WHEREOF, the undersigned governmental units, by action of their governing bodies, have caused this agreement to be executed in accordance with the authority of Minnesota Statutes Sections 103B. 211 and 471.59.

COOPERATIVE AGREEMENT

City of St. Louis Park and Minnehaha Creek Watershed District

CITY OF ST. LOUIS PARK

POWELL ROAD STORMWATER DIVERSION PROJECT

This Cooperative Agreement ("Agreement") is made by and between the Minnehaha Creek Watershed District, a watershed district with purposes and powers as set forth at Minnesota Statutes Chapters 103B and 103D (District), and the City of St. Louis Park, a home rule charter city in the State of Minnesota ("St. Louis Park").

Recitals

A. The City of Hopkins ("Hopkins") owns and operates a municipal system to collect and convey stormwater from a catchment of 217 acres more or less, principally within the Hopkins, as delineated on Attachment A hereto. The conveyance passes into St. Louis Park, where it conducts the stormwater without flow management or water quality treatment to an outfall into Minnehaha Creek. St. Louis Park holds the authority to maintain that part of the conveyance within its boundaries.

B. The District owns a parcel of land of about 17 acres within Hopkins and adjacent to Minnehaha Creek (the "Property"). The District is performing feasibility work to assess the siting of a stormwater infiltration basin or similar practice that would provide water quality treatment for stormwater runoff from an area including this catchment, manage stormwater peak flow and volume, and reduce sediment discharge into the creek from bank erosion and downstream flooding.

C. The District and Hopkins have entered or will enter into a project agreement in which the responsibility is allocated between them for design, construction and maintenance of proposed improvements consisting of modification to the stormwater conveyance system, with associated structural appurtenances, to divert stormwater presently discharged directly to Minnehaha Creek to the stormwater practice on the Property (the "Project").

D. St. Louis Park supports the Project and concurs that it will benefit St. Louis Park by reducing the discharge of pollutants from the conveyance that it owns and operates into receiving waters located within St. Louis Park.

E. The purpose of this Agreement is to establish terms for cooperation in the Project. The Project will lie on and under Powell Road, private property and both public and private rail right-of-way.

THEREFORE St. Louis Park and the District agree as follows:

1.0 DESIGN

1.1 The District may proceed with Project design and to that end will retain a professional engineering consultant to prepare plans and specifications for the Project. The design will provide for connection of a diversion pipe to the conveyance within the Powell Road right-of-way in Hopkins, with a pump and other appurtenances, so that lower flows will be diverted from the conveyance but high flows will continue to flow north as presently into that part of the conveyance maintained by St. Louis Park. Attachment A depicts the alignment of the present conveyance and proposed diversion.

1.2 During the design process, St. Louis Park, in a timely fashion, will:

- (a) Specify reasonable terms and conditions for work in and adjacent to its Powell Road right-of-way;
- (b) Give the District all information it possesses regarding subsurface conditions and rights of third parties within and adjacent to the affected right-of-way; facilitate coordination with such third parties; and facilitate resolution of any actual or potential concerns as to the effect of Project construction or maintenance on third party rights and facilities;
- (c) Otherwise advise the District of any requirements or interests that may affect the plans, specifications and construction including any technical considerations for the stormwater conveyance system.

1.3 The District will obtain easements, permits and other approvals necessary to construct and maintain the Project. St. Louis Park will process any permits or approvals it requires promptly and will not impose on the District any fees for those permits or approvals.

1.4 St. Louis Park will be given the opportunity to review and comment on 90 percent plans and will do so promptly.

2.0 CONSTRUCTION

2.1 The District may award a contract to construct the Project and proceed with construction. The District will manage the construction contract, but will give St. Louis Park advance notice of all formal pre-construction and construction meetings, which St. Louis Park may attend. St. Louis Park will not direct the contractor.

2.2 For work within the St. Louis Park right-of-way, the District's contract will require that:

- (a) The contractor name St. Louis Park as an additional insured for general liability, on a primary basis and for both ongoing work and completed operations;
- (b) The contractor will indemnify St. Louis Park for the contractor's negligent acts and those of its subcontractors;
- (c) The contractor will be responsible to locate and protect all utilities;
- (d) The contractor will provide a performance bond for the completion of the Project;
- (e) The contractor will comply with local traffic and site control requirements; and
- (f) The contractor will restore or repair any damage to St. Louis Park's lands, equipment or facilities resulting from the contractor's activities.

2.3 Until Hopkins accepts the Project per subsection 3.1, below, the District and its contractor may occupy St. Louis Park right-of-way within areas so designated in the plans and specifications, including to stage and operate equipment and vehicles, stockpile excavation and fill materials, store materials, maintain erosion and sediment control practices, and otherwise as necessary or convenient to construct the Project.

2.4 In performing its responsibilities under this section 2.0, including its securing of any work in progress insurance, the District is not assuming the role or authority of an owner of St. Louis Park right-of-way or an operator of St. Louis Park's stormwater infrastructure. The District assumes no responsibility for any pre-existing environmental condition within St. Louis Park right-of-way disturbed by the Project.

3.0 MAINTENANCE

3.1 The project agreement referenced in recital C above provides that on certification of Project substantial completion by the District's engineer and the delivery of record drawings to Hopkins, Hopkins will provide written acceptance of same and at that time will assume ownership of the Project infrastructure, including but not limited to all pumps, manholes and other appurtenances, and the responsibility to maintain that infrastructure. The District will monitor this maintenance responsibility so that there is no hydraulic obstruction in the diversion that risks damage to St. Louis Park's portion of the conveyance north of the diversion or increased maintenance cost for St. Louis Park related thereto.

3.2 St. Louis Park will maintain its portion of the conveyance north of the diversion so as not to impair the design function of the diversion.

3.3 The District may temporarily occupy St. Louis Park right-of-way to inspect and repair any part of the Project located in or adjacent to it. The District will coordinate with St. Louis Park in advance of any such work to minimize disruption to other uses of the right-of-way. The District may assign rights and responsibilities under this paragraph to Hopkins.

4.0 COST RESPONSIBILITIES and REMEDIES

4.1 St. Louis Park will bear its own administrative costs to perform its roles under this Agreement and its costs of maintenance under subsection 3.2.

4.2 St. Louis Park does not otherwise bear any cost related to the design, construction or maintenance of the Project.

4.3 Each party holds harmless, and agrees to defend and indemnify, the other party from and against that portion of any and all liability, loss, claim, damage or expense (including reasonable attorney fees, costs and disbursements) that the indemnified party may incur as a result of the performance of this Agreement due to any negligent act or omission of the indemnifying party or any other act or omission that subjects the indemnifying party to liability in law or equity.

4.4 St. Louis Park holds the District harmless from and against that portion of any and all liability, loss, claim, damage or expense (including reasonable attorney fees, costs and disbursements) arising from a pre-existing environmental condition on St. Louis Park right-of-way.

4.5 Notwithstanding subsections 4.3 and 4.4, this Agreement creates no right in and waives no immunity, defense or liability limit with respect to any third party or the other party to this Agreement. This Agreement is not a joint powers agreement under Minnesota Statutes §471.59 and nothing herein constitutes either party's agreement to be responsible for the acts or omissions of the other party pursuant to subdivision 1a of that statute.

4.6 Only contractual remedies are available for the failure of a party to fulfill the terms of this Agreement.

5.0 PROJECT REPRESENTATIVES

5.1 Each communication under this Agreement will be made to the following representatives:

MCWD:

Project Manager, Powell Road Project
Minnehaha Creek Watershed District
15320 Minnetonka Boulevard
Minnetonka MN 55345-1503



CITY:

Phillip Elkin, Senior Engineering Project Manager
City of St. Louis Park
5005 Minnetonka Boulevard
St. Louis Park, MN 55416

A party may change its contact by written notice to the other party.

IN WITNESS WHEREOF the parties execute this Agreement by their authorized officers.


CITY OF ST. LOUIS PARK

By  Date: 1/23/15
Its Mayor
By  Date: 1/23/15
Its City Manager

MINNEHAHA CREEK WATERSHED DISTRICT

By  Date: 1-29-2015
Its President

Approved for form and execution:


MCWD Counsel

MEMORANDUM of UNDERSTANDING

**Between the Minnehaha Creek Watershed District
and the City of St. Louis Park
for Local Water Planning and Regulation**

This Memorandum of Understanding (MOU) is made this 19th day of Jan, 2016 by and between the Minnehaha Creek Watershed District, a watershed district with purposes and powers as set forth at Minnesota Statutes Chapters 103B and 103D ("MCWD"), and the City of St. Louis park, a body corporate and politic and a statutory city in the State of Minnesota ("City").

Recitals and Statement of Purpose

WHEREAS, in 2007, the MCWD revised its comprehensive watershed management plan under Minnesota Statutes § 103B.231, which details the existing physical environment, land use and development in the watershed, and establishes a plan to regulate water resource use and management to protect water resources, improve water quality, prevent flooding, and otherwise achieve the goals of Minnesota Statutes Chapters 103B and 103D;

WHEREAS, the MCWD's comprehensive watershed management plan incorporates the Rules adopted by the MCWD to protect water resources, improve water quality, prevent flooding and otherwise achieve the goals of Minnesota Statutes Chapters 103B and 103D;

WHEREAS, the City has developed a local water management plan under Minnesota Statutes § 103B.235 that describes the existing and proposed physical environment and land use within the City and sets forth an implementation plan for bringing local water management into conformance with the MCWD's comprehensive watershed management plan;

WHEREAS, on September 3, 2009, the MCWD Board of Managers conditionally approved the City's local water management plan by adoption of Resolution 09-087, which resolution is attached to and incorporated herein as Exhibit A, and the City satisfied the conditions therein;

WHEREAS, the City now wishes to assume sole permitting responsibility in the area of erosion control, but to continue to authorize MCWD to exercise permitting authority with respect to all other areas regulated by the MCWD;

WHEREAS, MCWD approval of a local plan requires a finding that the official controls of the local government are at least as protective of water resources as the MCWD rules;

WHEREAS, the finding by the MCWD Board of Managers in this regard with respect to permitting areas other than erosion control, rested on the City's authorization of the MCWD's continued exercise of regulatory authority within the City in accordance with Minnesota Statutes § 103B.211, subdivision 1(a)(3);

WHEREAS the MCWD Board of Managers finds that the City's erosion control ordinance[s], attached to and incorporated herein as Exhibit B, are at least as protective of water resources as MCWD's Erosion Control Rule;

WHEREAS, the MCWD and City desire to memorialize their respective roles in implementing water resource protection and management within the City;

NOW THEREFORE, it is mutually agreed by and between the parties that they enter into this MOU in order to document the understanding of the parties as to the roles and responsibilities of each party.

1.0 Responsibilities of the City

1.1 The City may exercise all present and future authority it otherwise may possess to issue permits for and regulate activities affecting water resources within the City.

1.2 The City is solely responsible for permitting for purposes of erosion control within the City. The City will regulate these activities in accordance with the City's approved local water management plan and the terms of this MOU.

1.3 The City will not issue a variance from an above-referenced ordinance until the MCWD has approved the variance and proposed conditions. On receipt of a property owner's or agent's request for a variance from the above-reference ordinance(s), the City promptly will transmit a copy of the variance request and supporting documentation to the MCWD for review.

1.4 The City will maintain a log of permits it grants pursuant to this MOU, will provide the log to the MCWD annually and will meet at least annually with the MCWD to review the implementation of the City's local water management plan and erosion control ordinance[s].

2.0 Responsibilities of the MCWD

2.1 The MCWD will continue to apply and enforce its Rules, as they may be amended from time to time, within the City except for erosion control, which will not apply within the City.

2.2 The MCWD will review and issue a decision on any variance request transmitted to it by the City in accordance with paragraph 1.3 herein within 45 days of receipt.

2.3 The MCWD will meet with the City at least annually to review the implementation of the City's local water management plan and erosion control ordinance[s].

2.4 The MCWD retains the right to enforce any and all of its rules in the event that the City is unable or unwilling to carry out its obligations listed in Section 1.0 of this MOU.

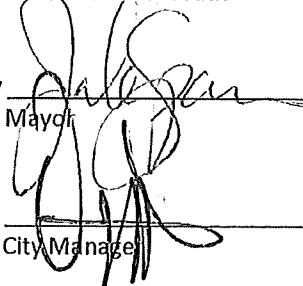
2.5 The MCWD retains all authority that it may possess under Minnesota Statutes Chapters 103B and 103D or any other provision of law, except as explicitly reposed in the City under this MOU, including but not limited to authority set forth at Minnesota Statutes § 103B.211, subd. 1(a); 103D.335 and 103D.341.

3.0 Amendment

This MOU may be amended only by a writing signed by both of the parties.
IN WITNESS WHEREOF, the parties hereto have executed this Memorandum of Understanding.

CITY OF ST. LOUIS PARK

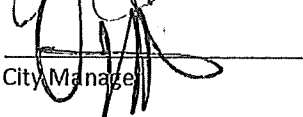
By


Mayor

Date:

1/25/16

By

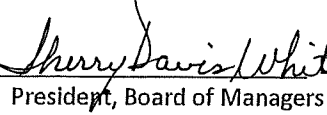

City Manager

Date:

1/20/16

MINNEHAHA CREEK WATERSHED DISTRICT

By


President, Board of Managers

Date:

6-20-19

APPROVED AS TO FORM AND EXECUTION

APPROVED AS TO FORM AND EXECUTION

By _____
Its Attorney

By _____
Its Attorney



Bassett Creek Watershed Management Commission

February 21, 2018

Erick Francis
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park MN 55416

RE: 2017 Water Education Activities – Letter of Understanding

Dear Erick,

This letter is to serve as an official arrangement between the Bassett Creek Watershed Management Commission (BCWMC) and the City of St. Louis Park. The City of St. Louis Park provides financial contributions to the BCWMC through an annual assessment based on area within the watershed and tax valuation of property in the watershed. In 2017 this assessment was \$19,463. Further, watershed commissioners representing St. Louis Park and St. Louis Park city staff participate in, guide, and help implement the programs of the BCWMC, including its public education program.

Education-related activities of the BCWMC are guided by its 2015 Watershed Management Plan, specifically its education and outreach policies (Section 4.2.9), and its overall Education and Outreach Plan found in Appendix B. <http://www.bassettcreekwmo.org/document/wmp-plans>. The specific activities of the BCWMC public outreach and education program are set annually by the Commission after recommendations are forwarded by the BCWMC Education and Outreach Committee.

In 2017, the BCWMC performed or participated in the following education and outreach activities:

BCWMC Website - The BCWMC maintained its new user-friendly website in 2017 and maintained the information including latest news, contact list, meeting calendar, meeting materials, watershed plan, data, and projects. In 2017, there were approximately 6,945 with 22,849 page views.

West Metro Water Alliance (WMWA) Membership – The BCWMC continued its participation in WMWA along with several watershed management and other water-related organizations in the west Metro area. Through WMWA, these organizations collaborated on educational campaigns including the Watershed PREP program aimed at educating 4th grade students about water resources and the impacts of stormwater. In 2017, 121 classes totaling 3,249 students attended Watershed PREP lessons within the WMWA watersheds, including 1,083 students in the Bassett Creek Watershed. In 2017 WMWA published three newsletters called Water Links. The newsletter was sent via email to over one thousand subscribers through Hennepin County. WMWA also continued its “Pledge to Plant” campaign aimed at engaging residents and businesses in converting turf or hard surfaces to native plantings <http://www.westmetrowateralliance.org/>.

Metro WaterShed Partners Membership —The BCWMC participated as a member of the Metro WaterShed Partners as a general supporter of the program and a financial supporter of the Metro Clean Water Minnesota Media Campaign. Metro Watershed Partners maintains a listserve and a website as forums for information sharing, holds monthly meetings for members to collaborate, and displays an exhibit at the State Fair to educate the public about watersheds. In 2017, the Clean Water Minnesota Media Campaign began

featuring monthly, seasonally appropriate stories about metro area residents taking action at home and in their lives to keep water clean. These professionally produced stories and photos were used by partners across a variety of media platforms. The BCWMC used these stories in newsletters, social media, and on its homepage. www.cleanwatermn.org.

Participation in Community Events and Meetings – The BCWMC began using its new educational display materials (including watershed map, banners, and bean bag toss game) and participated in the Plymouth Home Expo, the Golden Valley Arts and Music Festival, a restoration event at Westwood Nature Center. Give-aways included dog waste disposal bag dispensers, watershed maps, cups showing the amount of deicer needed for a certain space, and written educational materials.

Parking Lot & Winter Maintenance Training Course – The BCWMC hosted a free "Parking Lot and Sidewalk Winter Maintenance Workshop" at Crystal's Community Center. Twenty-one city staff, private applicators, and parks district staff attended the 5-hour course. Most participants took an exam to become certified in level one "smart salting."

Signs at Creek Crossings – The BCWMC designed and purchased eight creek identification signs for placement where roads cross Bassett Creek. Two signs were installed on Douglas Drive in Golden Valley, one on each side of the creek. Three more stream crossings in Golden Valley will be posted in 2018.

Partnership with Metro Blooms for Harrison Neighborhood Project – The BCWMC continued its partnership and support of Metro Blooms' Harrison Neighborhood Project. The project aims to engage residents, train youth, and install water quality practices in Minneapolis' Near North neighborhood. The BCWMC received a \$100,000 grant from the Met Council for this project on behalf of Metro Blooms in 2016 and was awarded a Clean Water Fund grant from the MN Board of Water and Soil Resources that will be executed in 2017.

Volunteer Monitoring Programs – The BCWMC entered agreements with the Metropolitan Council and Hennepin County to participate in the Citizen Assisted Monitoring Program (CAMP) and the River Watch Program, respectively.

Commissioner Training Sponsorship – The BCWMC reimbursed Commissioners for registration costs to attend the Road Salt Symposium, Water Resources Conference, and the DNR's Aquatic Invasive Species Detection Training.

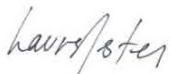
Social Media – The BCWMC started a Facebook page and continues with weekly posts. The page currently has 192 followers. In 2017, the BCWMC made 101 posts and reached 35,010. BCWMC continues to work on growing its Facebook followers.

Financial Sponsorship for Organizations – The BCWMC financially sponsored Metro Blooms and the Children's Water Festival.

Due to the City of St. Louis Park's financial contributions and close involvement and participation with the BCWMC's activities, the BCWMC's education activities can and should be considered part of the city's implementation of Minimal Control Measures (MCM) 1 and 2 in the MS4 stormwater permit.

Please let me know if you have any questions or require further information.

Sincerely,



Laura Jester, Administrator

STORMWATER POLLUTION PREVENTION PROGRAM (SWPPP)

City of St. Louis Park

March 2019

MS4 Owner

City of St. Louis Park

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Acronyms

| | |
|--------------------|-------------------------------------------------|
| BCWMC | Bassett Creek Watershed Management Commission |
| BMP | Best Management Practice |
| CAMP | Citizen-Assisted Monitoring Program |
| CFR | Code of Federal Regulations |
| CWA | Clean Water Act |
| EPA | Environmental Protection Agency |
| ERP | Enforcement Response Procedures |
| ESC | Erosion and Sediment Control |
| GIS | Geographic Information System |
| IDDE | Illicit Discharge Detection and Elimination |
| MCM | Minimum Control Measures |
| MCWD | Minnehaha Creek Watershed District |
| MEP | Maximum Extent Practicable |
| MPCA | Minnesota Pollution Control Agency |
| MS4 | Municipal Separate Storm Sewer Systems |
| NPDES | National Pollutant Discharge Elimination System |
| SLP | St. Louis Park |
| SOP | Standard Operating Procedures |
| SWMM | Stormwater Management Model |
| SWMP | Surface Water Management Plan |
| SWPPP ¹ | Stormwater Pollution Prevention Program |
| TMDL | Total Maximum Daily Load |
| WHNC | Woodland Hills Nature Center |
| WLA | Waste Load Allocation |

I. Background and Introduction

The United States (U.S.) Congress enacted the Federal Water Pollution Control Act (Act) to “enhance the quality and value of our water resources and to establish a national policy for the prevention, control, and abatement of water pollution” in 1948. The Act has been amended several times, with the most notable amendment in 1977, which changed the name of the Act to the Clean Water Act (CWA). The CWA established a structure for regulating point and nonpoint source discharges to waters of the U.S. and gave the U.S. Environmental Protection Agency (EPA) authority to implement pollution control programs. The EPA delegated the administration of those programs to some state agencies, including the Minnesota Pollution Control Agency (MPCA) for the state of Minnesota.

Phase I of the EPA’s Stormwater Discharge Regulations (40 Code of Federal Regulations [CFR] Part 122) promulgated in 1990 instituted a National Pollutant Discharge Elimination System (NPDES) permit for all facilities/projects/municipalities that fell into one of the following three categories: 1) stormwater discharges associated with industrial activities, 2) stormwater discharges associated with construction activities disturbing five (5) acres or more of land, or 3) discharges from medium- and large-sized municipal separate storm sewer systems (MS4s). Phase II of the Stormwater Discharge Regulations (40 CFR 122.26, Stormwater Discharges applicable to State NPDES Programs) was promulgated in 1999. Phase II redefined and expanded the MS4-regulated areas to include military bases, universities, and other entities that exist within locales defined as “Urban Areas” or small-sized MS4s by the U.S. Census Bureau. In response to these federal regulations, after years of development, public comment, and contested case hearings, the MPCA published the Phase I and II Stormwater Program rules and issued the associated general permit.

The City of St. Louis Park (“City” or “St. Louis Park”) is one of many communities within the Twin Cities metropolitan area that is federally required to obtain an NPDES MS4 permit for managing nonpoint source stormwater discharges. As part of the NPDES MS4 permit process, St. Louis Park is required to develop and implement a Stormwater Pollution Prevention Program (SWPPP) with measurable goals for regulating and improving nonpoint and point source pollutant discharges to the waters of the U.S. to the maximum extent practicable (MEP).

The following sections describe the City and present the City’s SWPPP.

II. Description

Located in the east central portion of Hennepin County just west of Minneapolis, the 10.7-square-mile city of St. Louis Park is a fully developed first-ring suburban community. It is bordered by the cities of Minneapolis on the east, Golden Valley and Plymouth on the north, Hopkins and Minnetonka on the west, and Edina on the south. The population of St. Louis Park is approximately 48,800 residents, making it the 20th-largest city in Minnesota.

St. Louis Park contains a variety of natural resources, including several wetlands and small lakes, wooded areas, parks, and recreational lands, as well as the Minnehaha Creek corridor. Two watershed management organizations cover St. Louis Park, each with its own governing body: the Bassett Creek Watershed Management Commission (BCWMC) and the Minnehaha Creek Watershed District (MCWD). They comprise 12 percent and 88 percent of the City, respectively.

St. Louis Park's population has been relatively stable since 1980. Most of the city was developed in the 1950s and 1960s and is experiencing some moderate redevelopment today. St. Louis Park's land use consists of predominantly low-density residential areas with interspersed park and open areas. Residential areas consist of small residential lots of approximately 1/5 of an acre. Commercial, office, industrial, and other high-density land uses generally occur along the major transportation corridors nearby, such as Interstate 394, Highway 7, Excelsior Boulevard, Highway 100, and Highway 169.

Because much of the city developed before many major standards and regulations related to wetlands, water quantity, and water quality were implemented, the city has had to retroactively update its surface water management and treatment infrastructures. As this redevelopment occurs, stormwater management practices can be incorporated into the system. St. Louis Park's stormwater system consists of approximately 110 miles of underground pipe ranging in size from 12 inches to 102 inches, 12 lift stations, 22 lakes and ponds, and more than 3,000 catch basins. Ninety percent of the city's streets are curb and gutter systems. Stormwater within the city drains to the two watersheds, Bassett Creek and Minnehaha Creek, with the Mississippi River as the terminus.

III. The Stormwater Pollution Prevention Program

The City's SWPPP must implement practices that align with the six minimum control measures (MCM) of the NPDES permit summarized below in Table III.1.

TABLE III-1: Minnesota Pollution Control Agency Required Six Minimum Control Measures Elements

| Minimum Control Measures | Description |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Public Education and Outreach | Develop and implement a public education program to distribute educational materials and perform equivalent outreach that informs the public of the impact stormwater discharges have on water bodies; this includes actions citizens, businesses, and other local organizations can take to reduce the discharge of pollutants to stormwater. |
| Public Participation/Involvement | Provide opportunities through a public participation/involvement program to solicit public input on the development and implementation of the Stormwater Pollution Prevention Program. |
| Illicit Discharge Detection and Elimination (IDDE) | Develop, implement, and enforce a plan to detect and eliminate illicit discharges into a small municipal separate storm sewer system (MS4). |
| Construction Site Runoff Control | Develop, implement, and enforce a construction site stormwater runoff control program that reduces pollutants in stormwater runoff to the small MS4 from construction activity with a land disturbance of greater than or equal to one (1) acre, including projects of less than one acre that are part of a larger common plan of development or sale. |
| Postconstruction Storm Water Management | Develop, implement, and enforce a postconstruction stormwater management program that prevents or reduces water pollution after construction activity is completed, related to new development and redevelopment projects with land disturbance of greater than or equal to one (1) acre, including projects of less than one acre that are part of a larger common plan of development or sale. |
| Pollution Prevention/Good Housekeeping | Develop and implement an operations and maintenance program that prevents or reduces the discharge of pollutants from city-owned/operated facilities and operations to the small MS4. |

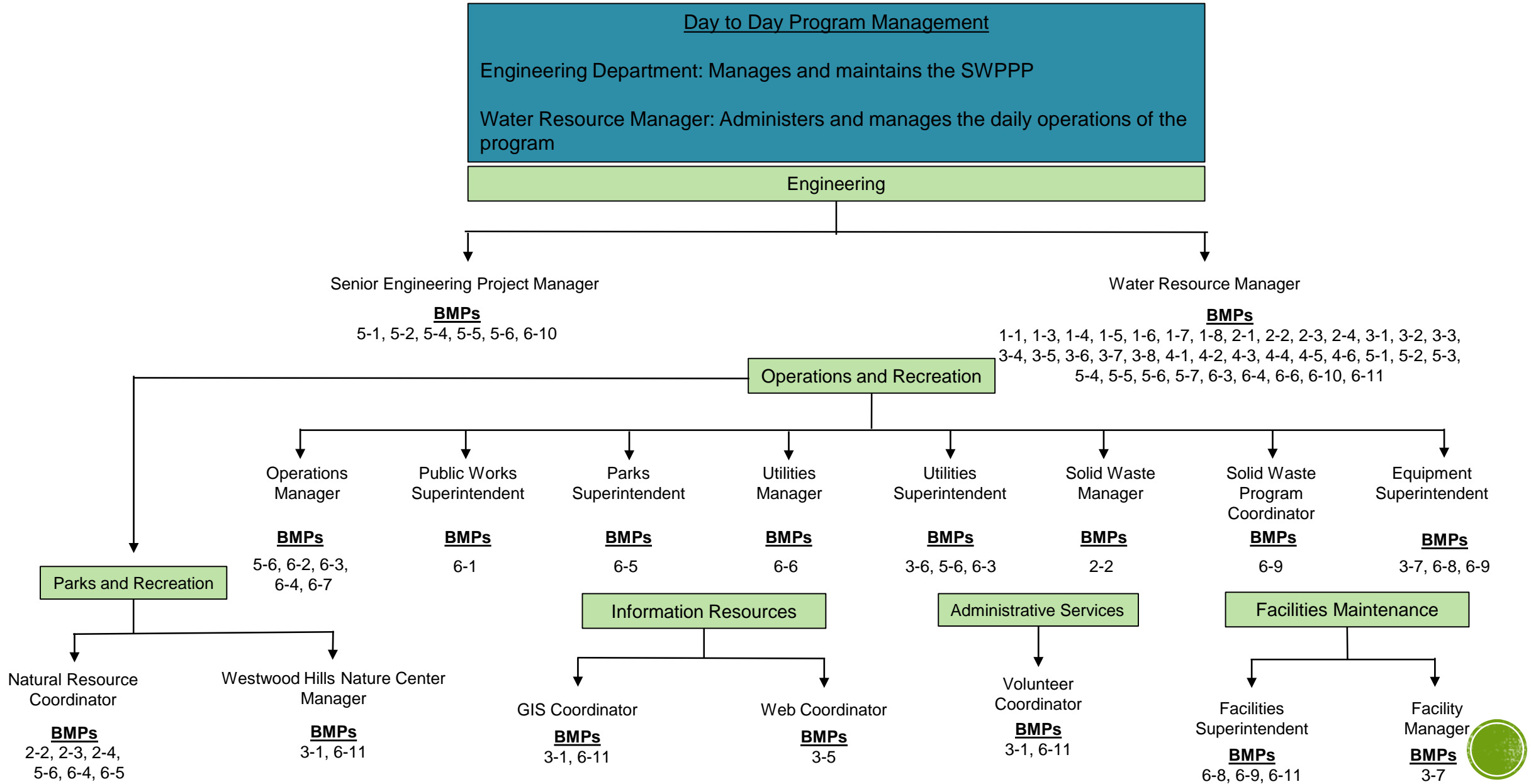
The city developed its first SWPPP in 2003 and has periodically updated it to incorporate new understandings of stormwater management and to retire ineffective practices. This SWPPP and other reference documents (such as standard operating procedure [SOPs], St. Louis Park City Code Sec.12-151 to 12-168... etc.) detail measures taken by the city to reduce discharge of pollutant-laden stormwater that may reach U.S. waters, namely Bassett Creek, Minnehaha Creek, and the Mississippi River. Additionally, it describes measurable goals and outcomes and general best management practices (BMPs) for construction and postconstruction stormwater management; includes a program evaluation process (e.g., monitoring, recordkeeping, and reporting); and conforms to the requirements set forth by the MPCA General Permit MNR040000 Authorization to Discharge Stormwater Associated with Small MS4s under the NPDES/State Disposal System Permit Program (MS4 NPDES Permit) effective August 2013 through July 2018.

St. Louis Park operates under the council-manager form of government. An elected city council sets the policy and overall direction for St. Louis Park. City staff, under the direction of a professional city manager, accountable to the city council, carry out council decisions and provide day-to-day city services. The responsibility for carrying out the MS4 permit and associated stormwater management activities is shared by various departments within St. Louis Park. However, day-to-day MS4 permit and SWPPP administration and compliance are the responsibility of the Water Resources Manager in the Engineering Department. Figure III-1 presents the city's organizational chart, and Tables III 2–3 present the Communication Plan and Tracking Chart, respectively.

St. Louis Park is committed to being a leader in environmental stewardship through its goal of increasing environmental consciousness and responsibility in all areas of City business and management. This commitment means that merely complying with the NPDES MS4 permit is not enough. In 2000, the City implemented a stormwater utility fee to provide revenue for stormwater management (e.g., master planning, regulatory oversight and enforcement, remedial maintenance, and capital projects). Additionally, the City exhibits leadership through its education and outreach program, operation and maintenance program, and regulatory mechanisms, all of which are captured in Appendix A: Minimum Control Measures—Best Management Summary Sheets.

FIGURE III-1: St. Louis Park Stormwater Pollution Prevention Program Organization Chart

MS4 SWPPP Responsible Parties Organizational Charts



The numbers refer to BMPs in Appendix A



TABLE III-2: St. Louis Park Stormwater Pollution Prevention Program Communication Plan

| COMMUNICATIONS MATRIX | | | | | | | | |
|-----------------------|-----------------------------------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------|----------------------------------------------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project Name: | | MS4 Permit Stormwater Pollution Prevention Program (SWPPP) | | | | | | |
| City: | | St. Louis Park | | | | | | |
| Project Manager Name: | | Water Resources Manager | | | | | | |
| Project Description: | | SLP MS4 Stormwater Pollution Prevention Program Communication Plan | | | | | | |
| ID ¹ | Communication Vehicle ² | Target Audience ³ | Description/Purpose ⁴ | Frequency ⁵ | Owner ⁶ | Distribution Vehicle ⁷ | Internal / External ⁸ | Comments ⁹ |
| 1-1 | Stormwater Management Educational Materials Meeting | General Public | This meeting will be conducted at the end of the year and/or early in the year to plan and discuss the educational materials that will be produced and where/when/how they will be published throughout the year. | Semi-annually | Water Resources Manager | E-mail In person Handouts Social media | Internal | The number of articles published, and partners engaged with should be documented. These educational activities should be reported in the Annual Report to the MPCA. |
| 1-2 | Nature Center Activity Report | Project Team | A report summarizing programming, attendees, and materials distributed will be published quarterly. | Quarterly | WHNC Manager | E-mail | Internal & External | The report will focus on surface water, stormwater, and other environmental education programs. |
| 1-6 | Field Employee Training Manual | Project Team | Annual training to review and discuss SOPs, organizational charts, MCM BMPs, regulations, etc. | Annually | Water Resources Manager | Training | Internal | Training will be held annually, and attendance will be logged. |
| 1-8 | Rainwater Rewards Annual Report | Project Team | An annual summary report of the number of applications received and funded. | Annually | Water Resources Manager | E-mail | Internal & External | |
| 2-1 | SWPPP Public Notice Meeting | General Public | Meeting to provide information to the public about the SWPPP and to solicit input. The meeting will be noticed in the local newspaper, and information will be put on the city's website informing the public of meeting time(s) and location(s), as well as of the 10-day public comment period. | Annually | Water Resources Manager | Web Page Public Notice, Sun Sailor Social Media | External | Input from the Senior Engineering Program Manager may be required for this meeting. A summary report of the comments received should be prepared. Feasible public comments should be considered to be incorporated into the SWPPP. Changes in watershed state and federal requirements that may require an amendment to the SWMP should be reviewed. |

¹ ID: A unique ID number used to identify the communication within the communication matrix. It also connects to the primary SWPPP minimum control measure it addresses and meeting can be held concurrently.

² Communication Vehicle: This column should be populated with a description of the type of communication that will be conducted.

³ Target Audience: This field should be populated with a description of the target audience for this communication vehicle.

⁴ Description/Purpose: This field should be populated with a description of the purpose of the communication.

⁵ Frequency: This field should be populated with the frequency of which the communication will be distributed.

⁶ Owner: This field should be populated with the name of the owner of the communication.

⁷ Distribution Vehicle: This field should be populated with the type of distribution vehicle that will be used to disseminate the communication.

⁸ Internal/External: This field should indicate if the communication is for internal, external, or both internal and external distribution.

⁹ Comments: This column should be populated with any additional comments.

| COMMUNICATIONS MATRIX | | | | | | | | |
|------------------------------|------------------------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------|-----------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project Name: | | MS4 Permit Stormwater Pollution Prevention Program (SWPPP) | | | | | | |
| City: | | St. Louis Park | | | | | | |
| Project Manager Name: | | Water Resources Manager | | | | | | |
| Project Description: | | SLP MS4 Stormwater Pollution Prevention Program Communication Plan | | | | | | |
| ID ¹ | Communication Vehicle ² | Target Audience ³ | Description/Purpose ⁴ | Frequency ⁵ | Owner ⁶ | Distribution Vehicle ⁷ | Internal / External ⁸ | Comments ⁹ |
| 2-3 | Cleanup Event Meeting | Project Team | Meeting to organize and facilitate household cleanup event(s) and cleanup activities adjacent to water resources in the city. | Quarterly | Volunteer Coordinator | E-mail | Internal & External | Input from the Natural Resources Coordinator, Volunteer Coordinator, WHNC Manager, and Solid Waste Manager may be required for this meeting. The number of events, participants, loads disposed of, waterbodies cleaned, and their locations should be documented. |
| 2-4 | Lake and Stream Monitoring Annual Report | Project Team | An annual report will be developed documenting the number of volunteers, lakes monitored, and citizen-assisted monitoring program (CAMP) activities undertaken within the city. | Annually | Water Resources Manager | E-mail | Internal & External | Input from the Natural Resources Coordinator may be required. Information will be solicited annually from the Bassett Creek Water Management Commission and Minnehaha Creek Watershed District on their citizen monitoring programs. |
| 3-3 | IDDE Plan Meeting | General Public | The meeting will consist of reviewing public informational documents and updates to the city's website. | Quarterly | Water Resources Manager | E-mail | Internal & External | A review of illicit discharge reports will occur, and the number of violations identified and resolved will be discussed and documented. |
| 3-6 | Wellhead Protection Plan Meeting | Project Team | This meeting will be held to discuss areas that need to be reviewed per the plan. | Annually | Water Resources Manager | E-mail | Internal | Input from the Utilities Superintendent will be required for this meeting. |
| 4-1 | City Ordinances Review Meeting | Project Team | This meeting will consist of reviewing the city's ordinances 12-157, 12-156, 12-158, and Ch. 12 Article V. based on enforcement and inspection activities. | Annually | Water Resources Manager | E-mail | Internal | |

| COMMUNICATIONS MATRIX | | | | | | | | |
|-----------------------|-------------------------------------------|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------|-----------------------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project Name: | | MS4 Permit Stormwater Pollution Prevention Program (SWPPP) | | | | | | |
| City: | | St. Louis Park | | | | | | |
| Project Manager Name: | | Water Resources Manager | | | | | | |
| Project Description: | | SLP MS4 Stormwater Pollution Prevention Program Communication Plan | | | | | | |
| ID ¹ | Communication Vehicle ² | Target Audience ³ | Description/Purpose ⁴ | Frequency ⁵ | Owner ⁶ | Distribution Vehicle ⁷ | Internal / External ⁸ | Comments ⁹ |
| 4-2 | Site Plan Review Meeting | Developer and Contractors | This meeting will cover the number of site plans reviewed for permitting as well as review the application process for any improvements that can be made. Reviews of infrastructure design and construction should also be reviewed and updated as necessary. This meeting will also discuss erosion and sedimentation control on construction sites. Financial securities for these types of activities shall also be discussed and documented. | Quarterly | Water Resources Manager | E-mail | Internal | Input from the Senior Engineering Project Manager may be required for this meeting. The number of permitted projects and inspections, and the number and type of enforcement actions taken will be documented. |
| 4-6 | Erosion Control Inspector Meeting | Project Team | This meeting will address certification requirements and updates to inspection protocols. | Annually | Water Resources Manager | E-mail | Internal | Trained and certified inspectors will be tallied. Inspectors will be updated on additional training requirements, as needed. |
| 5-2 | Stormwater Management Plan Review Meeting | Project Team | This meeting will consist of reviewing stormwater management plans for completeness and compliance with city ordinances. | Annually | Water Resources Manager | E-mail | Internal & External | Input from the Senior Engineering Project Manager Senior Planner may be required for this meeting. A report summarizing the number of projects reviewed and permitted will be produced. |
| 5-6 | Storm Sewer System Meeting | Project Team | This meeting will discuss, plan, and address maintenance and operation of the storm sewer system. This meeting will also discuss the structural pollution control device inspection reports. Review and revise the Operations and Maintenance Program of storm water infrastructure. An annual maintenance summary will be kept, including the number of maintenance agreements established. Employee training in these areas will also be discussed and planned. A review of inspection results every two years will be conducted to see if changes in the maintenance program need to be made. The street sweeping program will also be discussed and changed as necessary. | Annually | Water Resources Manager | E-mail | Internal | This meeting requires input from the Public Works Superintendent, Utilities Superintendent, Utilities Manager, Operations Manager, and GIS Coordinator. Any changes made to the storm sewer system should be updated and reflected on the Storm Sewer Map. |

| COMMUNICATIONS MATRIX | | | | | | | | |
|-----------------------|------------------------------------|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------|-----------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project Name: | | MS4 Permit Stormwater Pollution Prevention Program (SWPPP) | | | | | | |
| City: | | St. Louis Park | | | | | | |
| Project Manager Name: | | Water Resources Manager | | | | | | |
| Project Description: | | SLP MS4 Stormwater Pollution Prevention Program Communication Plan | | | | | | |
| ID ¹ | Communication Vehicle ² | Target Audience ³ | Description/Purpose ⁴ | Frequency ⁵ | Owner ⁶ | Distribution Vehicle ⁷ | Internal / External ⁸ | Comments ⁹ |
| 5-7 | Impaired Waters Meeting | Project Team | This meeting consists of reviewing/updating the impaired waters map and actions being taken to address that area. | Annually | Water Resources Manager | E-mail | Internal | Produce a report summarizing the number of projects underway and the performance of those projects. |
| 6-7 | Annual Snowplow Meeting | Project Team | This meeting will consist of reviewing the amount of salt and other products used, number of spreaders calibrated, and corrective practices and issues employed during street de-icing. | Annually | Operations Manager | Training | Internal | Document the amount of salt and other products used, number of spreaders calibrated, and the number of employees in attendance at the meeting. |
| 6-11 | Facilities Meeting | Project Team | The meeting will consist of reviewing mapped facilities and making recommendations for modifications, where warranted. The meeting will also review and update the city's procedures and emergency response to spills. Inspection of stockpiles, storage, and material handling areas will be planned and documented. Procedures for materials handling will also be reviewed and updated. Maintenance of city vehicles will also be discussed. | Quarterly | Water Resources Manager | E-mail | Internal | This meeting will require input from the Equipment Superintendent and Facilities Manager. A report will be produced summarizing the amount of fertilizer, pesticide, and herbicide used by the city and maintain a list of employees who are trained to handle these materials. A hazardous materials inventory will be maintained and updated. Hazardous material and annual "Right to Know" employee training will be administered. The number of spills over and under 5 gallons will be documented and reported. The number of vehicles maintained, and the volume of materials recycled will be tracked. |

TABLE III-3: St. Louis Park Stormwater Pollution Prevention Program Annual Goal Tracking Chart

| Annual Goal Tracking Chart | | | | | | |
|-------------------------------------------------|------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------|-------------------------|--------------------------|----------|
| BMP # | BMP Implementation Strategy | Responsible Person | Measurable Goals | Goals and schedule met? | Following year priority? | Comments |
| MCM 1 - Public Education and Outreach | | | | | | |
| 1-1 | Stormwater Education Program | Water Resource Manager | Track materials produced and distributed | | | |
| | | | Number of educational articles published | | | |
| | | | Website analytics | | | |
| 1-2 | Environmental Programming at Westwood Hills Nature Center (WHNC) | Westwood Hills Nature Center Manager | Record events, visitors and program attendees | | | |
| | | | Quantities and descriptions for materials distributed | | | |
| 1-3 | Education Plan Implementation and Coordination | Water Resource Manager | Track materials produced and distributed | | | |
| | | | Number of educational articles published | | | |
| | | | Track number of partners | | | |
| 1-4 | Evaluate Public Education and Outreach Strategies | Water Resource Manager | Complete annual review and evaluation | | | |
| | | | Complete summary spreadsheet | | | |
| 1-5 | Communications Plan | Water Resource Manager | Implement Communication Plan | | | |
| 1-6 | Employee Training Program | Water Resource Manager | Complete annual training | | | |
| | | | Attendance log | | | |
| | | | Update SWPPP organizational chart, as needed | | | |
| 1-7 | Participate in Clean Water Minnesota | Water Resource Manager | Maintain membership | | | |
| 1-8 | Rainwater Rewards Program | Water Resource Manager | Number of applications received | | | |
| | | | Number of applications funded | | | |
| MCM 2 - Public Involvement/Participation | | | | | | |
| 2-1 | Opportunities for Public Input on the SWPPP | Water Resource Manager | Complete public notice requirement | | | |
| | | | Document public comments received (verbal or written) | | | |
| | | | Incorporate feasible public input into SWPPP | | | |
| 2-2 | Household Cleanup Events | Water Resource Manager | Number of events completed | | | |
| | | Solid Waste Manager | Number of participants or loads disposed of | | | |
| | | Natural Resource Coordinator | | | | |
| 2-3 | Continue Volunteer Opportunities | Volunteer Coordinator | Track volunteers | | | |
| | | Natural Resource Coordinator | Document waterbodies cleaned and locations | | | |
| | | Westwood Hills Nature Center Manager | Document trash collected | | | |
| | | Water Resource Manager | | | | |

| Annual Goal Tracking Chart | | | | | | |
|------------------------------------------------------------|-------------------------------------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------|----------|
| BMP # | BMP Implementation Strategy | Responsible Person | Measurable Goals | Goals and schedule met? | Following year priority? | Comments |
| 2-4 | Lake and Stream Monitoring | Natural Resource Coordinator | Number of volunteers | | | |
| | | Water Resource Manager | Number of lakes monitored in CAMP | | | |
| | | | Annual monitoring reports from BCWMC and MCWD | | | |
| MCM 3 - Illicit Discharge Detection and Elimination | | | | | | |
| 3-1 | Storm Sewer Map | Water Resource Manager | Maintain updated database and map | | | |
| | | GIS Coordinator | | | | |
| 3-2 | Regulatory Control Program | Water Resource Manager | Review ordinance and Enforcement Response Procedures for updates if needed based on inspections and monitoring | | | |
| 3-3 | Illicit Discharge Detection and Elimination Program | Water Resource Manager | Review brochure(s) for updates if needed | | | |
| | | | Review website for updates if needed | | | |
| | | | Review IDDE Plan for updates if needed | | | |
| 3-4 | Illicit Discharge Inspection Training and Inspections | Water Resource Manager | Attendance logs | | | |
| | | | Designate priority illicit discharge inspection areas | | | |
| | | | Review and evaluate training program | | | |
| | | | Number of illicit discharges identified | | | |
| 3-5 | Illicit Discharge Webpage and Reporting | Water Resource Manager | Review webpage and My SLP App for updates, as needed | | | |
| | | Web Coordinator | Document and track reports received Review Enforcement Response Procedures and documentation information | | | |
| 3-6 | Implement Wellhead Protection Plan | Water Resource Manager | Development review(s) in vulnerable areas | | | |
| | | Utilities Superintendent | | | | |
| 3-7 | Spill Reduction for Municipal Operations | Water Resource Manager | Number of spills under and over 5 gallons reported | | | |
| | | Equipment Superintendent | Number of employees trained | | | |
| | | Facility Manager | Update written procedures if needed | | | |
| 3-8 | Enforcement Response Procedures (ERP) | Water Resource Manager | Documentation of all relevant information | | | |
| | | | Number of violations | | | |
| | | | Number of violations resolved | | | |
| MCM 4 - Construction Site Stormwater Runoff Control | | | | | | |
| 4-1 | Ordinance or Other Regulatory Mechanism | Water Resource Manager | Updates to ordinance, as needed | | | |

| Annual Goal Tracking Chart | | | | | | |
|-------------------------------------------------|----------------------------------------------------|------------------------------------|-------------------------------------------------------------------------------------------------|-------------------------|--------------------------|----------|
| BMP # | BMP Implementation Strategy | Responsible Person | Measurable Goals | Goals and schedule met? | Following year priority? | Comments |
| 4-2 | Procedure for Site Plan Review | Water Resource Manager | Number of site plans reviewed | | | |
| | | | Review permit application packages and checklists annually for updates | | | |
| 4-3 | Construction Sites and Erosion Control Inspections | Water Resource Manager | Number of permitted projects | | | |
| | | | Number of inspections | | | |
| | | | Number of enforcement actions | | | |
| 4-4 | Erosion Control Enforcement | Water Resource Manager | Record number and type of enforcement actions | | | |
| 4-5 | Financial Securities | Water Resource Manager | Number of financial securities | | | |
| | | | Number of retained financial securities | | | |
| 4-6 | Erosion Control Inspection Training | Water Resource Manager | Number of trained/certified inspectors | | | |
| MCM 5 - Post Construction Stormwater Management | | | | | | |
| 5-1 | Design and Construction Standards | Water Resource Manager | Review guidance and standards materials annually, update as needed | | | |
| | | Senior Engineering Project Manager | | | | |
| 5-2 | Plan Review and Approval Procedures | Water Resource Manager | Number of projects reviewed | | | |
| | | Senior Engineering Project Manager | Number of permitted projects | | | |
| 5-3 | Development Agreements | Water Resource Manager | Number of development agreements | | | |
| 5-4 | Ordinance or Other Regulatory Mechanism | Water Resource Manager | Updates to ordinance, as needed | | | |
| | | Senior Engineering Project Manager | | | | |
| 5-5 | Surface Water Management Plan (SWMP) | Water Resource Manager | Review watershed plans (as updated) to incorporate into SWMP through a formal amendment process | | | |
| | | Senior Engineering Project Manager | Annually update SWPPP in conjunction with submitting Annual Report to the MPCA | | | |
| 5-6 | Long-term Operation and Maintenance of BMPs | Water Resource Manager | Annual maintenance summary | | | |
| | | Senior Engineering Project Manager | Number of maintenance agreements established | | | |
| | | Utilities Superintendent | | | | |
| | | Operations Manager | | | | |
| | Natural Resource Coordinator | | | | | |

| Annual Goal Tracking Chart | | | | | | |
|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|--------------------------|----------|
| BMP # | BMP Implementation Strategy | Responsible Person | Measurable Goals | Goals and schedule met? | Following year priority? | Comments |
| 5-7 | Review of Impaired Waters with approved Total Maximum Daily Loads (TMDLs) and applicable Waste Load Allocations (WLAs) | Water Resource Manager | Review/Update the impaired waters map Tally of projects that decrease constituents of concern and the total number of lbs. sequestered. | | | |
| MCM 6 - Pollution Prevention/Good Housekeeping for Municipal Operation | | | | | | |
| 6-1 | Municipal Operations and Maintenance Program | Public Works Superintendent | Review and revise operations and maintenance program, as needed. Annual employee training | | | |
| 6-2 | Municipal Street Sweeping Program | Operations Manager | Number of lane miles swept Number of loads collected | | | |
| 6-3 | Annual Inspection of All Structural Pollution Control Devices | Utilities Superintendent | Inspection reports | | | |
| | | Operations Manager | | | | |
| 6-4 | Quarterly Stockpile, Storage, and Material Handling Program | Water Resource Manager | Quarterly inspections completed | | | |
| | | Natural Resource Coordinator | | | | |
| 6-5 | Fertilizer, Pesticide, and Herbicide Application Program | Parks Superintendent | Number of employees trained, licensed | | | |
| | | Natural Resource Coordinator | Quantity of products applied | | | |
| 6-6 | Inspection Analysis and Frequency | Water Resource Manager | Review inspection results every 2 years | | | |
| | | Utilities Manager | Adjust programs when needed | | | |
| 6-7 | Street Deicing Program | Operations Manager | Number of employees trained | | | |
| | | | Amount of salt and other products used | | | |
| 6-8 | Fleet and Building Maintenance Program | Equipment Superintendent | Number of vehicles maintained | | | |
| | | | Facilities Supervisor | Volume of materials recycled Number of employees trained | | |
| 6-9 | Hazardous Material Storage and Recycling Program | Equipment Superintendent | Annual Right to Know training completed | | | |
| | | Facilities Supervisor | | | | |
| | | Solid Waste Program Coordinator | Maintain inventory of hazardous materials | | | |

| Annual Goal Tracking Chart | | | | | | |
|----------------------------|-----------------------------------------------|------------------------------------|---------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------|----------|
| BMP # | BMP Implementation Strategy | Responsible Person | Measurable Goals | Goals and schedule met? | Following year priority? | Comments |
| 6-10 | Stormwater Treatment Effectiveness Assessment | Senior Engineering Project Manager | Evaluate the effective of treatment practices every 3 - 5 years and, where warranted, recommend modifications | | | |
| | | Water Resource Manager | | | | |
| 6-11 | Facilities Inventory | GIS Coordinator | Review mapped facilities and, where warranted, recommend modifications | | | |
| | | Water Resource Manager | | | | |
| | | Facilities Supervisor | | | | |

APPENDIX A: MINIMUM CONTROL MEASURES—BEST MANAGEMENT PRACTICE SUMMARY SHEETS

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 1-1

Minimum Control Measures Addressed by this BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| X | Public education & outreach | X | Construction site runoff controls |
| X | Public participation & involvement | X | Post-construction stormwater management |
| X | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

BMP Title: Stormwater Education Program

BMP Description:
Stormwater education is critical for the successful implementation of the city's Stormwater Pollution Prevention Plan (SWPPP) and for achieving its goal of protecting and improving water quality. The city has a comprehensive surface water education and outreach program outlined in its Standard Operating Procedure (SOP), which contains the required inclusions of the MS4 NPDES Permit. City staff develop, coordinate, and distribute materials to various audiences to promote consistent stormwater messaging through various communication channels. Materials focus on informing the public about the impacts of stormwater runoff on water quality, and it informs and educates the public on how the city manages stormwater runoff through implementation of the SWPPP. Educational materials, including the SWPPP, are available on the city's Stormwater Management webpage. Educational materials are also placed at public offices for distribution or viewing. City staff also dedicates time and resources to coordinating outreach events, such as stormwater events, open houses, presentations, and other events with various civic groups.

| | |
|---------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Measurable Goals: Track materials produced and distributed Number of educational articles published Website analytics | Timeline / Implementation Schedule: Currently implemented and will continue annually |
|---------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|

Specific Components & Notes (optional):
Materials and information generated, distributed and promoted address topics in all MCMs for the current MS4 NDPEs Permit (2013-2018).

| | |
|--------------------------------------------------------------|-------------------------------|
| Responsible Party (refer to the organizational chart) | Responsible Department |
|--------------------------------------------------------------|-------------------------------|

| | |
|---------------------------------------|--------------------------------|
| Title: Water Resources Manager | Department: Engineering |
|---------------------------------------|--------------------------------|

Components related to this BMP (description or number – optional):

Audience: Residents, contractors, community groups, schools, and partnering organizations

Goals: Promote general awareness and understanding of the stormwater management, runoff pollution prevention, and environmental stewardship.

Activities: Develop and distribute brochures, newsletters, and other communication channels. Review the city's surface and Stormwater Management webpage quarterly and update, as appropriate. Participate in and facilitate stormwater events, open houses, presentations, and other events, as deemed appropriate.

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 1-2

Minimum Control Measures Addressed by this BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| X | Public education & outreach | - | Construction site runoff controls |
| X | Public participation & involvement | - | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | - | Pollution prevention/Good housekeeping |

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| BMP Title: Environmental Programming at Westwood Hills Nature Center (WHNC) | |
| <p>The city's Rainwater Rewards program offers financial, educational, and technical assistance to residential Westwood Hills Nature Center (WHNC) is a 160-acre natural area, featuring marsh, woods, and restored prairie. Within the WHNC is a beautiful area that is home to many animals including deer, foxes, minks, and owls. Westwood Naturalists conduct year-round programs for visitors of all ages to increase the visitors' understanding and appreciation of our natural world and aspects of surface and stormwater quality and quantity management. WHNC, owned and operated by the city, also hosts and advertises volunteer opportunities featuring educational programming, special events (e.g., tree plantings, trash cleanups), and habitat restoration.</p> | |
| <p>Measurable Goals: Record events, visitors and program attendees Quantities and descriptions for materials distributed</p> | <p>Timeline / Implementation Schedule: Currently implemented and will continue annually</p> |
| <p>Specific Components & Notes (optional): See the City's SOP for additional information.</p> | |
| <p>Responsible Party (refer to the organizational chart)</p> | <p>Responsible Department</p> |
| <p>Title: Westwood Hills Nature Center Manager</p> | <p>Department: Parks and Recreation</p> |
| <p>Components related to this BMP (description or number – optional):</p> <p>Audience: Residents, visitors of all ages</p> <p>Goals: To provide age appropriate environmental education and stewardship to all visitors.</p> <p>Activities: Year-round activities include youth and school trips, facility/shelter rentals, and equipment rentals for canoes, snowshoeing, kick sleds, and fishing equipment. Volunteer activities include the Naturalists and Junior Naturalist programs, Natural Resource Stewards, and maintenance or administrative support opportunities.</p> <p>Annual Summary:</p> | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 1-3

Minimum Control Measures Addressed by this BMP

| | | | |
|-------------------------------------|-------------------------------------------|-------------------------------------|-----------------------------------------|
| <input checked="" type="checkbox"/> | Public education & outreach | <input checked="" type="checkbox"/> | Construction site runoff controls |
| <input checked="" type="checkbox"/> | Public participation & involvement | <input checked="" type="checkbox"/> | Post-construction stormwater management |
| <input checked="" type="checkbox"/> | Illicit discharge detection & elimination | <input checked="" type="checkbox"/> | Pollution prevention/Good housekeeping |

BMP Title: Education Plan Implementation and Coordination

The city's Rainwater Rewards program offers financial, educational, and technical assistance to residential
This SWPPP will be hosted on the city's website along with related educational materials. The minimum control measures found in Section 1: Public Education and Outreach of the city's SWPPP and SOP serve as the Education Plan. The best management practices are coordinated to meet specific activities and schedules that reach measurable goals for each target audience. The city encourages interdisciplinary collaboration with watershed management organizations and other partners to increase educational efforts and cross-promote articles, events, or programs. The city also shares content and other resources with educational partners, when appropriate.

Measurable Goals:

Track materials produced and distributed
Number of educational articles published
Track number of partners

Timeline / Implementation Schedule:

Currently implemented and will continue annually

Specific Components & Notes (optional):

See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)

Responsible Department

Title: Water Resources Manager

Department: Engineering

Components related to this BMP (description or number – optional):

Audience: Residents, business owners, developers, and contractors

Goals: Educate the public that live, work, and do business in the City on stormwater management goals, opportunities, and issues and ways to address pollution prevention

Activities: Coordinate implementation activities according to the Section III.D.1. of the MS4 NPDES Permit in Appendix A.

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 1-4

Minimum Control Measures Addressed by this BMP

| | | | |
|-------------------------------------|-------------------------------------------|-------------------------------------|-----------------------------------------|
| <input checked="" type="checkbox"/> | Public education & outreach | <input checked="" type="checkbox"/> | Construction site runoff controls |
| <input checked="" type="checkbox"/> | Public participation & involvement | <input checked="" type="checkbox"/> | Post-construction stormwater management |
| <input checked="" type="checkbox"/> | Illicit discharge detection & elimination | <input checked="" type="checkbox"/> | Pollution prevention/Good housekeeping |

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| BMP Title: Evaluate Public Education and Outreach Strategies | |
| <p>The city's Rainwater Rewards program offers financial, educational, and technical assistance to residential The city will conduct a review of public education and outreach strategies used each year in conjunction with submitting the Annual Report to the Minnesota Pollution Control Agency. Annual reviews will assess educational measures, activities, and timelines for their ability to meet the goals of the city's SWPPP. Findings and implementation strategies for the upcoming year will be documented in the SWPPP summary.</p> | |
| <p>Measurable Goals: Complete annual review and evaluation Complete summary spreadsheet</p> | <p>Timeline / Implementation Schedule: 2018: Create tracking spreadsheet and continue future annual reviews</p> |
| Specific Components & Notes (optional): | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Water Resources Manager | Department: Engineering |
| Components related to this BMP (description or number – optional): | |
| Audience: General public | |
| Goals: To evaluate relevant and available educational information for public use | |
| Activities: Annual evaluation | |
| Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 1-5

Minimum Control Measures Addressed by this BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| X | Public education & outreach | - | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | - | Pollution prevention/Good housekeeping |

BMP Title: Communication Plan

The city's Rainwater Rewards program offers financial, educational, and technical assistance to residential
The Communication Plan is an additional tool the city can utilize to further implement and organize the strategies required to assess and implement the SWPPP. The city's Communication Plan will further coordinate outgoing stormwater messages across all city communication channels. It outlines the quarterly (seasonal) messages to the public explaining how stormwater from public and private properties could impact water quality and includes the type of communication, target audience(s), timeline, and draft language and/or photos prepared each January.

Measurable Goals:
Implement Communication Plan

Timeline / Implementation Schedule:
2018: Develop Communication Plan. Review annually.

Specific Components & Notes (optional):
See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)

Responsible Department

Title: Water Resources Manager

Department: Engineering

Components related to this BMP (description or number – optional):

Audience: Residents, business owners, developers, contractors

Goals: Promote general awareness and understanding of the stormwater management, runoff pollution prevention, and environmental stewardship.

Activities: Implement Communications Plan

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 1-6

Minimum Control Measures Addressed by this BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| X | Public education & outreach | X | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| X | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

BMP Title: Employee Training Program

BMP Description:

City staff will arrange an annual training for field employees, as presented in the city's SOP. The training outlines responsible departments for each BMP contained in the city's SWPPP and the SOPs for implementing the BMPs. The training will address the importance of protecting water quality, introductory water quality protection concepts, current stormwater regulations, and requirements of the permit that are relevant to employee job duties. The training will also highlight the importance of achieving individual BMP goals to the overall effectiveness of the city's SWPPP. In addition to properly implementing BMPs to reduce the impact of city operations, field staff will be trained to recognize minimum control measures on construction sites and illicit discharges. City employees are provided a current SWPPP organizational chart to report any potential violations for further investigation. All training opportunities, including the dates and the names of employees in attendance, will be tracked, as best as possible.

Measurable Goals:

Complete annual training
Attendance log
Update SWPPP organizational chart, as needed

Timeline / Implementation Schedule:

Currently implemented and will continue annually. Train new and/or seasonal employees annually.

Specific Components & Notes (optional):

See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)

Responsible Department

Title: Water Resources Manager

Department: Engineering

Components related to this BMP (description or number – optional):

Audience: City field staff

Goals: Address the importance of protecting water quality and cover the requirements of the permit that are relevant to the job duties of the employee

Activities: Conduct annual training, provide SWPPP organizational chart

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 1-7

Minimum Control Measures Addressed by this BMP

| | | | |
|-------------------------------------|-------------------------------------------|-------------------------------------|-----------------------------------------|
| <input checked="" type="checkbox"/> | Public education & outreach | <input type="checkbox"/> | Construction site runoff controls |
| <input checked="" type="checkbox"/> | Public participation & involvement | <input checked="" type="checkbox"/> | Post-construction stormwater management |
| <input checked="" type="checkbox"/> | Illicit discharge detection & elimination | <input type="checkbox"/> | Pollution prevention/Good housekeeping |

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| BMP Title: Participate in Clean Water Minnesota | |
| BMP Description: Clean Water Minnesota is an outreach program of the Metro Watershed Partners that celebrates metro-area residents who use water-friendly practices. The city is a member of Metro Watershed Partners and uses the information and assistance of Clean Water Minnesota to help educate residents on ways they can help protect lakes and other water bodies. Recent activities include metro-wide messages on using salt responsibly, taking small actions at home, cleaning up neighborhoods, and adopting a storm drain. | |
| Measurable Goals: Maintain membership | Timeline / Implementation Schedule: Currently implemented and will continue annually as funding allows |
| Specific Components & Notes (optional): | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Water Resources Manager | Department: Engineering |
| Components related to this BMP (description or number – optional): | |
| Audience: General public | |
| Goals: Promote public understanding that inspires people to protect and improve lakes and rivers | |
| Activities: | |
| Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 1-8

Minimum Control Measures Addressed by this BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| X | Public education & outreach | - | Construction site runoff controls |
| X | Public participation & involvement | X | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | - | Pollution prevention/Good housekeeping |

BMP Title: Rainwater Rewards Program

BMP Description:

The city's Rainwater Rewards program offers financial, educational, and technical assistance to residential projects that effectively manage stormwater in the city. It may be used by residents implementing projects that do one or more of the following: (1) protect and restore stormwater by capturing pollutants in runoff, (2) increase the watershed's ability to store water, (3) preserve and restore native plant and wildlife communities, and (4) protect and preserve groundwater quality and quantity. Funding is awarded to applicants that meet specific criteria, including location in the watershed and the type of project proposed. To maintain the efficacy of the raingarden, a maintenance agreement is required specifying routine inspections.

Measurable Goals:

Number of applications received
Number of applications funded

Timeline / Implementation Schedule:

Currently implemented and will continue annually as funding allows

Specific Components & Notes (optional):

Rainwater Rewards Program requires application and maintenance agreement

Responsible Party (refer to the organizational chart)

Responsible Department

Title: Water Resources Manager

Department: Engineering

Components related to this BMP (description or number – optional):

Audience: St. Louis Park residents

Goals: Cost share with residents to reduce pollutants and/or runoff volume from property

Activities: Promote and manage program

Annual
Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 2-1

Minimum Control Measures Addressed by This BMP

| | | | |
|-------------------------------------|-------------------------------------------|-------------------------------------|-----------------------------------------|
| <input checked="" type="checkbox"/> | Public education & outreach | <input checked="" type="checkbox"/> | Construction site runoff controls |
| <input checked="" type="checkbox"/> | Public participation & involvement | <input checked="" type="checkbox"/> | Post-construction stormwater management |
| <input checked="" type="checkbox"/> | Illicit discharge detection & elimination | <input checked="" type="checkbox"/> | Pollution prevention/Good housekeeping |

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| BMP Title: Opportunities for Public Input on the SWPPP | |
| BMP Description: Provide at least one annual opportunity for the public to review and provide comments or input to the city's SWPPP and annual report. The opportunity may be an event or meeting. The city will provide a ten-day public-comment period published in the newspaper and on the city's website including the location to view the document(s). The city will document the date(s) and time(s) the event(s) were held and review all relevant input to determine if SWPPP modifications are necessary based on input received. | |
| Measurable Goals: Complete public notice requirement Document public comments received (verbal or written) Incorporate feasible public input into SWPPP | Timeline / Implementation Schedule: Post 10-day meeting notice Currently implemented and will continue annually |
| Specific Components & Notes (optional): The SWPPP, annual report, and other documentation is available for public review on the City's Stormwater Management webpage | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Water Resources Manager | Department: Engineering |
| Components related to this BMP (description or number – optional): Audience: Residents, developers, business owners, and contractors Goal: To inform the public on the status of the City's SWPPP and provide members of the public an opportunity to provide input on the SWPPP. Activities: Notice the opportunity, solicit public input and document comments received. Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 2-2

Minimum Control Measures Addressed by This BMP

| | | | |
|-------------------------------------|-------------------------------------------|--------------------------|-----------------------------------------|
| <input checked="" type="checkbox"/> | Public education & outreach | <input type="checkbox"/> | Construction site runoff controls |
| <input checked="" type="checkbox"/> | Public participation & involvement | <input type="checkbox"/> | Post-construction stormwater management |
| <input checked="" type="checkbox"/> | Illicit discharge detection & elimination | <input type="checkbox"/> | Pollution prevention/Good housekeeping |

| | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| BMP Title: Household Cleanup Events | |
| BMP Description: The city will hold two household-cleanup events each year where residents can bring garbage/refuse not accepted by their haulers. Examples of collected materials include electronics, tires, appliances, and general debris. This program reduces the number of potentially toxic or hazardous items illegally disposed of or dumped within the city. All materials collected are taken by licensed haulers and disposed of properly. | |
| Measurable Goals: Completed events Number of participants or loads disposed of | Timeline / Implementation Schedule: Currently implemented and will continue twice a year |
| Specific Components & Notes (optional): | |
| Responsible Party (refer to the organizational chart) | |
| Title: Natural Resources Coordinator, Solid Waste Manager, Water Resources Manager | Department: Operations and Recreation, Engineering |
| Components related to this BMP (description or number – optional): | |
| Audience: Residents | |
| Goal: Provide residents a local, accessible option to recycle and/or safely dispose of unwanted household items. | |
| Activities: Publicize the Household Clean Up event | |
| Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 2-3

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| X | Public education & outreach | - | Construction site runoff controls |
| X | Public participation & involvement | - | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

BMP Title: Continue Volunteer Opportunities

BMP Description:
The city annually partners with several schools or community volunteer programs to provide opportunities to participate in cleaning up trash and debris from parks and areas adjacent to creeks, lakes, or ponds. The programs generally provide awareness of the amount of trash and debris that may accumulate and enter into the city’s stormwater system. Typically, these events are held in the spring and summer months and focus on Earth Day or Arbor Day themes. Additionally, the Minnehaha Creek Watershed District (MCWD), Bassett Creek Watershed Management Commission (BCWMC), and WHNC annually coordinate a major cleanup effort where the city assists through outreach efforts using its website and social media networks. Trash collected is weighed, and disposal is coordinated with haulers.

| | |
|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Measurable Goals: Track volunteers Document waterbodies cleaned and locations Document trash collected | Timeline / Implementation Schedule: Currently implemented and will continue annually |
|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|

Specific Components & Notes (optional):

| | |
|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Volunteer Coordinator, Natural Resources Coordinator, WHNC Manager, Water Resources Manager | Department: Administrative Services, Operations and Recreation, Parks and Recreation, Engineering |

Components related to this BMP (description or number – optional):

Audience: Residents, school, or civic organizations

Goal: To provide a public participation opportunity that increases awareness of local water issues

Activities:

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 2-4

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| X | Public education & outreach | - | Construction site runoff controls |
| X | Public participation & involvement | X | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | - | Pollution prevention/Good housekeeping |

BMP Title: Lake and Stream Monitoring

BMP Description:
The city partners with the Metropolitan Council, Bassett Creek Watershed Management Commission (BCWMC) and Minnehaha Creek Watershed District (MCWD) on monitoring activities on annual lakes and streams. The Citizen-Assisted Monitoring Program is a Metropolitan Council program that allows volunteers to collect surface-water samples for analysis. The city gathers volunteers and pays for sample testing annually. This program tracks trends in lakes over time and offers a public participation opportunity for interested residents. The Minnehaha Creek Watershed District and the Bassett Creek Watershed Management Commission staff or consultants provide lake and stream monitoring.

| | |
|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measurable Goals: Number of volunteers Number of lakes monitored in CAMP Annual monitoring reports from BCWMC and MCWD | Timeline / Implementation Schedule: Currently implemented and will continue annually 2018-2020: Evaluated monitoring opportunities based on future needs and trends |
|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Specific Components & Notes (optional):

Responsible Party (refer to the organizational chart) | Responsible Department

| | |
|----------------------------------------------------------------------|-----------------------------------------------------------|
| Title: Natural Resources Coordinator, Water Resources Manager | Department: Operations and Recreation, Engineering |
|----------------------------------------------------------------------|-----------------------------------------------------------|

Components related to this BMP (description or number – optional):

Audience: Residents, school or civic organizations looking to learn more about water quality

Goal: To provide a public participation opportunity on water quality monitoring that will increase awareness of local water issues

Activities: See BMP description above

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 3-1

Minimum Control Measures Addressed by This BMP

| | | | |
|-------------------------------------|-------------------------------------------|-------------------------------------|-----------------------------------------|
| <input checked="" type="checkbox"/> | Public education & outreach | <input type="checkbox"/> | Construction site runoff controls |
| <input checked="" type="checkbox"/> | Public participation & involvement | <input type="checkbox"/> | Post-construction stormwater management |
| <input checked="" type="checkbox"/> | Illicit discharge detection & elimination | <input checked="" type="checkbox"/> | Pollution prevention/Good housekeeping |

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| BMP Title: Storm Sewer Map | |
| BMP Description: The city maintains a storm sewer map in a geographic information system showing the location of all structural infrastructure (e.g., catch basins, manholes, pipes 12" or greater, and lift stations) and all receiving waters. The map includes all outfalls, flow direction, unique identification numbers, and associated geographic coordinates. This map represents an integral part of the city's effective inspection and maintenance program. (See SWPPP Appendix B for 2018 Storm Sewer Map) | |
| Measurable Goals: Maintain updated database and map | Timeline / Implementation Schedule: Update map annually with changes or redevelopment |
| Specific Components & Notes (optional): | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Water Resources Manager, GIS Coordinator | Department: Engineering, Information Resources |
| Components related to this BMP (description or number – optional): | |
| Audience: City staff | |
| Goal: Enables City staff to view and analyze dynamic maps to enhance their daily operations, improve decision-making, and effectively respond to customer requests and emergency situations | |
| Activities: Update, as needed. | |
| Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 3-2

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | - | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| X | Illicit discharge detection & elimination | - | Pollution prevention/Good housekeeping |

BMP Title: Regulatory Control Program

BMP Description:

Only stormwater should be conveyed through the city's stormwater discharge system. Any other pollutants or discharges are considered illicit and prohibited. City Code 12-157 regulates the introduction of pollutants into the stormwater system. This regulatory mechanism effectively prohibits illicit connections and discharges into the stormwater system. The code and written Enforcement Response Procedures are designed to utilize the maximum extent practical to reduce the discharge of pollutants to protect water quality. The city has the authority to carry out all inspections and to monitor procedures necessary to ensure compliance with this ordinance.

Measurable Goals:

Review ordinance and Enforcement Response Procedures for updates if needed based on inspections and monitoring

Timeline / Implementation Schedule:

Currently implemented and will continue annually

Specific Components & Notes (optional):

City Code Chapter 12: Environment and Public Health; Article V. Stormwater, Soil Erosion, And Sedimentation; Section 12-157 Illicit Discharge and Connection Enforcement Response Procedures

Responsible Party (refer to the organizational chart)

Responsible Department

Title: Water Resources Manager

Department: Engineering

Components related to this BMP (description or number – optional):

Audience: City Staff and Public

Goal: Educate the staff and the public on the importance of Illicit discharge detection and elimination (IDDE).

Activities: Maintain material on the City's Stormwater Management Webpage

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 3-3

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| X | Public education & outreach | X | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| X | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

BMP Title: Illicit Discharge Detection and Elimination Program

BMP Description:

The city will continue to implement the Illicit Discharge Detection and Elimination (IDDE) program outlined in its SOP. The Minimum Control Measures found in Section 3: Illicit Discharge Detection and Elimination of the city's SWPPP further outline the IDDE Program. BMPs herein are coordinated to meet specific activities and schedules that set measurable goals for each target audience. The IDDE Program focuses on providing a timely response to known, suspected, or reported illicit discharges. The city disseminates all IDDE information via its Illicit Discharge webpage, printed brochures for the public, and city staff trainings tailored to their work activities. The educational materials clearly state what the public should do if they suspect or witness an illicit discharge, and the materials include contact information for reporting. The materials also contain information about the city's proactive efforts to inspect for these harmful pollutants. Resources are used for both the public and new employees/seasonal field staff.

Measurable Goals:

Review brochure(s) for updates if needed
Review website for updates if needed
Review IDDE Plan for updates if needed

Timeline / Implementation Schedule:

Currently implemented and will continue annually

Specific Components & Notes (optional):

Illicit Discharge Detection and Elimination Plan (2015)
See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)

Title: Water Resources Manager

Responsible Department

Department: Engineering

Components related to this BMP (description or number – optional):

Audience: Residents, city staff, contractors

Goal: Provide comprehensive resources to the public for identifying and eliminating potential illicit discharges

Activities: Provide updated brochures and website information

Annual
Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 3-4

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | X | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| X | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

BMP Title: Illicit Discharge Inspection Training and Inspections

BMP Description:

The city has incorporated illicit discharge detection into all maintenance and inspection activities for permanent and seasonal field staff. Staff will be made familiar with the program goals, able to recognize illicit discharges, and able to report them for further investigation to the proper contacts. The city may use dye testing, televise infrastructure with a camera, or use other means necessary to help track or detect illegal and/or improper connections to storm drainage systems and receiving waters. To prioritize inspections, the city will evaluate land uses associated with business/industrial activities, areas where illicit discharges have been identified in the past, and areas with storage or large quantities of materials that could result in an illicit discharge.

Measurable Goals:

Attendance logs
Designate priority illicit discharge inspection areas
Review and evaluate training program
Number of illicit discharges identified

Timeline / Implementation Schedule:

Annually review potential priority inspection areas

Specific Components & Notes (optional):

See the City's SOP for additional information.

Responsible Party (refer to the organizational

Responsible Department

Title: Water Resources Manager

Department: Engineering

Components related to this BMP (description or number – optional):

Audience: City field staff

Goal: Train city field staff on spill reduction and response to limit impacts on water resources

Activities:

Annual
Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 3-5

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| X | Public education & outreach | X | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| X | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| BMP Title: Illicit Discharge Webpage and Reporting | |
| BMP Description: The city will continue to host an Illicit Discharge webpage and the My SLP app, providing information for both city staff and the public regarding investigating, locating, and eliminating illicit discharges. | |
| Measurable Goals: Review webpage and My SLP App for updates, as needed Document and track reports received Review Enforcement Response Procedures and documentation information | Timeline / Implementation Schedule: Currently implemented and will continue annually |
| Specific Components & Notes (optional): Enforcement Response Procedures See the City's SOP for additional information. | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Water Resources Manager, Web Coordinator | Department: Engineering, Information Resources |
| Components related to this BMP (description or number – optional): Audience: General public Goal: Provide education and contact information for citizens and/or field staff to report potential illicit discharges for investigation Activities: Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 3-6

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | - | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| X | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

| | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| BMP Title: Implement Wellhead Protection Plan | |
| BMP Description: The city currently has a Wellhead Protection Plan that includes an assessment of the city and management strategies to protect groundwater resources from contamination. This plan was reviewed and updated in 2015. | |
| Measurable Goals: Development review(s) in vulnerable areas | Timeline / Implementation Schedule: Currently implemented and will continue annually |
| Specific Components & Notes (optional): Wellhead Protection Plan Update (2015) See the City's SOP for additional information. | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Water Resources Manager, Utilities Superintendent | Department: Engineering, Operations and Recreation |
| Components related to this BMP (description or number – optional): Audience: Residents, developers, businesses Goal: To maintain or improve groundwater resources Activities: Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 3-7

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | X | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| X | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| BMP Title: Spill Reduction for Municipal Operations | |
| BMP Description: The city operates a spill reduction and response program to prevent or contain hazardous waste from reaching the city's stormwater system. The city provides training for employees on storage, handling, and disposing of hazardous waste materials. In the event of a spill, the city's storm sewer map assists in identifying receiving waters and potential impacts for quick spill response, if required. Written emergency response procedures are available to all staff. The city supplies cleanup kits in vehicles and city buildings for immediate deployment, if needed. | |
| Measurable Goals: Number of spills under and over 5 gallons reported Number of employees trained Update written procedures if needed | Timeline / Implementation Schedule: Currently implemented and will continue annually |
| Specific Components & Notes (optional): See the City's SOP for additional information. The City uses spill kits, designated storage and containers, written procedures for spill response, and MSDS training. | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Water Resources Manager, Equipment Superintendent, Facility Manager | Department: Engineering, Operations and Recreation, Facilities Maintenance |
| Components related to this BMP (description or number – optional): Audience: City staff Goal: Train City staff on spill reduction and response to limit impacts on water resources Activities: Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 3-8

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | X | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| X | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

BMP Title: Enforcement Response Procedures (*SWPPP Appendix C*)

BMP Description:

The city will follow the written Enforcement Response Procedures or ERP for responding to spills and notifying the Minnesota Department of Public Safety Duty Officer, if applicable. Following reports of alleged illicit discharges, the city will investigate and, if needed, document the name of the person responsible, date(s), and location(s) of the observed violation(s). In correspondence, the city will reference the relevant city code from Chapter 12 and outline corrective actions and the associated completion timeline. The city will conduct follow-up inspections and further document the date(s) and type(s) of enforcement used to compel compliance and refer to other regulatory agencies, if applicable. See SWPPP Appendix C for the city's ERP)

Measurable Goals:

Documentation of all relevant information
Number of violations
Number of violations resolved

Timeline / Implementation Schedule:

Currently implemented and will continue annually

Specific Components & Notes (optional):

Enforcement Response Procedures
City Code 12-156 Environment and Public Health; Article V. Stormwater, Soil Erosion, And Sedimentation

Responsible Party (refer to the organizational

Responsible Department

Title: Water Resources Manager

Department: Engineering

Components related to this BMP (description or number – optional):

Audience: Residents, developers, contractors and city staff

Goal: Ensure procedures are developed to help the City enforce and achieve compliance with the ordinances when stormwater violations are discovered

Activities:

Annual
Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 4-1

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | X | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | - | Pollution prevention/Good housekeeping |

BMP Title: Ordinance or Other Regulatory Mechanism

BMP Description:
City Code Chapter 12 Environment and Public Health; Article V. Stormwater, Soil Erosion, and Sedimentation addresses reducing and controlling stormwater, soil erosion, and sedimentation within the city. It establishes standards and specifications for conservation practices and planning activities, which enhance water quality; minimize stormwater pollution, soil erosion, and sediment in waterways; and control the volume of water runoff to receiving streams and other water resources. This regulatory mechanism guides the city's Erosion and Sediment Control permitting and inspections program and contains provisions for enforcement, as well as penalties, if needed.

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|-------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Measurable Goals: Updates to ordinance, as needed | Timeline / Implementation Schedule: Currently implemented and will continue annually |
|-------------------------------------------------------------|------------------------------------------------------------------------------------------------|

Specific Components & Notes (optional):
City Code Chapter 12 Environment and Public Health; Article V. Stormwater, Soil Erosion, And Sedimentation; Section 12-156 Construction Site Stormwater Runoff and Erosion Control

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|--------------------------------------------------------------|-------------------------------|
| Responsible Party (refer to the organizational chart) | Responsible Department |
|--------------------------------------------------------------|-------------------------------|

| | |
|---------------------------------------|--------------------------------|
| Title: Water Resources Manager | Department: Engineering |
|---------------------------------------|--------------------------------|

Components related to this BMP (description or number – optional):

Audience: City staff, developers and contractors

Goal: Implement city requirements

Activities: Conduct plan reviews, ordinance reviews and enforcement

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 4-2

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | X | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | - | Pollution prevention/Good housekeeping |

BMP Title: Procedure for Site Plan Review

BMP Description:

The city has established procedures and guidelines for construction site erosion and sedimentation control during both the concept and development stage of site planning and also throughout the permit and approval process. The city will review site plans, make recommendations for appropriate erosion and sediment control BMPs, and analyze impacts to surrounding natural resources. The city reviews each site plan for grading, drainage, and utilities to ensure conformity with all city ordinances and design guidelines and to ensure the plans meet the city's Surface Water Management Plan (Appendix M) requirements prior to permitting or approval. The city requires an Erosion and Sediment Control (ESC) Permit when a project will disturb an area of 5,000 square feet or greater; will excavate a volume of 50 cubic yards or greater; or is within 100 feet of a lake, pond, or wetland.

Measurable Goals:

Number of site plans reviewed
Review permit application packages and checklists annually for updates

Timeline / Implementation Schedule:

Currently implemented and will continue annually

Specific Components & Notes (optional):

ESC Permit Application Package, site plan checklist for small projects, site plan checklist for large projects
Surface Water Management Plan Appendix M: Erosion and Sediment Control and Stormwater Management Plan Guidelines

Responsible Party (refer to the organizational chart)

Responsible Department

Title: Water Resources Manager

Department: Engineering

Components related to this BMP (description or number – optional):

Audience: Developers, contractors

Goal: Provide transparent review process, allow applicants to anticipate requirements and inspections

Activities: Provide checklists for applicants, review site plans according to guidelines, document review details

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 4-3

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | X | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| X | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

BMP Title: Construction Sites and Erosion Control Inspections

BMP Description:

The city has erosion and sedimentation control BMP requirements within Chapter 12: Article V. Stormwater, Soil Erosion, and Sedimentation ordinance. Specifications of site-specific erosion and sediment control plans and individual SWPPPs, with mapped locations of these BMPs, are required prior to permit approval. Prior to permitting, the city provides design standards, manuals, and standard site plan review procedures. Project owners/permittees are responsible to self-inspect their construction sites and provide documentation of the inspections, findings, and remedies in their individual SWPPP records. The city also conducts regular erosion and sedimentation inspections for all permitted projects. Written procedures and checklists are used by city staff to determine compliance with city code from the site plan review stage, throughout construction, to final stabilization.

Measurable Goals:

Number of permitted projects
Number of inspections
Number of enforcement actions

Timeline / Implementation Schedule:

Currently implemented and will continue annually

Specific Components & Notes (optional):

City Code Chapter 12-157: Environment and Public Health, Article II. Nuisances; Article III. Litter; and Article V. Stormwater, Soil Erosion, and Sedimentation and Enforcement Response Procedures
See the City's SOP for additional information.

Responsible Party (refer to the organizational chart)

Responsible Department

Title: Water Resources Manager

Department: Engineering

Components related to this BMP (description or number – optional):

Audience: Developers, contractors

Goal: Ensure temporary and permanent ESC BMPs are properly maintained on construction sites with regular inspections

Activities: Provide regular inspections and document findings

Annual
Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 4-4

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | X | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| X | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| BMP Title: Erosion Control Enforcement | |
| BMP Description: The city uses the Enforcement Response Procedures or ERP identified in City Code Chapter 12: Environment and Public Health; Article V. Stormwater, Soil Erosion, and Sedimentation; Section 12-160 Enforcement to remedy issues regarding noncompliant construction sites. When the city observes violations, it will provide a written description of the violation, corrective actions required, and a timeframe for completion to the permittee or responsible party. The city may notify other applicable agencies and document the date the violation was resolved. | |
| Measurable Goals: Record number and type of enforcement actions | Timeline / Implementation Schedule: Currently implemented and will continue annually |
| Specific Components & Notes (optional): Enforcement Response Procedures City Code Chapter 12-157: Environment and Public Health, Article V. Stormwater, Soil Erosion, and Sedimentation; Section 12-160 Enforcement | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Water Resources Manager | Department: Engineering |
| Components related to this BMP (description or number – optional): Audience: Developers, contractors Goal: Assure proactive compliance with city code and permit standards to prevent enforcement actions or penalties Activities: Record number and type of enforcement actions discovered during inspections Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 4-5

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | X | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| X | Illicit discharge detection & elimination | - | Pollution prevention/Good housekeeping |

| | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| BMP Title: Financial Securities | |
| BMP Description: Permitted projects may require financial securities to ensure all erosion and sedimentation BMPs are installed properly. Financial securities or damage deposits are required with erosion and sediment control permit applications. The city may use a portion or the entire financial security/deposit to remedy construction site problems due to noncompliance with city code and permit standards. The financial security/damage deposit must be provided via secured funds and made out to the City of St. Louis Park when the erosion and sediment control application is submitted. Applications will not be reviewed if the damage deposit is not included. | |
| Measurable Goals: Number of financial securities Number of retained financial securities | Timeline / Implementation Schedule: Currently implemented and will continue annually |
| Specific Components & Notes (optional): City Code Chapter 12 Environment and Public Health; Article V. Stormwater, Soil Erosion, And Sedimentation; Section 12-156 Construction Site Stormwater Runoff and Erosion Control Surface Water Management Plan Appendix M: Erosion and Sediment Control and Stormwater Management Plan Guidelines | |
| The secured funds will be placed in a non-interest bearing account and will be returned to the applicant once the project is complete. | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Water Resources Manager | Department: Engineering |
| Components related to this BMP (description or number – optional): Audience: Developers, contractors Goal: Damage deposits are intended to reduce non-compliance issues and to ensure that outstanding non-compliance issues are corrected quickly. Activities: Record financial securities. Reduce the deposit or return in full as projects are completed Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 4-6

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | X | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| X | Illicit discharge detection & elimination | - | Pollution prevention/Good housekeeping |

BMP Title: Erosion Control Inspection Training

BMP Description:
The city provides regular training for all construction site inspectors through the University of Minnesota Erosion and Stormwater Management Certification Program (or equivalent). The certification program covers state permit requirements and BMPs to reduce or control erosion and sedimentation. Other topics include soil erodibility, turf-establishment techniques, grading techniques to minimize erosion, timing of installations, and the proper installation of best management practices. Staff also attend additional stormwater education workshops or conferences.

| | |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Measurable Goals: Number of trained/certified inspectors | Timeline / Implementation Schedule: Currently implemented Acquire and maintain certification |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|

Specific Components & Notes (optional):

| | |
|--------------------------------------------------------------|-------------------------------|
| Responsible Party (refer to the organizational chart) | Responsible Department |
|--------------------------------------------------------------|-------------------------------|

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|---------------------------------------|--------------------------------|
| Title: Water Resources Manager | Department: Engineering |
|---------------------------------------|--------------------------------|

Components related to this BMP (description or number – optional):

Audience: City field staff

Goal: Ensure field staff conducting site inspections are aware of rules, current trends or practices, and technologies with regular training or certification programs

Activities: Attend and record trainings, acquire and maintain certifications

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 5-1

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | X | Construction site runoff controls |
| - | Public participation & involvement | X | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | - | Pollution prevention/Good housekeeping |

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| BMP Title: Design and Construction Standards | |
| BMP Description: The city has standards for public and private infrastructure design and construction projects to aid in redevelopment, and it provides standard detail plates for temporary and permanent erosion and sediment control BMPs and specification, which are posted on the Engineering Department's webpage. | |
| Measurable Goals: Review guidance and standards materials annually, update as needed | Timeline / Implementation Schedule: Currently implemented and will continue annually |
| Specific Components & Notes (optional): Comprehensive Surface Water Management Plan Appendix M: Erosion and Sediment Control and Stormwater Management Plan Guidelines, Details and Specification on the City's Engineering Dept. Webpage Surface Water Management Plan Appendix M: Erosion and Sediment Control and Stormwater Management Plan Guidelines | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Senior Engineering Project Manager, Water Resources Manager | Department: Engineering |
| Components related to this BMP (description or number – optional): Audience: Developers, contractors Goal: Provide standard specifications for temporary and permanent erosion and sediment control Activities: Provide standard detail plates, review annually for updates Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 5-2

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | - | Construction site runoff controls |
| - | Public participation & involvement | X | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | - | Pollution prevention/Good housekeeping |

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| BMP Title: Plan Review and Approval Procedures | |
| BMP Description: Plan review procedures are identified in City Code Section 12-156 and 12-158, which require submittal, review, and approval of required permit applications and the Stormwater Management plan. The plan must detail how stormwater and associated water quality impacts, resulting from the proposed development, will be controlled or managed. This plan must indicate whether stormwater will be managed on-site or off-site and, if on-site, the general location and type of practices. The stormwater management plan(s) shall be referred to interested agencies for comment, and any comments must be addressed in the final Stormwater Management Plan. This final plan must be signed by a licensed professional engineer, who will verify that the design of all stormwater management practices meet the submittal requirements of the Surface Water Management Plan (SWMP). Timelines for review are provided in ordinance and guided by state requirements. Design standards (Appendix M) are provided in city ordinance, city policies, and the Engineering Standard Detail Plates. The city uses these combined mechanisms to ensure post-construction runoff control compliance with the SWMP and NPDES MS4 General Permit. Project approval is contingent upon the execution of an agreement to maintain post-construction stormwater BMPs, if applicable. | |
| Measurable Goals: Number of projects reviewed Number of permitted projects | Timeline / Implementation Schedule: Currently implemented and will continue annually |
| Specific Components & Notes (optional): City Code Chapter 12: Environment and Public Health, Article V. Stormwater, Soil Erosion, and Sedimentation; Section 12-156 Construction Site Stormwater Runoff and Erosion Control, and Section 12-158 Post Construction Stormwater Runoff; Surface Water Management Plan Appendix M: Erosion and Sediment Control and Stormwater Management Plan Guidelines; See the City's SOP for additional information. | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Water Resources Manager, Senior Engineering Project Manager | Department: Engineering |
| Components related to this BMP (description or number – optional): Audience: Developers, contractors Goal: Establish minimum stormwater management requirements and controls to minimize stormwater Activities: Review permit applications and Stormwater Management Plans according to written guidelines and document review details Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 5-3

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | - | Construction site runoff controls |
| - | Public participation & involvement | X | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | - | Pollution prevention/Good housekeeping |

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| BMP Title: Development Agreements | |
| BMP Description: Permitted projects may require a development agreement to ensure all erosion and sedimentation BMPs are installed properly. Development agreements are a legal document between an applicant and the city that details all terms, conditions, and responsibilities of a permitted project. | |
| Measurable Goals: Number of development agreements | Timeline / Implementation Schedule: Currently implemented and will continue annually |
| Specific Components & Notes (optional): | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Water Resources Manager | Department: Engineering |
| Components related to this BMP (description or number – optional): | |
| Audience: Developers, contractors | |
| Goal: Ensure a legal mechanism is in place to hold developer or contractor accountable for properly maintaining erosion and sediment controls throughout construction | |
| Activities: Record development agreements | |
| Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 5-4

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | - | Construction site runoff controls |
| - | Public participation & involvement | X | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | - | Pollution prevention/Good housekeeping |

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| BMP Title: Ordinance or Other Regulatory Mechanism | |
| BMP Description: City Code Section 12-158 contains requirements for Post-Construction Stormwater Management including objectives, applicability, plan requirements, maintenance requirements, and inspections and reporting activities. This code provides the basis for ensuring stormwater is managed properly for development and redevelopment projects. The code also contains an additional regulatory mechanism, a formal maintenance covenant, which must be approved by the city and recorded at the Hennepin County Recorder's Office prior to final plan approval. As part of the covenant, a schedule must be developed, including periodic inspections and the performance of discharge standards to ensure the proper functioning of the stormwater management facility. | |
| Measurable Goals: Updates to ordinance, as needed | Timeline / Implementation Schedule: Currently implemented and will continue annually |
| Specific Components & Notes (optional): City Code Chapter 12: Environment and Public Health, Article V. Stormwater, Soil Erosion, and Sedimentation; Section 12-158 Post Construction Stormwater Runoff; Surface Water Management Plan Appendix M: Erosion and Sediment Control and Stormwater Management Plan Guidelines ; See the City's SOP for additional information. | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Water Resources Manager, Senior Engineering Project Manager | Department: Engineering |
| Components related to this BMP (description or number – optional): Audience: Property owners and developers Goal: Ensure each developed/redeveloped property meets the City's requirements Activities: Review ordinance and track modification Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 5-5

Minimum Control Measures Addressed by This BMP

| | | | |
|-------------------------------------|-------------------------------------------|-------------------------------------|-----------------------------------------|
| <input checked="" type="checkbox"/> | Public education & outreach | <input checked="" type="checkbox"/> | Construction site runoff controls |
| <input checked="" type="checkbox"/> | Public participation & involvement | <input checked="" type="checkbox"/> | Post-construction stormwater management |
| <input checked="" type="checkbox"/> | Illicit discharge detection & elimination | <input checked="" type="checkbox"/> | Pollution prevention/Good housekeeping |

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| BMP Title: Surface Water Management Plan (SWMP) | |
| BMP Description: The city's Surface Water Management Plan (SWMP) serves as the guiding document for all surface water issues, goals, policies, and implementation strategies to protect water quality. The SWMP discusses current issues and challenges such as impaired waters and contaminated sites and opportunities to leverage resources with local and regional partners. The SWMP provides a comprehensive road map for improving water resources and infrastructure within the city in conjunction with the most current local watershed organization requirements and standards, as well as state and/or federal rules. The city is required to revise the SWMP every ten years, and it must be submitted to the Metropolitan Council and the two watershed organizations (BCWMC and MCWD) for review and approval. The SWMP may be updated prior to the ten-year review cycle as watershed management plans are updated or if other significant changes arise that would require an amendment. The process to amend is outlined in the SWMP. Some of the implementation strategies to achieve the SWMP's goals are outlined in the city's SWPPP, which is reviewed and updated annually in conjunction with submittal of the Annual Report to the Minnesota Pollution Control Agency. | |
| Measurable Goals: Review watershed plans (as updated) to incorporate into SWMP through a formal amendment process Annually update SWPPP in conjunction with submitting Annual Report to the MPCA | Timeline / Implementation Schedule: Currently implemented and will continue annually |
| Specific Components & Notes (optional): Surface Water Management Plan (2018) | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Water Resources Manager, Senior Engineering Project Manager | Department: Engineering |
| Components related to this BMP (description or number – optional): Audience: Staff, residents, contractors, developers Goal: Provide a surface water management plan for the City Activities: Implement the plan Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 5-6

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | - | Construction site runoff controls |
| - | Public participation & involvement | X | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | - | Pollution prevention/Good housekeeping |

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| BMP Title: Long-term Operation and Maintenance of BMPs | |
| BMP Description: The city has an established stormwater utility to fund the continued long-term maintenance costs of the publicly owned storm sewer system. The city will operate and maintain public stormwater management facilities to reduce the discharge of pollutants. Routine inspections of the system and these facilities identify necessary maintenance that may be prioritized for future improvements based on the severity of the maintenance need. Priority projects will provide the most cost-effective pollution reduction. For private stormwater infrastructure, provisions in city code require the long-term operation and maintenance agreements and/or maintenance covenants. | |
| Measurable Goals: Annual maintenance summary Number of maintenance agreements established | Timeline / Implementation Schedule: Currently implemented and will continue annually |
| Specific Components & Notes (optional): See the City's SOP for additional information. | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Water Resources Manager, Senior Engineering Project Manager, Utilities Superintendent, Operations Manager, Natural Resources Coordinator | Department: Engineering, Operation and Recreation, Parks and Recreation |
| Components related to this BMP (description or number – optional): Audience: City staff and property owners Goal: Effect operation and maintenance of best management practices (BMPs) Activities: Inspect and maintain BMPs Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 5-7

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | - | Construction site runoff controls |
| - | Public participation & involvement | X | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | - | Pollution prevention/Good housekeeping |

BMP Title: Review of Impaired Waters with approved Total Maximum Daily Loads (TMDLs) and applicable Waste Load Allocations (WLAs)

BMP Description:

Annually, the city will conduct a review of all approved total maximum daily loads(TMDLs) with applicable waste load allocations . The review will assess and document the city's progress toward meeting each discharge requirement, and it will include a list of BMPs being applied to achieve the applicable WLAs.

Measurable Goals:

Review/Update the impaired waters map
Tally of projects that decrease constituents of concern and the total number of lbs. sequestered.

Timeline / Implementation Schedule:

2018 Model update - EPA SWMM model (Hydrology, Hydraulics and Water Quality)
Currently Implemented and will continue annually.

Specific Components & Notes (optional):

The outcomes of implementing the SWPPP, SOP and associated codes should reduce transport and discharge of constituents of concerns.

Responsible Party (refer to the organizational chart)

Responsible Department

Title: Water Resources Manager

Department: Engineering

Components related to this BMP (description or number – optional):

Audience: City staff and regulatory agencies

Goal: Meet WLA to the maximum extent practicable

Activities: Update WLA activities, look for opportunities to reduce pollutants of concern

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-1

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | - | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

BMP Title: Municipal Operations and Maintenance Program

BMP Description:
The city's operations and maintenance program include routine maintenance of stormwater infrastructure to maintain the original capacity and intent of the system. Routine operations include cleaning pipes, catch basins, and manhole sump structures; lift station upkeep; pump replacement; general pond maintenance; sediment removal; and inspections of all outfalls and stockpiles.

| | |
|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Measurable Goals: Review and revise operations and maintenance program, as needed. Employee Training | Timeline / Implementation Schedule: Currently implemented and will continue annually |
|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|

Specific Components & Notes (optional):
See the City's SOP for additional information.

| | |
|--------------------------------------------------------------|-------------------------------|
| Responsible Party (refer to the organizational chart) | Responsible Department |
|--------------------------------------------------------------|-------------------------------|

Title: Public Works Superintendent **Department:** Operations and Recreation

Components related to this BMP (description or number – optional):

Audience: City employees

Goal: Effective inspection, operation and maintenance of storm sewer and stormwater management infrastructure to minimize pollutant transport to water resources.

Activities:

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-2

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | - | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

BMP Title: Municipal Street Sweeping Program

BMP Description:
All city streets and parking lots are swept at least twice a year and on an “as needed” basis. Priority areas around impaired water bodies considered “Intensive Sweeping Areas,” receive additional sweepings during the year. The city uses regenerative air sweepers and documents lane miles swept and disposal records for all materials collected.

| | |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Measurable Goals: Number of lane miles swept Number of loads collected | Timeline / Implementation Schedule: Currently implemented and will continue annually |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|

Specific Components & Notes (optional):
See the City’s SOP for additional information.

| | |
|--------------------------------------------------------------|-------------------------------|
| Responsible Party (refer to the organizational chart) | Responsible Department |
|--------------------------------------------------------------|-------------------------------|

| | |
|----------------------------------|----------------------------------------------|
| Title: Operations Manager | Department: Operations and Recreation |
|----------------------------------|----------------------------------------------|

Components related to this BMP (description or number – optional):

Audience:

Goal:

Activities:

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-3

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | - | Construction site runoff controls |
| - | Public participation & involvement | X | Post-construction stormwater management |
| X | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

BMP Title: Annual Inspection of All Structural Pollution Control Devices

BMP Description:
The city inspects all structural pollution control devices annually to evaluate the physical and operational condition of the infrastructure. Any maintenance or repair needs found are scheduled via a work order system. During these inspections, if dry weather flows are found that are not explained by areas of groundwater intrusion, irrigation, or lift station discharge, the flow is investigated for illicit discharges and/or connections.

| | |
|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Measurable Goals: Inspection reports Number of maintenance actions completed | Timeline / Implementation Schedule: Currently implemented and will continue annually |
|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|

Specific Components & Notes (optional):
See the City's SOP for additional information.

| | |
|--------------------------------------------------------------|-------------------------------|
| Responsible Party (refer to the organizational chart) | Responsible Department |
|--------------------------------------------------------------|-------------------------------|

| | |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------|
| Title: Utilities Superintendent, Operations Manager, Water Resources Manager | Department: Operations and Recreation, Engineering |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------|

Components related to this BMP (description or number – optional):

Audience: City field staff

Goal: Inspect and maintain BMPs

Activities: BMP inspection and maintenance, as needed

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-4

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | - | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| X | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| BMP Title: Quarterly Stockpile, Storage, and Material Handling Program | |
| BMP Description: All exposed stockpiles, storage, and material-handling areas will be inspected at least quarterly. The city has a written procedure to identify and manage all exposed stockpiles and follows proper storage techniques, as prescribed in the Material Safety Data Sheets and by state and federal authorities. | |
| Measurable Goals: Quarterly inspections completed | Timeline / Implementation Schedule: Currently implemented and will continue annually |
| Specific Components & Notes (optional): See the City's SOP for additional information. | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Water Resources Manager, Natural Resources Coordinator, Operations Manager | Department: Engineering, Operations and Recreation |
| Components related to this BMP (description or number – optional): Audience: City employees Goal: Prevent discharges from stockpiles, storage and material handling areas Activities: Inspection and maintenance, as needed Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-5

Minimum Control Measures Addressed by This BMP

| | | | |
|-------------------------------------|-------------------------------------------|-------------------------------------|-----------------------------------------|
| <input type="checkbox"/> | Public education & outreach | <input type="checkbox"/> | Construction site runoff controls |
| <input type="checkbox"/> | Public participation & involvement | <input type="checkbox"/> | Post-construction stormwater management |
| <input checked="" type="checkbox"/> | Illicit discharge detection & elimination | <input checked="" type="checkbox"/> | Pollution prevention/Good housekeeping |

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| BMP Title: Fertilizer, Pesticide, and Herbicide Application Program | |
| BMP Description: The Parks and Recreation Department applies fertilizer, pesticide, and herbicide within the city. No phosphorus fertilizer will be used unless a soil test determines need. Employees are trained on proper fertilizer and herbicide handling, application, and cleanup procedures. Pesticide application is handled by licensed employees to ensure safe handling and proper application. | |
| Measurable Goals: Number of employees trained, licensed Quantity of products applied | Timeline / Implementation Schedule: Currently implemented and will continue annually |
| Specific Components & Notes (optional): See the City's SOP for additional information. | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Parks Superintendent, Natural Resources Coordinator | Department: Operations and Recreation |
| Components related to this BMP (description or number – optional): Audience: City field staff and contractors Goal: Reduce use and leeching potential Activities: Reduce use Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-6

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | - | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| BMP Title: Inspection Analysis and Frequency | |
| BMP Description: The city maintains records of inspection results, dates, weather conditions, and any maintenance performed or recommended for structural stormwater pollution control devices. After two years of regular inspections, if maintenance patterns become apparent, the frequency of inspections may be adjusted accordingly. For example, if maintenance or sediment removal is required as a result of the first two annual inspections, the frequency of inspection shall be increased to at least twice annually, or more frequently as needed to prevent carry-over or washout of pollutants from the structures and maximize pollutant removal. If maintenance or sediment removal is not required as a result of both of the first two annual inspections, the frequency may be reduced to once every two years. | |
| Measurable Goals: Review inspection results every 2 years Adjust programs when needed | Timeline / Implementation Schedule: Currently implemented and will continue annually |
| Specific Components & Notes (optional): See the City's SOP for additional information. | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Water Resources Manager, Utilities Manager | Department: Engineering, Operations and Recreation |
| Components related to this BMP (description or number – optional): Audience: City field staff Goal: Ensure proper operation of BMPs Activities: Inspect, review and adjust frequency of inspections, as needed Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-7

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | - | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

BMP Title: Street Deicing Program

BMP Description:
The city's street deicing program includes training of new employees and an Annual Snowplow Meeting to review correct practices and issues related to street deicing. The city has developed a Sensible Salt Program that helps to determine the appropriate mixture of salt and/or salt mixtures for road applications according to the temperature, forecast, and road conditions. An enclosed building is used for all salt storage, truck loading, and mixing. Salt applicator trucks are calibrated and equipped with temperature sensors to determine application rates and to control salt applications. The city continuously reviews new technologies, alternative products or equipment, and procedures to reduce salt usage.

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Measurable Goals: Number of employees trained Amount of salt and other products used Number of spreaders calibrated annually | Timeline / Implementation Schedule: Currently implemented and will continue annually |
|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|

Specific Components & Notes (optional):
Sensible Salt Program, Annual snowplow meeting
New employee training

See the City's SOP for additional information.

| | |
|--------------------------------------------------------------|----------------------------------------------|
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Operations Manager | Department: Operations and Recreation |

Components related to this BMP (description or number – optional):

Audience: City employees

Goal: Provide city staff awareness of policy regarding street deicing procedures and associated stormwater impacts

Activities: Conduct annual meeting, new employee training

Annual Summary:

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-8

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | - | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| BMP Title: Fleet and Building Maintenance Program | |
| BMP Description: The city's Facilities Maintenance Division provides scheduled maintenance and safety checks on all city vehicles. This program aims to minimize leaks from the city's fleet and equipment. The program recycles used oils, antifreeze, and other materials. The city has an indoor wash bay for washing vehicles and the runoff is directed to grit chambers/sediment traps prior to discharge to the sanitary sewer. Employees are also responsible for inspecting for leaks from various city facilities and buildings. | |
| Measurable Goals: Number of vehicles maintained Volume of materials recycled Number of employees trained | Timeline / Implementation Schedule: Currently implemented and will continue annually |
| Specific Components & Notes (optional): See the City's SOP for additional information. | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Equipment Superintendent, Facilities Supervisor | Department: Facilities Maintenance |
| Components related to this BMP (description or number – optional): Audience: City employees Goal: Educate employees on proper fleet and building operation and maintenance Activities: Maintain and track records Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-9

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | - | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| BMP Title: Hazardous Material Storage and Recycling Program | |
| BMP Description: Hazardous materials management is outlined in the city's Emergency Operations Plan. Any hazardous material situation triggers an emergency response. The city recycles items such as fluorescent light bulbs, floor dry, solvents, and automobile fluids. The program is designed to reduce waste and contain all hazardous materials. Employees working with hazardous materials are trained on the proper storage, handling, and recycling of those materials. | |
| Measurable Goals: Annual Right to Know training completed Maintain inventory of hazardous materials | Timeline / Implementation Schedule: Currently implemented and will continue annually |
| Specific Components & Notes (optional): St. Louis Park Emergency Operations Plan See the City's SOP for additional information. | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Equipment Superintendent, Facilities Supervisor and Solid Waste Program Coordinator | Department: Facilities Maintenance, Operations and Recreation |
| Components related to this BMP (description or number – optional): Audience: City employees Goal: Reduce pollutant runoff from city operations, prevent spills or leakage Activities: See BMP Description above Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-10

Minimum Control Measures Addressed by This BMP

| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | - | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| BMP Title: Stormwater Treatment Effectiveness Assessment | |
| BMP Description: In an effort to ensure proper stormwater storage and treatment capacity, the city began an advanced evaluation of its stormwater detention ponds in 2011. This stormwater pond evaluation and prioritization process aids city staff with scheduling and budgeting appropriate resources for pond maintenance and provides the city with a better understanding of its ponds' current condition and functionality. The evaluation and assessment process is outlined in the city's SOP. | |
| Measurable Goals: | Timeline / Implementation Schedule: |
| Specific Components & Notes (optional): See the City's SOP for additional information. | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: Senior Engineer Project Manager, Water Resources Manager | Department: Engineering |
| Components related to this BMP (description or number – optional): Audience: City staff Goal: Determine most effective treatment practices Activities: Develop and maintain a water quality model Annual Summary: | |

MS4 Implementation Strategy

MS4 Name: City of St. Louis Park

Unique Identifying Number: 6-11

Minimum Control Measures Addressed by This BMP















| | | | |
|---|-------------------------------------------|---|-----------------------------------------|
| - | Public education & outreach | - | Construction site runoff controls |
| - | Public participation & involvement | - | Post-construction stormwater management |
| - | Illicit discharge detection & elimination | X | Pollution prevention/Good housekeeping |

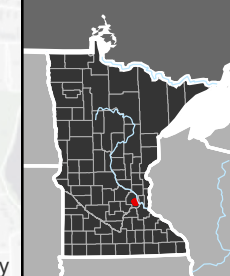
| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| BMP Title: Facilities Inventory | |
| BMP Description: In 2016, a comprehensive review and inventory of all city-owned facilities was completed to assess the stockpile and materials handling location, assess the potential for materials to discharge to and to impact surface water resources, and determine the need for BMP installation and/or maintenance. During the inspection (which included public works facilities, police stations, parks, open space, a water treatment facility, etc.), it was determined that only two facilities have areas with potential concerns that would warrant quarterly inspections. At the two facilities (SLP Stockyards), fueling procedures, stockpiles, hazardous waste storage, and vehicle/equipment washing areas will be inspected to ensure existing BMPs are maintained to function properly. | |
| Measurable Goals: Review mapped facilities and, where warranted, recommend modifications | Timeline / Implementation Schedule: Currently implemented and will continue annually |
| Specific Components & Notes (optional): See the City's SOP for additional information. | |
| Responsible Party (refer to the organizational chart) | Responsible Department |
| Title: GIS Coordinator, Water Resources Manager, Facilities Supervisor | Department: Information Resources, Engineering, Facilities Maintenance |
| Components related to this BMP (description or number – optional): Audience: City staff Goal: To keep an inventory of the City's building and facilities and to manage potential pollution Activities: Inspect and maintain the City's facilities Annual Summary: | |

APPENDIX B: ST. LOUIS PARK 2018 STORM SEWER MAP

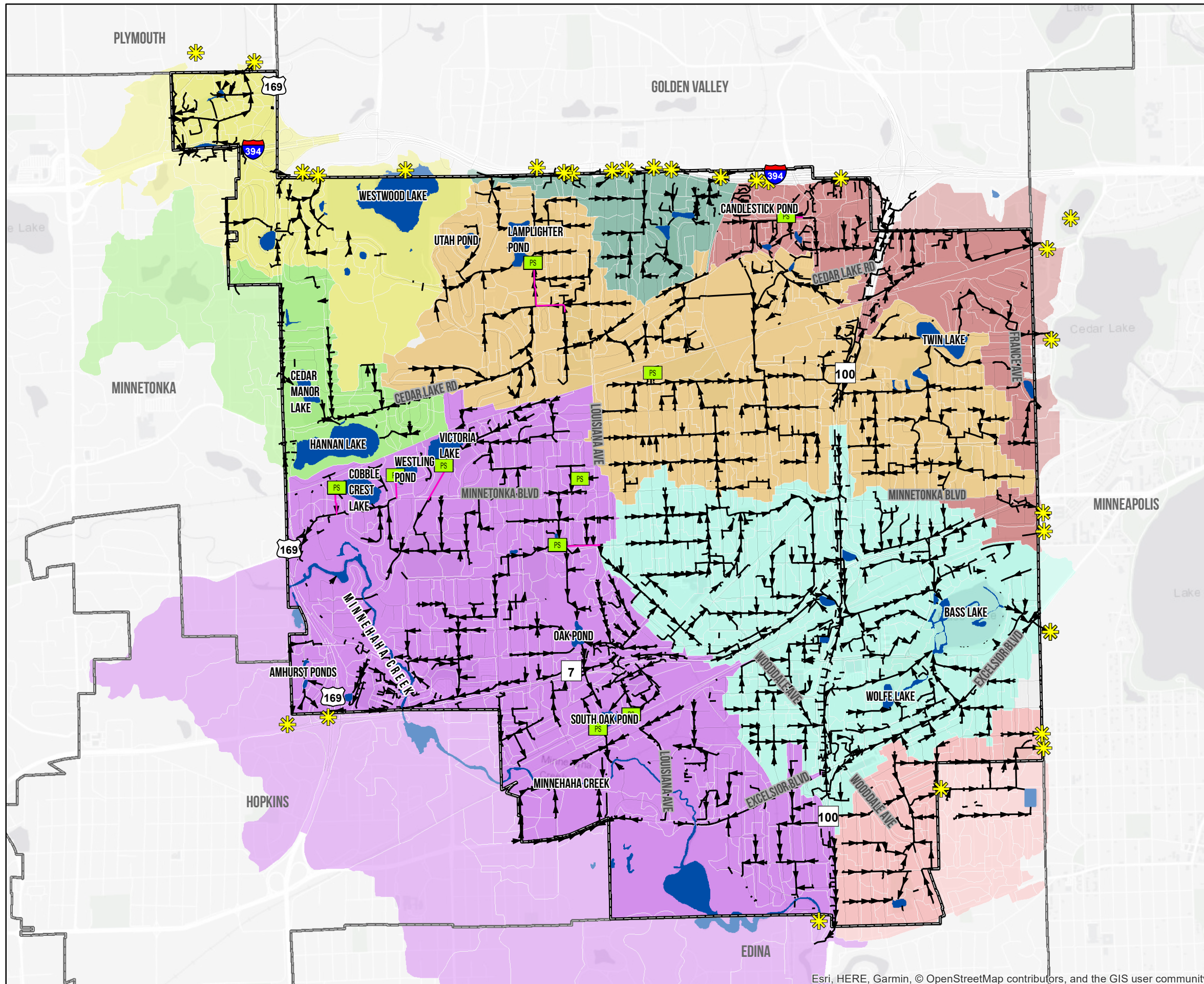
SURFACE WATER SYSTEM

LEGEND

-  Intercommunity Flow Locations
-  Stormwater Lift Stations
-  Stormwater Discharge Points
-  Storm Mains (Gravity)
-  Storm Mains (Pressure)
-  01-Westwood Lake District (740 acres)
-  02-Golden Valley District (219 acres)
-  03-Hannan Lake District (605 acres)
-  04-Minnehaha Creek District (3,783 acres)
-  05-Twin Lake District (1,636 acres)
-  06-Minneapolis District (649 acres)
-  07-Bass Lake District (1,362 acres)
-  08-Edina District (497 acres)
-  City Boundary



Scale: As Shown
 Drawn By: KAT
 Checked By:
 Proj. #: 03259
 Date: 2018.11.08



APPENDIX C: ST. LOUIS PARK ENFORCEMENT RESPONSE PROCEDURES (ERP)

City of St. Louis Park Enforcement Response Procedures

Introduction to the Enforcement Response Procedures

The purpose of this Enforcement Response Procedures (ERP) is to define the city's enforcement capabilities for noncompliance with city, state, and local stormwater laws, ordinances, and design guidelines. In addition, this ERP outlines the enforcement procedures and methods used to compel compliance with the defined regulatory mechanisms that have been developed and are implemented by the City of St. Louis Park.

Inclusion of the Enforcement Response Procedures

This ERP includes, but is not limited to, stormwater discharge violations and noncompliance for the following stormwater discharge related issues:

- Construction Stormwater Runoff (city ordinance 12-156)
- Illicit Discharge (city ordinance 12-157)
- Post Construction Stormwater Runoff (city ordinance 12-158)

Please refer to the aforementioned city ordinances and Appendix M of the city's Surface Water Management Plan for further details on city stormwater regulations.

The City requires contractors to obtain all required permits pertaining to land disturbance activities from various agencies. Permits may include watershed district, DNR, ACOE, City and/or State permits. The city's MS4 permit requires the City to implement a system to monitor construction activities and to enforce Permit provisions. The City has an inspection oversight responsibility and must ensure that a trained employee inspects construction activity at sites until final stabilization is achieved. If violations occur, City employees are directed to follow this enforcement response procedure to encourage a timely response by the alleged violator.

Identification and Reporting of Stormwater Discharge Related Issues

Inspections and investigations of stormwater related issues by city staff occur on a routine or reactive basis. Routine inspections generally occur on permitted sites, known areas of concern, and long-term maintenance sites. Reactive inspections for stormwater related issues occur based on a resident or staff identification and reporting.

Inspection and Documentation of Stormwater Discharge Related Issues

Inspection and any enforcement actions required by the city, based on referral or routine inspections, shall be documented and include the following information:

1. Name of the person responsible for violating the terms and conditions of the permittee's Regulatory Mechanism
2. Date and location of the observed violation

3. Description of the violation, including reference to relevant regulatory mechanism
4. Corrective action schedule issued by the permittee
5. Date and type of enforcement used to compel compliance
 1. Verbal notice of violation
 2. Written notice of violation
 3. Withholding of authorization of permits
 4. Stop work order
 5. Draw on damage deposit (city ordinance 12-157)
 6. Administrative penalty order (city ordinance 6-179)
 7. Legal action / property assessment (city ordinance 6-179)
 8. Referral to additional regulatory agencies
6. Referrals to other regulatory organizations, if necessary
 - a. Emergency Response 911
 - b. Police and Fire Dispatch (non-emergency) 952-924-2618
 - c. Water Resources Manager 952-924-2690
 - i. Erick Francis (efrancis@stlouispark.org)
 - d. MystlouisparkApp (Report an Issue)
 - i. http://iframe.publicstuff.com/#?client_id=1310#picker-top
 1. Construction stormwater runoff
 2. Illicit discharge
 - e. Minnesota State Duty Officer 800-422-0798
7. Date when the stormwater related violation has been resolved

Response to Stormwater Discharge Related Issues

If a prohibited stormwater discharge is found in and/or entering the City's storm water system, city staff will perform investigations, per each MCM 3, 4, or 5 SOP, within the watershed to determine the source of pollution and the party responsible for the discharge, if possible. Investigators will notify selected city staff, as defined on the MS4 Organizational Chart, and any other regulatory agency as necessary, noted above, to assist in the containment, cleanup, and remediation of the discharge. Please note that at times, situations may become unpleasant or hostile and it is important to know that it's acceptable to call for police assistance at any time if these situations occur. The City's response to stormwater related discharges will be determined on a case by case scenario.

Enforcement to Stormwater Discharge Related Issues

Typical enforcement actions for a stormwater discharge related issues will include one or more of the following actions:

1. Verbal notice of violation
2. Written notice of violation
3. Withholding authorization of permits
4. Stop work order
5. Draw on damage deposit
6. Administrative penalty order
7. Legal action / property assessment
8. Referral to additional regulatory agencies

The extent of the enforcement action due to a stormwater related discharge will be determined on a case by case scenario by city staff based on the consistency of the discharge and its extent, environmental impact, and ability to remediate the environmental impact. Enforcement actions may also be escalated based on level of cooperation from the responsible parties, response time and remediation actions from responsible parties, and the reoccurrence or negligence by the responsible party. Enforcement action will increase from 1 to 8 based on these aforementioned criteria and direction from city staff.

In the instance of an accidental incident or spill, additional consideration will be given to what level of enforcement, if any, will be implemented if after the investigation has been completed and it has been determined the intent of the incident or spill was determined to not be on accident and not malicious. However, the incident will still be investigated and documented per this ERP.

Part I Wellhead Protection Plan Update
Wellhead Protection Area Delineation
Drinking Water Supply Management Area Delineation
Well and Drinking Water Supply Management Area Vulnerability Assessments



Public Water Supplier 1270050

February 2015



Part I Wellhead Protection Plan Update
St. Louis Park, Minnesota
February 2015

Public Water Supplier 1270050

Source Water Solutions, LLC

I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Geologist under the laws of the State of Minnesota.

Erik J. Tomlinson, PG, LEED AP

Date: _____ Lic. No.: 46739

Source Water Solutions, LLC
221 McCarron St.
Roseville, MN 55113

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Glossary of Terms

Data Element. A specific type of information required by the Minnesota Department of Health to prepare a wellhead protection plan.

Drinking Water Supply Management Area (DWSMA). The area delineated using identifiable land marks that reflects the scientifically calculated wellhead protection area boundaries as closely as possible (Minnesota Rules, part 4720.5100, subpart 13).

Drinking Water Supply Management Area Vulnerability. An assessment of the likelihood that the aquifer within the DWSMA is subject to impact from land and water uses within the wellhead protection area. It is based upon criteria that are specified under Minnesota Rules, part 4720.5210, subpart 3.

Emergency Response Area (ERA). The part of the wellhead protection area that is defined by a one-year time of travel within the aquifer that is used by the public water supply well (Minnesota Rules, part 4720.5250, subpart 3). It is used to set priorities for managing potential contamination sources within the DWSMA.

Inner Wellhead Management Zone (IWMZ). The land that is within 200 feet of a public water supply well (Minnesota Rules, part 4720.5100, subpart 19). The public water supplier must manage the IWMZ to help protect it from sources of pathogen or chemical contamination that may cause an acute health effect.

Wellhead Protection (WHP). A method of preventing well contamination by effectively managing potential contamination sources in all or a portion of the well's recharge area.

Wellhead Protection Area (WHPA). The surface and subsurface area surrounding a well or well field that supplies a public water system, through which contaminants are likely to move toward and reach the well or well field (Minnesota Statutes, section 103I.005, subdivision 24).

Well Vulnerability. An assessment of the likelihood that a well is at risk to human-caused contamination, either due to its construction or indicated by criteria that are specified under Minnesota Rules, part 4720.5550, subpart 2.

Acronyms

CWI - County Well Index

DNR - Minnesota Department of Natural Resources

EPA - United States Environmental Protection Agency

OPDC - Prairie du Chien Group

CJDN – Jordan Sandstone

CMTS – Mt. Simon Sandstone

MDA - Minnesota Department of Agriculture

MDH - Minnesota Department of Health

MGS - Minnesota Geological Survey

MnDOT - Minnesota Department of Transportation

MPCA - Minnesota Pollution Control Agency

PLS – Public Land Survey

SWCD - Soil and Water Conservation District

UMN - University of Minnesota

USGS - United States Geological Survey

1.0 Public Water Supply Profile

The following persons are the contacts for the St. Louis Park Wellhead Protection Plan.

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2.0 Introduction

Source Water Solutions was retained by the City of St. Louis Park (City) (PWSID 1270050) to complete an update to the City's wellhead protection (WHP) plan. The work was performed in accordance with the Minnesota Wellhead Protection Rule, Parts 4720.5100 to 4720.5590.

This report presents the delineation of the wellhead protection area (WHPA), the drinking water supply management area (DWSMA), and the vulnerability assessments for the public water supply wells and DWSMAs. **Figure 1** shows the boundaries for the DWSMA and WHPA. The WHPAs are defined by a 10-year time of travel. **Figure 2** shows the emergency response areas (ERA), which are defined by a 1-year time of travel and the Inner Wellhead Protection Management Zone (IWMZ), a 200 foot radius around each well. Definitions of rule-specific terms that are used are provided in the "Glossary of Terms."

This report also documents the technical information that was required to prepare this portion of the WHP Plan in accordance with the Minnesota Wellhead Protection Rule. Additional technical information is available from MDH.

The municipal water supply wells included in the WHP Plan are listed in **Table 1**.

Table 1 - Water Supply Well Information

| Well No. | Unique Well No. | Use/Status | Year Constructed | Casing Diam. (in) | Casing Depth (ft) | Total Depth (ft) | Aquifer Formation | Vulnerability |
|----------|-----------------|----------------|------------------|-------------------|-------------------|------------------|-------------------------|----------------|
| 3 | 206440 | Abandoned | 8/1939 | 24 | 103 | 286 | St. Peter | Vulnerable |
| 4 | 200542 | Primary | 1946 | 24/18 | 304 | 510 | Prairie du Chien-Jordan | Vulnerable |
| 5 | 203196 | Out of Service | 1947 | 24/20 | 305 | 465 | Prairie du Chien-Jordan | NA |
| 6 | 206457 | Emergency | 1948 | 24/20 | 303 | 480 | Prairie du Chien-Jordan | Vulnerable |
| 7 | 206436 | Out of Service | 1952 | 24/20 | 274 | 450 | Prairie du Chien-Jordan | NA |
| 8 | 203678 | Primary | 1955 | 24/16 | 314 | 507 | Prairie du Chien-Jordan | Not Vulnerable |
| 9 | 206437 | Out of Service | 1956 | 24/16 | 289 | 473 | Prairie du Chien-Jordan | NA |
| 10 | 206442 | Primary | 1955 | 24/16 | 316 | 479 | PDC-JDN | Vulnerable |
| 11 | 206439 | Primary | 1960 | 24/16 | 880 | 1093 | Mt. Simon | Not Vulnerable |
| 12 | 206456 | Primary | 1965 | 30/24/16 | 900 | 1095 | Mt. Simon | Not Vulnerable |
| 13 | 206424 | Primary | 1964 | 30/24/16 | 891 | 1045 | Mt. Simon | Not Vulnerable |
| 14 | 227965 | Primary | 1955 | 30/24/16 | 389 | 485 | Jordan | Vulnerable |
| 15 | 215447 | Primary | 1969 | 30/24 | 398 | 503 | Jordan | Vulnerable |
| 16 | 203187 | Primary | 1973 | 30/24 | 425 | 510 | Jordan | Vulnerable |
| 17 | 147459 | Out of Service | 1983 | 36/30/24 | 818 | 1085 | Mt. Simon | NA |

3.0 Assessment of the Data Elements

MDH staff met with representatives of the public water supplier in August 2013 for a scoping meeting that identified the data elements required to prepare Part I of the WHP Plan Update. **Table 2** presents the assessment of these data elements, relative to the present and future implications of planning items, as specified in Minnesota Rules, part 4720.5210. The Scoping Decision Notice is provided as **Appendix A**.

Table 2 - Assessment of Data Elements

| | Present and Future Implications | | | | Data Source |
|----------------------------------------------------|---------------------------------|----------------------|------------------------------------|-----------------------------------|----------------------------------------|
| | Use of the Well (s) | Delineation Criteria | Quality and Quantity of Well Water | Land and Groundwater Use in DWSMA | |
| Precipitation | | | | | |
| Average monthly and annual precipitation | L | M | L | M | Midwestern Regional Climate Center |
| Geology | | | | | |
| Maps and geologic descriptions | M | H | H | H | MGS, DNR, USGS, Consultant Reports |
| Subsurface data | M | H | H | H | MGS, MDH, MPCA, DNR, MDA |
| Borehole geophysics | M | H | H | H | MGS, Consultant Reports |
| Surface geophysics | L | L | L | L | DNR, MPCA, Consultant Reports |
| Maps and soil descriptions | L | M | L | M | USDA SURGGO |
| Water Resources | | | | | |
| Watershed units | L | M | L | M | DNR |
| List of public waters | L | M | L | M | DNR |
| Land Use | | | | | |
| Parcel boundaries map | L | H | L | M | Hennepin County |
| Political boundaries map | L | H | L | M | DNR |
| PLS map | L | H | L | L | DNR |
| Public Utility Services | | | | | |
| Transportation routes and corridors | L | H | M | M | Mn/DOT, City of St. Louis Park |
| Storm/sanitary sewers and PWS system map | L | L | M | M | City of St. Louis Park |
| Public drainage systems map or list | L | M | M | M | DNR, City of St. Louis Park |
| Records of well construction, maintenance, and use | H | H | H | H | City of St. Louis Park, CWI, MDH files |
| Surface Water Quantity | | | | | |
| Stream flow data | L | L | M | L | USGS, MPCA, DNR |
| Ordinary high water mark data | L | L | L | M | DNR |
| Permitted withdrawals | M | L | M | M | DNR, City of St. Louis Park |
| Protected levels/flows | M | L | M | M | DNR, MPCA |
| Water use conflicts | M | M | M | M | DNR, MPCA |

| | Use of the Well (s) | Delineation Criteria | Quality and Quantity of Well Water | Land and Groundwater Use in DWSMA | |
|-------------------------------------|---------------------|----------------------|------------------------------------|-----------------------------------|-----------------------------------|
| Groundwater Quantity | | | | | |
| Permitted withdrawals | H | H | H | H | DNR |
| Groundwater use conflicts | H | H | H | H | DNR |
| Water levels | H | H | H | H | DNR, MPCA, MDA, MDH, City |
| Surface Water Quality | | | | | |
| Monitoring data summary | L | L | M | M | MPCA |
| Groundwater Quality | | | | | |
| Monitoring data | H | H | H | H | MPCA, MDH, MDA, USGS |
| Isotopic data | H | H | H | H | MPCA, MDH, MDA, USGS, County, UMN |
| Tracer studies | H | H | H | H | DNR, MPCA |
| Contamination site data | H | M | H | H | MPCA, MDA |
| MPCA and MDA spills/release reports | H | L | H | H | MPCA, MDA |

Definitions Used for Assessing Data Elements:

High (H) - the data element has a direct impact

Moderate (M) - the data element has an indirect or marginal impact

Low (L) - the data element has little if any impact

Acronyms used in this report are listed on page ii, after the "Glossary of Terms."

3.1 Precipitation

Precipitation Data was obtained from the Midwestern Regional Climate Center website. Monthly data was available for the past five years at the MINNEAPOLIS/ST PAUL Airport station (USW00014922) and is provided below in **Table 3**. Precipitation data can be used for determining local recharge for the groundwater model.

Table 3 - Precipitation Data

| Year | Jan. | Feb. | Mar. | Apr. | May | Jun. | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. | Annual |
|-------------|------|------|------|------|------|------|------|------|------|------|------|------|--------|
| 2009 | 0.57 | 0.93 | 1.5 | 1.57 | 0.53 | 2.86 | 2.17 | 6.43 | 0.46 | 5.57 | 0.38 | 1.83 | 24.8 |
| 2010 | 0.45 | 0.75 | 0.69 | 2.32 | 2.5 | 6.25 | 3.03 | 4.91 | 5.52 | 1.61 | 2.07 | 2.79 | 32.89 |
| 2011 | 1 | 1.12 | 2.06 | 2.8 | 4.04 | 5.28 | 5.23 | 3.03 | 0.36 | 0.7 | 0.3 | 0.99 | 26.91 |
| 2012 | 0.36 | 1.71 | 1.4 | 3.04 | 9.34 | 3.59 | 4.9 | 1.38 | 0.3 | 1.3 | 0.63 | 1.64 | 29.59 |
| 2013 | 0.86 | 1.33 | 2.04 | 5.22 | 6.24 | 5.17 | 3.51 | 2.07 | 1.35 | 3 | 0.52 | 1.46 | 32.77 |

Note: All values are in inches.

3.2 Geological Information

The local and regional geologic and hydrogeologic conditions influence the delineation of the WHPAs for the public water supply wells. By characterizing these conditions, the geometry, location and magnitude of groundwater recharge and discharge areas, and the groundwater flow direction of the source water aquifer could be determined or estimated.

Existing geological maps, reports, and studies that were used are listed in the References section of the plan. Through the use of public-domain well records and local and regional geologic studies and

publications, the geology and hydrogeology of the area have been evaluated and reviewed to aid in the WHPA delineations and vulnerability assessments. These resources were provided by the City, the MDH, the Minnesota Geological Survey (MGS), and the USGS. These resources provided the basis for defining local geologic and hydrologic conditions but this interpretation was refined using the records of wells, borings, exploration test holes, and excavations. The City has no additional geologic information from logs or borehole geophysical records of wells, borings, or exploration test holes, nor additional information from surface geophysical studies. A surficial geology map is presented as **Figure 3** and a bedrock geologic map is presented as **Figure 4**. Geologic cross-sections were created through the study area and are provided as **Figures 5 and 6**. The cross-section locations are depicted on **Figure 4**.

Generally, the depth to bedrock in the St. Louis Park area ranges from 50 to 100 feet. However, there are areas surrounding St. Louis Park in which the depth to bedrock is 100 to 200 feet. The top of bedrock elevation ranges from 700 to 800 feet above mean sea level (MSL). According to the well records of the St. Louis Park municipal wells, bedrock was encountered at depths ranging from 69 (Municipal Well 9) to 127 feet (Municipal Well 12). Figures 2 and 3 are generalized geologic cross-sections through the St. Louis Park area. Figure 4 depicts the uppermost bedrock conditions in the St. Louis Park area and Figure 5 is a typical stratigraphic column for the St. Louis Park area.

The first bedrock unit in the St. Louis Park area is typically the Platteville and Glenwood Formations overlying the St. Peter Sandstone. The bedrock formations beneath the St. Peter Sandstone are (in descending order): the Prairie du Chien Group, the Jordan Sandstone, the St. Lawrence Formation, the Franconia Formation, the Ironton and Galesville Sandstones, the Eau Claire Formation, and the Mount Simon and Hinckley Sandstones.

The Platteville Formation is a fine-grained limestone containing thin shale partings near its top and base. It is underlain by the 0 – 5 feet thick, green sandy shale of the Glenwood Formation.

The upper half to two-thirds of the St. Peter Sandstone consists of fine- to medium-grained, friable quartz sandstone. The lower part of the formation contains multi-colored beds of mudstone, siltstone, and shale with interbedded very coarse sandstone. The typical thickness of the St. Peter Sandstone in Hennepin County is approximately 160 feet.

The Prairie du Chien Group is a dolostone that is sandy with minor amounts of shale in the upper third to half, and less sandy in the lower part. The formation is thin-bedded and contains thin beds of sandstone in the upper part, but is more massive- and thick-bedded in the lower part. Regionally, it is typically about 120 feet thick.

Below the Prairie du Chien Group is the Jordan Sandstone, a quartzose sandstone approximately 95 feet thick. The upper and middle portions of this formation are comprised of medium- and coarse-grained sandstone. The lower portion is massively bedded. The Prairie du Chien and Jordan are hydraulically connected.

The St. Lawrence Formation, a dolomitic siltstone and shale is below the Jordan Sandstone, and overlies the Tunnel City (formerly Franconia Formation), a glauconitic sandstone. The Wonewoc Sandstone (formerly Ironton and Galesville Sandstones) comprising of sandstone is found beneath the Tunnel City. Both the Tunnel City and Wonewoc are hydraulically connected.

The Eau Claire Formation - a siltstone, shale, and silty sandstone, which acts as a confining unit between the Mount Simon below, and the Wonewoc above. The Mount Simon aquifer consists of the Mount Simon Sandstone. In general, the Mount Simon is hydraulically isolated from the shallow groundwater systems and surface waters above it.

This geological information was used to define hydrogeologic boundaries that were incorporated into the delineation of the WHPA and used to assess DWSMA vulnerability. Also, the construction information about the public water supply wells was used in conjunction with groundwater quality data to assess well vulnerability.

3.3 Land Use Information

Parcel boundaries, road centerlines, and U.S. Public Land Survey coordinates were used to define the boundaries of the DWSMA.

Parcel and political boundaries are depicted in **Figure 1**. This information was primarily used to delineate the DWSMA and determine whether the limits of the DWSMA cross political boundaries. Specific land uses and zoning within and adjacent to the DWSMA will be reviewed, evaluated, assessed, and presented in Part II of the Plan.

Figures included in this Plan depict the major transportation routes and corridors within and surrounding St. Louis Park. However, sanitary and storm sewer coverage and presence of large-scale pipelines within the DWSMA will be examined in Part II of the Plan.

3.4 Water Quantity Information

Since other high capacity wells in the St. Louis Park area influence the groundwater flow field of the source water aquifer, high capacity private and public wells were evaluated and assessed in detail during the delineations of the WHPAs for the City's public water supply wells. In addition, specific information related to the construction, maintenance, and use of the municipal wells has been compiled, utilized, and presented in the Plan (**Table 1**). This information was also used in delineating the WHPAs and completing the vulnerability assessments.

Groundwater pumping information from high capacity wells was obtained from the State Water Use Data System (SWUDS) that is maintained by the DNR. The annual pumping reported by the Public Water Supplier was used in determining the daily volume of water that is discussed in Section 2 of this document (**Table 6**). Furthermore, SWUDS data, combined with well construction records from the CWI, were used to identify additional high capacity wells to be included in delineating the WHPA. The locations and daily volumes were cross checked with those in the Metro Model. The pumping volumes were updated as appropriate. These wells constitute flow boundaries (**Table 7**).

The primary wells used by the St. Louis Park public water supply system currently rely upon three source water aquifers – the Prairie du Chien, Jordan, and Mt. Simon aquifers. In 2014, the City abandoned Well 3 (206440) which had utilized the St. Peter sandstone.

Municipal Wells 4, 8 and 10 are multi-aquifer wells, open to both the Prairie du Chien and Jordan aquifers. Wells 14, 15, and 16 are completed in the Jordan sandstone and Wells 11, 12, and 13 are open to the Mt. Simon aquifer. Well 6 is also open to both the Prairie du Chien and Jordan aquifers, however it is classified as an emergency well and was not included in the WHPA delineations. Well logs are included as **Appendix B**. **The existing groundwater wells appear adequate to meet the City's current and future water demand. The City has no immediate plans to replace or add municipal wells, or utilize any other source of water supply.**

The City has provided the 2009-2013 water use and pumping volume records presented in this Plan to determine an appropriate discharge rate for the wells in delineating the WHPAs. In addition, the City has estimated a projected increase in groundwater use for 2017. These records are provided in **Table 6**.

Currently, there are no known, significant groundwater-use conflicts between the City and other parties.

3.5 Water Quality Information

Groundwater quality information was used to update well vulnerability. The quality of the groundwater in the source water aquifers, and in the St. Louis Park area specifically, must be evaluated and assessed for this Plan. Groundwater contamination and undesirable groundwater quality will directly impact the public water supply system. Certain naturally-occurring constituents in the groundwater also provide information that can be used to determine the vulnerability of the source water aquifer. The City publishes an annual consumer confidence report that contains water quality data collected over the course of the year.

The overall quality of groundwater in St. Louis Park is good. No contaminants were detected at levels that violated federal drinking water standards. Some were detected in trace amounts that were below legal limits. The St. Louis Park 2013 Consumer Confidence Report is available on the City website.

4.0 General Descriptions

4.1 Description of the Water Supply System

The public water supplier currently obtains its drinking water supply from nine primary groundwater wells and one emergency backup well. **Table 1** summarizes information regarding the City wells.

4.2 Description of the Hydrogeologic Setting

The description of the hydrologic setting for the aquifer used to supply drinking water is presented in **Table 4** and discussed in further detail below.

Table 4 - Description of Hydrogeologic Setting

| Aquifer | Attribute | Descriptor | Data Source |
|-------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prairie du Chien (OPDC) | Aquifer Material | Dolostone | CWI Well Logs, MGS |
| | Porosity (type and value) | 0.056 | Metro Model 3.0 |
| | Aquifer Thickness | 110-121 ft. | City Well Logs |
| | Stratigraphic Top Elevation | 623-637 ft. MSL | City Well Logs |
| | Stratigraphic Bottom Elevation | 489-527 ft. MSL | City Well Logs |
| | Hydraulic Confinement | Confined | City Well Logs |
| | Transmissivity (T) | Reference Value/ Range: 13,100 ft ² /day (12,990-13,140 ft ² /day) | The reference value for the transmissivity of the Prairie du Chien Aquifer was determined from pumping tests on Minnetonka Well 6 and Meadowbrook Golf Course Well 2. The pump test analysis was provided as part of the Aquifer Test Plan for the OPDC and approved on December 10, 2015 . |
| | Hydraulic Conductivity (K) | Reference Value: 73.8 ft/day | The reference K value was calculated based upon the T value provided in the ATP divided by the aquifer thickness at the tested well. |
| Groundwater Flow Field | Flow to the southeast Hydraulic Gradient: 0.00083 | Measured from model results. Flow generally to the southeast toward the Minnesota River. | |
| Jordan Sandstone (CJDN) | Aquifer Material | Sandstone | City Well Logs |
| | Porosity (type and value) | 0.318 | Metro Model 3.0 |
| | Aquifer Thickness | 67-100 ft. | City Well Logs |
| | Stratigraphic Top Elevation | 489-527 ft. MSL | City Well Logs |
| | Stratigraphic Bottom Elevation | 422-444 ft. MSL | City Well Logs |
| | Hydraulic Confinement | Confined | City Well Logs |

| Aquifer | Attribute | Descriptor | Data Source |
|----------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Transmissivity (T) | Reference Value/Range 2,400 ft ² /day (2,360-2,510 ft ² /day) | The reference value for the transmissivity of the Jordan Sandstone Aquifer was determined from pumping tests on Minnetonka Well 6. The pump test analysis was provided as part of the Aquifer Test Plan for the Jordan and approved on December 10, 2015 . |
| | Hydraulic Conductivity (K) | Reference Value: 25.5 ft/day | The reference K value was calculated based upon the T value provided in the ATP divided by the aquifer thickness at the tested well. |
| | Groundwater Flow Field | Flow to the southeast Hydraulic Gradient: 0.0011 | Measured from model results. Flow generally to the southeast toward the Minnesota River. |
| Mt. Simon Sandstone (CMTS) | Aquifer Material | Sandstone | City Well Logs |
| | Porosity (type and value) | 0.233 | Metro Model 3.0 |
| | Aquifer Thickness | 68-81 ft. | City Well Logs |
| | Stratigraphic Top Elevation | 67-124 ft. MSL | City Well Logs |
| | Stratigraphic Bottom Elevation | (-138) - (-185) ft. MSL | City Well Logs |
| | Hydraulic Confinement | Confined | City Well Logs |
| | Transmissivity (T) | Reference Value: 1,970 ft ² /day | The reference value for the transmissivity of the Mt. Simon Aquifer was determined from pumping tests on St. Louis Park Well 11. The pump test analysis was provided as part of the Aquifer Test Plan for the Mt. Simon and approved on December 10, 2015 . |
| | Hydraulic Conductivity (K) | Reference Value: 7.49 ft/day | The reference K value was calculated based upon the T value provided in the ATP divided by the aquifer thickness at the tested well. |
| Groundwater Flow Field | Flow to the southeast Hydraulic Gradient: 0.0020 | Modeled groundwater flow field. | |

The primary wells used by the St. Louis Park public water supply system currently rely upon three source water aquifers – the Prairie du Chien, Jordan, and Mt. Simon aquifers. In 2014, the City abandoned Well 3 (206440) which had previously utilized the St. Peter sandstone.

Municipal Wells 4, 8 and 10 are multi-aquifer wells, open to both the Prairie du Chien and Jordan aquifers. Wells 14, 15, and 16 are completed in the Jordan sandstone and Wells 11, 12, and 13 are open to the Mt. Simon aquifer. Well 6 is also open to both the Prairie du Chien and Jordan aquifers, however it is classified as an emergency well and was not included in the WHPA delineations. Well 15 is no longer in use and was not analyzed for this Update.

Municipal well information including location, construction information, and aquifer is presented in **Table 1.**

5.0 Delineation of the Wellhead Protection Area

5.1 Delineation Criteria

The boundary for the City’s WHPA is shown in **Figure 1**. **Table 5** describes how the delineation criteria that are specified under Minnesota Rules, part 4720.5510, were addressed.

Table 5 - Description of WHPA Delineation Criteria

| Criterion | Descriptor | How the Criterion was Addressed |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flow Boundary | Local Lakes and Rivers: Minnesota River, Lake Minnetonka and Minnehaha Creek | The rivers and lakes provided boundary conditions to the model that extended to and included these natural boundaries. They were included in the model and helped set the regional groundwater flow and water balance. |
| Flow Boundary | Other High-Capacity Wells Table 7 | The pumping amounts were determined based on the averaged 2003-2011 pumped volumes. The pumping amounts of these high-capacity wells were included in the methods used for the delineation. |
| Daily Volume of Water Pumped | See Table 6 | Pumping information was obtained from the Minnesota Department of Natural Resources Appropriations Permit 1973-1007. The annual pumped volumes were converted to a daily volume pumped by a well. |
| Groundwater Flow Field | Southeast Flow See Figures 8, 9, and 10 | The model calibration process addressed the relationship between the calculated versus observed groundwater flow field. |
| Aquifer Transmissivity (T) | Reference Value: OPDC: 11,269 ft ² /day CJDN: 2,400 ft ² /day CMTS: 1,970 ft ² /day | The reference value for the transmissivity of the Jordan and Prairie du Chien Aquifers were determined from pumping tests and other data collected for the City of St. Louis Park’s WHP Plan. Uncertainty regarding T was addressed as described in Section 5.4. |
| Time of Travel | 10 years | The public water supplier selected a 10 year time of travel. |

Information provided by the public water supplier was used to identify the maximum volume of water pumped annually by each well over the previous five-year period, as shown in **Table 6**. Also, the projected 2017 pumping rate is shown. Previous pumping values have been reported to the DNR, as required by the public water supply’s Groundwater Appropriation Permit No. (1973-1007). Maximum daily volume of discharge, used as an input parameter in the model, was calculated by dividing the greatest annual pumping volume by 365 days.

Table 6 - Annual Volume of Water Discharged from Water Supply Wells

| Well Name/ Number | Unique Number | Model Well Name | 2009 | 2010 | 2011 | 2012 | 2013 | Projected 2017 Year Withdrawal* (gal/yr) | Daily Volume max withdrawal (cubic meters) |
|-------------------|---------------|-------------------------|--------------------|--------------------|-------------|--------------------|-------------|------------------------------------------|--------------------------------------------|
| Well 3** | 206440 | 206440~1973-1007_3_211 | 4,655,000 | 117,000 | 0 | 20,000 | 29,000 | 0 | 0.00 |
| Well 4 | 200542 | MNW_00420 | 513,012,000 | 525,041,000 | 521,918,000 | 443,539,000 | 491,993,000 | 573,888,542 | 5,959.01 |
| Well 5 | 203196 | MNW_00421 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 |
| Well 6 | 206457 | MNW_00422 | 257,000 | 246,000 | 184,000 | 471,000 | 94,000 | 109,647 | 1.14 |
| Well 7 | 206436 | MNW_00423 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 |
| Well 8 | 203678 | MNW_00424 | 296,189,000 | 545,933,000 | 530,319,000 | 457,559,000 | 522,378,000 | 609,331,330 | 6,327.03 |
| Well 9 | 206437 | MNW_00425 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 |
| Well 10 | 206442 | MNW_00419 | 206,959,000 | 133,248,000 | 245,767,000 | 331,570,000 | 279,588,000 | 326,127,302 | 3,386.36 |
| Well 11 | 206439 | 206439~1973-1007_11_211 | 122,233,000 | 58,707,000 | 53,806,000 | 116,691,000 | 77,031,000 | 89,853,328 | 933.00 |
| Well 12 | 206456 | 206456~1973-1007_12_211 | 362,056,000 | 307,158,000 | 213,246,000 | 187,409,000 | 292,369,000 | 341,035,786 | 3,541.17 |
| Well 13 | 206424 | 206424~1973-1007_13_211 | 211,310,000 | 228,064,000 | 79,131,000 | 178,301,000 | 26,290,000 | 30,666,147 | 318.42 |
| Well 14 | 227965 | 227965~1973-1007_14_211 | 214,874,000 | 82,696,000 | 185,172,000 | 200,316,000 | 262,638,000 | 306,355,861 | 3,181.06 |
| Well 15 | 215447 | 215447~1973-1007_15_211 | 55,240,000 | 0 | 0 | 0 | 0 | 0 | 0.00 |
| Well 16 | 203187 | 203187~1973-1007_16_211 | 375,759,000 | 273,452,000 | 262,047,000 | 306,562,000 | 257,731,000 | 300,632,058 | 3,121.63 |
| Well 17 | 147459 | 147459~1973-1007_17_211 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 |

Annual volumes expressed as gallons. **Bold** indicates greatest annual pumping volume.

* Total annual volume taken from St. Louis Park Water Supply Plan. Well volume ratio was calculated based upon 2013 pumping. Well 3 volume was taken out of this calculation.

**Well 3 was abandoned in Spring 2014.

In addition to the wells used by the public water supplier, **Table 7** shows other high-capacity wells, within one mile of the City wells, included in the delineation to account for their pumping impacts on the capture areas for the public water supply wells. Pumping data was obtained from the DNR State Water Use Database System.

Table 7 - Other Permitted High-Capacity Wells

| Unique Number | Permittee | Permit | Use | Aquifer | Reported Withdrawal (MGY) | | | | |
|---------------|------------------------------|-----------|------------------------|-------------|---------------------------|-------|------|-------|-------|
| | | | | | 2011 | 2010 | 2009 | 2008 | 2007 |
| 206474 | EDINA, CITY OF | 1973-1119 | Municipal Waterworks | OPDC/CJDN | 0 | 0 | 0 | 0 | 0 |
| 204054 | MINNETONKA, CITY OF | 1979-6207 | Municipal Waterworks | CJDN | 134.2 | 110.7 | 98.0 | 146.9 | 163.3 |
| 208012 | MINNETONKA, CITY OF | 1979-6207 | Municipal Waterworks | CJDN | 134.1 | 110.7 | 98.0 | 146.9 | 163.3 |
| 203183 | MINNEAPOLIS GOLF CLUB | 1986-6083 | Golf Course Irrigation | OPDC/CJDN | 12.2 | 12.7 | 13.6 | 12.9 | 13.5 |
| Unknown | MINNEAPOLIS GOLF CLUB | 1986-6083 | Golf Course Irrigation | NA | 21.5 | 21.1 | 26.6 | 26.0 | 26.0 |
| Unknown | MINNEAPOLIS PARK & REC BOARD | 1986-6125 | Golf Course Irrigation | MEADOWBROOK | 3.4 | 12.8 | 21.5 | 16.6 | 22.1 |

| Unique Number | Permittee | Permit | Use | Aquifer | Reported Withdrawal (MGY) | | | | |
|---------------|------------------------------|-----------|-----------------------------|-----------|---------------------------|------|------|------|------|
| | | | | | 2011 | 2010 | 2009 | 2008 | 2007 |
| 216009 | MINNEAPOLIS PARK & REC BOARD | 1986-6125 | Golf Course Irrigation | OPDC/CJDN | 12.2 | 3.2 | 0 | 0 | 0 |
| 224098 | GENERAL MILLS INC | 2007-0209 | Fire Protection | OPDC/CJDN | 1.6 | 0.8 | 0.5 | 0.2 | 3.0 |
| 224099 | GENERAL MILLS INC | 2007-0210 | Landscaping/Athletic Fields | OPDC/CJDN | 23.4 | 23.2 | 32.2 | 31.3 | 30.5 |

5.2 Method Used to Delineate the Wellhead Protection Area

Conceptual Model

The City of St. Louis Park utilizes the Prairie du Chien, Jordan, and Mt. Simon aquifers for its water supply. The Metro Model Version 3, a recognized nine layer MODFLOW base model developed by the Metropolitan Council, was used as a base model and then refined in the vicinity of the St. Louis Park area (Metropolitan Council, 2014). The model grid, pumping rates, and hydraulic conductivity/transmissivity zones were refined to better represent the local geologic conditions. Model refinement focused primarily on the OPDC (Layer 3), CJDN (Layer 4), and CMTS (Layer 9) aquifers. The model refinement is described in more detail below.

Numerical Model

MODFLOW is the name that has been given the USGS Modular Three-Dimensional Ground-Water Flow Model. Because of its ability to simulate a wide variety of systems, its extensive publicly available documentation, and its rigorous USGS peer review, MODFLOW has become the worldwide standard ground-water flow model. MODFLOW is used to simulate systems for water supply, containment remediation, and mine dewatering. MODFLOW is most appropriate in those situations where a relatively precise understanding of the flow system is needed to make a decision. MODFLOW was developed using the finite-difference method. The finite-difference method permits a physical explanation of the concepts used in construction of the model.

Ground-water flow within the aquifer is simulated in MODFLOW using a block-centered finite-difference approach. Layers can be simulated as confined, unconfined, or a combination of both. Flows from external stresses such as flow to wells, areal recharge, evapotranspiration, flow to drains, and flow through riverbeds can also be simulated. The existing Metro Model 3, a nine layer model, was used as a base model. The model layers represented include the Quaternary, St. Peter Sandstone, Prairie du Chien Group, Jordan Sandstone, St. Lawrence Formation, Tunnel City Group (formerly known as the Ironston and Galesville Sandstones), Wonewoc Sandstone (formerly known as the Franconia Formation), Eau Claire Formation, and Mt. Simon-Hinkley Sandstones (Metropolitan Council, 2014). The model was refined around the St. Louis Park area using local data and focused primarily on the layers/aquifers that the City relies on for its water supply, the Prairie du Chien, Jordan, and Mt. Simon Aquifers. The Groundwater Vistas Version 6.74 Build 39 software package was used to model the system.

Grid Development/Refinement

Because MODFLOW is a block centered finite-difference model, a grid must be defined over the model domain. The grid spacing and size of cells varies across the model domain. The Metro Model 3 consists of a uniform 500 x 500 meter grid. In areas where impact from pumping and accuracy will not impact the capture zones, cells remained 500 x 500 meters. In areas where the accuracy of

groundwater contours and the delineation of particle tracks require greater accuracy (around pumping wells) the grid spacing is 15 x 15 meters.

Boundary Conditions

Constant head boundaries were used to represent water bodies in the model along northern sections of the St Croix River. **Figure 7** shows the boundary conditions used to represent natural features in the model in the Minnetonka area. River boundaries were used to represent the water bodies in the model. Boundary conditions for local lakes and rivers were not updated due to the confined nature of the OPDC and CJDN aquifers. The remaining boundary conditions from the original Metro Model were far enough from the area of study as to not impact the study area results. Model files are provided as **Appendix E**.

Transmissivity

Transmissivity values for the OPDC, CJDN, and CMTS were calculated based the analysis of well pump tests conducted on wells completed in each aquifer. An aquifer test plan for each aquifer was submitted to and approved by the MDH. The transmissivity values in the ATPs were used as a starting point for refining the model. Those values are referenced above in **Table 5**.

A polygon shapefile was created to differentiate areas of similar and dissimilar hydraulic conductivity values. Hydraulic conductivity zone values were calculated based upon the model layer/aquifer thickness and the transmissivity value calculated for each aquifer. The zones for Layer 3 are depicted in **Figure 8**, Layer 4 in **Figure 9**, and Layer 9 in **Figure 10**.

Porosity

A porosity of 0.056 was used for the OPDC, 0.318 for the CJDN, and 0.233 for the CMTS aquifers.

Aquifer Recharge

The USGS estimates annual recharge rates to surficial materials in the Twin Cities area to range between 3 and 9 inches per year (Delin 2007). The Metro Model 3 (Metropolitan Council, 2014) estimates infiltration using the Soil Water Balance (SWB) model developed by the Metropolitan Council. The aerial average infiltration for a period 1988-2011 was 8.2 inches per year and ranged between 2.7 and 13.0 inches per year. Due to the way that the Metro Model 3 handles this variable and that the aquifers utilized by the City of St. Louis Park are confined and not likely directly affected by recharge/infiltration, the values were not altered from those of the base Metro Model 3.

5.3 Fracture Flow Delineation Method

The Prairie du Chien formation is capable of rapidly transmitting water through its secondary porosity features (fractures and solution cavities) and can transmit water to the underlying Jordan aquifer, an additional delineation effort was required for the Prairie du Chien and Jordan aquifer wells. The Minnesota Department of Health has developed a guidance document and ArcGIS tool to assist in the delineation of the wellhead capture zone in fractured bedrock aquifers. The methodology is outlined in greater detail in *Guidance for Delineating Wellhead Protection Areas in Fractured and Solution-Weathered Bedrock in Minnesota* (MDH 2005).

Three (3) of St. Louis Park's nine (9) active wells are completed at least partially in the fractured Prairie du Chien aquifer. Guidance also requires the assessment of wells completed solely in porous media aquifers that are hydraulically connected to a fractured bedrock aquifer. The City has three (3) wells that are completed only in the Jordan, so these wells were assessed for fracture flow delineation.

St. Louis Park's wells 4, 8, and 10 are multi-aquifer wells, open to both the OPDC and CJDN aquifers. The MODFLOW model allocates flow from each layer based on aquifer properties and well elevations of the well's open interval in the model. The amount of flow from Layer 3 (OPDC) at each of these wells was used to calculate the fracture flow delineation for the PDC-JDN wells. **Appendix G** summarizes the information used in the fracture flow delineations.

Pumping volumes were extracted from the MODFLOW model for wells completed in the Prairie du Chien aquifer for the layer that represents the Prairie du Chien (Layer 3). This value along with the open interval thickness was input into the MDH ArcGIS delineation tool to determine if there was any overlap of capture zones. If there is overlap, additional analysis is completed to account for the volume of water "shared" by each well from the aquifer. There was no overlap of the calculated fixed radius (CFR) delineation of the OPDC wells.

The modified Metro Model 3 model was analyzed to determine the estimated recharge from the PDC into the JDN aquifer across the 10 year delineation areas for the wells completed only in the Jordan aquifer (Wells 14 and 16). Well 15 is no longer in use and was not analyzed for this WHPP Update. The analysis comparing the pumping volume generated by the MODFLOW model to the volume of water pumped by the wells completed in the Jordan aquifer met the 10% contribution threshold indicating that there is a highly leaking setting. The fractured aquifer is a major source of recharge to the Jordan aquifer and fracture flow delineation was completed for the City's Jordan wells. This was done by computing a water balance for the cells within the 10-year capture zone. The value contributed by the PDC was used as the flow value for the Jordan wells. **Appendix G** summarizes this information.

The CFR for Well 16 and Well 8 did overlap. A separate analysis to account for the overlapped volume was completed. The final fracture flow delineation area is represented on **Figure 1**. Summary tables of fracture flow input data and output results are provided in **Appendix G**.

The fracture flow capture zones were added to the area defined by the MODFLOW model and a composite delineation was created. The City's well capture zones can be found on **Figure 1** and the shapefiles can be found in **Appendix E**.

5.4 Results of Model Calibration and Sensitivity Analysis

Model calibration is a procedure that compares the results of a model based on estimated input values to measured or known values. This procedure can be used to define model validity over a range of input values, or it helps determine the level of confidence with which model results may be used. As a matter of practice, groundwater flow models are usually calibrated using water elevation or flux.

Hydraulic conductivity zones were refined while updating the Metro Model 3 during calibration and the sensitivity analysis. **Figures 8, 9, and 10** show the updated hydraulic conductivity zones for model layers 3, 4 and 9, representing the OPDC, CJDN and CMTS aquifers respectively. The calibration results for this model are presented in **Figure 11** and the resulting potentiometric surface depicts groundwater flow direction and gradient. Hydraulic conductivity was the primary variable used to calibrate the model in the local area surrounding St. Louis Park.

Model sensitivity is the amount of change in model results caused by the variation of a particular input parameter. The direction and extent of the modeled capture zone may be sensitive to any of the input parameters:

- The pumping rate directly affects the volume of the aquifer that contributes water to the well. An increase in pumping rate leads to an equivalent increase in the volume of aquifer

within the capture zone, proportional to the porosity of the aquifer materials. However, the pumping rate is based on the results presented in **Table 6** and, therefore, is not a variable factor that will influence the delineation of the WHPA.

- The direction of groundwater flow determines the orientation of the capture area. Variations in the direction of groundwater flow will not affect the size of the capture zone but are important for defining the areas that are the source of water to the well. The potentiometric map that is produced by the refined Metro Model 3 model closely matches that as seen by the calibration points of observed static water level data (**Figures 8, 9, and 10**). Therefore, the direction of groundwater flow should not have a significant effect on WHPA delineation given the current knowledge of hydraulic head distribution in the aquifer.
- A hydraulic gradient of zero produces a circular capture zone, centered on the well. As the hydraulic gradient increases, the capture zone changes into an elliptical shape, with the well centered on the down-gradient focal point. The hydraulic gradient was determined by using water level elevations and contoured by the calibrated Metro Model 3. Generally, the accuracy of the hydraulic gradient determination is directly proportional to the amount of available data that describes the distribution of hydraulic head in the aquifer.
- The aquifer thickness and porosity influence the size and shape of the capture zone. A decrease in either thickness or porosity causes a linear, proportional increase in the areal extent of the capture zone. Aquifer thickness was verified in the area of study based upon boring and geophysical log data. The aquifer thickness in the area of study is relatively well defined, therefore is not a variable that will change to influence the WHPA delineation. A change in porosity will affect the delineation of the WHPA, however, the value used in the model for the aquifers are relatively accepted, and therefore is not a variable that will change to influence the WHPA delineation.
- Aquifer permeability will influence the size and shape of the capture zone. Permeability defines the relative proportions of the capture zone width to length. A decrease in permeability decreases the length of the capture zone and increases the distance to the stagnation point, making the capture zone more circular in shape, centered at the well. The updated hydraulic conductivity zones (**Figures 8, 9, and 10**) appeared to represent the local OPDC, CJDN and CMTS conditions relatively well. During sensitivity analysis, as the K value increased, the capture zone increased slightly. Results of the sensitivity analysis are presented in **Figure 12**. The K values used during the sensitivity analysis are included below in **Table 8**.

Table 8- Sensitivity Analysis Variables

| Model Run Name | Description | Layer | T Value (ft ² /d) | Kh Value (m/day) | Kv Value (m/day) | Results |
|----------------|---------------------------------------------------------------------------------------------------|-------|------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Max T (Khigh) | The maximum T value (based upon pump test analysis) identified in the aquifer test plan was used. | L3 | 13,140 | Zone 1 92.05 Zone 2 241.4 Zone 3 241.4 | Zone 1 0.01 Zone 2 0.23 Zone 3 0.01 | Slight shift in capture zone to the north east. Path lines extend slightly outside of the delineated DWSMA. Note: K zones are depicted in Figures |

| | | | | | | |
|-----------------|---------------------------------------------------------------------------------------------------|----|---------|-------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | L4 | 2,360 | Zone 1 83.7 | Zone 1 0.007 | 8 and 9. |
| Min T (Klow) | The minimum T value (based upon pump test analysis) identified in the aquifer test plan was used. | L3 | 12,990 | Zone 1 59.6 Zone 2 156.3 Zone 3 156.3 | Zone 1 0.007 Zone 2 0.23 Zone 3 0.007 | Slight shift in capture zone to the north east. Path lines extend slightly outside of the delineated DWSMA. Note: K zones are depicted in Figures 8 and 9. |
| | | L4 | 2,510 | Zone 1 83.7 | Zone 1 0.007 | |
| K10x | The minimum T value (based upon pump test analysis) identified in the aquifer test plan was used. | L3 | 131,000 | Zone 1 293.3 Zone 2 320.3 Zone 3 353.3 | Zone 1 29.3 Zone 2 32.0 Zone 3 35.3 | Dramatic increase in capture zone to the north west. Path lines extend well outside of the delineated DWSMA. Note: K zones are depicted in Figures 8 and 9. |
| | | L4 | 24,000 | Zone 1 88.8 | Zone 1 8.88 | |

6.0 Delineation of the Drinking Water Supply Management Area

Boundaries used to delineate the Drinking Water Supply Management Area (DWSMA) are described above in Section 3.2. The DWSMA boundaries were defined using the following features (**Figure 1**):

- Road centerlines,
- public land surveys (including township, range, section, and ¼ section boundaries), and
- property lines (Hennepin County parcel data).

A GIS shapefile of the DWSMA is provided in **Appendix D**.

7.0 Vulnerability Assessments

The Part I wellhead protection plan includes the vulnerability assessments for the public water supply wells and the DWSMA. These vulnerability assessments are used to help define potential contamination sources within the DWSMA and to select appropriate measures for reducing the risk that they present to the public water supply.

7.1 Assessment of Well Vulnerability

The vulnerability assessment for each well used by the public water supplier is listed in **Table 1** and is based upon the following conditions:

- 1) Well construction meets current state Well Code specifications (Minnesota Rules, part 4725) and the well itself does not provide a pathway for contaminants to enter the aquifer used by the public water supplier;
- 2) The geologic conditions at the well site include a cover of geologic materials over the aquifer that is sufficient to retard or prevent the vertical movement of contaminants;
- 3) None of the human-caused contaminants regulated under the federal Safe Drinking Water Act have been detected at levels indicating that the well itself serves to draw contaminants into the aquifer as a result of pumping.
- 4) Tritium analysis of water from each well.

Results of the well vulnerability analysis – The MDH Source Water Protection (SWP) Vulnerability rating for St. Louis Park’s municipal wells determined Wells 8, 11, 12, and 13 to be not vulnerable and Wells 3, 4, 6, 10, 14, 15, and 16 to be vulnerable. In general, the wells identified as not vulnerable were the three Mt. Simon wells and Well 8 which did not have any detections of tritium or nitrate, a very low geologic sensitivity to pollution, and an L-Score of 10. These L-scores and sensitivity ratings are based upon the overlying surficial geology and the presence of any protective confining units. The wells identified as vulnerable may have a low geologic sensitivity and high L-score, however the vulnerability was overridden because the well water either had a detection of tritium or a nearby well within the same aquifer had a detection of tritium. The MDH scoring sheets are presented as **Appendix F**.

7.2 Assessment of Drinking Water Supply Management Area Vulnerability

The vulnerability of the DWSMA is shown in **Figure 11** and is based upon the following information:

Boring logs available for wells within both DWSMAs were reviewed for the presence of clay thicknesses. Geologic cross-sections were developed and are included as **Figures 5 and 6**.

MDH guidance (MDH, 1997) was followed in determining the DWSMA vulnerability. L-scores were provided by MDH staff and calculated based upon DNR geologic sensitivity guidelines for wells within the DWSMA that extended to the OPDC-OJDN. Geologic Sensitivities were also determined for each of those wells. In addition, the following criteria, incorporating available tritium data, were used to determine the vulnerability of the City’s DWSMA:

- 1) Areas of very low geologic sensitivity but tritium present should be of low vulnerability;
- 2) Areas of low geologic sensitivity but tritium present should be of moderate vulnerability; and
- 3) Areas of moderate geologic sensitivity but tritium present should be of high vulnerability.

A review of the geologic logs contained in the CWI database and geological maps and reports indicate that the OPDC and CJDN aquifers exhibit a low to moderate geologic sensitivity within the DWSMA. Boring logs available for wells within the DWSMA were reviewed for the presence of clay thicknesses and L-scores calculated.

8.0 Recommendations

The following plan implementation action item recommendations have been made for the Public Water Supplier to consider. Each recommendation is referenced to the plan implementation category under which it can be incorporated. Each recommendation will be further evaluated during the preparation of the Part II WHP Plan Update.

Plan Implementation Category – Data Collection

Item 1 – Work Cooperatively with Neighboring Municipalities Regarding Wellhead Protection

The DWSMA that was delineated as part of this project extends beyond the St. Louis Park municipal boundaries. While developing and implementing Part II of the City's WHPP, it is recommended that the City of St. Louis Park collaborate and cooperate with municipalities in which the City's DWSMA extends to. As the City cannot dictate landuse activities outside of its jurisdiction, it can work closely with surrounding municipalities as landuses change and decisions are made that may impact the City's water supply.

Item 2 – Work Cooperatively with Neighboring Stakeholder Groups and Local Governmental Units

There are many stakeholders and local governmental units (LGUs) that may be found within the City's DWSMA boundary. It is recommended that as the City and/or LGUs plan to make changes that may affect landuse within the DWSMA boundary, that attempts be made to work collaboratively together to meet each of their needs and/or goals.

Item 3 - Addressing deficiencies in the distribution and quality of subsurface geologic and hydrologic information.

The direction of groundwater flow and the hydraulic gradient used to determine the capture zones for the water supply wells are based on information from a limited number of water well, observation well, and well sealing records. The direction of groundwater flow determines the orientation of the capture zone and the hydraulic gradient affects the length of the capture zone. Generally, the accuracy of the flow direction and hydraulic gradient determination are directly proportional to the amount and quality of subsurface information. The MDH and the Public Water Supplier should continue to verify the locations of wells, sealed wells, and other borings that are constructed within a two-mile radius of the DWSMA as part of the process for amending the WHP plan. Additional subsurface information will provide insight into whether modifications to the delineation of the WHPA and the assessment of DWSMA vulnerability are warranted under the next plan amendment process.

Plan Implementation Category – Contingency Planning

Item 4 - Addressing the potential movement of contamination toward the community well(s).

The MDH recommends that if contaminants are ever detected in a municipal water supply well, the Public Water Supplier work with the MDH to perform an evaluation of whether to continue pumping the impacted well(s). Turning off a well may alter the movement of contamination to other pumping wells and compound the problem. Therefore, it is very important to include this recommendation in the Part II contingency plan.

9.0 Standard of Care

The interpretations presented in this report are based on local data collected during this study and previous studies, such as current and historical pumping tests and regional data collected from governmental agencies. Data collected and analyzed by others and used in this report may not be precise or accurate. This Plan does not account for any variations that may occur between points of exploration; geologic and hydrogeologic conditions likely differ across the study area. Also, it must be noted that seasonal and cyclical fluctuations in the hydrogeologic characteristics and properties of the aquifers will occur.

The scope of this report and the corresponding groundwater flow model and calculations is limited to the delineation of capture zones for the St. Louis Park municipal wells. Use of the groundwater flow model by other parties or for other purposes is not advised. Use or modification of the model for purposes other than the delineation of capture zones must be done with caution and a full understanding of the inherent assumptions and limitations of the data.

This Plan represents our understanding of the significant aspects of the local geologic and hydrogeologic conditions; the conclusions are based on our hydrogeologic and engineering judgment, understanding and perspective, and represent our professional opinions. These opinions were arrived at in accordance with the currently accepted standard of care for geologic and engineering practices at this time and location. No warranty is implied or intended.

10.0 Selected References

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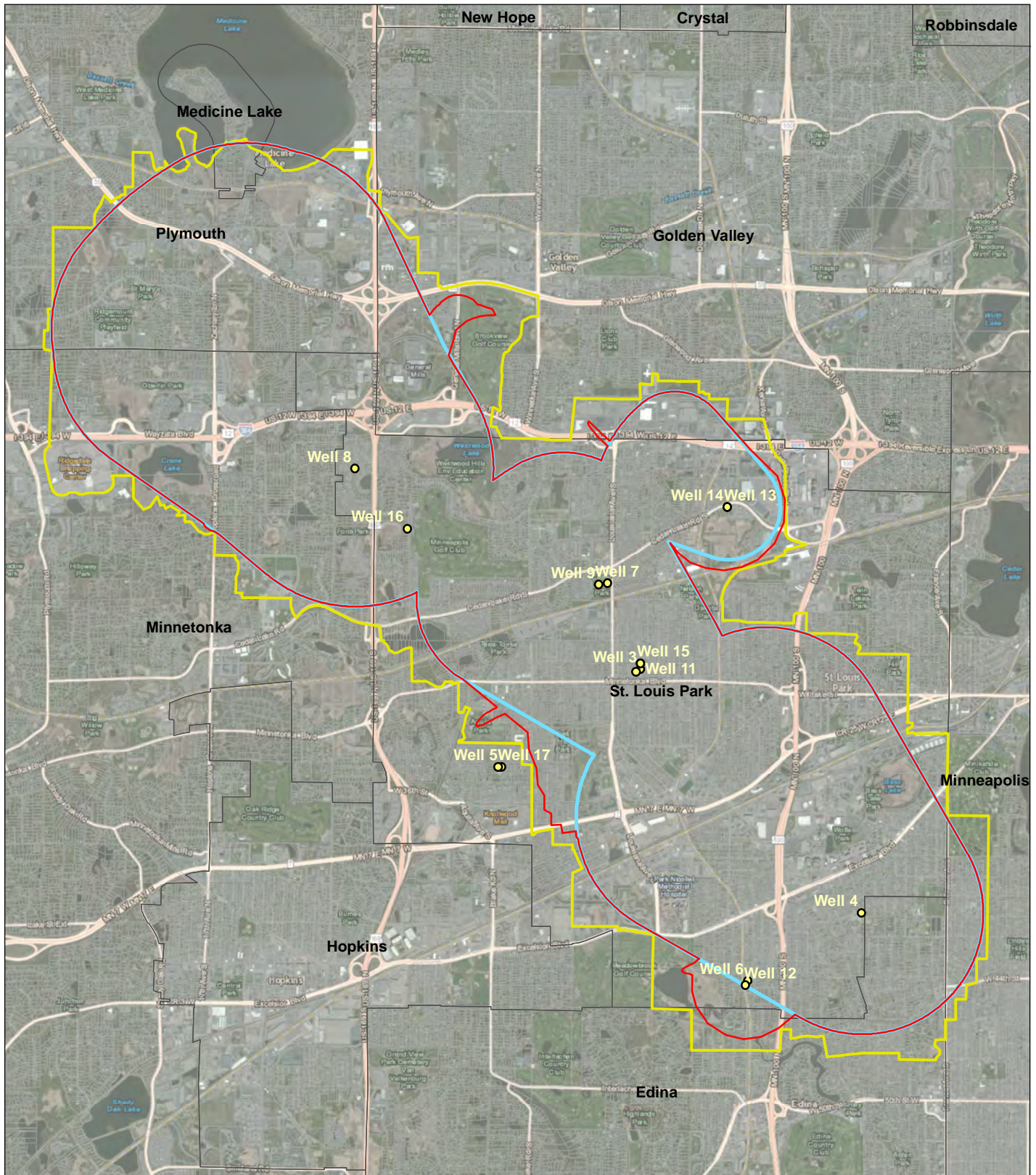
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Legend

- Municipal Wells
- Municipal Boundary
- Parcels
- WHPA (10-Yr)

- DWSMA
- Fracture Flow Delineation (10-Yr)

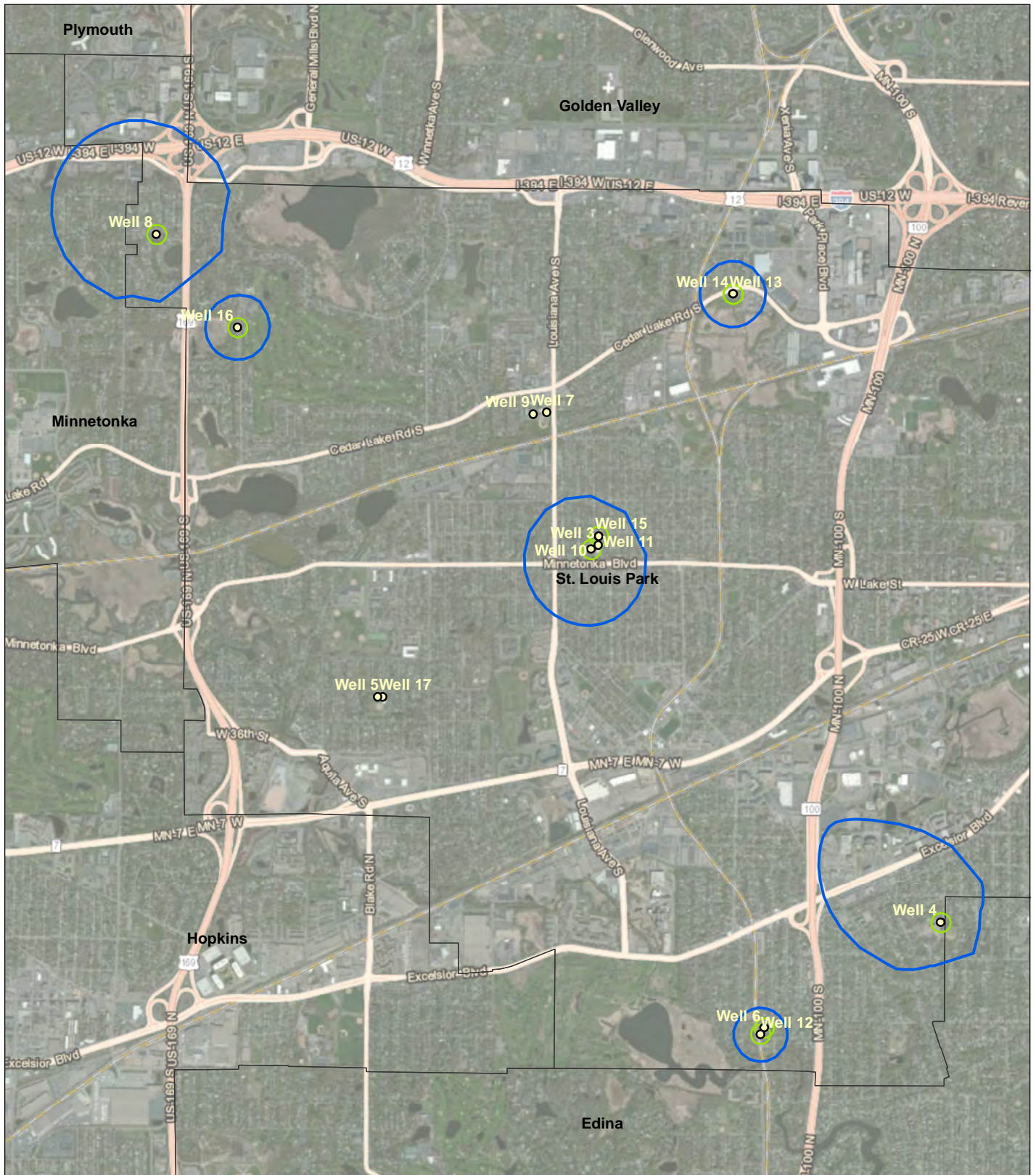


0 375 750 1,500 2,250 Meters

Figure 1






WHPA and DWSMA

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Legend

-  Municipal Wells
-  Fracture Flow Delineation (1-Yr)
-  Municipal Boundary
-  ERA (1-Yr)
-  IWMZ

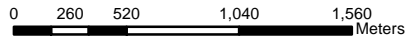
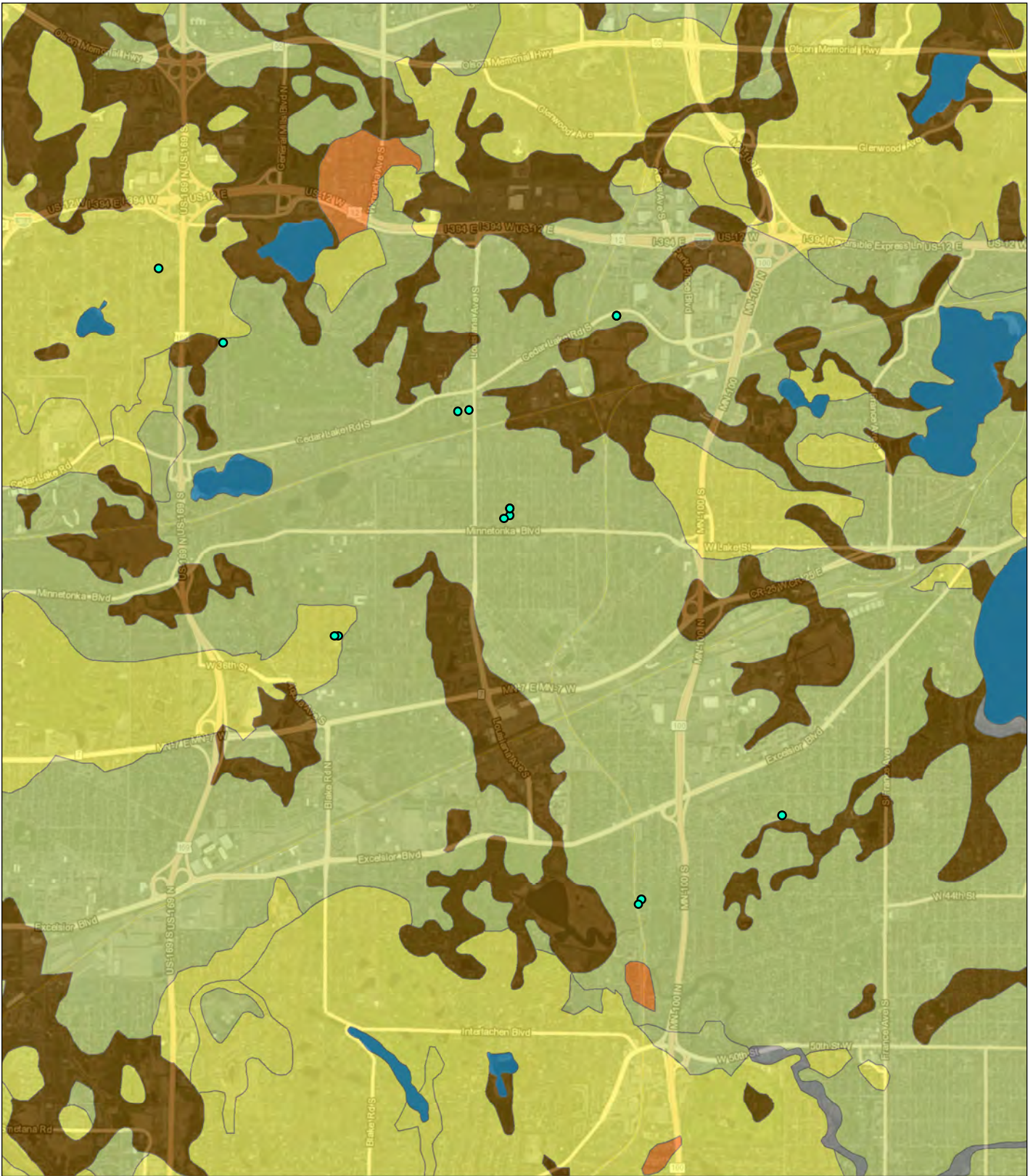


Figure 2







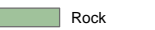
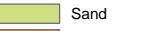

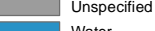
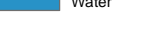
Emergency Response Areas and Inner Wellhead Management Zones

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Legend

- | | |
|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
|  Rock |  Municipal Wells |
|  Boulders |  DWSSMA |
|  Clay | |
|  Diamicton | |
|  Sand | |
|  Silt | |
|  Unspecified | |
|  Organic | |
|  Water | |

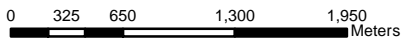
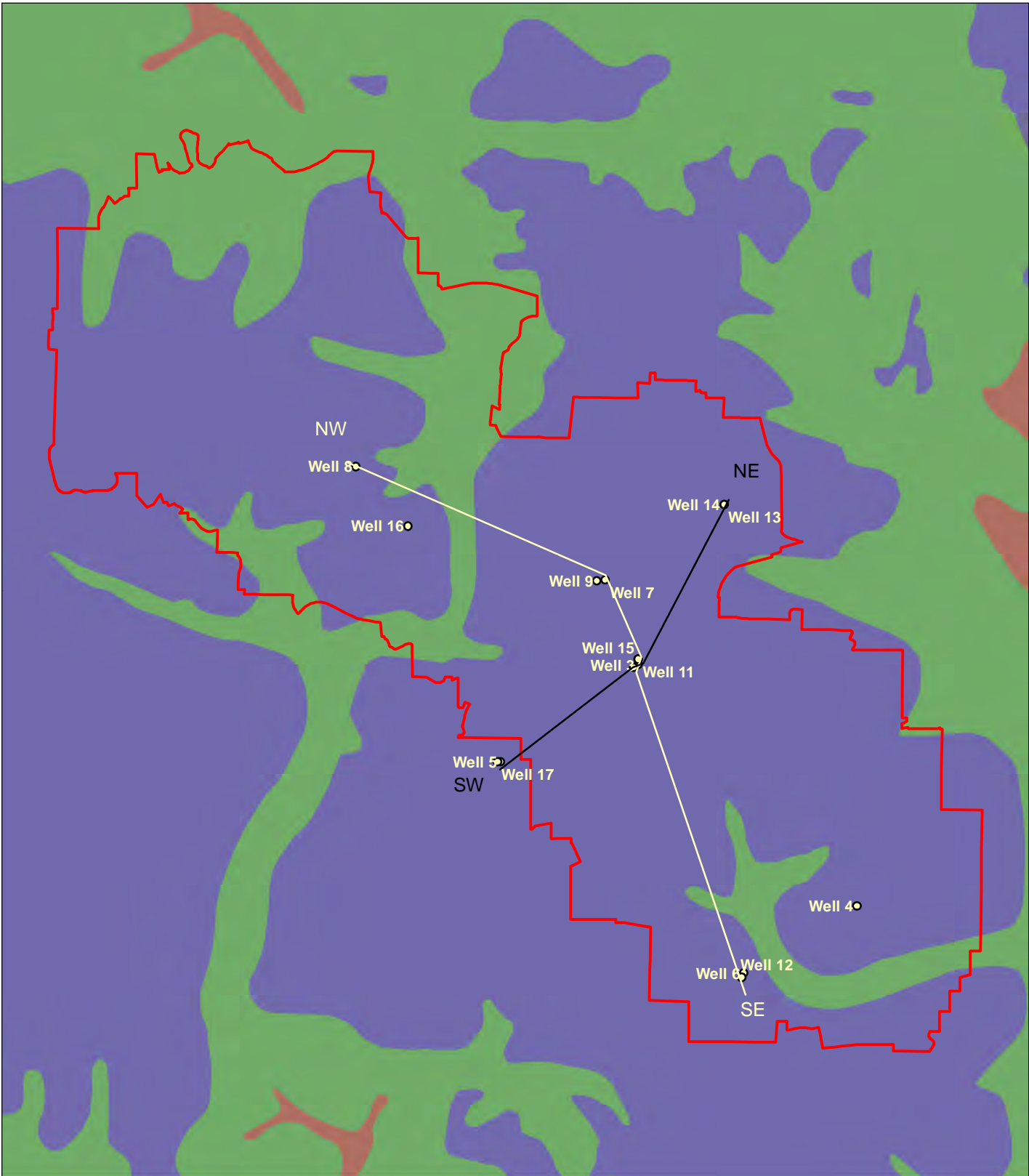


Figure 3

Surficial Geology

St. Louis Park Wellhead Protection Plan



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Legend

- Platteville-Glenwood
- St. Peter
- Prairie du Chein Group
- Jordan
- St. Lawrence Formation
- Franconia-Ironton-Galesville
- Eau Claire Formation

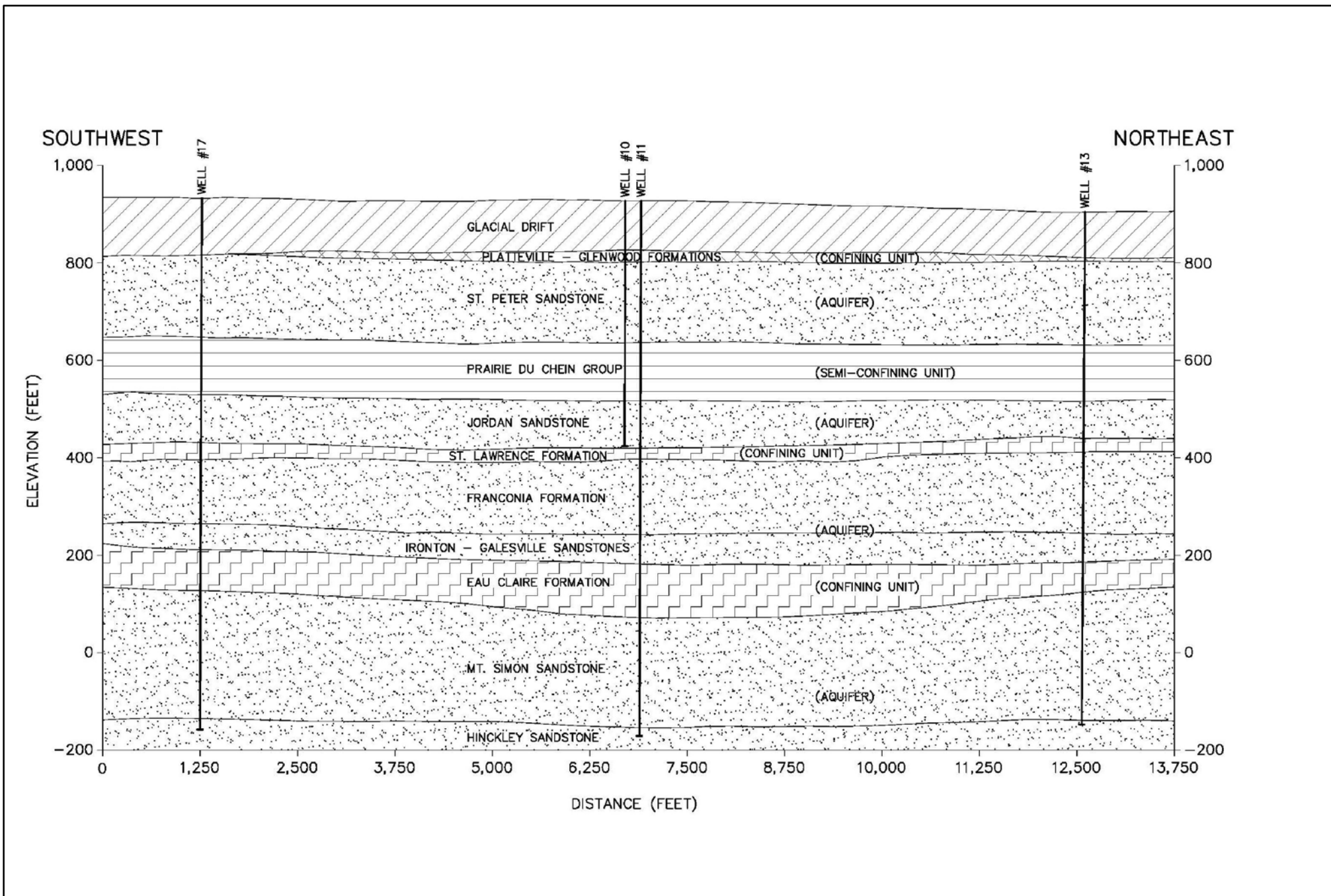
- DWSMA
- Municipal Wells



0 335 670 1,340 2,010 Meters

Figure 4
 Bedrock
 Geology

St. Louis Park Wellhead
 Protection Plan

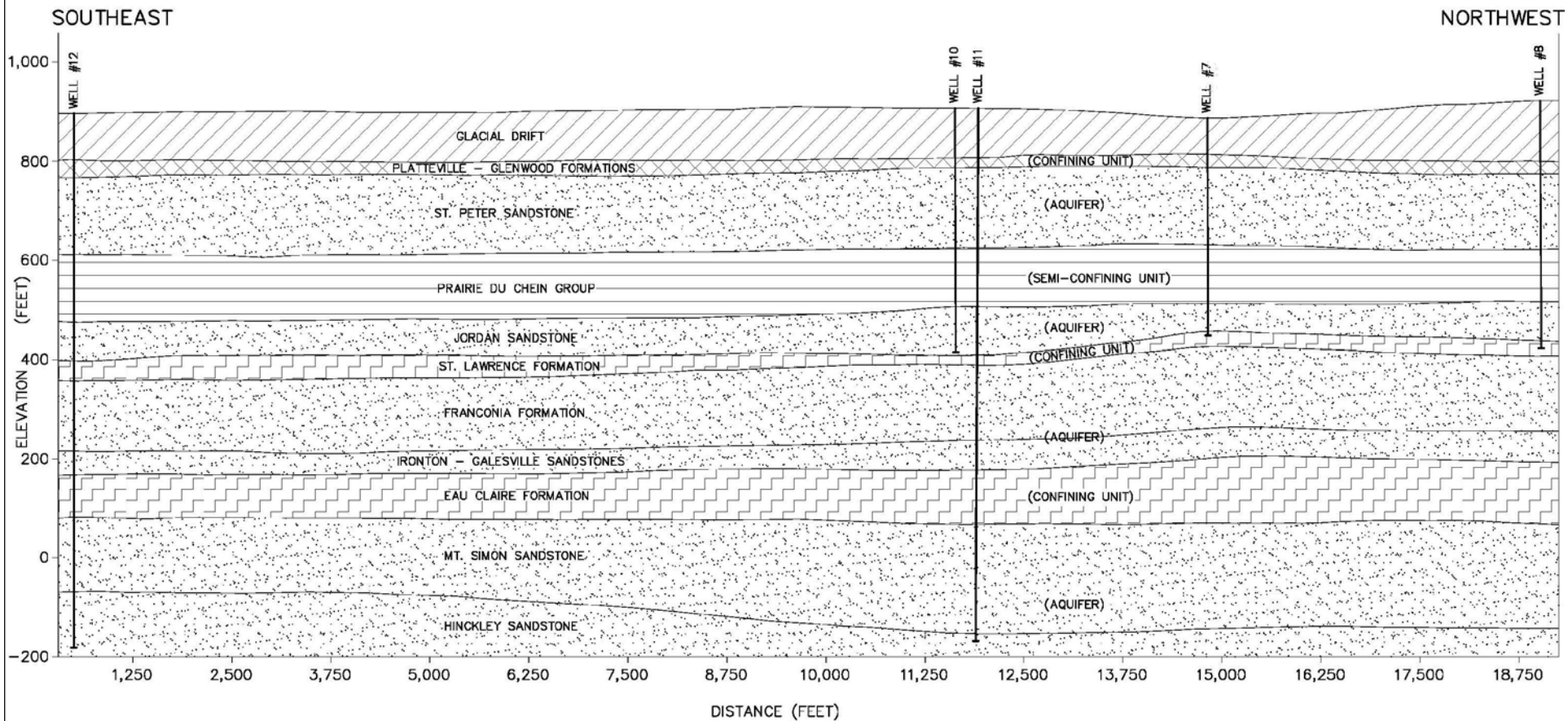


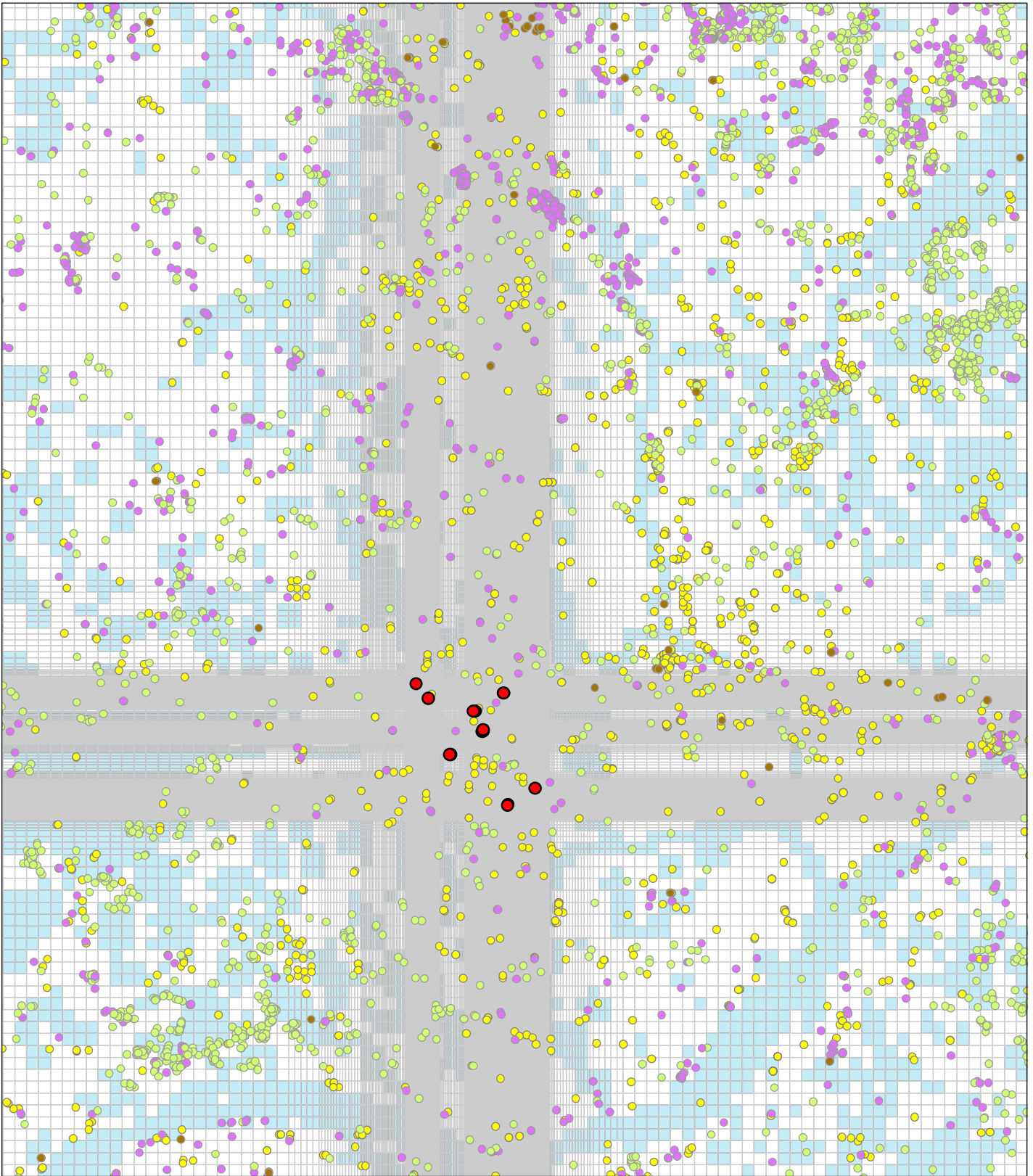
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Generalized Cross Section
SW - NE

Figure 5

St. Louis Park Wellhead Protection Plan





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Legend

Calibration Targets (Layer)

- 3
- 4
- 9
- High Capacity Wells

- Municipal Wells
- Model Grid
- River Boundaries

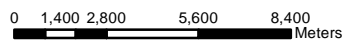
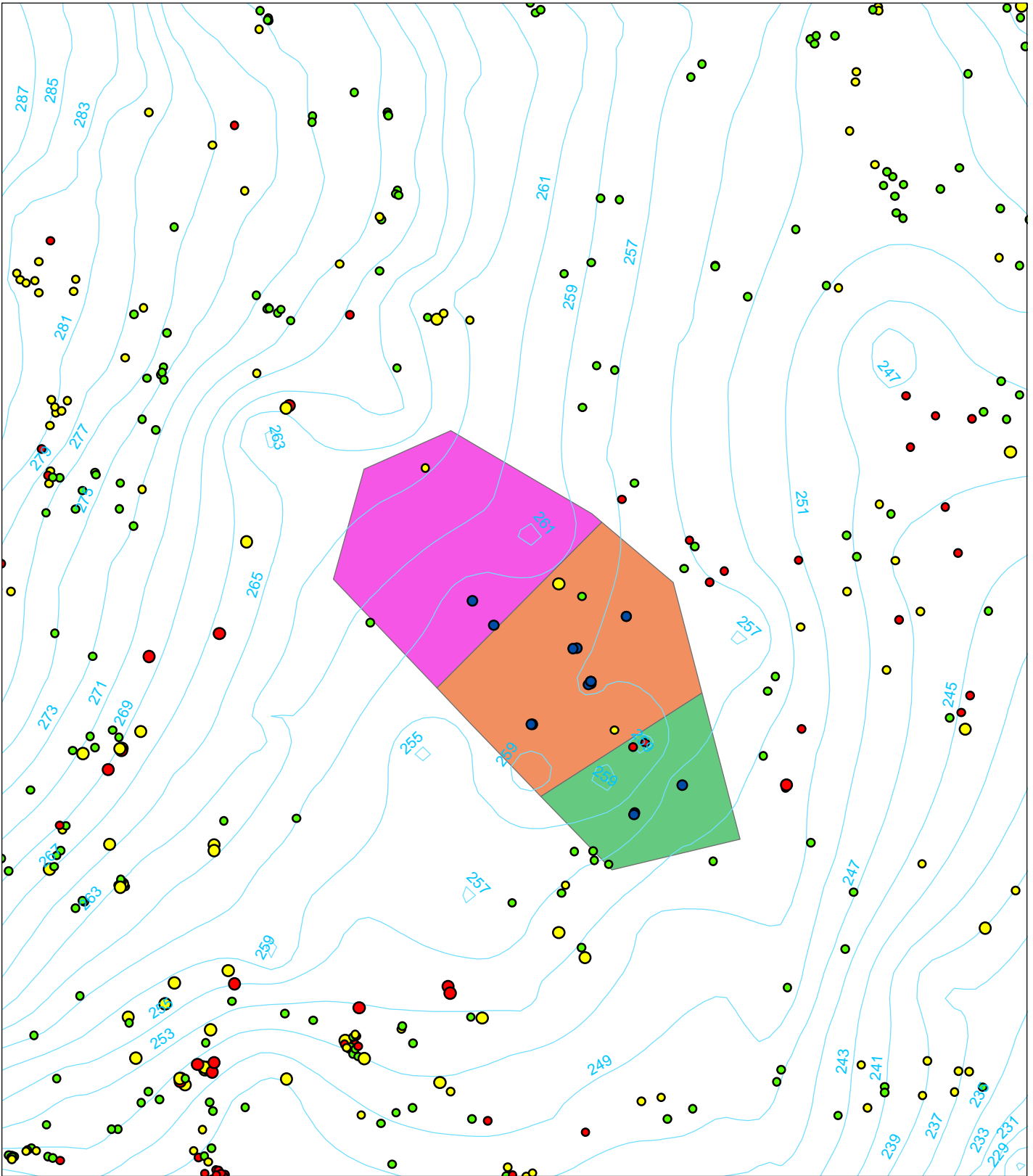


Figure 7

Model Boundary
 Conditions

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 Protection Plan



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Legend

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> ● -54 - -10 ● -9 - -5 ● -4 - 5 ● 6 - 10 ● 11 - 40 | <ul style="list-style-type: none"> ● Municipal Wells — Layer 3 Contours (m) |
| <p>Layer 3 Kh (m/d)</p> <ul style="list-style-type: none"> ■ 29.33 ■ 32.03 ■ 35.33 | |

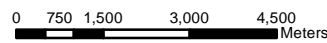
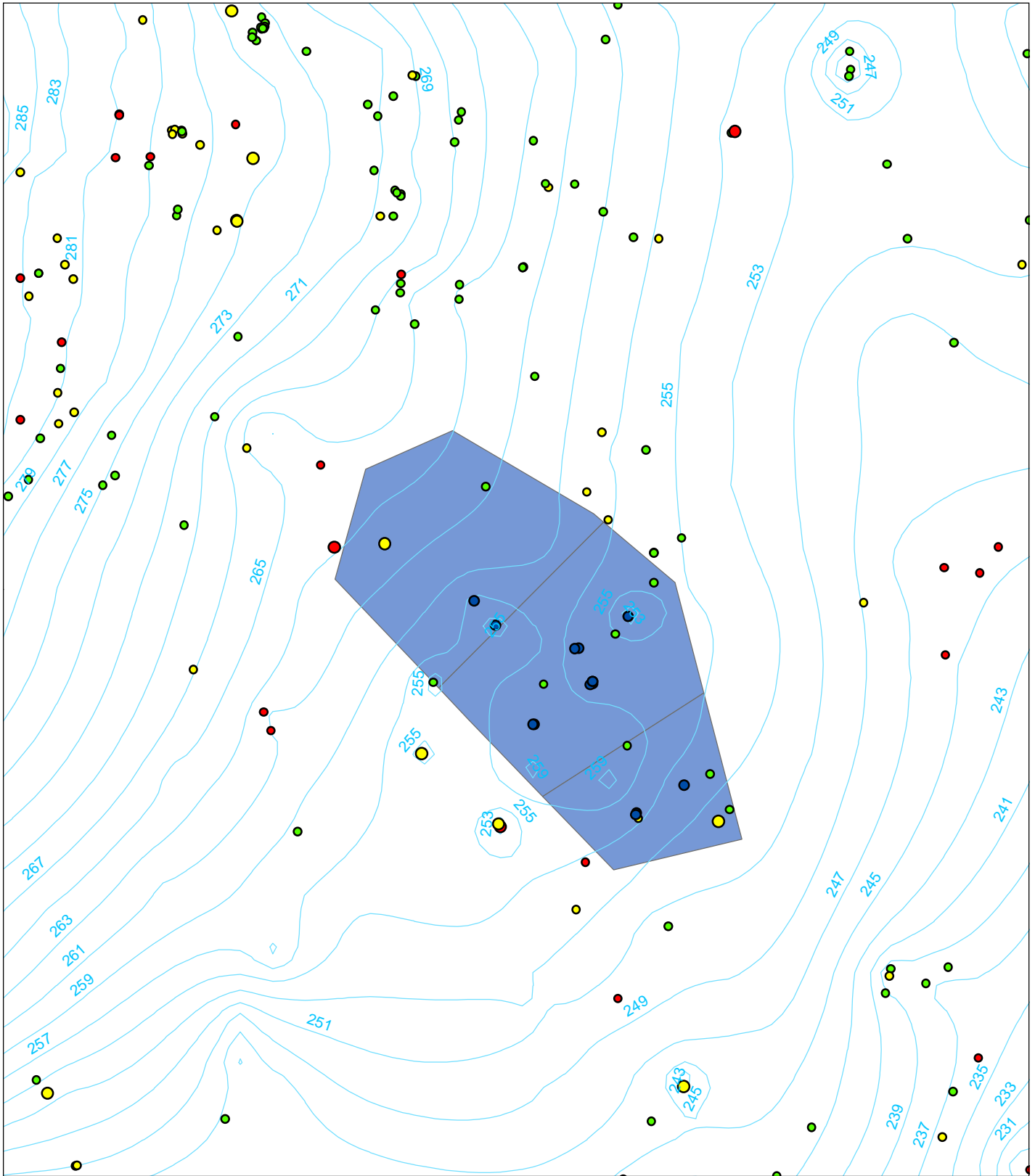


Figure 8

Layer 3 Results

St. Louis Park Wellhead Protection Plan



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Legend

Residual

- -54 - -10
- -9 - -5
- -4 - 5
- 6 - 10
- 11 - 40

Layer 4 Kh (m/d)

- 8.88
- Layer 4 Contours (m)
- Municipal Wells

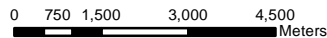
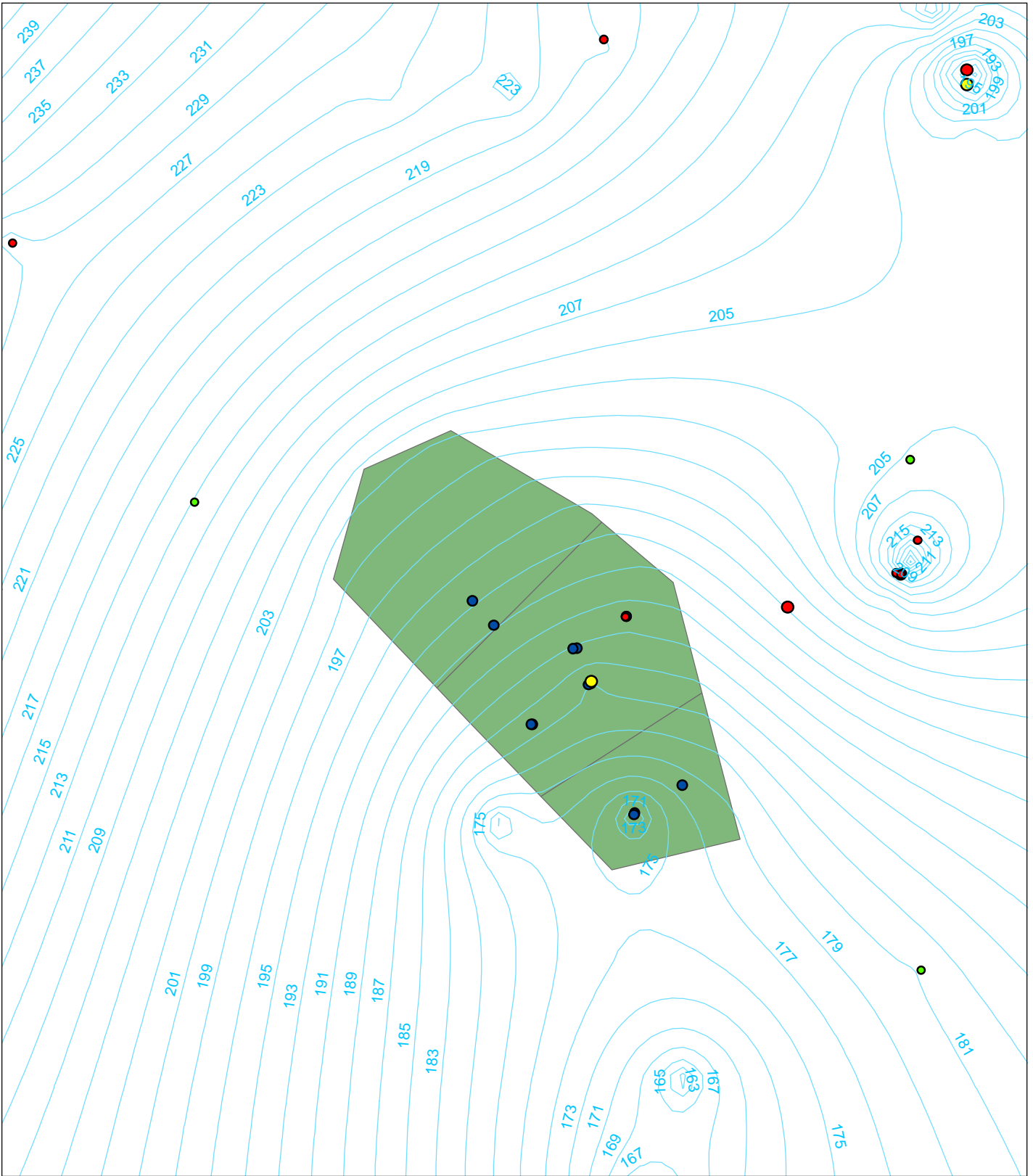


Figure 9

Layer 4
 Results

St. Louis Park Wellhead
 Protection Plan



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Legend

- | | |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------|
| ● -54 - -10 | ● Municipal Wells |
| ● -9 - -5 | — Layer 9 Contours (m) |
| ● -4 - 5 | Layer 9 Kh (m/d) |
| ● 6 - 10 | 3.05 |
| ● 11 - 40 | |

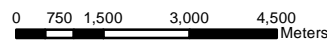
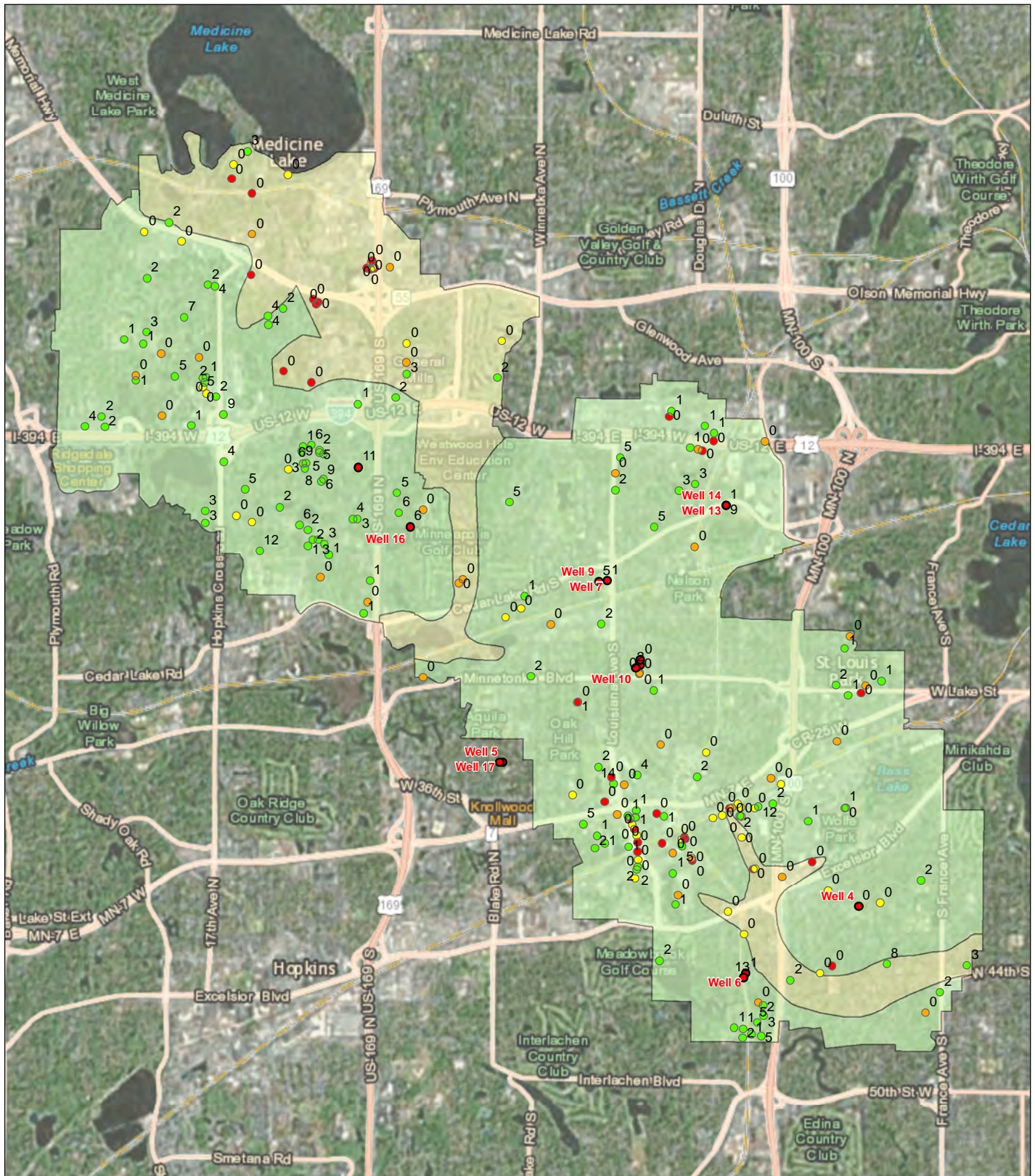


Figure 10

Layer 9
 Results

St. Louis Park Wellhead
 Protection Plan



www.sourcewater-solutions.com
 Phone: (612) 701.7343

Legend

Geologic Sensitivity

- Very High
- High
- Moderate
- Low
- Very Low

● Municipal Wells

○ L-Score

Vulnerability

- Moderate
- Low

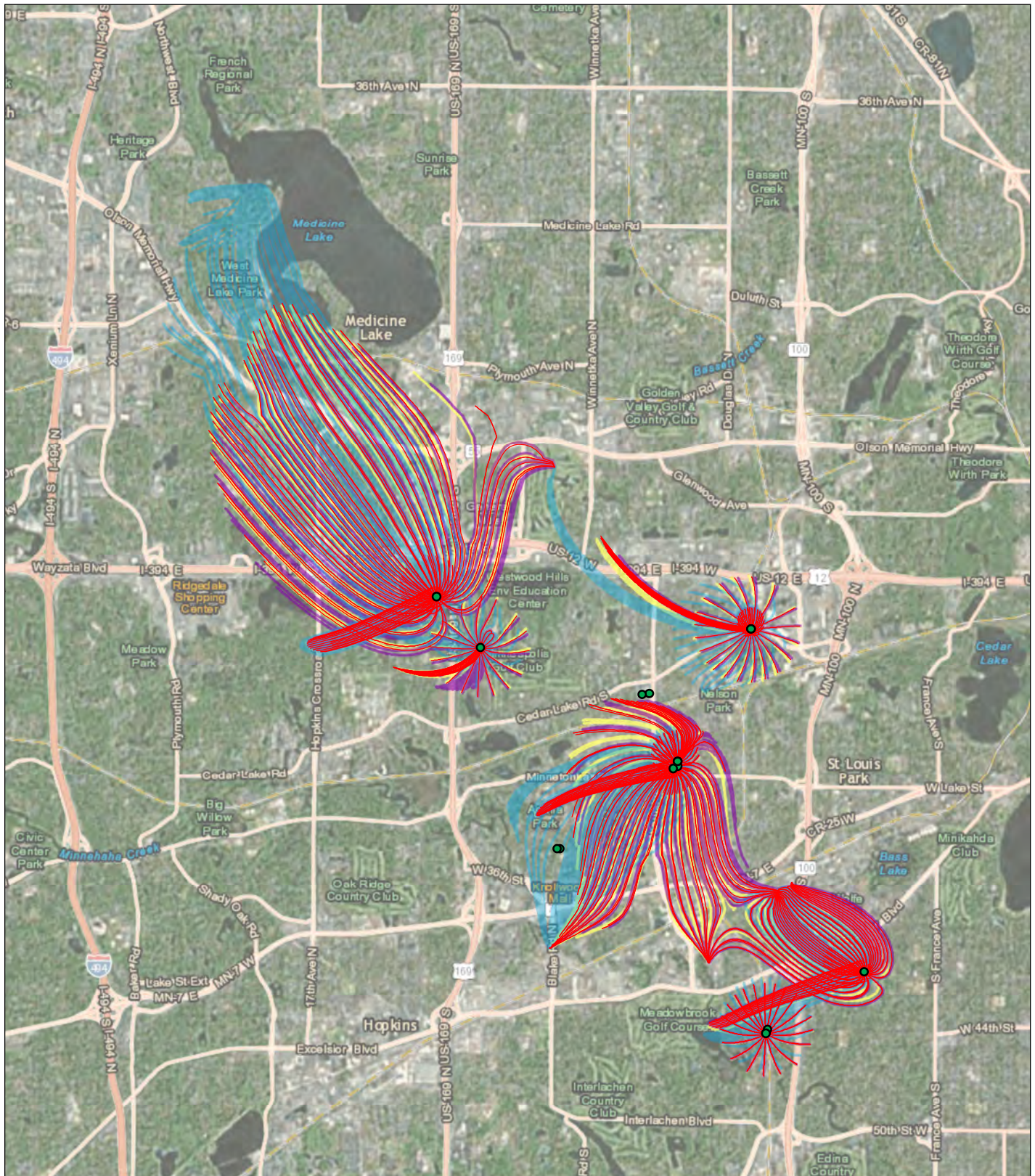


0 337.5 675 1,350 2,025 Meters

Figure 11

DWSMA
 Vulnerability

St. Louis Park Wellhead
 Protection Plan



Phone: (612) 701-7343
www.sourcewater-solutions.com

Legend

- Municipal Wells
- Modeled 10 Yr. Capture Zone
- K10x 10yr Capture Zone
- Klow 10yr Capture Zone
- Khigh 10yr Capture Zone



0 260 520 1,040 1,560 Meters

Figure 12

Sensitivity Analysis Results
 St. Louis Park Wellhead Protection Plan

Appendix A

Scoping Decision Notice



Protecting, maintaining and improving the health of all Minnesotans

August 23, 2013

Mr. Jay Hall, Utility Superintendent
City of St. Louis Park
Municipal Service Center
7305 Oxford Street
St. Louis Park, Minnesota 55426-4512

Dear Mr. Hall:

Subject: **Scoping Decision Notice No. 1 for the City of Saint Louis Park, PWSID 1270050, for Amending the Wellhead Protection Plan**

This letter provides notice of the results of the Scoping 1 meeting that Amal Djerrari and John Freitag (Minnesota Department of Health) held with you and Mark Hanson (city of Saint Louis Park) on July 24, 2013, to amend your wellhead protection plan. During the meeting, we discussed the preparation of Part I of a Wellhead Protection Plan that will document the 1) delineation of a wellhead protection area, 2) delineation of a drinking water supply management area, and 3) assessments of well and aquifer vulnerability related to these areas for the primary water supply wells that are used by the city of St. Louis Park. As you may remember, the wellhead protection area is the surface and subsurface area surrounding your public water supply wells through which contaminants are likely to move and affect your drinking water supply. The drinking water supply management area is the area delineated using identifiable landmarks that reflect the wellhead protection area boundaries as closely as possible.

It is our understanding that the city also retains Well 6 (206457) for emergency standby use. The city must manage an inner wellhead management zone that is defined by a 200-foot radius around each emergency standby well. A wellhead protection area is not defined for this well because the well only pumps during emergency water needs. The city also has four out long term wells [Well 5 (203196), Well 7 (206436), Well 9 (206437), and Well 17 (147459)]. No wellhead protection area is defined for these wells because the wells are not supposed to pump. We recommend sealing those wells if they are not in use anymore.

The city will have until April 22, 2016, to submit the amendment of its entire Wellhead Protection Plan, Part I and Part II. The Minnesota Department of Health (MDH) highly recommends that half of the time allotted be dedicated to completing Part II of the plan.

It is our understanding that you will be contracting a consultant to prepare the delineations and vulnerability assessments for the city for amending its Wellhead Protection Plan. MDH has a draft Request for Proposal (RFP) that can be used to help select a consultant that has experience in wellhead protection planning and, in particular, with preparing a Part I report. Please contact me at the phone number below if you want to discuss using the draft RFP.

Mr. Jay Hall
Page 2
August 23, 2013

At our meeting, we discussed rule requirements and the types of information needed to amend the Part I report. The Wellhead Protection Plan must be prepared in accordance with Minnesota Rules, parts 4720.5100 to 4720.5590. General wellhead protection requirements and criteria for delineating the wellhead protection area and data reporting are presented in Minnesota Rules, parts 4720.5500 to 4720.5510.

The enclosed Scoping Decision Notice No. 1 formally identifies the information the city must provide to MDH to meet rule requirements for amending and preparing Part I of the Wellhead Protection Plan. The wellhead rule refers to the existing information required for wellhead planning as data elements. Much of this information is available in the public domain, as described in the Scoping Decision Notice No. 1 form.

You only need to provide the information that is not in the public domain and, therefore, not available to MDH. The Scoping Decision Notice No. 1 form also 1) lists the Minnesota unique well number and well construction for each well that will be included in the Wellhead Protection Plan [Table 1]; 2) lists the pumping volumes for each well [Table 2]; and 3) includes a map of the well locations. A summary of the information that the PWS needs to provide is included at the end of the Scoping Decision Notice No. 1 form.

After we have had an opportunity to review the information listed in the Scoping Decision Notice No. 1 that you will be providing to MDH, we would appreciate the opportunity to again meet with you and select the appropriate method for delineating your wellhead protection area. We will also discuss how you can become involved in the preparation of amending the Part I report.

After your consultant has had an opportunity to develop a conceptual model of the local hydrogeologic setting, we would like to meet with your consultant to discuss the proposed delineation approach. This pre-delineation meeting may be accomplished by a conference call if 1) MDH approves, and 2) the consultant provides figures for the discussion beforehand. The porous media delineation could be performed using either new Metro Model that Barr Engineering developed for the Metro Council. Local detail and/or new information should be added as required and recalibration should be performed to reflect the hydrogeological conditions in Hennepin County.

A fracture flow delineation is necessary for Well 4 (200542), Well 6 (206457), Well 8 (203678) and Well 10 (206442), which are open to both the Prairie du Chien dolomite and Jordan sandstone.

Finally, it is our understanding that you will serve officially as the wellhead protection manager on behalf of the city. You are responsible for providing written notice to local units of government of the city's intent to amend the Wellhead Protection Plan, as required by the wellhead protection rule (part 4720.5300, subpart 3). A copy of this notice should be forwarded to MDH and must include a list of the city's wells, their unique well numbers, and contact information for you as Wellhead Protection manager. If you do not have a copy of your original notice from your previous WHP Plan, your Source Water Protection Unit Planner, John Freitag, can provide you with some examples of the notification of intent that other communities have used. Please contact him at 612/201-4669.

Mr. Jay Hall
Page 3
August 23, 2013

In closing, we look forward to working with you on amending your Wellhead Protection Plan. If you have any questions regarding our comments, please contact me at 651/201-4577 or at amal.djerrari@state.mn.us.

Sincerely,



Amal Djerrari, Hydrologist
Source Water Protection Unit
Environmental Health Division
P.O. Box 64975
St. Paul, Minnesota 55164-0975

AMD:ds-b

Enclosures: Scoping Decision Notice No. 1, Summary of Data Requested, Table 1 - Public Water Supply Well Information, Table 2 - Annual Volume of Water Pumped From PWS Wells, Table 3 - Permitted High-Capacity Wells, Map of Well Locations

cc: John Freitag, Source Water Protection Unit, St. Paul Office
Byron Adams, Water Monitoring Section, Minnesota Pollution Control Agency
Joe Richter, Division of Waters, Minnesota Department of Natural Resources
Ron Struss, Minnesota Department of Agriculture
Eric Mohring, Board of Water and Soil Resources
Mark Hanson, City of Saint Louis Park

SCOPING DECISION NOTICE No. 1 (Vulnerable Setting)

The purpose for the first Scoping Meeting, as required by Minnesota Rules, part 4720.5310, is to discuss the information necessary for preparing the Part I Report of a Wellhead Protection Plan. The Part I Report identifies the area that provides the source of drinking water for the public water supply (PWS) so that the PWS can develop land use or management practices to protect their groundwater resource from contamination. Specifically, the Part I Report documents the delineation of the wellhead protection area (WHPA), the delineation of the drinking water supply management area (DWSMA), and assesses the vulnerability of the PWS wells and DWSMA.

The wellhead rule (Minnesota Rules, part 4720.5310) refers to the information required for wellhead planning as data elements. This form lists the data elements stated in Minnesota Rules, part 4750.5400. The Minnesota Department of Health (MDH) uses this form to designate which data elements are needed to prepare the Part I Report, based on the hydrogeological setting, vulnerability of the wells, and aquifer information known at the time of the Scoping 1 Meeting.

| | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------------|
| Name of Public Water Supply | | Date |
| City of Saint Louis Park (PWSID = 1270010) | | August 23, 2013 |
| Name of the Wellhead Protection Manager | | |
| Mr. Jay Hall, Utility Superintendent | | |
| Address | City | Zip |
| 7305 Oxford Street | Saint Louis Park | 55426-4512 |
| Unique Well Numbers | | Phone |
| 206440 (Well 3), 200542 (Well 4), 203196 (Well 5), 206457 (Well 6-Emergency)*, 206436 (Well 7), 203678 (Well 8), 206437 (Well 9), 206442 (Well 10), 206439 (Well 11), 206456 (Well 12), 206424 (Well 13), 227965 (Well 14), 215447 (Well 15), 203187 (Well 16), 147459 (Well 17). | | 952/924-2557 |

*Emergency wells only use the IWMZ Form for data collection

Instructions for Completing the Scoping No. 1 Form

| | | | | |
|----------|----------|----------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N | D | V | S | N = If this box is checked with an "X," this data element is NOT necessary for the Part I Report of your Wellhead Protection Plan. This data element may be identified later at the Scoping 2 Meeting and used for the Part 2 Report. Please go to the next data element. |
| X | | | | |

| | | | | |
|----------|----------|----------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N | D | V | S | D = If this box is checked with an "X," the preparer of the Part I Report is required to use this information for the DELINEATION of the WHPA or the DWSMA. If there is no check in the "S" box, this information is available in the public domain or is at MDH. |
| | X | | | |

| | | | | |
|----------|----------|----------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N | D | V | S | V = If this box is checked with an "X," the preparer of the Part I Report is required to use this information for the VULNERABILITY assessment of the PWS well(s) or the DWSMA. If there is no check in the "S" box, this information is available in the public domain or is on file at MDH. |
| | | X | | |

| | | | | |
|----------|----------|----------|----------|------------------------------------------------------------------------------------------------|
| N | D | V | S | S = If this box is checked with an "X," the PWS must SUBMIT the information to the MDH. |
| | | | X | |

DATA ELEMENTS ABOUT THE PHYSICAL ENVIRONMENT

| A. PRECIPITATION | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N | D | V | S | A.1: An existing map or list of local precipitation gauging stations. |
| | X | | | |
| Technical Assistance Comments: Precipitation values can be used to determine the local recharge in the groundwater model. The map can be used to determine the closest gauging station. The locations of the gauging stations are available in the public domain. | | | | |
| N | D | V | S | A.2: An existing table showing the average monthly and annual precipitation, in inches, for the preceding five years. |
| | X | | X | |
| Technical Assistance Comments: This information may be used for determining local recharge for the groundwater model. This information may be available in the public domain if there is a local gauging station, or obtained from the local wastewater treatment plant. | | | | |
| B. GEOLOGY | | | | |
| N | D | V | S | B.1: An existing geologic map and a description of the geology, including aquifers, confining layers, recharge areas, discharge areas, sensitive areas as defined in Minnesota Statutes, section 103H.005, subdivision 13, and groundwater flow characteristics. |
| | X | X | X | |
| Technical Assistance Comments: Information of this type is required to characterize the geologic and hydrogeologic setting of the PWS well field(s). This information is used to define aquifer geometry, location and magnitude of the recharge and discharge areas, and groundwater flow information. Aquifer tests or alternatives listed in MN Rules, part 4720.5510, subpart 6, can be used to help characterize flow in the aquifer. Reference all information used to develop the conceptual model of the geologic setting and submit to MDH only the information that is not available in the public domain. | | | | |
| N | D | V | S | B.2: Existing records of the geologic materials penetrated by wells, borings, exploration test holes, or excavations, including those submitted to the department. |
| | X | X | X | |
| Technical Assistance Comments: Information of this type may be useful to refine the understanding of the geologic and hydrogeologic setting on a local basis. Submit only if the PWS or city has information of test drilling or site investigations conducted by the city that is not available in the public domain. | | | | |
| N | D | V | S | B.3: Existing borehole geophysical records from wells, borings, and exploration test holes. |
| | X | X | X | |
| Technical Assistance Comments: Information from geophysical records may provide additional information about aquifer thickness, well construction, and water level information at a local scale. Submit only if the information is not available in the public domain. | | | | |
| N | D | V | S | B.4: Existing surface geophysical studies. |
| | X | X | X | |
| Technical Assistance Comments: Information from geophysical studies may be useful to refine the understanding of the geology on a local basis. Submit only if the information is not available in the public domain. | | | | |
| C. SOILS | | | | |
| N | D | V | S | C.1: Existing maps of the soils and a description of soil infiltration characteristics. |
| | X | X | | |
| Technical Assistance Comments: This information is in the public domain and can be used to delineate the WHPA and assess the vulnerability of the DWSMA because it indicates the underlying geology. | | | | |
| N | D | V | S | C.2: A description or an existing map of known eroding lands that are causing sedimentation problems. |
| X | | | | |
| Technical Assistance Comments: | | | | |

| D. WATER RESOURCES | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N | D | V | S | D.1: An existing map of the boundaries and flow directions of major watershed units and minor watershed units. |
| | X | | | |
| Technical Assistance Comments: This information is in the public domain and may be used to delineate the surface water contribution area of the WHPA. | | | | |
| N | D | V | S | D.2: An existing map and a list of public waters as defined in Minnesota Statutes, section 103G.005, subdivision 15, and public drainage ditches. |
| | X | X | | |
| Technical Assistance Comments: This information is in the public domain and may be used to delineate the surface water contribution area of the WHPA and determine the vulnerability of the DWSMA. | | | | |
| N | D | V | S | D.3: The shoreland classifications of the public waters listed under sub-item (2), pursuant to part 6120.3000 and Minnesota Statutes, sections 103F.201 to 103F.221. |
| X | | | | |
| Technical Assistance Comments: | | | | |
| N | D | V | S | D.4: An existing map of wetlands regulated under Chapter 8420 and Minnesota Statutes, section 103G.221 to 103G.2373. |
| X | | | | |
| Technical Assistance Comments: | | | | |
| N | D | V | S | D.5: An existing map showing those areas delineated as floodplain by existing local ordinances. |
| X | | | | |
| Technical Assistance Comments: | | | | |

DATA ELEMENTS ABOUT THE LAND USE

| E. LAND USE | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N | D | V | S | E.1: An existing map of parcel boundaries. |
| | X | | X | |
| Technical Assistance Comments: This information may be helpful in delineating the DWSMA, if available. If this information is provided, identification numbers must be provided for each parcel. An electronic format for the map is preferable. | | | | |
| N | D | V | S | E.2: An existing map of political boundaries. |
| | X | | X | |
| Technical Assistance Comments: Please provide this information if the boundaries have been updated/changed. This information may be helpful in delineating the DWSMA. An electronic format for the map is preferable. | | | | |
| N | D | V | S | E.3: An existing map of public land surveys, including township, range, and section. |
| | X | | | |
| Technical Assistance Comments: This information is available in the public domain and may be helpful in delineating the DWSMA. | | | | |
| N | D | V | S | E.4: A map and an inventory of the current and historical agricultural, residential, commercial, industrial, recreational, and institutional land uses and potential contaminant sources. |
| X | | | | |
| Technical Assistance Comments: | | | | |

| | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|------------------------------------------------------------------------------------------------------------------------------------|
| N | D | V | S | E.5: An existing, comprehensive land-use map. |
| X | | | | |
| Technical Assistance Comments: | | | | |
| N | D | V | S | E.6: Existing zoning map. |
| X | | | | |
| Technical Assistance Comments: | | | | |
| F. PUBLIC UTILITY SERVICES | | | | |
| N | D | V | S | F.1: An existing map of transportation routes or corridors. |
| | X | | | |
| Technical Assistance Comments: This information is available in the public domain and may be helpful in delineating the DWSMA. | | | | |
| N | D | V | S | F.2: An existing map of storm sewers, sanitary sewers, and the public water supply systems. |
| | X | | X | |
| Technical Assistance Comments: Do not submit a map of the storm sewers and sanitary sewers. Describe the difference in how much water is pumped and how much is sold. The difference is the leakage that may be used as recharge in the groundwater model. | | | | |
| N | D | V | S | F.3: An existing map of gas and oil pipelines used by gas and oil suppliers. |
| X | | | | |
| Technical Assistance Comments: | | | | |
| N | D | V | S | F.4: An existing map or list of public drainage systems. |
| | X | X | | |
| Technical Assistance Comments: This information is available in the public domain and may be helpful in delineating the DWSMA. | | | | |
| N | D | V | S | F.5: An existing record of construction, maintenance, and use of the public water supply well(s) and other wells within the DWSMA. |
| | X | X | X | |
| Technical Assistance Comments: If the information is different from that with MDH, please provide 1) the pumping rates for the current and previous years, and the projected annual pumping rates for the next five years for each well in the PWS; and 2) well record(s) for the PWS well(s). Information about the PWS well(s) may affect the vulnerability assessment due to rehabilitation/reconstruction of a well or changes in pumping rates. | | | | |

DATA ELEMENTS ABOUT WATER QUANTITY

| G. SURFACE WATER QUANTITY | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|------------------------------------------------------------------------------------------------------------------------------------------------------|
| N | D | V | S | G.1: An existing description of high, mean, and low flows on streams. |
| | X | X | | |
| Technical Assistance Comments: This information is available in the public domain and may be used to determine hydraulic connections between surface water bodies and the aquifer(s) of concern. | | | | |
| N | D | V | S | G.2: An existing list of lakes where the state has established ordinary high water marks. |
| | X | | | |
| Technical Assistance Comments: This information is available in the public domain. The information may be used to determine the WHPA. | | | | |
| N | D | V | S | G.3: An existing list of permitted withdrawals from lakes and streams, including source, use, and amounts withdrawn. |
| | X | X | X | |
| Technical Assistance Comments: Only required if different from the DNR database. Surface water bodies may be in direct hydraulic connection with the aquifer(s) of concern and withdrawals may affect water levels in both the surface water and adjacent groundwater systems. | | | | |
| N | D | V | S | G.4: An existing list of lakes and streams for which state protected levels or flows have been established. |
| | X | | | |
| Technical Assistance Comments: This information is available in the public domain and may be used to determine hydraulic connections between surface water bodies and the aquifer(s) of concern. | | | | |
| N | D | V | S | G.5: An existing description of known water-use conflicts, including those caused by groundwater pumping. |
| | X | X | X | |
| Technical Assistance Comments: Please notify MDH of surface water/well interference problems of which the PWS is aware. Conflicts between use of groundwater resources and surface water bodies would indicate a hydrologic boundary that would need to be considered in delineating the WHPA. | | | | |
| H. GROUNDWATER QUANTITY | | | | |
| N | D | V | S | H.1: An existing list of wells covered by state appropriation permits, including amounts of water appropriated, type of use, and aquifer source. |
| | X | X | X | |
| Technical Assistance Comments: Please submit this information for wells not permitted by the DNR because this information may be useful in identifying the hydrologic boundary conditions that could affect the size and shape of the WHPA boundaries. | | | | |
| N | D | V | S | H.2: An existing description of known well interference problems and water-use conflicts. |
| | X | X | X | |
| Technical Assistance Comments: Please notify MDH of well interference problems of which the PWS is aware. Interference problems with other wells, if present, likely indicate a hydrologic boundary that would need to be considered in making the WHPA delineation. | | | | |
| N | D | V | S | H.3: An existing list of state environmental boreholes, including unique well number, aquifer measured, years of record, and average monthly levels. |
| | X | X | X | |
| Technical Assistance Comments: Only submit monthly water level measurements (with unique well numbers and dates) that are not in the public domain. | | | | |

DATA ELEMENTS ABOUT WATER QUALITY

| I. SURFACE WATER QUALITY | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N | D | V | S | I.1: An existing map or list of the state water quality management classification for each stream and lake. |
| X | | | | |
| Technical Assistance Comments: | | | | |
| N | D | V | S | I.2: An existing summary of lake and stream water quality monitoring data, including: 1. bacteriological contamination indicators; 4. sedimentation; 2. inorganic chemicals; 5. dissolved oxygen; and 3. organic chemicals; 6. excessive growth or deficiency of aquatic plants. |
| | | X | X | |
| Technical Assistance Comments: This information can be used to evaluate surface water/groundwater interactions and aquifer water quality. Submit if the PWS has information that is not available in the public domain. | | | | |
| J. GROUNDWATER QUALITY | | | | |
| N | D | V | S | J.1: An existing summary of water quality data, including: 1) bacteriological contamination indicators; 2) inorganic chemicals; and 3) organic chemicals. |
| | X | X | X | |
| Technical Assistance Comments: Submit if the PWS has information that is not available in the public domain because the information may help explain groundwater flow paths. | | | | |
| N | D | V | S | J.2: An existing list of water chemistry and isotopic data from wells, springs, or other groundwater sampling points. |
| | X | X | X | |
| Technical Assistance Comments: Submit if the PWS has information that is not available in the public domain because the information may help explain groundwater flow paths. | | | | |
| N | D | V | S | J.3: An existing report of groundwater tracer studies. |
| | X | X | X | |
| Technical Assistance Comments: Submit if the PWS has information that is not available in the public domain because the information may help explain groundwater flow paths. | | | | |
| N | D | V | S | J.4: An existing site study and well water analysis of known areas of groundwater contamination. |
| | | X | X | |
| Technical Assistance Comments: Submit if the PWS has information on contaminant sources not available in the public domain because these reports may contain additional geologic or hydrogeologic information. | | | | |
| N | D | V | S | J.5: An existing property audit identifying contamination. |
| X | | | | |
| Technical Assistance Comments: | | | | |
| N | D | V | S | J.6: An existing report to the Minnesota Department of Agriculture and the Minnesota Pollution Control Agency of contaminant spills and releases. |
| | X | X | | |
| Technical Assistance Comments: Notify MDH of reports on spills or contaminant releases that are with the PWS or city but are not in the public domain. These reports do not need to be submitted, but MDH staff would like to review reports. | | | | |

Summary of Data Request Specific Data to be Provided to MDH by PWS

As discussed during the first Scoping Meeting on July 24, 2013, the public water supply (PWS) will supply the following information for Part I of their Wellhead Protection Plan to the Minnesota Department of Health. The number of the data element that refers to the information needed to prepare the Part I Report is listed in the parenthesis at the end of each request.

- 1) PWS well information: Use Tables 1 and 2, the well records for the PWS wells, and a map showing the locations of all the PWS wells, to review the accuracy of 1) all PWS well construction, 2) well locations, and 3) pumping information. (F.5)

Table 1 lists well use and construction for each of the PWS wells. Have you reconstructed any wells? Are there well records for reconstructed wells?

The enclosed map shows the locations of the primary public water supply wells. Please let us know if you feel the wells are not correctly located. These locations must be used to delineate your wellhead protection areas.

Table 2 shows the available pumping information and indicates what information the PWS needs to provide for the delineation of the capture zone. Please provide 1) the pumping data for 2010 that was sent to the Minnesota Department of Natural Resources, 2) whether this rate was measured or estimated, and 3) the projected annual pumping amounts for the next five years.

- 2) Please provide a copy of any aquifer test or specific capacity information for the PWS wells that was obtained during well construction, maintenance, or repair. (B.1)
- 3) Is there an existing map of parcel and/or political boundaries that could be used for defining the Drinking Water Supply Management Area (DWSMA)? If you wish to use parcel lines, please provide the parcel identification number for each parcel boundary along with the map. Have the city boundaries changed? If the city boundaries have changed, please provide the new boundaries. The boundaries of the DWSMA may be larger if political boundaries are used instead of the parcel boundaries. (E.1 and E.2)
- 4) If there are private well records, soil boring reports, geophysical studies, or water level measurements in your files that MDH staff did not identify at the scoping meeting and that would be available for MDH staff to review and copy, please notify MDH. (B.2, B.3, B.4, and H.3)
- 5) Please identify reports that you have relating to leaks/contamination sites that may be of concern to your drinking water supply, that MDH may review and copy. (J.4)

Summary of Data Request

Page 2

- 6) If your files contain water chemistry data, such as bacteria, virus, inorganic, organic, or isotopic results from wells or other groundwater sampling points, not currently available to MDH that MDH may review and copy, please notify MDH. (J.1 and J.2)
- 7) Please identify reports that you have in your files relating to groundwater tracer studies that have been conducted. (J.3)
- 8) Please provide information about other high-capacity wells in your area that may not be permitted and are not listed on the attached Table 3. (H.1)
- 9) Please describe any conflicts over water use that the PWS has been involved with, such as 1) private wells that went dry (or well interference) or 2) springs or wetlands that were affected. Was the Department of Natural Resources involved in resolving the conflict? (G.5 and H.2)
- 10) Please describe the annual amount of water that is lost due to leaks in the distribution system. Can you identify specific parts of the distribution system where this loss occurs? (F.2)
- 11) If local precipitation information is not available in the public domain within a couple of miles and in the same geomorphic setting, please provide average monthly precipitation values from the wastewater treatment facility during the preceding five years. (A.2)
- 12) Please identify any other reports about surface water withdrawals or surface water monitoring data from lakes, streams, or wetlands that are not in the public domain that MDH staff could review and copy. (G.3 and I.2)

**Table 1
Water Supply Well Information
City of Saint Louis Park**

| Local Well Name | Unique Number | Type | Casing Diameter (inches) | Casing Depth (feet) | Well Depth (feet) | Date Constructed | Well Vulnerability | Aquifer |
|-----------------|---------------|----------------------------|--------------------------|---------------------|-------------------|------------------|--------------------|--------------------------------|
| Well 3 | 206440 | Primary | 24 | 103 | 286 | 1939 | Vulnerable | OSTP - St.Peter |
| Well 4 | 200542 | Primary | 24 x 18 | 304 | 490 | 1946 | Vulnerable | OPCJ - Prairie Du Chien-Jordan |
| Well 5 | 203196 | Out Long Term ¹ | 24 x 20 | 305 | 465 | 1905 | Vulnerable | OPCJ - Prairie Du Chien-Jordan |
| Well 6 | 206457 | Emergency ¹ | 24 x 20 | 303 | 482 | 1948 | Vulnerable | OPCJ - Prairie Du Chien-Jordan |
| Well 7 | 206436 | Out Long Term ¹ | 24 x 20 | 274 | 446 | 1952 | Not Vulnerable | OPCJ - Prairie Du Chien-Jordan |
| Well 8 | 203678 | Primary | 24 x 16 | 314 | 507 | 1905 | Not Vulnerable | OPCJ - Prairie Du Chien-Jordan |
| Well 9 | 206437 | Out Long Term ¹ | 24 x 16 | 289 | 473 | 1956 | Not Vulnerable | OPCJ - Prairie Du Chien-Jordan |
| Well 10 | 206442 | Primary | 24 x 16 | 316 | 500 | 1955 | Vulnerable | OPCJ - Prairie Du Chien-Jordan |
| Well 11 | 206439 | Primary | 24 x 16 | 880 | 1093 | 1960 | Not Vulnerable | CMTS - Mt.Simon |
| Well 12 | 206456 | Primary | 30 x 24 x 16 | 900 | 1095 | 1965 | Not Vulnerable | CMTS - Mt.Simon |
| Well 13 | 206424 | Primary | 30 x 24 x 16 | 891 | 1045 | 1964 | Not Vulnerable | CMTS - Mt.Simon |
| Well 14 | 227965 | Primary | 30 x 24 x 16 | 389 | 485 | 1965 | Vulnerable | CJDN - Jordan |
| Well 15 | 215447 | Primary | 30 x 24 | 398 | 503 | 1905 | Vulnerable | CJSL - Jordan |
| Well 16 | 203187 | Primary | 30 x 24 | 425 | 500 | 1973 | Vulnerable | CJDN - Jordan |
| Well 17 | 147459 | Out Long Term ¹ | 36 x 30 x 24 x 18 x 12 | 818 | 1085 | 1983 | Not Vulnerable | CMTS - Mt.Simon |

¹ The rules do not require to define a wellhead protection area is not defined for those wells.

**Table 2
Annual Volume of Water Pumped from Wells
City of Saint Louis Park**

| Well Name | Unique Number | Total Annual Withdrawal (gal/year) | | | | | | Maximum Withdrawal 2008 - 2012 (gallons/year) | Projected 2016 Withdrawal (gallons/year) |
|---------------|---------------|------------------------------------|---------------|---------------|---------------|---------------|---------------|-----------------------------------------------|------------------------------------------|
| | | 2008 | 2009 | 2010 | 2011 | 2012 | 2012 | | |
| Well 3 | 206440 | 13,304,000 | 4,655,000 | 117,000 | 0 | 20,000 | 13,304,000 | | |
| Well 4 | 200542 | 483,350,000 | 513,012,000 | 525,041,000 | 521,918,000 | 443,539,000 | 525,041,000 | | |
| Well 5 | 203196 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Well 6 | 206457 | 188,000 | 257,000 | 246,000 | 184,000 | 471,000 | 257,000 | | |
| Well 7 | 206436 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Well 8 | 203678 | 292,233,000 | 296,189,000 | 545,933,000 | 530,319,000 | 457,559,000 | 545,933,000 | | |
| Well 9 | 206437 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Well 10 | 206442 | 351,748,000 | 206,959,000 | 133,248,000 | 245,767,000 | 331,570,000 | 351,748,000 | | |
| Well 11 | 206439 | 67,036,000 | 122,233,000 | 58,707,000 | 53,806,000 | 116,691,000 | 122,233,000 | | |
| Well 12 | 206456 | 357,570,000 | 362,056,000 | 307,158,000 | 213,246,000 | 187,409,000 | 362,056,000 | | |
| Well 13 | 206424 | 97,701,000 | 211,310,000 | 228,064,000 | 79,131,000 | 178,301,000 | 228,064,000 | | |
| Well 14 | 227965 | 345,326,000 | 214,874,000 | 82,696,000 | 185,172,000 | 200,316,000 | 345,326,000 | | |
| Well 15 | 215447 | 57,000 | 55,240,000 | 0 | 0 | 0 | 55,240,000 | | |
| Well 16 | 203187 | 371,318,000 | 375,759,000 | 273,452,000 | 262,047,000 | 306,562,000 | 375,759,000 | | |
| Well 17 | 147459 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Totals | | 2,379,831,000 | 2,362,544,000 | 2,154,662,000 | 2,091,590,000 | 2,222,438,000 | 2,924,961,000 | | |

Source: The DNR State Water Use Database System (SWUDS), Permit Number 1973-1007.

Table 3
Permitted High-Capacity Wells Within 2.0 miles
DNR State Water Use Database System (SWUDS)
City of Saint Louis Park

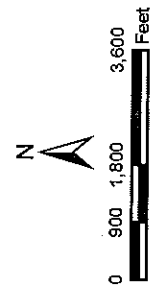
| Unique Number | Well Name | DNR Permit Number | Aquifer | Use | Annual Volume of Water Pumped* | Daily Volume* |
|---------------|------------------------------|-------------------|----------|-------------------------|--------------------------------|---------------|
| 204068 | Hopkins, City Of | 1975-6245 | OPDCCJDN | Municipal Waterworks | 476.926 | 1.307 |
| 203613 | Edina, City Of | 1973-1119 | CJDN | Municipal Waterworks | 381.803 | 1.046 |
| 208399 | Edina, City Of | 1973-1119 | OPDCCJDN | Municipal Waterworks | 362.299 | 0.993 |
| 112228 | Hopkins, City Of | 1975-6245 | OPDCCJDN | Municipal Waterworks | 317.123 | 0.869 |
| 200561 | Edina, City Of | 1973-1119 | OPDCCJDN | Municipal Waterworks | 250.601 | 0.687 |
| 200564 | Edina, City Of | 1973-1119 | OPDCCJDN | Municipal Waterworks | 218.278 | 0.598 |
| 204054 | Minnetonka, City Of | 1979-6207 | CJDN | Municipal Waterworks | 110.731 | 0.303 |
| 208012 | Minnetonka, City Of | 1979-6207 | CJDN | Municipal Waterworks | 110.725 | 0.303 |
| 203614 | Edina, City Of | 1973-1119 | CMTS | Municipal Waterworks | 105.59 | 0.289 |
| 578922 | Honeywell Inc | 1998-6076 | OPDCCJDN | Non-Metallic Processing | 66.615 | 0.183 |
| 240630 | Edina, City Of | 1973-1119 | OPDCCJDN | Municipal Waterworks | 45.79 | 0.125 |
| 434042 | St Louis Park, City Of | 1990-6036 | OSTP | Pollution Containment | 30.402 | 0.083 |
| 204072 | Oak Ridge Country Club | 1966-1167 | OPDCCJDN | Golf Course Irrigation | 29.105 | 0.08 |
| 216050 | St Louis Park, City Of | 1988-6213 | OPCJ | Pollution Containment | 28.876 | 0.079 |
| 434045 | St Louis Park, City Of | 1987-6212 | QBAA | Pollution Containment | 25.821 | 0.071 |
| 538134 | St Louis Park, City Of | 1995-6047 | QWTA | Pollution Containment | 25.326 | 0.069 |
| 206588 | Edina, City Of | 1973-1119 | PMHNPMFL | Municipal Waterworks | 19.54 | 0.054 |
| 200534 | Minikahda Club | 1975-6248 | OPCJ | Golf Course Irrigation | 19.27 | 0.053 |
| 236585 | Golden Valley Country Club | 1986-6180 | OPDC | Golf Course Irrigation | 16.364 | 0.045 |
| 236157 | Edina Country Club | 1972-1231 | OPDCCJDN | Golf Course Irrigation | 15.135 | 0.041 |
| 207674 | Edina, City Of | 1973-1119 | OPDCCJDN | Municipal Waterworks | 14.608 | 0.04 |
| 534115 | Golden Valley Country Club | 1986-6180 | OPDCCJDN | Golf Course Irrigation | 14.514 | 0.04 |
| 203183 | Minneapolis Golf Club | 1986-6083 | OPDCCJDN | Golf Course Irrigation | 12.734 | 0.035 |
| 453805 | Interlachen Country Club | 1969-0490 | OPCJ | Golf Course Irrigation | 12.511 | 0.034 |
| 434044 | St Louis Park, City Of | 1987-6212 | OPVL | Pollution Containment | 10.323 | 0.028 |
| 223780 | General Mills Inc | 1960-0603 | OPDCCJDN | Agricultural Processing | 9.464 | 0.026 |
| 161443 | Edina Country Club | 1972-1231 | OPDCCJDN | Golf Course Irrigation | 4.908 | 0.013 |
| 161436 | Minikahda Club | 1975-6248 | OPDCCJDN | Golf Course Irrigation | 4.746 | 0.013 |
| 255948 | Sun Valley Mobile Home Park | 1985-6006 | OSTP | Private Waterworks | 3.564 | 0.01 |
| 216009 | Minneapolis Park & Rec Board | 1986-6125 | OPDCCJDN | Golf Course Irrigation | 3.185 | 0.009 |
| 224098 | General Mills Inc | 2007-0209 | OPDCCJDN | Fire Protection | 0.764 | 0.002 |



Saint Louis Park Wells

Status

- ☆ Emergency
- ★ Out long term
- ☆ Primary



City Well Locations
Saint Louis Park, MN

Appendix B

Well Logs

Unique Well Number
147459

County Hennepin
Quad Hopkins
Quad Id 104B

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/28
Received Date

Well Name ST. LOUIS PARK 17
Township Range Dir Section Subsection Field Located MDH
117 21 W 18 DABBAC Elevation 920.00 ft.

Well Depth 1085.00 ft Depth Completed 1085.00 ft Date Well Completed 1983/05/20

Well Address ST. LOUIS PARK 17
ST LOUIS PARK MN 55426 Changed
Contact Address CITY OF ST. LOUIS PARK
ST LOUIS PARK MN 55426

Drilling Method Cable Tool
Drilling Fluid Well Hydrofractured? YES NO
From ft. to

Use Community Supply
Casing Type Steel (black or low Drive Shoe? YES NO Hole Diameter (in.)
Diameter 12 Depth 818 12.0(To 385.0
36.00 in. from 0.00 to 115.00 ft. lbs/ft
30.00 in. from 0.00 to 205.00 ft. lbs/ft
24.00 in. from 0.00 to 278.00 ft. lbs/ft
18.00 in. from 0.00 to 475.00 ft. lbs/ft
12.00 in. from 0.00 to 818.00 ft. lbs/ft

| Description | Color | Hardness | From | To (ft.) |
|--------------------------|---------|----------|------|----------|
| DRIFT | | | 0 | 105 |
| DRIFT WITH LIMEROCK | | | 105 | 115 |
| SHALE | BLUE | | 115 | 124 |
| ST. PETER SANDSTONE | | | 124 | 227 |
| SHALE | RED | | 227 | 275 |
| SHAKOPEE LIMESTONE | | | 275 | 282 |
| SHAKOPEE LIMESTONE | | | 282 | 400 |
| SHAKOPEE LIMESTONE | | | 400 | 405 |
| JORDAN SANDSTONE | | | 405 | 465 |
| SHALE | RED/GRN | | 465 | 500 |
| SHALE | RED/GRN | | 500 | 533 |
| SHALE | RED/GRN | | 533 | 668 |
| SHALE | RED/GRN | | 668 | 691 |
| SANDSTONE W/SHALE LAYERS | | | 691 | 718 |
| SANDSTONE W/SHALE LAYERS | | | 718 | 802 |
| SANDSTONE W/SHALE LAYERS | | | 802 | 805 |
| SANDSTONE | | | 805 | 1065 |
| SANDSTONE | | | 1065 | 1082 |
| RED CLASTICS | | | 1082 | 1085 |

Screen No Open Hole(ft.) From 818.0 to 1085.
Make Type
Diameter Slot Length Set

Static Water Level 315.00 ft. Land surface Date measured 1983/04/27

Pumping Level (below land surface) 439.00 ft. after 120.00 hrs. pumping 1200.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
 Casing Protection 12 in. above grade
 At-grade (Environmental Wells and Borings ONLY) Basement offset

Grouting Information Well grouted? YES NO
Material Neat Cement From 0.0 To 818.0 ft. 510.00 Sacks

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? YES NO

Pump Not Installed Date Installed
Manufacturer's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m
Type

Abandoned Wells Does property have any not in use and not sealed well(s)? YES NO

Variance Was a variance granted from the MDH for this well? YES NO

Well Contractor Certification Layne Well Co. 27010

License Business Name Lic. or Reg No.
HOLLEN, G

Remarks
M.G.S. NO. 1979 M.G.S. NO.1979. GAMMA LOGGED 2-25-1988 & 6-24-1988.
First Bedrock OSTP Aquifer Mt.Simon
Last Strat PMSU Depth to Bedrock 115.00 ft.

Unique Well Number

200542

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/24
Received Date

Well Name ST. LOUIS PARK 4
Township Range Dir Section Subsection Field Located MDH
28 24 W 7 BDADAC Elevation 900.00 ft.

Well Depth 490.00 ft
Depth Completed 490.00 ft
Date Well Completed 1946/09/00

Well Address ST. LOUIS PARK 4
41ST ST
ST LOUIS PARK MN 55416 Changed
Contact Address CITY OF ST. LOUIS PARK
ST LOUIS PARK MN Changed

Drilling Method Cable Tool
Drilling Fluid
Well Hydrofractured? YES NO
From ft. to

Use Community Supply
Casing Type Steel (black or low Drive Shoe? YES NO Hole Diameter (in.)
Diameter 18 Depth 304
24.00 in. from 0.00 to 90.00 ft. lbs/ft
18.00 in. from 0.00 to 304.00 ft. lbs/ft

Table with columns: Description, Color, Hardness, From, To (ft.). Rows include: FILL, SAND & GRAVEL, PLATTEVILLE LIME, ST PETER SAND, HARD SANDSTONE & SHALE, LIME, LIME MILKY CUTTINGS, JORDAN SANDSTONE, JORDAN SANDSTONE & HARD, ST. LAWRENCE.

Screen No
Open Hole(ft.) From 304.0 to 390.0
Make Type
Diameter Slot Length Set

Static Water Level
85.00 ft. Land surface Date measured 1946/09/27

Pumping Level (below land surface)
121.00 ft. after 24.00 hrs. pumping 2560.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
Casing Protection 12 in. above grade
At-grade (Environmental Wells and Borings ONLY) Basement offset

Grouting Information Well grouted? YES NO

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? YES NO

Pump
Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity 1200 g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? YES NO

Variance
Was a variance granted from the MDH for this well? YES NO

Well Contractor Certification
Layne Well Co. 27010

License Business Name Lic. or Reg No.

First Bedrock OPVL Aquifer Prairie Du Chien-Jordan
Last Strat CSTL Depth to Bedrock 76.00 ft.

Unique Well Number

203187

County Hennepin

Quad Hopkins

Quad Id 104B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24

Update Date 2012/09/17

Received Date

Well Name ST. LOUIS PARK 16
Township Range Dir Section Subsection Field Located MDH
117 21 W 7 BBADBA Elevation 917.00 ft.

Well Depth 500.00 ft
Depth Completed 500.00 ft
Date Well Completed 1973/07/31

Well Address ST. LOUIS PARK 16
ST LOUIS PARK MN 55416 Changed
Contact Address CITY OF ST. LOUIS PARI
ST LOUIS PARK MN 55416

Drilling Method Cable Tool
Drilling Fluid
Well Hydrofractured? YES NO
From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? YES NO
Diameter 24 Depth 425
30.00 in. from 0.00 to 310.00 ft. lbs/ft
24.00 in. from 0.00 to 425.00 ft. lbs/ft

Table with 5 columns: Description, Color, Hardness, From, To (ft.). Rows include SAND & GRAVEL, CLAY & BOULDERS, COARSE SAND & GRAVEL, BROKEN LIMESTONE, PLATTVILLE LIMESTONE, ST. PETER SANDSTONE, SHALE, SHAKOPEE LIMESTONE, JORDAN SANDSTONE, ST. LAWRENCE SHALE.

Screen No
Open Hole(ft.) From 425.0 to 500.0

Make Type
Diameter Slot Length Set

Static Water Level
125.00 ft. Land surface Date measured 1973/07/31

Pumping Level (below land surface)
238.00 ft. after hrs. pumping 2000.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
Casing Protection 12 in. above grade
At-grade (Environmental Wells and Borings ONLY) Basement offset

Grouting Information Well grouted? YES NO
Material Neat Cement From To ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? YES NO

Pump
Not Installed Date Installed
Manufacture's name
Model number HP Volts
Length of drop pipe Material Capacity g.p.m
Type

Remarks

Abandoned Wells
Does property have any not in use and not sealed well(s)? YES NO

Variance
Was a variance granted from the MDH for this well? YES NO

Well Contractor Certification
Tri-state Well Co. 27118

License Business Name Lic. or Reg No.
BERTHIAUME, F

First Bedrock OPVL Aquifer Jordan
Last Strat CSTL Depth to Bedrock 105.00 ft.

Unique Well Number

203196

County Hennepin

Quad Hopkins

Quad Id 104B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24

Update Date 2011/08/28

Received Date

Well Name ST. LOUIS PARK 5
Township Range Dir Section Subsection Field Located MDH
117 21 W 18 DABBAD Elevation 930.00 ft.

Well Depth 465.00 ft
Depth Completed 465.00 ft
Date Well Completed 1947/00/00

Well Address ST. LOUIS PARK 5
ST LOUIS PARK MN 55426 Changed
Contact Address CITY OF ST. LOUIS PARK
ST LOUIS PARK MN 55426

Drilling Method Cable Tool
Drilling Fluid
Well Hydrofractured? YES NO
From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? YES NO
Diameter 20 Depth 305 Hole Diameter (in.)
24.00 in. from 0.00 to 115.00 ft. lbs/ft
20.00 in. from 0.00 to 305.00 ft. lbs/ft
20.0(To 465.0

Table with 5 columns: Description, Color, Hardness, From, To (ft.). Rows include SAND & GRAVEL, CLAY & BOULDERS, COARSE GRAVEL, PLATTEVILLE LIME, ROCK & SHALE, SANDROCK, SHALE & ROCK, LIMEROCK, SANDSTONE, ST. LAWRENCE.

Screen Open Hole(ft.) From to
Make Type
Diameter Slot Length Set

Static Water Level 91.00 ft. Land surface Date measured 1947/00/00

Pumping Level (below land surface) 116.00 ft. after hrs. pumping 1380.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
Casing Protection 12 in. above grade
At-grate (Environmental Wells and Borings ONLY) Basement offset

Grouting Information Well grouted? YES NO
Material Neat Cement From To ft. 15.00 Cubic yards

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? YES NO

Pump Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m
Type

Remarks

Abandoned Wells Does property have any not in use and not sealed well(s)? YES NO

Variance Was a variance granted from the MDH for this well? YES NO

Well Contractor Certification Layne Well Co. 27010

License Business Name Lic. or Reg No. SHUEY, P.

First Bedrock OPVL Aquifer Prairie Du Chien-Jordan
Last Strat CSTL Depth to Bedrock 109.00 ft.

Unique Well Number
203678

County Hennepin
Quad Hopkins
Quad Id 104B

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/29
Received Date

Well Name ST. LOUIS PARK 8
Township Range Dir Section Subsection Field Located MDH
117 22 W 1 DACCBC Elevation 940.00 ft.

Well Depth 507.00 ft Depth Completed 507.00 ft Date Well Completed 1955/00/00

Well Address ST. LOUIS PARK 8
ST LOUIS PARK MN 55426 Changed
Contact Address CITY OF ST. LOUIS PARK
ST LOUIS PARK MN 55426

Drilling Method Cable Tool
Drilling Fluid Well Hydrofractured? YES NO
From ft. to

Use Community Supply
Casing Type Steel (black or low Drive Shoe? YES NO Hole Diameter (in.)
Diameter 16 Depth 314 23.0 To 507.0
24.00 in. from 0.00 to 253.00 ft. lbs/ft
16.00 in. from 0.00 to 314.00 ft. lbs/ft

| Description | Color | Hardness | From | To (ft.) |
|----------------------------|--------|----------|------|----------|
| PLATFORM | | | 0 | 3 |
| YELLOW CLAY, ROCKS & BOULI | | | 3 | 38 |
| RED CLAY & ROCKS | | HARD | 38 | 65 |
| BROWN CLAY (GRAY) & ROCKS | | | 65 | 97 |
| SAND & GRAVEL (DIRTY) | | | 97 | 108 |
| CLAY, ROCKS & BROKEN LIMER | | | 108 | 126 |
| SHALE | YELLOW | | 126 | 132 |
| SANDROCK & SHALE | | | 132 | 179 |
| SANDROCK | | | 179 | 242 |
| SHALE | | | 242 | 259 |
| SANDROCK | | HARD | 259 | 302 |
| SHALE & SANDROCK | | | 302 | 303 |
| SHAKOPEE LIMEROCK | | HARD | 303 | 413 |
| SANDROCK CLEAN | | M.HARD | 413 | 436 |
| SANDROCK FINE | RED | HARD | 436 | 464 |
| SANDROCK SHALEY | | V.HARD | 464 | 482 |
| SANDROCK COARSE | WHITE | M.HARD | 482 | 486 |
| SANDROCK FINE | WHITE | M.HARD | 486 | 496 |
| SHALEY SANDROCK | | | 496 | 507 |

Screen No Open Hole(ft.) From 314.0 to 507.0
Make Type
Diameter Slot Length Set

Static Water Level 95.00 ft. Land surface Date measured 1955/00/00

Pumping Level (below land surface) 130.00 ft. after hrs. pumping 0.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
 Casing Protection 12 in. above grade
 At-grade (Environmental Wells and Borings ONLY) Basement offset

Grouting Information Well grouted? YES NO
Material From To 314.0 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? YES NO

Pump Not Installed Date Installed
Manufacturer's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m.
Type

Abandoned Wells Does property have any not in use and not sealed well(s)? YES NO

Variance Was a variance granted from the MDH for this well? YES NO

Well Contractor Certification Bergerson-Caswell 27058

License Business Name Lic. or Reg No.

Remarks
COPIED FROM D.N.R.
First Bedrock OSTP Aquifer Prairie Du Chien-Jordan
Last Strat CSTL Depth to Bedrock 126.00 ft.

Unique Well Number
206436

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/26
Received Date

Well Name ST. LOUIS PARK 7
Township Range Dir Section Subsection Field Located MDH
117 21 W 8 BDDAAC Elevation 905.00 ft.

Well Depth 446.00 ft Depth Completed 446.00 ft Date Well Completed 1952/05/09

Well Address ST. LOUIS PARK 7
2500 LOUISIANA AV
ST LOUIS PARK MN 55416 Changed
Contact Address CITY OF ST. LOUIS PARK
ST LOUIS PARK MN 55416

Drilling Method Cable Tool
Drilling Fluid Well Hydrofractured? YES NO
From ft. to

Use Community Supply
Casing Type Steel (black or low Drive Shoe? YES NO Hole Diameter (in.)
Diameter 20 Depth 274
24.00 in. from 0.00 to 80.00 ft. lbs/ft
20.00 in. from 0.00 to 274.00 ft. lbs/ft

| Description | Color | Hardness | From | To (ft.) |
|------------------------|-------|----------|------|----------|
| SAND GRAVEL & BOULDERS | | | 0 | 75 |
| LIMEROCK | | | 75 | 97 |
| SHALE | | | 97 | 100 |
| SANDSTONE | | | 100 | 210 |
| SHALE & SANDSTONE | | | 210 | 260 |
| DOLOMITE | | | 260 | 380 |
| JORDAN SANDSTONE | | | 380 | 420 |
| FINE SAND & SHALE | | | 420 | 430 |
| JORDAN SAND | | | 430 | 440 |
| ST. LAWRENCE | | | 440 | 446 |

Screen No Open Hole(ft.) From 274.0 to 446.0
Make Type
Diameter Slot Length Set

Remarks

First Bedrock OPVL Aquifer Prairie Du Chien-Jordan
Last Strat CSTL Depth to Bedrock 75.00 ft.

Static Water Level 58.00 ft. Land surface Date measured 1952/05/09

Pumping Level (below land surface)
ft. after hrs. pumping 1200.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
 Casing Protection 12 in. above grade
 At-grade (Environmental Wells and Borings ONLY) Basement offset

Grouting Information Well grouted? YES NO

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? YES NO

Pump
 Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m.
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? YES NO

Variance
Was a variance granted from the MDH for this well? YES NO

Well Contractor Certification
Layne Well Co. 27010

License Business Name Lic. or Reg No.
SHUEY, P.

Unique Well Number

206437

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/28
Received Date

Well Name ST. LOUIS PARK 9
Township Range Dir Section Subsection Field Located MDH
117 21 W 8 BDDBAC Elevation 899.00 ft.

Well Depth 473.00 ft
Depth Completed 473.00 ft
Date Well Completed 1956/06/06

Well Address ST. LOUIS PARK 9
2500 NEVADA
ST LOUIS PARK MN 55426 Changed
Contact Address CITY OF ST. LOUIS PARK
ST LOUIS PARK MN 55426

Drilling Method Cable Tool
Drilling Fluid
Well Hydrofractured? YES NO
From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? YES NO
Diameter 16 Depth 289
24.00 in. from 0.00 to 81.00 ft. lbs/ft
16.00 in. from 0.00 to 289.00 ft. lbs/ft
Hole Diameter (in.)

Table with 5 columns: Description, Color, Hardness, From, To (ft.). Rows include DRIFT, LIMESTONE, SHALE AND SANDSTONE, SHALE, LIMEROCK, SANDSTONE, LIMEROCK, SANDSTONE.

Screen No
Open Hole(ft.) From 289.0 to 473.0

Make Type
Diameter Slot Length Set

Static Water Level
70.00 ft. Land surface Date measured 1956/06/06

Pumping Level (below land surface)
ft. after hrs. pumping g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
Casing Protection 12 in. above grade
At-grade (Environmental Wells and Borings ONLY) Basement offset

Grouting Information Well grouted? YES NO
Material Neat Cement From To ft. 414.00 Sacks

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? YES NO

Pump
Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m
Type

Remarks

Abandoned Wells
Does property have any not in use and not sealed well(s)? YES NO

Variance
Was a variance granted from the MDH for this well? YES NO

Well Contractor Certification
Layne Well Co. 27010

License Business Name Lic. or Reg No.
LAFONTAINE, W

First Bedrock OPSP Aquifer Prairie Du Chien-Jordan
Last Strat CJDN Depth to Bedrock 69.00 ft.

Unique Well Number
206439

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/28
Received Date

Well Name ST. LOUIS PARK 11
Township Range Dir Section Subsection Field Located MDH
117 21 W 8 DCDBAB Elevation 920.00 ft.

Well Depth 1093.00 ft Depth Completed 1093.00 ft Date Well Completed 1960/11/01

Well Address ST. LOUIS PARK 11
ST LOUIS PARK MN 55426 Changed
Contact Address CITY OF ST. LOUIS PARK
5925 37TH ST W MN 55426 Changed
MINNEAPOLIS

Drilling Method Cable Tool
Drilling Fluid Well Hydrofractured? YES NO
From ft. to

Use Community Supply
Casing Type Steel (black or low Drive Shoe? YES NO Hole Diameter (in.)
Diameter 16 Depth 880
24.00 in. from 0.00 to 103.00 ft. lbs/ft
16.00 in. from 0.00 to 880.00 ft. lbs/ft

| Description | Color | Hardness | From | To (ft.) |
|------------------------|---------|----------|------|----------|
| GLACIAL DRIFT | | | 0 | 101 |
| LIMEROCK | | | 101 | 120 |
| SANDROCK | | | 120 | 288 |
| LIMEROCK | | | 288 | 400 |
| LIMEROCK | | | 400 | 408 |
| SANDROCK | | | 408 | 498 |
| SANDROCK | | | 498 | 505 |
| LIMEROCK & SHALE | | | 505 | 530 |
| SHALE | GREEN | HARD | 530 | 683 |
| CLEAN SANDROCK & SHALE | | HARD | 683 | 745 |
| SHALE | GRAY | HARD | 745 | 805 |
| SHALE & SANDROCK | YELLOW | | 805 | 813 |
| SHALE | GREEN | | 813 | 817 |
| SANDROCK & SHALE | | | 817 | 853 |
| SANDROCK & SHALE | | HARD | 853 | 955 |
| SANDROCK & SHALE | PNK/RED | | 955 | 1050 |
| CLEAN COARSE SANDROCK | | | 1050 | 1078 |
| RED CLASTIC | RED | | 1078 | 1093 |

Screen No Open Hole(ft.) From 880.0 to 1093.
Make Type
Diameter Slot Length Set

Static Water Level 221.00 ft. Land surface Date measured 1960/11/01

Pumping Level (below land surface) 355.50 ft. after hrs. pumping 1500.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
 Casing Protection 12 in. above grade
 At-grade (Environmental Wells and Borings ONLY) Basement offset

Grouting Information Well grouted? YES NO

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? YES NO

Pump
 Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m.
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? YES NO

Variance
Was a variance granted from the MDH for this well? YES NO

Well Contractor Certification
Bergerson-Caswell 27058

License Business Name Lic. or Reg No.

Remarks
COPIED FROM D.N.R. M.G.S. NO.167. GAMMA LOGGED 2-24-1984.

First Bedrock OPVL Aquifer Mt.Simon
Last Strat PMSU Depth to Bedrock 101.00 ft.

Unique Well Number
206440

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/28
Received Date

Well Name ST. LOUIS PARK 3
Township Range Dir Section Subsection Field Located MDH
117 21 W 8 DCDBDB Elevation 925.00 ft.

Well Depth 286.00 ft Depth Completed 286.00 ft Date Well Completed 1939/08/00

Well Address ST. LOUIS PARK 3
2924 IDAHO AV
ST LOUIS PARK MN 55426 Changed
Contact Address CITY OF ST. LOUIS PARK
ST LOUIS PARK MN 55426

Drilling Method Cable Tool
Drilling Fluid Well Hydrofractured? YES NO
From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? YES NO Hole Diameter (in.)
Diameter 24 Depth 103
24.00 in. from 0.00 to 103.00 ft. lbs/ft

| Description | Color | Hardness | From | To (ft.) |
|-------------|-------|----------|------|----------|
| DRIFT | | | 0 | 103 |
| LIMEROCK | | | 103 | 118 |
| SANDROCK | | | 118 | 230 |
| SHALE | RED | | 230 | 245 |
| SHALE | | | 245 | 286 |

Screen No Open Hole(ft.) From 103.0 to 286.0

Make Type
Diameter Slot Length Set

Static Water Level
60.00 ft. Land surface Date measured 1959/00/00

Pumping Level (below land surface)
114.00 ft. after hrs. pumping 0.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
 Casing Protection 12 in. above grade
 At-grade (Environmental Wells and Borings ONLY) Basement offset

Grouting Information Well grouted? YES NO

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? YES NO

Pump
 Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m.
Type

Remarks

First Bedrock OPVL Aquifer St.Peter
Last Strat OSTP Depth to Bedrock 103.00 ft.

Abandoned Wells
Does property have any not in use and not sealed well(s)? YES NO

Variance
Was a variance granted from the MDH for this well? YES NO

Well Contractor Certification
Mccarthy Well Co. 27022

License Business Name Lic. or Reg No.

| | | |
|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------|
| Well Name ST. LOUIS PARK 10 Township Range Dir Section Subsection Field Located MDH 117 21 W 8 DCDCBC Elevation 925.00 ft. | Well Depth 500.00 ft Depth Completed 500.00 ft | Date Well Completed 1955/09/15 |
|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------|

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Well Address ST. LOUIS PARK 10 ST LOUIS PARK MN 55426 Changed Contact Address CITY OF ST. LOUIS PARK ST LOUIS PARK MN 55426 | Drilling Method Cable Tool Drilling Fluid Well Hydrofractured? <input type="checkbox"/> YES <input type="checkbox"/> NO From ft. to Use Community Supply Casing Type Steel (black or low Drive Shoe? <input type="checkbox"/> YES <input type="checkbox"/> NO Diameter 16 Depth 316 Hole Diameter (in.) 24.00 in. from 0.00 to 106.00 ft. lbs/ft 16.00 in. from 0.00 to 316.00 ft. lbs/ft 23.0(To 500.0 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Description | Color | Hardness | From | To (ft.) |
|--------------------|-------|----------|------|----------|
| SAND & GRAVEL | | | 0 | 83 |
| CLAY | | | 83 | 103 |
| LIMEROCK | | | 103 | 123 |
| ST. PETER SANDROCK | | | 123 | 288 |
| SHAKOPEE | | | 288 | 407 |
| JORDAN SANDROCK | | | 407 | 500 |

| | |
|--------------------------------------------------------------|-------------------------------------------|
| Screen No Make Diameter Slot Length Set Type | Open Hole(ft.) From 316.0 to 500.0 |
|--------------------------------------------------------------|-------------------------------------------|

| | |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Static Water Level 104.00 ft. Land surface Date measured 1955/09/15 | Pumping Level (below land surface) 199.00 ft. after hrs. pumping 2005.00 g.p.m. |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|

| | |
|--------------------------------------------------------------------------|---------------------------------------------|
| Wellhead Completion | |
| Pitless adapter manufacturer _____ | Model _____ |
| <input type="checkbox"/> Casing Protection | <input type="checkbox"/> 12 in. above grade |
| <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY) | <input type="checkbox"/> Basement offset |

| |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Grouting Information Well grouted? <input type="checkbox"/> YES <input type="checkbox"/> NO Material Neat Cement From _____ To _____ ft. 550.00 Sacks |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|

| |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nearest Known Source of Contamination _____ feet Direction _____ Type _____ Well disinfected upon completion? <input type="checkbox"/> YES <input type="checkbox"/> NO |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pump <input type="checkbox"/> Not Installed Date Installed _____ Manufacture's name _____ Model number _____ HP 0.00 Volts _____ Length of drop pipe _____ Material _____ Capacity _____ g.p.m. Type _____ |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| |
|----------------------------------------------------------------------------------------------------------------------------------------------|
| Abandoned Wells Does property have any not in use and not sealed well(s)? <input type="checkbox"/> YES <input type="checkbox"/> NO |
|----------------------------------------------------------------------------------------------------------------------------------------------|

| |
|--------------------------------------------------------------------------------------------------------------------------------|
| Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> YES <input type="checkbox"/> NO |
|--------------------------------------------------------------------------------------------------------------------------------|

| |
|-------------------------------------------------------------|
| Well Contractor Certification Keys Well Co. 62012 |
|-------------------------------------------------------------|

| | |
|---------------------------------------------|------------------------|
| License Business Name JOHNSON, R. | Lic. or Reg No. |
|---------------------------------------------|------------------------|

Remarks
GAMMA LOGGED 2-24-1984.

| | |
|-----------------------------------------------------|------------------------------------------------------------------------------|
| First Bedrock OPVL Last Strat CJDN | Aquifer Prairie Du Chien-Jordan Depth to Bedrock 103.00 ft. |
|-----------------------------------------------------|------------------------------------------------------------------------------|

Unique Well Number

206456

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/29
Received Date

Well Name ST. LOUIS PARK 12
Township Range Dir Section Subsection Field Located MDH
117 21 W 21 CDBDCD Elevation 910.00 ft.

Well Depth 1095.00 ft
Depth Completed 1095.00 ft
Date Well Completed 1965/08/00

Well Address ST. LOUIS PARK 12
ST LOUIS PARK MN 55426 Changed
Contact Address CITY OF ST. LOUIS PARK
ST LOUIS PARK MN 55426

Drilling Method Cable Tool
Drilling Fluid
Well Hydrofractured? YES NO
From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? YES NO
Diameter 16 Depth 900 Hole Diameter (in.)
30.00 in. from 0.00 to 99.00 ft. lbs/ft
24.00 in. from 0.00 to 270.00 ft. lbs/ft
16.00 in. from 0.00 to 900.00 ft. lbs/ft
24.00 To 395.0

Table with 5 columns: Description, Color, Hardness, From, To (ft.). Rows include DRIFT, PLATTEVILLE, SHALE (GLENWOOD), ST. PETER, SHAKOPEE, JORDAN, ST. LAWRENCE, FRANCONIA, IRONTON, GALESVILLE, EAU CLAIRE, MT. SIMON, HINCKLEY.

Screen No
Open Hole(ft.) From 900.0 to 1095.

Make Type
Diameter Slot Length Set

Static Water Level
245.00 ft. Land surface Date measured 1965/08/00

Pumping Level (below land surface)
353.00 ft. after 1.00 hrs. pumping 1300.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
Casing Protection 12 in. above grade
At-grade (Environmental Wells and Borings ONLY) Basement offset

Grouting Information Well grouted? YES NO
Material Neat Cement From To 900.0 ft. 360.00 Sacks

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? YES NO

Pump
Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? YES NO

Variance
Was a variance granted from the MDH for this well? YES NO

Well Contractor Certification
Keys Well Co. 62012

License Business Name Lic. or Reg No.
KEMPER, R.

Remarks
M.G.S. NO. 279. OLD P.A. 63-0083.

First Bedrock OPVL Aquifer Mt.Simon
Last Strat CMTS Depth to Bedrock 96.00 ft.

Unique Well Number

206457

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/29
Received Date

Well Name ST. LOUIS PARK 6
Township Range Dir Section Subsection Field Located MDH
117 21 W 21 CDBDBD Elevation 915.00 ft.

Well Depth 482.00 ft
Depth Completed 482.00 ft
Date Well Completed 1948/02/19

Well Address ST. LOUIS PARK 6
ST LOUIS PARK MN 55426 Changed
Contact Address CITY OF ST. LOUIS PARK
ST LOUIS PARK MN 55426

Drilling Method Cable Tool
Drilling Fluid
Well Hydrofractured? YES NO
From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? YES NO
Diameter 20 Depth 303
24.00 in. from 0.00 to 107.50 ft. lbs/ft
20.00 in. from 0.00 to 303.00 ft. lbs/ft
Hole Diameter (in.)

Table with 5 columns: Description, Color, Hardness, From, To (ft.). Rows include SAND & GRAVEL, LIMEROCK, SHALE, ST. PETER SAND, SHAKOPEE LIME, JORDAN SANDSTONE, ST. LAWRENCE.

Screen No
Open Hole(ft.) From 303.0 to 482.0

Make Type
Diameter Slot Length Set

Static Water Level
60.00 ft. Land surface Date measured 1948/01/19

Pumping Level (below land surface)
ft. after hrs. pumping g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
Casing Protection 12 in. above grade
At-grade (Environmental Wells and Borings ONLY) Basement offset

Grouting Information Well grouted? YES NO
Material Neat Cement From To ft. 24.00 Cubic yards

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? YES NO

Pump
Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity 1200 g.p.m
Type

Remarks

Abandoned Wells
Does property have any not in use and not sealed well(s)? YES NO

Variance
Was a variance granted from the MDH for this well? YES NO

Well Contractor Certification
Layne Well Co. 27010

License Business Name Lic. or Reg No.
SHUEY, P.

First Bedrock OPVL Aquifer Prairie Du Chien-Jordan
Last Strat CSTL Depth to Bedrock 90.00 ft.

Unique Well Number

215447

County Hennepin
Quad Minneapolis South
Quad Id 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1991/08/24
Update Date 2011/08/28
Received Date

Well Name ST. LOUIS PARK 15
Township Range Dir Section Subsection Field Located MDH
117 21 W 8 DCDBAB Elevation 920.00 ft.

Well Depth 503.00 ft
Depth Completed 503.00 ft
Date Well Completed 1969/00/00

Well Address ST. LOUIS PARK 15
ST LOUIS PARK MN 55426 Changed
Contact Address CITY OF ST. LOUIS PARK
ST LOUIS PARK MN 55426

Drilling Method Cable Tool
Drilling Fluid
Well Hydrofractured? YES NO
From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? YES NO
Diameter 24 Depth 398
30.00 in. from 0.00 to 102.00 ft. lbs/ft
24.00 in. from 0.00 to 398.00 ft. lbs/ft

Table with 5 columns: Description, Color, Hardness, From, To (ft.). Rows include DRIFT, LIMESTONE, SANDSTONE, LIMESTONE, SANDSTONE, SHALE.

Screen No
Open Hole(ft.) From 398.0 to 503.0

Make Type
Diameter Slot Length Set

Static Water Level
115.00 ft. Land surface Date measured 1977/00/00

Pumping Level (below land surface)
183.00 ft. after hrs. pumping 1200.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
Casing Protection 12 in. above grade
At-grade (Environmental Wells and Borings ONLY) Basement offset

Grouting Information Well grouted? YES NO

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? YES NO

Pump
Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity g.p.m
Type

Remarks

Abandoned Wells
Does property have any not in use and not sealed well(s)? YES NO

Variance
Was a variance granted from the MDH for this well? YES NO

Well Contractor Certification
Bergerson-Caswell 27058

License Business Name Lic. or Reg No.

First Bedrock OPVL Aquifer Jordan
Last Strat CSTL Depth to Bedrock 102.00 ft.

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Well Name ST. LOUIS PARK 14 Township Range Dir Section Subsection Field Located MDH 117 21 W 4 CCDACA Elevation 902.00 ft. | Well Depth 485.00 ft Depth Completed 485.00 ft Date Well Completed 1965/02/15 |
|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Well Address ST. LOUIS PARK 14 ST LOUIS PARK MN 55416 Changed Contact Address CITY OF ST. LOUIS PARK ST LOUIS PARK MN 55416 | Drilling Method Cable Tool Drilling Fluid _____ Well Hydrofractured? <input type="checkbox"/> YES <input type="checkbox"/> NO From _____ ft. to _____ Use Community Supply Casing Type Steel (black or low Drive Shoe? <input type="checkbox"/> YES <input type="checkbox"/> NO Hole Diameter (in.) Diameter 16 Depth 389 30.00 in. from 0.00 to 94.00 ft. _____ lbs/ft 24.00 in. from 0.00 to 253.00 ft. _____ lbs/ft 16.00 in. from 0.00 to 389.00 ft. _____ lbs/ft |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Description | Color | Hardness | From | To (ft.) |
|--------------------------|-------|----------|------|----------|
| GLACIAL DRIFT | | | 0 | 94 |
| PLATTEVILLE LIMESTONE | | | 94 | 98 |
| GLENWOOD SHALE | | | 98 | 101 |
| ST. PETER SANDROCK | | | 101 | 265 |
| SHAKOPEE/ONEOTA DOLOMITE | | | 265 | 375 |
| CLEAN COARSE SANDROCK | | HARD | 375 | 410 |
| SANDROCK | RED | V.HARD | 410 | 420 |
| SHALEY SANDROCK | | HARD | 420 | 440 |
| FINE SANDROCK | TAN | HARD | 440 | 450 |
| FINE SANDROCK | WHITE | HARD | 450 | 475 |
| FINE SHALEY SANDROCK | GREEN | HARD | 475 | 485 |

| | |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Static Water Level 80.00 ft. Land surface Date measured 1965/02/15 | Screen No Open Hole(ft.) From 389.0 to 485.0 Make _____ Type _____ Diameter Slot Length Set |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|

| | |
|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pumping Level (below land surface) 129.50 ft. after hrs. pumping 1000.00 g.p.m. | Wellhead Completion Pitless adapter manufacturer _____ Model _____ <input type="checkbox"/> Casing Protection <input type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY) <input type="checkbox"/> Basement offset |
|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Grouting Information Well grouted? <input type="checkbox"/> YES <input type="checkbox"/> NO Material Neat Cement From _____ To _____ ft. 710.00 Sacks | Nearest Known Source of Contamination _____ feet Direction _____ Type _____ Well disinfected upon completion? <input type="checkbox"/> YES <input type="checkbox"/> NO |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Pump <input type="checkbox"/> Not Installed Date Installed _____ Manufacture's name _____ Model number _____ HP 0.00 Volts _____ Length of drop pipe _____ Material _____ Capacity _____ g.p.m. Type _____ | Abandoned Wells Does property have any not in use and not sealed well(s)? <input type="checkbox"/> YES <input type="checkbox"/> NO |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|

| | |
|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> YES <input type="checkbox"/> NO | Well Contractor Certification Bergerson-Caswell 27058 |
|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|

| | |
|--------------------------------------------------|-----------------------------------------------------------------|
| Remarks CEDAR LAKE ROAD & ALABAMA AVE. | License Business Name _____ Lic. or Reg No. _____ |
|--------------------------------------------------|-----------------------------------------------------------------|

| |
|-------------------------------------------------------------------------------------------------------------|
| First Bedrock OPVL Aquifer Jordan Last Strat CSTL Depth to Bedrock 94.00 ft. |
|-------------------------------------------------------------------------------------------------------------|

Appendix C

Aquifer Test Plans



Environmental Health Division
 Drinking Water Protection Section
 Source Water Protection Unit
 P.O. Box 64975
 St. Paul, Minnesota 55164-0975

Determination of Aquifer Properties and Aquifer Test Plan (DAP-ATP) Form

| | | | |
|--------------------------------|--|------------------|--|
| Public Water Supply ID: | | PWS Name: | |
|--------------------------------|--|------------------|--|

Contact Information for Person Completing this Form

| | |
|----------------------------|--|
| Name: | |
| Address: | |
| | |
| City, State, Zip: | |
| Phone, Fax, e-mail: | |

Aquifer Properties Determination Methods

- 1) An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on a well connected to the public water supply system.
- 2) An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on another well in a hydrogeologic setting determined by the department to be equivalent.
- 3) A proposed new test to be conducted on a new or existing well connected to the public water supply system and that meets the requirements for larger-sized water systems (wellhead protection rule part 4720.5520). A test plan must be approved before conducting the test.
- 4) A proposed new test to be conducted on a new or existing public well connected to the public water supply system and that meets the requirements for smaller-sized water systems (wellhead protection rule part 4720.5530). A test plan must be approved before conducting the test.
- 5) An existing pumping test that does not meet the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on: 1) a public water supply well or 2) another well in a hydrogeologic setting determined by the department to be equivalent.
- 6) Existing specific capacity test(s) conducted on the public water supply well(s) or specific capacity tests conducted on other wells in a hydrogeologic setting determined by the department to be equivalent.
- 7) An existing published transmissivity value.
 - Include all test data and analysis documentation with the estimated transmissivity, ft²/day, when the aquifer properties determination method is; 1, 2, 5, 6, or 7, listed above.
 - Attach detailed aquifer test plan for methods 3 or 4.

| | | |
|----------------------|-----------------------|--------------|
| Submitted by: | Prof. License: | Date: |
|----------------------|-----------------------|--------------|

To request this document in another format, please call our Section Receptionist (651/201-4700) or Division TTY (651/201-5797).



Rationale for: 1) Aquifer Properties Determination or 2) Proposed New Test

Briefly describe the rationale for: 1) selected method to determine aquifer properties from existing data, or 2) a new aquifer test to be conducted on the pumped well referenced below. Include unique well numbers of all wells that were (or will be) monitored during data collection. How does the existing or proposed test deviate from the ideal. (e.g. rate, duration, no. of obwells, interfering wells, etc.) Attach documentation as necessary.

| | | | | |
|----------------------|--|----------|------------|----------------|
| Aquifer Name: | | Confined | Unconfined | Fractured Rock |
|----------------------|--|----------|------------|----------------|

Proposed New Test Information Summary

| | | | |
|---------------------------------------------------------------------------------------------------|--|-----------------------------------------|--|
| Pumped Well Name (Unique Number): | | Test Duration (Hours): | |
| Location: X, Y (meters) UTM-Z15N <u>or</u> Lat-Lon (decimal degrees) datum: NAD83 | | Pump Type: | |
| | | Discharge Rate: | |
| Number of Observation Wells: | | Flow Rate Measuring Device Type: | |

- A map showing the location of the pumping well and observation well(s) must be included.

List the unique number of each public water supply well to which this DAP-ATP Form applies

| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| | | |
|---------------------|------------------------------|-----------------------|
| Reviewed by: | Approved: Yes No | Approval Date: |
|---------------------|------------------------------|-----------------------|

Memo



Date: December 13, 2005
To: Steve Robertson / Project File
From: Betty Wheeler
Subject: Pumping Test of St. Louis Park Well 11 (206439) on 10/07/2003
Test ID: 2220

The pumping test performed on Well 11 (206439) was conducted as described below, Tables 1 and 2. The data were analyzed using standard methods cited in the references. Analysis graphs are presented in Appendix 1 and are summarized in Table 3.

Table 1. Aquifer Test Information

| | |
|---------------------------------------|-------------------------------------|
| Test Location | St. Louis Park 11 |
| Well Owner | City of St. Louis Park |
| Test Conducted By | SEH |
| Aquifer | CMTS |
| Confined / Unconfined | Confined |
| Date/Time Monitoring Start | 10/06/2003 09:00:00 (approximately) |
| Date/Time Pump off Before Test | 10/05/2003 afternoon |
| Date/Time Test Start | 10/07/2003 08:41 |
| Date/Time Recovery Start | 10/09/2003 09:21 |
| Date/Time Test Finish | 10/11/2003 11:00 |
| Flow Rate | 1,203 |
| WL Data Collection Method | Pressure transducer / datalogger |
| Number of Observation Wells | 1 |

Test Type:

Constant Rate Variable Rate Recovery Step Drawdown

Other (Describe) _____

Data scanned

Data entered into database

Table 2. Wells Monitored for the Test

| Well Name | Unique Well No. | Radial Distance | Static Water Levels | | | Aquifer |
|------------------------------------------|-----------------|-----------------|---------------------|----------|-------|---------|
| | | | Start | Mid-test | End | |
| Pumped Well: St. Louis Park 11 | 206439 | NA | NA | NA | NA | CMTS |
| Ob Wells: St. Louis Park 17 | 147459 | 5,700 ft. | 385 | 392.6 | 385.2 | CMTS |

Table 3. Analysis Results

| Unique Well No. | Transmissivity ft ² /day | Storage Coefficient | Analysis Method | Time Period Emphasis | Remarks |
|-------------------------------|----------------------------------------|---------------------|-----------------|----------------------|---------|
| Pumped Well: 206439 | NA | NA | | | |
| Ob Wells: 147459 | 1,970 | 1.7E-4 | Theis | Mid- to Late Time | |

Note 1: The water levels in the pumped well (206439) could not be determined because the well's casing was inaccessible.

Note 2: The pressure transducer in the observation well (147459) malfunctioned during the pumping phase of the test, so the data was unusable. The transducer was serviced at that point, so the groundwater level data collected during the recovery phase of the test was usable.

Representative Aquifer Characteristics:

Transmissivity: 1,970 ft²/day

Storage Coefficient: 1.7E-4

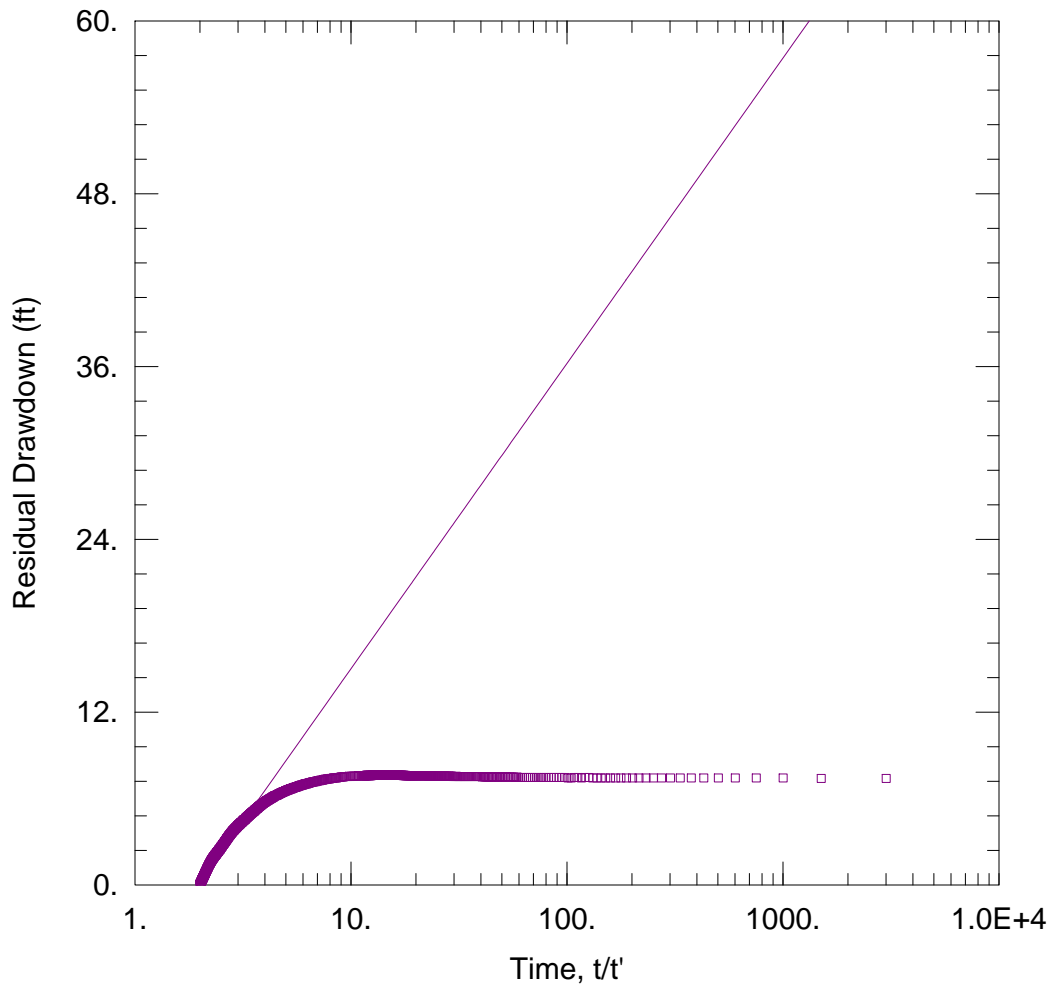
References

Confined Aquifer

Early-Time: (Log-log)

Non-Leaky

Theis, C.V., April 1935, "The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground-Water Storage," Trans. American Geophysical Union, 16th Annual Meeting, pp. 519-24.



CITY OF ST LOUIS PARK

Data Set: O:\...\Pumping Test of St. Louis Park Well 11 (206439) - Obswell Well 17 (147459) - Theis Recovery.ac
 Date: 09/02/14 Time: 08:40:52

PROJECT INFORMATION

Company: SEH
 Project: Mt Simon Aquifer
 Location: City of St Louis Park
 Test Well: Well 11 (206439)
 Test Date: October 9, 2003

AQUIFER DATA

Saturated Thickness: 263. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

| Pumping Wells | | | Observation Wells | | |
|------------------|--------|--------|--------------------|--------|--------|
| Well Name | X (ft) | Y (ft) | Well Name | X (ft) | Y (ft) |
| Well 11 (206439) | 0 | 0 | □ 147459 - Well 17 | 5700 | 0 |

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)
 $T = 1970. \text{ ft}^2/\text{day}$ $S/S' = 1.96$



Environmental Health Division
 Drinking Water Protection Section
 Source Water Protection Unit
 P.O. Box 64975
 St. Paul, Minnesota 55164-0975

Determination of Aquifer Properties and Aquifer Test Plan (DAP-ATP) Form

| | | | |
|--------------------------------|--|------------------|--|
| Public Water Supply ID: | | PWS Name: | |
|--------------------------------|--|------------------|--|

Contact Information for Person Completing this Form

| | |
|----------------------------|--|
| Name: | |
| Address: | |
| | |
| City, State, Zip: | |
| Phone, Fax, e-mail: | |

Aquifer Properties Determination Methods

- 1) An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on a well connected to the public water supply system.
- 2) An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on another well in a hydrogeologic setting determined by the department to be equivalent.
- 3) A proposed new test to be conducted on a new or existing well connected to the public water supply system and that meets the requirements for larger-sized water systems (wellhead protection rule part 4720.5520). A test plan must be approved before conducting the test.
- 4) A proposed new test to be conducted on a new or existing public well connected to the public water supply system and that meets the requirements for smaller-sized water systems (wellhead protection rule part 4720.5530). A test plan must be approved before conducting the test.
- 5) An existing pumping test that does not meet the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on: 1) a public water supply well or 2) another well in a hydrogeologic setting determined by the department to be equivalent.
- 6) Existing specific capacity test(s) conducted on the public water supply well(s) or specific capacity tests conducted on other wells in a hydrogeologic setting determined by the department to be equivalent.
- 7) An existing published transmissivity value.
 - Include all test data and analysis documentation with the estimated transmissivity, ft²/day, when the aquifer properties determination method is; 1, 2, 5, 6, or 7, listed above.
 - Attach detailed aquifer test plan for methods 3 or 4.

| | | |
|----------------------|-----------------------|--------------|
| Submitted by: | Prof. License: | Date: |
|----------------------|-----------------------|--------------|

To request this document in another format, please call our Section Receptionist (651/201-4700) or Division TTY (651/201-5797).



Rationale for: 1) Aquifer Properties Determination or 2) Proposed New Test

Briefly describe the rationale for: 1) selected method to determine aquifer properties from existing data, **or** 2) a new aquifer test to be conducted on the pumped well referenced below. Include unique well numbers of all wells that were (or will be) monitored during data collection. How does the existing or proposed test deviate from the ideal. (e.g. rate, duration, no. of obwells, interfering wells, etc.) Attach documentation as necessary.

| | | | | |
|----------------------|--|----------|------------|----------------|
| Aquifer Name: | | Confined | Unconfined | Fractured Rock |
| | | | | |

Proposed New Test Information Summary

| | | | |
|---------------------------------------------------------------------------------------------------|--|-----------------------------------------|--|
| Pumped Well Name (Unique Number): | | Test Duration (Hours): | |
| Location: X, Y (meters) UTM-Z15N <u>or</u> Lat-Lon (decimal degrees) datum: NAD83 | | Pump Type: | |
| | | Discharge Rate: | |
| Number of Observation Wells: | | Flow Rate Measuring Device Type: | |

▪ A map showing the location of the pumping well and observation well(s) must be included.

List the unique number of each public water supply well to which this DAP-ATP Form applies

| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
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| | | | | |
|---------------------|------------------|-----|----|-----------------------|
| Reviewed by: | Approved: | Yes | No | Approval Date: |
|---------------------|------------------|-----|----|-----------------------|

Memo



Date: May 22, 2014
To: St. Louis Park WHP Project File (PWSID: 1270050)
From: Justin Blum
Subject: Analysis of the Meadowbrook Golf Course 2 (802162) Production and Pumping Tests, May 1 - 6, 2014, Prairie du Chien - Jordan Aquifer

Test No. 2462

The pumping test performed on Meadowbrook Golf Course 2 (802162) was conducted as described below and summarized in Tables 1 and 2. The data were analyzed using standard methods cited in the references. Analysis graphs are presented in Appendix 1 and are summarized in Table 3. Appendix 2 contains observations, field notes, and any other documentation.

Result Summary

Conceptual model: leaky confined - radial porous media flow

Representative aquifer values:

| | | |
|-----------------------------|--------|----------------------|
| Transmissivity (T): | 15,500 | ft ² /day |
| Aquifer Thickness (b): | 254 | Feet |
| Hydraulic Conductivity (k): | 58.9 | ft/day |
| Storativity (S): | 3.1e-4 | |
| Leakage (L): | -- | Feet |
| Hydraulic Resistance (c): | -- | Days |

Boundaries: leakage, fracture/conduit flow

Remarks:

Open conduits and/or bedding-plane fractures within the dolostone - sandstone aquifer transmit pumping stresses very quickly over a wide area. Other pumping wells influence water levels in later portions of test, particularly at the distant obwell. Transmissivity is fairly well constrained, +/- 20%, but there is significant uncertainty in the storativity because of the secondary porosity developed within the aquifer system.

Test Type:

Constant Rate Variable Rate Recovery Step Drawdown Other (Describe)

Data scanned Data entered

Table 1. Aquifer Test Information

| | |
|---------------------------------------|--------------------------------------|
| Test No. | 2462 |
| Test Location | Meadowbrook Golf Course Irrigation 2 |
| Well Owner | Minneapolis Park Board |
| Test Conducted By / For | Traut Well Drilling |
| Aquifer | Prairie du Chien –Jordan |
| Confined / Unconfined | Confined |
| Data Collection Methods | Manual, transducer |
| Number of Observation Wells | 2 |
| Date/Time Monitoring Start | 04/18/2014 12:20 |
| Production Test | |
| Date/Time Start | 05/02/2014 09:49 |
| Step Rates (units) | 500, 800, 1100, 1400, 1700 gpm |
| Step Times | 10:30, 11:30, 12:31, 13:31, 15:03 |
| Date/Time End | 05/02/2014 16:57 |
| Constant Rate Test | |
| Date/Time Pump off Before Test | 05/02/2014 16:57 |
| Date/Time Pumping Start | 05/05/2014 09:30:05 |
| Date/Time Recovery Start | 05/06/2014 09:35:01 |
| Date/Time Test Finish | 05/08/2014 09:10 |
| Flow Rate (units) | 1100 gpm |

Table 2. Wells Monitored During the Test

| Well Name (Unique Well No.) | Radial Distance (feet) | Static Water Levels (feet below measuring point) | | | Change in Water Level (feet) | Aquifer |
|--------------------------------|---------------------------|-----------------------------------------------------|----------|-------|---------------------------------|-----------------------------------|
| | | Start | Mid-test | End | | |
| Pumped Well: | | | | | | |
| GC 2 (802162) | 1 | 82.0 | 95.85 | 89.20 | 13.85 | Prairie du Chien -Jordan |
| Ob Wells: | | | | | | |
| GC 1 (216009) | 133 | 84.60 | 98.16 | 87.00 | 13.56 | Prairie du Chien –St. Lawrence |
| MH (216067) | 2072 | 81.33 | 86.98 | 81.15 | 5.65 | Prairie du Chien -Jordan |

Table 3. Analysis Results

| Transient Analysis | | | | | |
|-------------------------------------------|---------------------------------------------|------------------------------|------------------------|-------------------------|---------------------------------------|
| Well Name (Unique Well No.) | Transmissivity, T (ft ² /day) | Storage Coefficient, S | Analysis Method | Time Period Emphasis | Plot No. Remarks |
| Pumped Well: | | | | | |
| GC 2 (802162) | 12,950 | | Theis | 20-400 minutes | A1-1 poor match |
| Ob Wells: | | | | | |
| GC 1 (216009) | 12,000 | 7.2e-5 | Theis | 20-400 minutes | A1-2 |
| MH (216067) | 18,700 | 2.8e-5 | Theis | 5-400 minutes | A1-3 |
| Distance Drawdown Analysis | -- | -- | Theis t/r ² | pumping | A1-4 poor match to Theis curve |
| | 18,700 | 2.8e-5 | Theis t/r ² | Pumping | A1-5 adjusted radial distance |
| GC 1 (216009) | 15,600 | 1.6e-5 | Cooper-Jacob | 2-400 minutes | A1-6 projected drawdown to 10k min |
| GC 2 (216009) GC 1 (216009) | 15,470 | 3.1e-4 | Agarwal recovery | 2-300 | A1-9, r = 20 ft. |

| Steady-state Analysis | | | | |
|---------------------------------------------|----------------------------------------|--------------------------------------|--------------------|---------------------------------------|
| Transmissivity, T (ft ² /day) | Characteristic Leakage, L (feet) | Hydraulic Resistance, c (days) | Analysis Method | Plot No. Remarks |
| 10,900 | 13,500 | 16,800 | de Glee | A1-7, low T - unreasonable large L |
| 19,200 | 47,000 | 114,800 | de Glee | A1-8, reasonable T - absurdly large L |

Test Description

Purpose of test: production and constant rate tests were performed by Traut Well to qualify a new irrigation well for Meadowbrook Golf Course, St. Louis Park. The MDH Source Water Protection Unit considered the test of this new well to be a rare opportunity to support wellhead protection efforts of St. Louis Park and adjacent communities.

Test setup: Traut monitored the new irrigation well manually and with a transducer during the tests. Two existing wells were instrumented with transducer-data logger equipment by MDH for water level monitoring, Table 2 and Appendix 2.

Hydrogeologic setting: leaky confined bedrock aquifer, fractured and karsted. The Prairie du Chien-Jordan Aquifer System is extensively used for drinking water and industrial/commercial supply in Hennepin County.

Well construction: the well was blasted and bailed during construction and development to enhance the production capability. Approximately 150 to 200 cubic yards of sand were removed from the borehole, resulting in an effective radius of the pumped well that is substantially larger than the original borehole radius.

Other interfering wells: because of the heavy use of the Prairie du Chien-Jordan Aquifer System, the daily fluctuation in static water levels is large - even in times of low demand. Therefore, a 'static' level is known only within a reasonable range in this aquifer system. The long pre-test monitoring record from the Methodist Hospital well (216067) documents this variability. During the fourteen days prior to the test, the mean water elevation in this

well was 808.9 ft. (MSL). The daily variation in water elevation was +/- 0.78 feet with a standard deviation of 0.39 feet.

Weather conditions: a large precipitation event, 3+ inches of rainfall, occurred during the pre-test monitoring period. This recharge event is reflected in the arithmetic plot of water elevations, Appendix 2. Total April precipitation in the Metro Area was the second highest on record. During the test period the weather was clear and cool.

Data collection, reporting, and analysis:

Data were collected with little problem from wells that were accessible for measurement. Time synchronization between the three data loggers was the most problematical issue. In the field, time of day of the Traut data logger differed from MDH time by more than 8 minutes. However, this was corrected by Traut when the data were transferred from the data logger. The subsequent adjustment to match time of MDH loggers (GPS-time) was small, +13 seconds.

Cable stretch of transducers was on the order of 0.2 feet and could be assumed to have occurred before the start of the test because of the influence of the production (step) test on transducer position within the vent tube and the length of pre-test monitoring.

There is intimate connection between the pumped well and the nearest obwell that complicates the analysis of these data. The obwell reacted within tenths of seconds to any disturbance in the pumped well. This is assumed to result from conduits within the Prairie du Chien Group, bedding-plane fractures, and well development techniques employed by the drillers.

Transient analyses

- These analyses generally show the expected increase in transmissivity with radial distance from the pumped well. However, the storage coefficient calculated from transient methods (plots A1-1, 6) of 10^{-5} is representative of a highly confined system. The leaky system that is known to exist in this area is expected to produce storativity values in the range of 10^{-4} . Also, a storativity of 10^{-5} is sufficiently isolated from precipitation events that no detectable recharge should occur as a result of infiltration. This is contradicted by pretest monitoring data, Appendix 2.
- The poor match to the Theis curve on A1-4 demonstrates 1) the enhanced efficiency of the pumped well and 2) the apparent negative efficiency in the nearby obwell. Both of these effects are removed when an identical radial distance of 20 feet is used to adjust the plots, A1-5. This is a further demonstration of the interconnection of the boreholes.
- The response in the most distant obwell determines the storage coefficient on plot A1-5. In order to obtain a minimum reasonable storage coefficient of 10^{-4} , this well would have to be located ~700 feet from the pumped well, 1/3 of the actual radial distance. The magnitude of this difference in length indicates an inhomogeneity which can have a large scale effect such as; conduit flow and/or bedding-plane fractures, rather than grain-size variation or other types of depositional fabric which tend to have more local effects.

Steady-state analyses

- For the steady-state analysis, drawdown was projected to 10,000 minutes of pumping, plot A1-6. These values were used for the distance-drawdown plots, A1-7 & 8. The steady-state analyses are problematical. On A1-7, when actual radial distance is used – T is unrealistically low and the characteristic leakage factor is quite large for this setting; neither value is acceptable. Whereas on A1-8, the T is reasonable but the leakage factor is truly unreasonably large (physically impossible).

The recovery analysis, plot A1-9, produces a more reasonable transmissivity and storage coefficient that is considered representative of the aquifer properties in this area, assuming a radial distance of 20 feet. However, the characteristic leakage factor is not provided by this type of analysis.

Evaluation of Test Results

Hydraulic response affected by:

- Well construction techniques and the geological character of aquifer materials cause a very large effective radius of the pumped well;
- The connection between the pumped well and nearest obwell was such that the hydraulic response of the obwell was essentially identical to that of the pumped well, even though the radial distance between the wells was 133 feet.
- Open conduits and/or bedding-plane fractures within the dolostone - sandstone aquifer transmit pumping stresses very quickly over a wide area.
- Other pumping wells influenced water levels in later portions of test, particularly at the distant obwell.

Consistency with conceptual model:

Neither of the distance-drawdown analyses can be considered to produce reasonable results because the storage coefficient and characteristic leakage factor are representative of more highly confined systems. In a highly confined system, pumping stress is transmitted very efficiently over a wide area. In Hennepin County, this aquifer system is leaky (semi-confined). Therefore, modification of both the transient or steady-state conceptual models to incorporate fracture/conduit flow is required to accurately represent aquifer conditions within the Prairie du Chien –Jordan system.

The fact that the standard porous media conceptual models do not produce consistent results implies a low level of confidence for predictive modeling of this aquifer system, particularly when flow models do not incorporate other flow types. Improved understanding of this flow system (fracture flow analysis) is not possible without many more wells and a great deal of testing.

Representative aquifer properties best represented by: the Agarwal recovery analysis, plot A1-9. Based on this storativity and other tests performed in this aquifer system, the characteristic leakage factor is roughly estimated to be in the range of 1000 to 3000 feet and certainly no larger.

References:

Agarwal, R.G., (1980) A new method to account for producing time effects when drawdown type curves are used to analyze pressure buildup and other test data. SPE Paper 9289, presented at the 55th SPE Annual Technical Conference and Exhibition, Dallas, Texas, September 21–24, 1980.

Cooper, H.H. and Jacob, C.E. (1946) A Generalized Graphical Method for Evaluating Formation Constants and Summarizing Well-filed History, Trans. American Geophysical Union, V. 27, pp. 526 – 534.

deGlee, G. (1930) Over grondwaterstromingen bij wateronttrekking door middle van putten. Ph.D. thesis, Delft Technische Hogeschool, Delft.

Jacob, C. E., (1947) Drawdown Test to Determine the Effective Radius of Artesian Wells, Trans. ASCE, pp.1047-70

deGlee Method [English] in:

Kruseman and De Ridder, (1991) Analysis and Evaluation of Pumping Test Data (2nd Edition), Publication 47, International Institute for Land Reclamation and Improvement, P.O. Box 45, 6700 AA Wageningen, The Netherlands, pp. 76-78.

Hantush, M. S., (1960) Modification of the Theory of Leaky Aquifers, Journal of Geophysical Research, Vol. 65, pp. 3713-25.

Theis, C. V., (1935) The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground-Water Storage, Trans. American Geophysical Union, 16th Annual Meeting, April, 1935, pp. 519-24.

Appendix 1

Graphical Analysis

MDH Test No: 2462
 Pumped Well: GC 2 (802162)
 Obwell: --
 Test Date: 5/5/2014
 Data Series: Composite pumping and recovery
 Discharge Rate (gpm): 1100
 Radial Distance (feet): 20

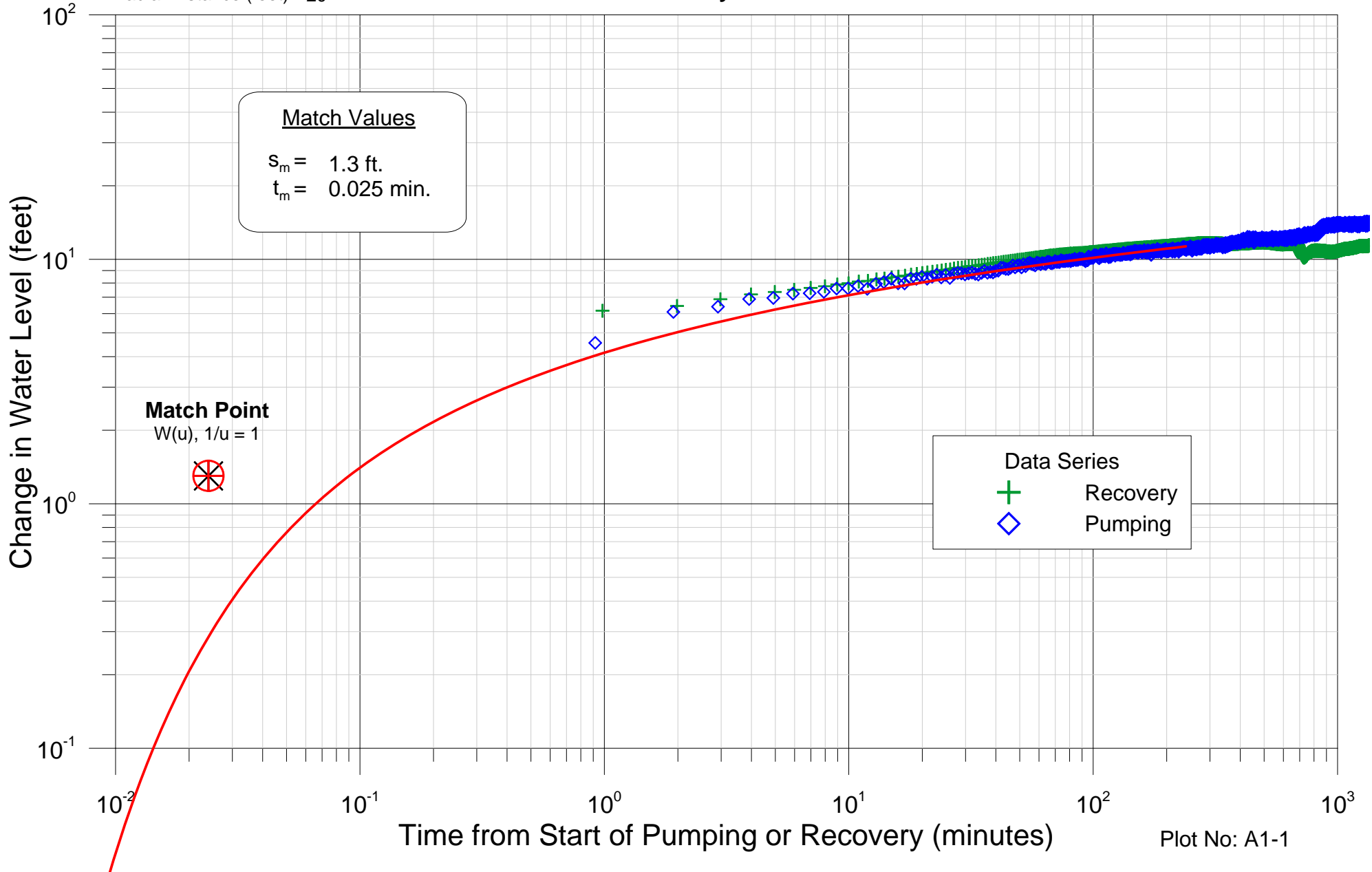
$$T = 15.3 \cdot Q \cdot W_{(u)} / s_m$$

$$S = T \cdot t_m \cdot 1/u / r^2 \cdot 360$$

$$T = 15.3 \cdot 1100 / 1.3 = 12946.2 \text{ ft}^2/\text{day}$$

$$S = \text{Not Applicable}$$

Theis Analysis



MDH Test No: 2462
 Pumped Well: GC 2 (802162)
 Obwell: GC 1 (216009)
 Test Date: 5/5/2014
 Data Series: Composite pumping and recovery
 Discharge Rate (gpm): 1100
 Radial Distance (feet): 133

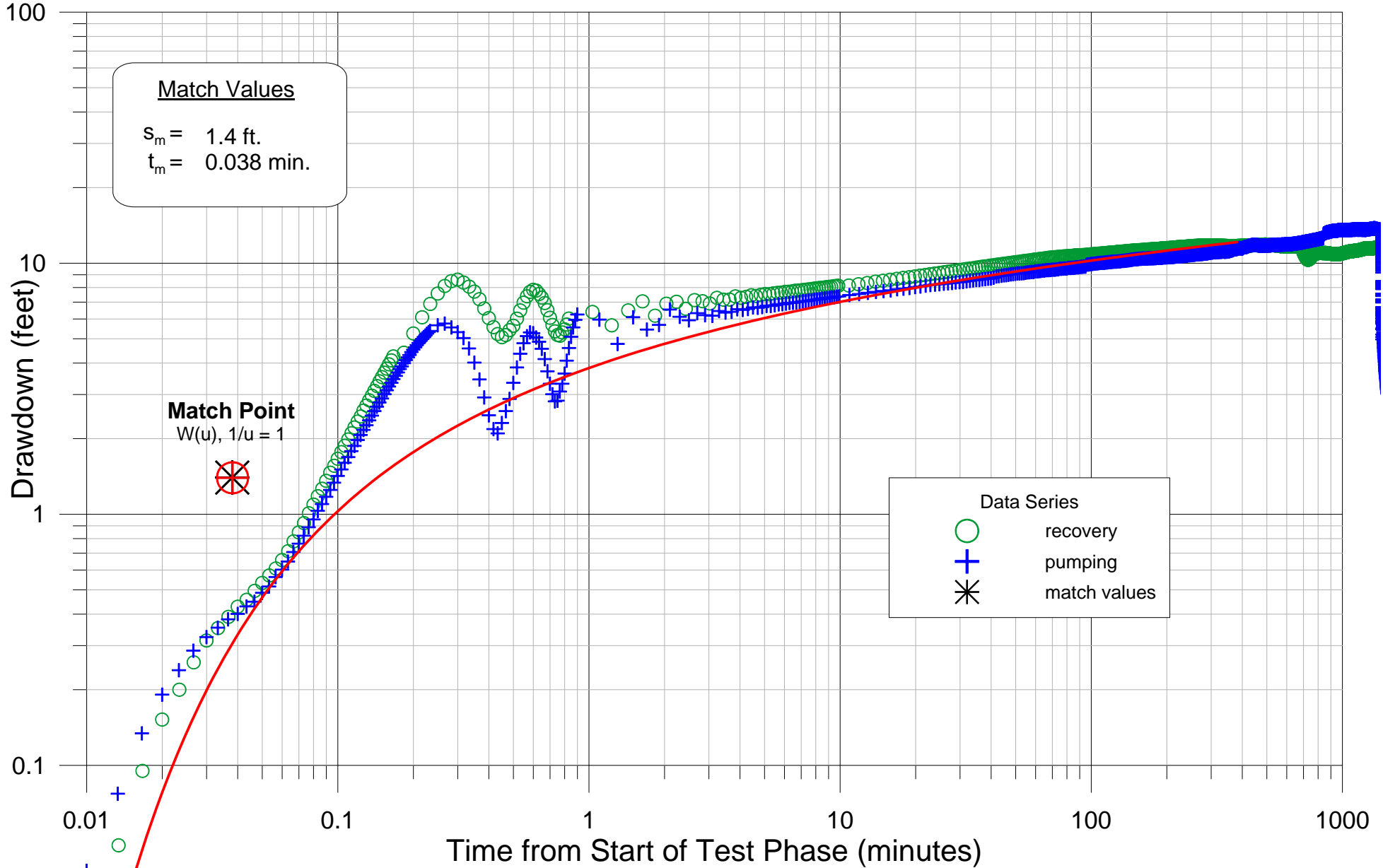
$$T = 15.3 \cdot Q \cdot W_{(u)} / s_m$$

$$S = T \cdot t_m \cdot 1/u / r^2 \cdot 360$$

$$T = 15.3 \cdot 1100 / 1.4 = 12021.4 \text{ ft}^2/\text{day}$$

$$S = 12021.4 \cdot 0.038 / (133^2 \cdot 360) = 7.17355e-005$$

This Analysis



MDH Test No: 2462
 Pumped Well: GC 2 (802162)
 Obwell: MH (216067)
 Test Date: 5/5/2014
 Data Series: Composite pumping and recovery
 Discharge Rate (gpm): 1100
 Radial Distance (feet): 2072

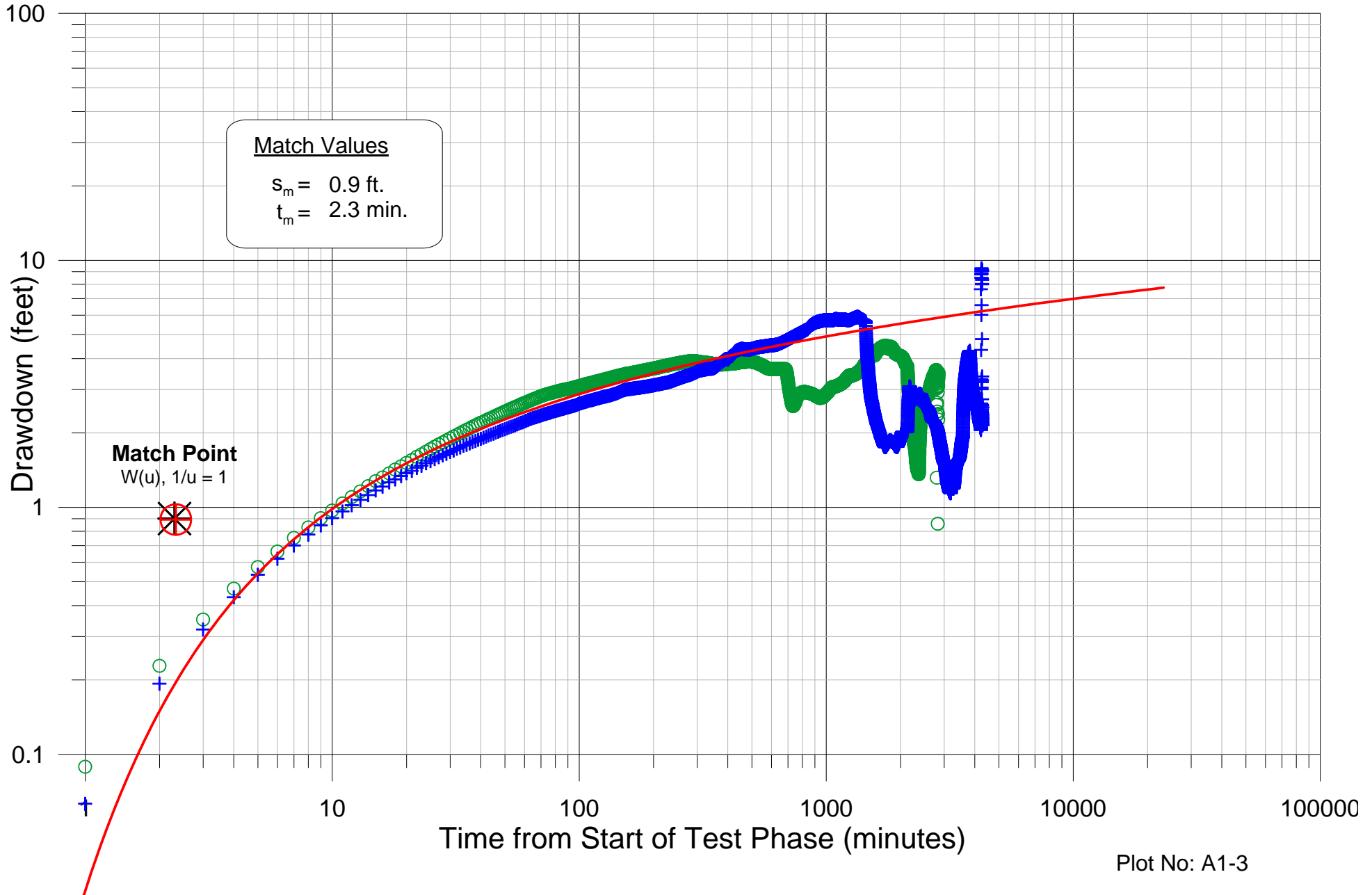
Theis Analysis

$$T = 15.3 \cdot Q \cdot W(u) / s_m$$

$$S = T \cdot t_m \cdot 1/u / r^2 \cdot 360$$

$$T = 15.3 \cdot 1100 / 0.9 = 18700 \text{ ft}^2/\text{day}$$

$$S = 18700 \cdot 2.3 / (2072^2 \cdot 360) = 2.78283e-005$$

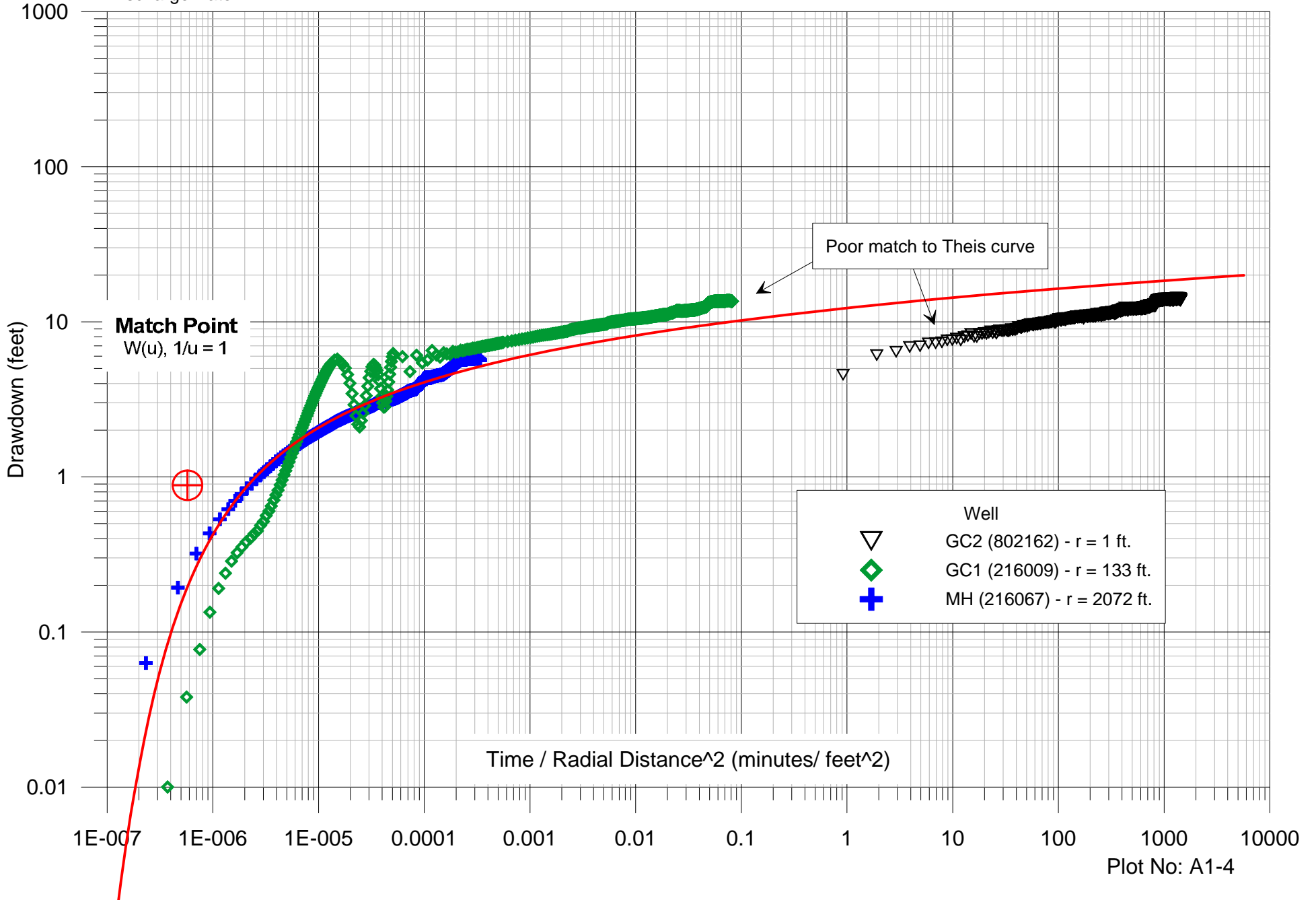


MDH Test No: 2462
 Pumped Well: GC 2 (802162)
 Test Date: 5/5/2014
 Data Series: Pumping
 Discharge Rate: 1100

Theis Distance-Drawdown Analysis - actual radial distance

$$T = 15.3 \cdot Q \cdot W(u) / s_m$$

$$S = T \cdot t_m \cdot 1/u / 360$$



MDH Test No: 2462
 Pumped Well: GC 2 (802162)
 Test Date: 5/5/2014
 Data Series: Pumping
 Discharge Rate: 1100

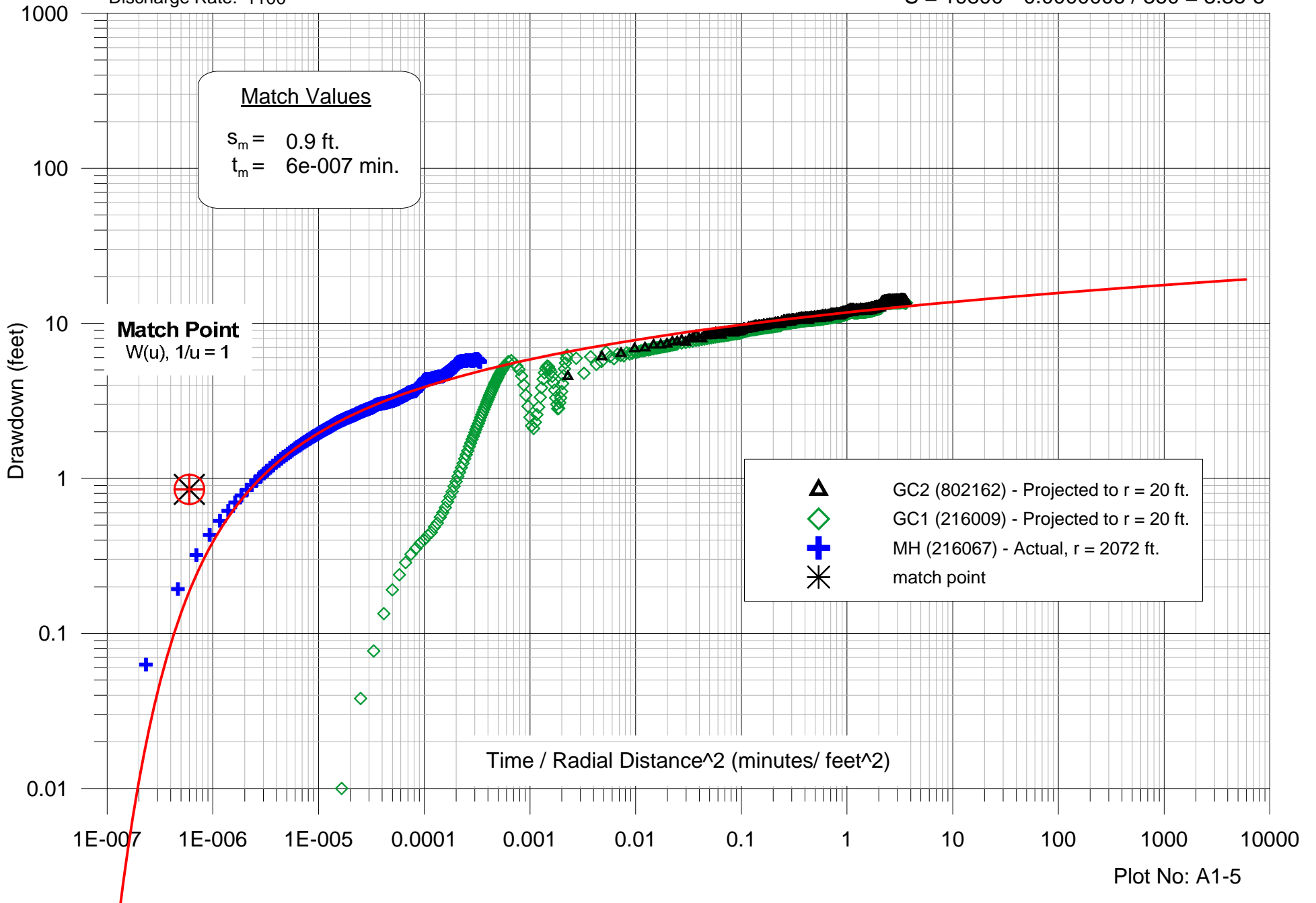
Theis Distance-Drawdown Analysis Projected to r = 20 ft.

$$T = 15.3 \cdot Q \cdot W(u) / s_m$$

$$S = T \cdot t_m \cdot 1/u / 360$$

$$T = 15.3 \cdot 1100 / 0.9 = 19800 \text{ ft}^2/\text{day}$$

$$S = 19800 \cdot 0.0000006 / 360 = 3.3 \cdot 10^{-5}$$



MDH Test No: 2462
 Pumped Well: GC 2 (802162)
 Test Date: 5/5/2014
 Data Series: Pumping
 Discharge Rate: 1100 gpm

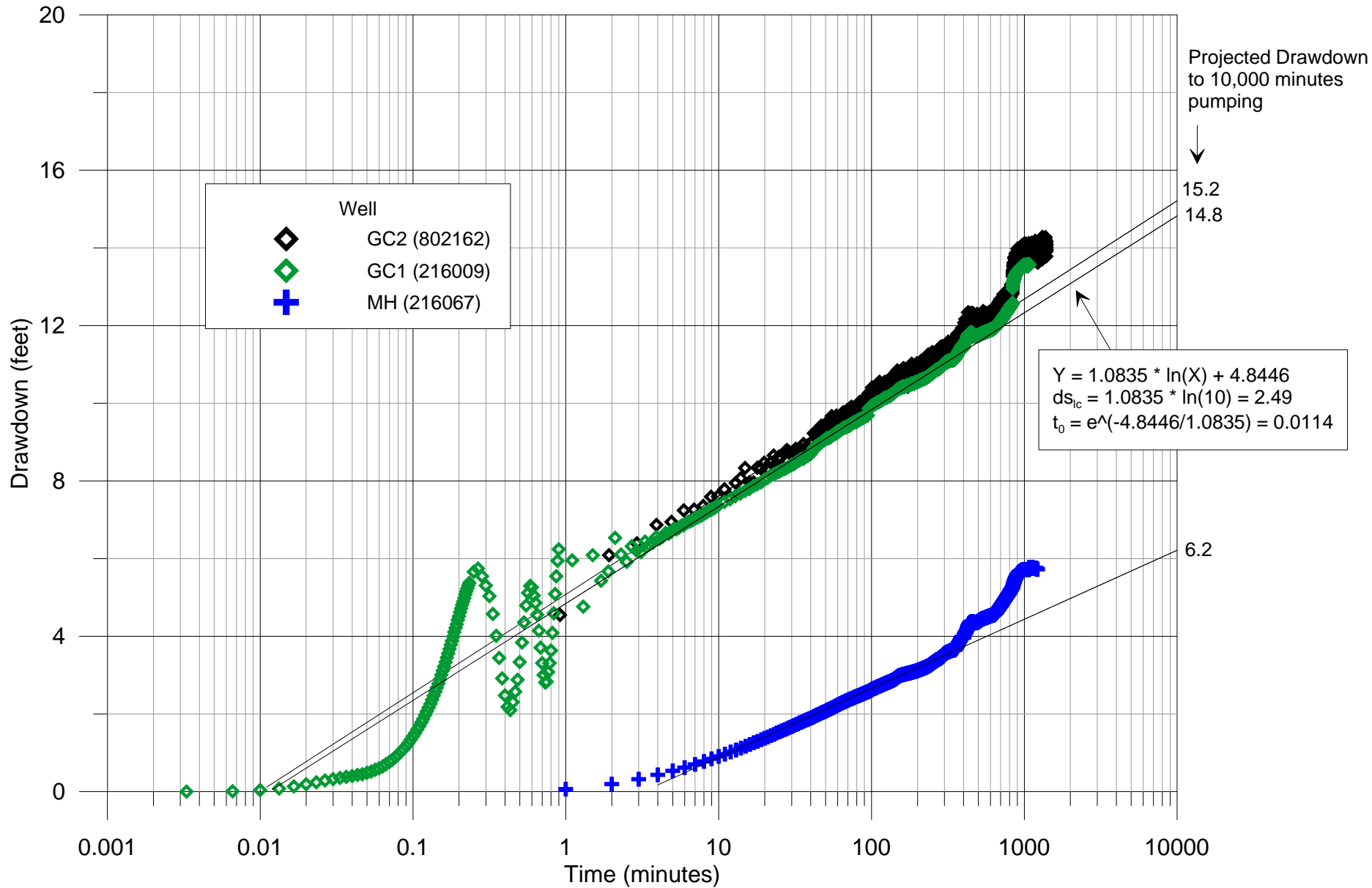
$$T = (2.303 * 1440 / 7.48 / 4 / \pi()) * Q / ds'_{ic}$$

$$S = T * t_0 / (r^2 * 640)$$

$$T = 35.3 * 1100 / 2.49 = 15600 \text{ ft}^2/\text{day}$$

$$S = 15600 * 0.01143 / (133^2 * 640) = 1.6e-5$$

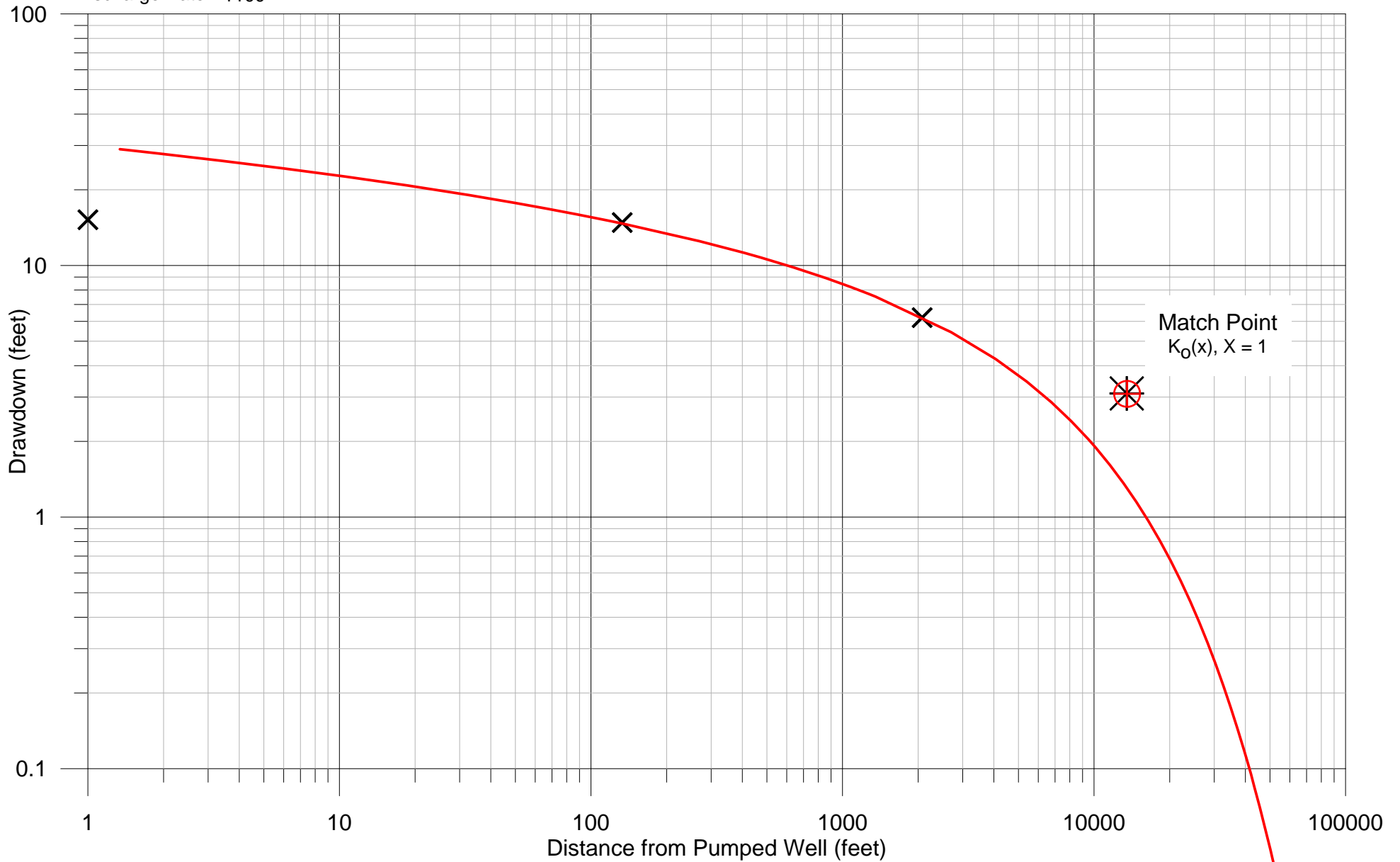
Cooper-Jacob Analysis



MDH Test No: 2462
Pumped Well: GC 2 (802162)
Test Date: 5/5/2014
Data Series: Pumping
Discharge Rate: 1100

de Glee Analysis projected pumping to 10,000 minutes

$T = 30.6 \cdot 1100 / 3.1 = 10858.1 \text{ ft}^2/\text{day}$
 $L = 13500$
 $c = (13500^2 / 10858.1) = 16784.8 \text{ days}$

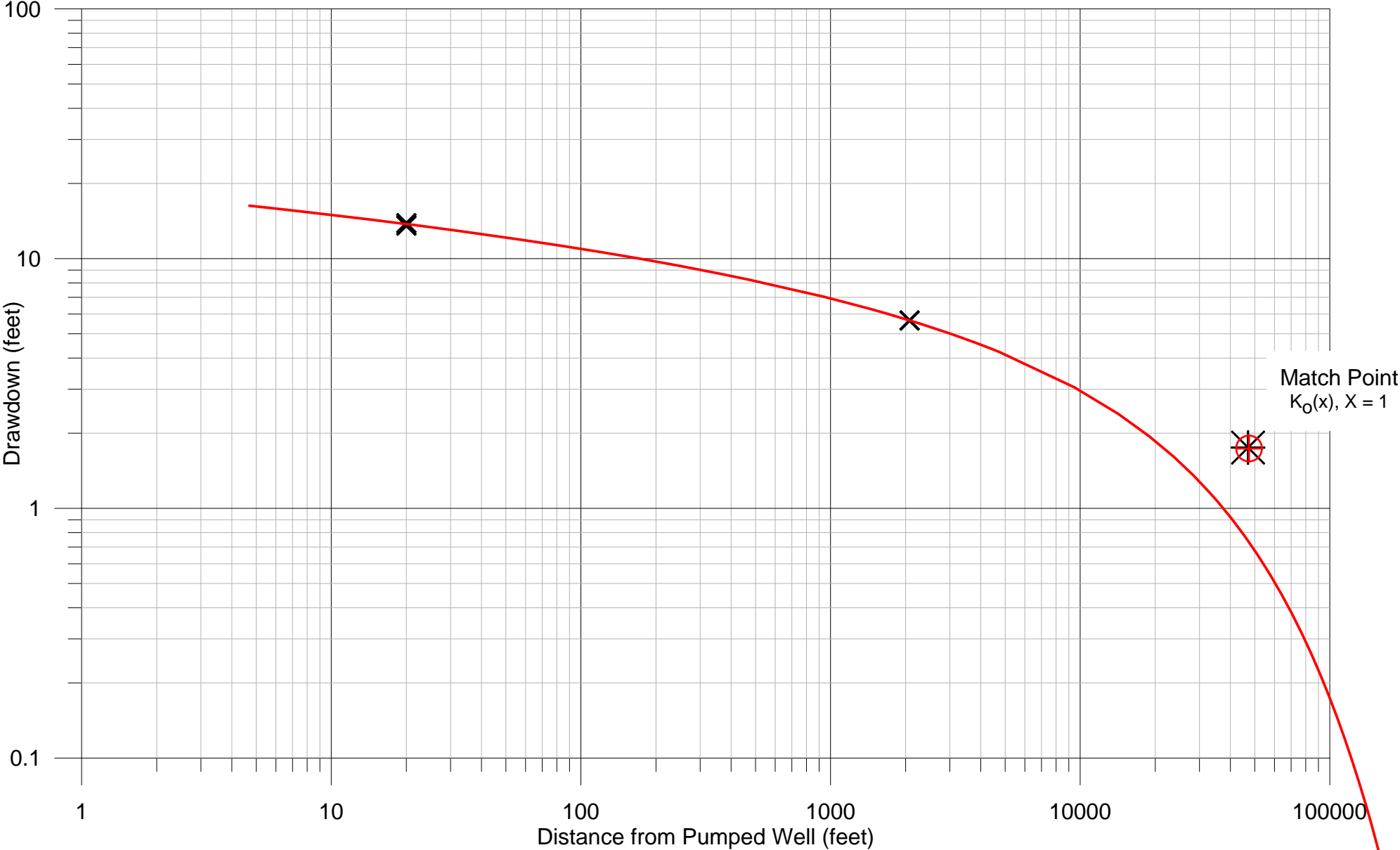


Plot No: A1-7

MDH Test No: 2462
Pumped Well: GC 2 (802162)
Test Date: 5/5/2014
Data Series: Pumping
Discharge Rate: 1100

de Glee Analysis
adjusted radial distance and
projected pumping to 10,000 minutes

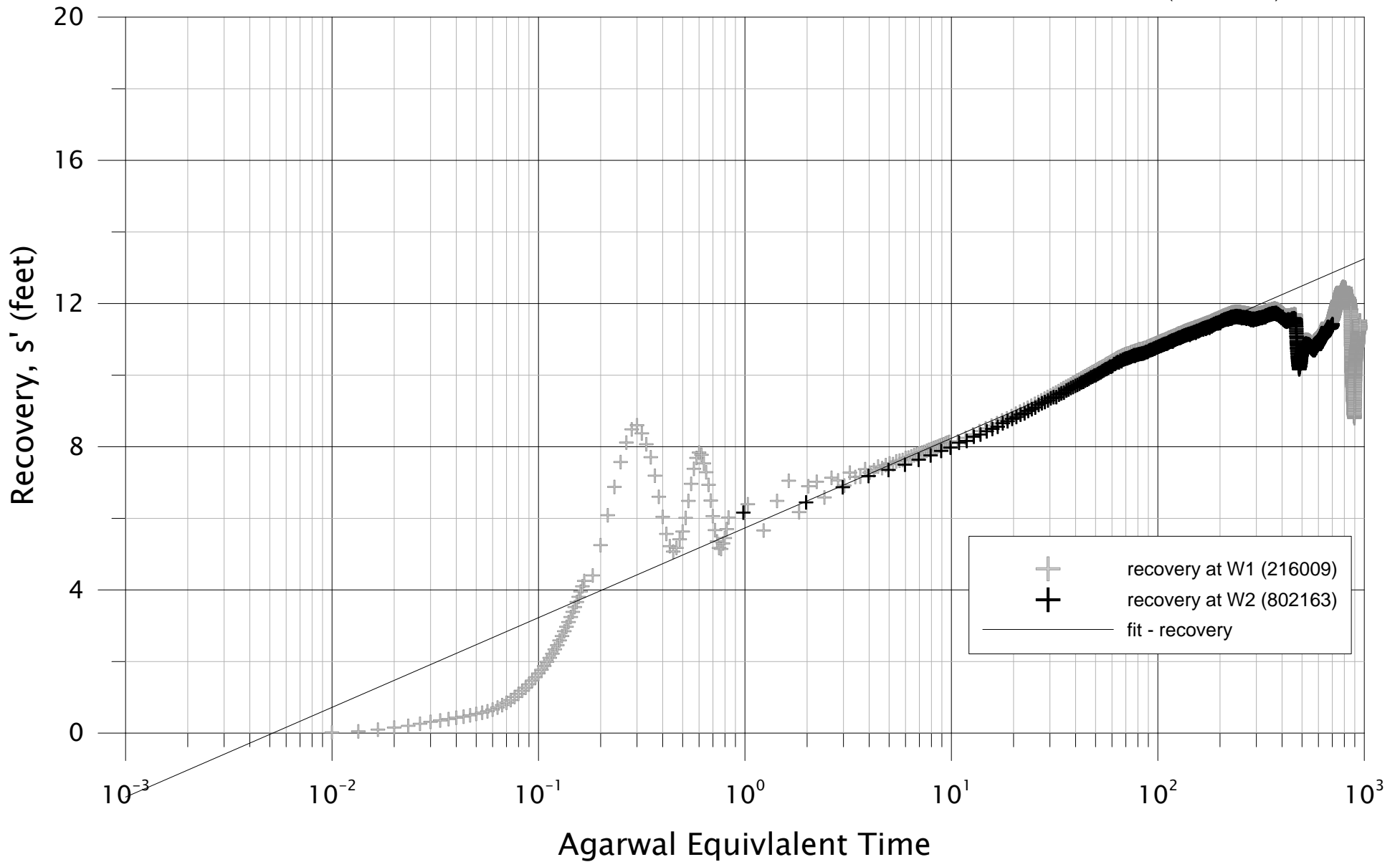
$T = 30.6 \cdot 1100 / 1.75 = 19234.3 \text{ ft}^2/\text{day}$
 $L = 47000$
 $c = (47000^2 / 19234.3) = 114847 \text{ days}$



$Q = 1100 \text{ gpm}$
 $\text{Fit} = 1.0884 * \ln(X) + 5.7296$
 $ds'_{1C} = 1.0884 * \ln(10) = 2.51$
 $t_0 = e^{(-5.7296/1.0884)} = 0.00517$

Test of Meadowbrook 2 (802162)
05/05/2014
Recovery

$T = (2.303 * 1440 / 7.48 / 4 / \pi()) * Q / ds'_{1C}$
 $S = 2.25 * T * t_0 / (r^2 * 1440)$
 $T = 35.3 * 1100 / 2.51 = 15470 \text{ ft}^2/\text{day}$
 $S = 2.25 * 15470 * 0.00517 / (20^2 * 1440) = 3.1e-4$



t_p = pumping time (fixed), t' = elapsed recovery time
 $(t_p * t') / (t_p + t')$

Plot No: A1-9

Appendix 2

Documentation

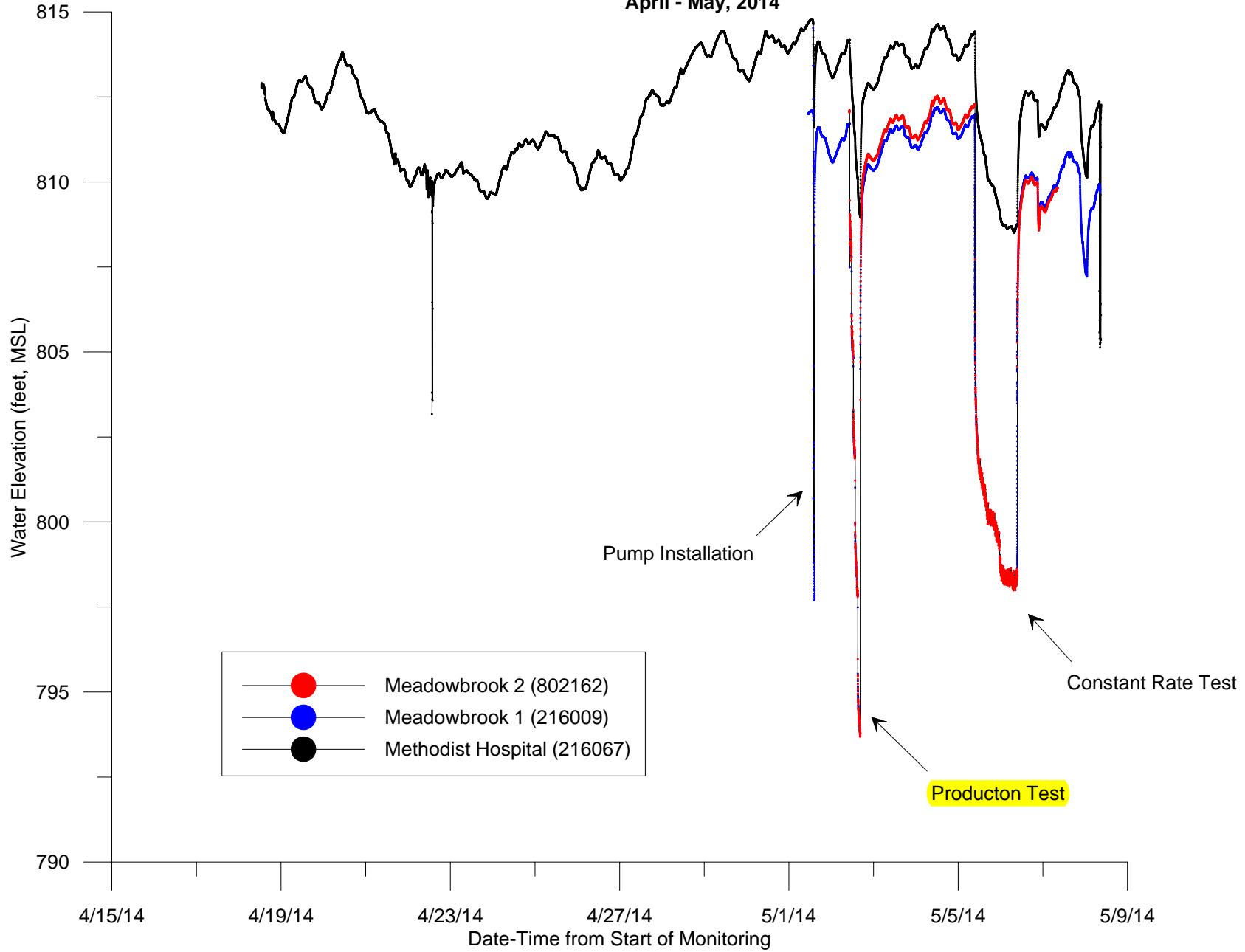
| A – Test Information | | |
|------------------------------------------------------------|---------------------------------------------|-------------------------------------------------------|
| Test Location Meadowbrook Golf Course 2 | Well Owner Minneapolis Park Board | Test Conducted By Traut Well Drilling / MDH |
| Aquifer Prairie du Chien-Jordan | Confined/Unconfined confined | Flow Rate (Units) 1100 gpm |
| Date/Time - Monitoring Start 04/18/2014 12:51:06 | Pump Type submersible | Flow Rate Measuring Device turbine |
| Date/Time - Test Start 05/05/2014 09:30:05 | Drop Pipe Length (Pump Intake) | Totalizer: End 68535050 |
| Date/Time - Recovery Start 05/06/2014 09:35:01 | Pumped Well Inner Casing Diameter | Totalizer: - Start 66926450 |
| Date/Time - Test Finish 05/08/2014 09:10 | Pump Pre-lube Time: NA | = Total Pumped (Units) 1608600 |

| B – Well Information | | | | | | | | |
|-----------------------------------------|-------------|--------------|------------------------------|---------------------------------------------|-------------------------------------------------|------------------------------|------------|--------------------------------------|
| Well Name (Unique Number) | Location | | Radial Distance (feet) | Ground Surface Elevation (ft.) GSE | Measuring Point Desc. GSE + (stick-up) | Open Interval (feet, MSL) | | Aquifer |
| | Easting (m) | Northing (m) | | | | from | to | |
| Meadowbrook GC 2 (802162) | 417218 | 4974638 | ~20 | 894.5 | + 3.27 ft. Vent Tube | from to | 634 380 | Prairie du Chien - Jordan |
| Meadowbrook GC 1 (216009) | 417229 | 4974599 | 133 | 893.6 | +~ 1 ft. Vent Tube | from to | 582 337 | Prairie du Chien –St. Lawrence |
| Methodist Hospital (216067) | 417392 | 4975245 | 2072 | 891.1 | +~ 2 ft. Vent Tube | from to | 636 406 | Prairie du Chien - Jordan |
| | | | | | | from to | | |
| | | | | | | from to | | |

| C – Data Collection | | | | | | | | |
|-----------------------------------------------------------|--------------------------|---------------------------|--------------|-----------------------|--------------|--------------------------------------------------|--------------|---------------|
| Data File Name: <small>Well Name_Unique Number</small> | Data Logger Type, SN: | Probe Id., Range (psi) | Installation | | Removal | | Difference | |
| | | | Static WL | Transducer Setting | Static WL | Transducer Setting | Static WL | XD Setting |
| GC2_802162.xlsx | Traut in-situ troll | SN:118832 100 psi | 82 | 181.8 | | | | |
| GC1_216009.xlsx | MDH box 3 Hermit 1K | 9 - 30 psi | 84.60 | -55.72 | 87.00 | XD _r -53.85 XD _o -53.52 | 2.40 | 2.20 |
| MH_216067.xlsx | MDH box 5 Hermit 3K | 4 - 20 psi | 81.33 | -19.57 | 81.15 | XD _r -19.81 XD _o -same | -0.17 | 0.24 |
| | | | | | | | | |

Test Notes: 150 to 200 yd³ blasted & bailed from well during development. GSE from Lidar +1 ft. to account for fill at wellhead for drilling platform.

Production Test Data
Meadowbrook Golf Course Irrigation Well 2 (802162)
April - May, 2014



STEP TESTPROJECT: MEADOWBROOK GOLF COURSEWell # N/AUniq # 802162Test By: BRIAN TRAUTJob # 3010588Meter Reading Beginning: 66504500Meter Reading Ending: 66926500**Well Information:**Transducer set at: 181.8 ft. (From Grade)Length of Casing: 260' from gradeLength of Screen: N/A Hp of Pump: 150Total Well Depth: 465' Model of Pump: AMERICAN MARSHStatic Water Level: 82.2' ft (From Grade)Well Capacity: 1700 GPM @ 101 PWL 89 G.P.F.D.D.

Page 1 of 2

| Date | Time | AM | PM | GPM | PWL | Sand/Gal | COMMENTS |
|-----------------|-------|----|----|------|-------|------------------|------------------|
| <i>1/2/2001</i> | 12:34 | X | X | 123 | 12'3" | 4" c/g | This is a sample |
| 5/2/2014 | 9:49 | X | | | | | |
| | 10:30 | X | | 500 | | | |
| | 10:36 | X | | | | clear/few grains | |
| | 10:40 | X | | | 85.35 | | |
| | 10:54 | X | | | 85.65 | | |
| | 11:00 | X | | | 85.85 | | |
| | 11:15 | X | | | 86.00 | | |
| | 11:30 | X | | 800 | 88.70 | clear/few grains | |
| | 11:41 | X | | | 89.08 | | |
| | 12:29 | | X | | 89.61 | | |
| | 12:31 | | X | 1100 | | | |
| | 12:35 | | X | | 91.46 | clear/few grains | |
| | 12:40 | | X | | 91.69 | | |
| | 1:00 | | X | | 92.14 | | |
| | 1:16 | | X | | 92.59 | | |
| | 1:29 | | X | | 92.45 | | |
| | 1:31 | | X | 1400 | | | |
| | 1:35 | | X | | 94.96 | clear/few grains | |
| | 1:47 | | X | | 95.62 | | |
| | 2:09 | | X | | 95.80 | | |
| | 2:12 | | X | | 95.00 | | |
| | 2:24 | | X | | 95.99 | | |
| | 2:31 | | X | | 95.98 | | |
| | 2:36 | | X | | 96.04 | | |

The data stated above is representative of the time spent pumping at the capacities stated. Deviation from either time spent pumping or both could change the outcome if these results.

NOTE: On RECOVERY need: 5-1 minute checks
5-5 minute checks

2-30 minute checks
1-per hour as needed

Notes:

Minnesota Unique Well No.

802162

County Hennepin
 Quad Minneapolis South
 Quad ID 104A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD

Entry Date 03/26/2014
 Update Date 04/21/2014
 Received Date

Minnesota Statutes Chapter 103I

| | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Well Name MEADOWBROOK GOLF COURSE Township Range Dir Section Subsections Elevation 893.5 ft. 117 21 W 20 DACCAD Elevation Method LiDAR 1m DEM (MNDNR) | | Well Depth 465 ft. Depth Completed 465 ft. Date Well Completed |
| Drilling Method -- | | Drilling Fluid -- Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From Ft. to Ft. |
| Use Irrigation | | Casing Type Steel (black or low carbon) Joint Welded Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> No Above/Below ft. |
| Geological Material Color Hardness From To | Casing Diameter Weight Hole Diameter 18 in. to ft. lbs./ft. 24 in. to ft. lbs./ft. | Open Hole from ft. to ft. |
| | Screen NO Make Type Diameter Slot/Gauze Length Set Between | Static Water Level 104 ft. from Land surface Date Measured 04/01/2014 |
| | PUMPING LEVEL (below land surface) ft. after hrs. pumping g.p.m. | Well Head Completion Pitless adapter manufacturer Model <input type="checkbox"/> Casing Protection <input type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY) |
| | REMARKS GAMMA, CALIPER, & MULTI TOOL LOGGED 4-1-2014. M.G.S. NO. 5385. LOGGED FOR COUNTY ATLAS. 0-71 QUUU, 71-81 OPVL, 81-87 OGWD, 87-253 OSTP, 253-375 OPDC, 375-469 CJDN. | Grouting Information Well Grouted? <input type="checkbox"/> Yes <input type="checkbox"/> No |
| | Located by: Minnesota Geological Survey Method: Digitization (Screen) - Map (1:24,000) Unique Number Verification: Information from owner Input Date: 04/02/2014 System: UTM - Nad83, Zone15, Meters X: 471218 Y: 4974638 | Nearest Known Source of Contamination _feet _direction _type Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Pump <input type="checkbox"/> Not Installed Date Installed Manufacturer's name Model number __ HP _ Volts Length of drop Pipe _ft. Capacity _g.p.m Type Material | Abandoned Wells Does property have any not in use and not sealed well(s)? <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Cuttings Yes Borehole Geophysics Yes First Bedrock Aquifer Last Strat Depth to Bedrock ft. | Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| County Well Index Online Report | Well Contractor Certification Mark J Traut Wells, Inc. 1404 BRIAN/JOSH License Business Name Lic. Or Reg. No. Name of Driller | |

802162

Printed 5/7/2014
 HE-01205-07

| | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------|
| Well Name MEADOWBROOK GOLF COURSE Township Range Dir Section Subsection Field Located MGS 117 21 W 20 DACDD Elevation 890.00 ft. | Well Depth 502.00 ft Depth Completed 502.00 ft | Date Well Completed 1935/06/27 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------|

| | |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Well and Contact Address MEADOWBROOK GOLF COURSE ST LOUIS PARK MN Changed | Drillhole Angle Drilling Method Cable Tool Drilling Fluid Well Hydrofractured? <input type="checkbox"/> YES <input type="checkbox"/> NO From ft. to Use Public Supply/non-community Casing Type Steel (black or low Drive Shoe? <input type="checkbox"/> YES <input type="checkbox"/> NO) Hole Diameter (in.) Diameter 12 Depth 257 12.00 To 502.0 16.00 in. from 0.00 to 77.00 ft. lbs/ft 12.00 in. from 77.00 to 257.00 ft. lbs/ft |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Description | Color | Hardness | From | To (ft.) |
|----------------------|-------|----------|------|----------|
| COARSE SAND & GRAVEL | | | 0 | 74 |
| LIMEROCK | | | 74 | 82 |
| SHALE | | | 82 | 90 |
| SANDROCK | | | 90 | 92 |
| SANDROCK | | | 92 | 190 |
| SHALE | RED | | 190 | 200 |
| SANDROCK | | | 200 | 252 |
| SHAKOPEE DOLOMITE | | | 252 | 253 |
| SHAKOPEE DOLOMITE | | | 253 | 375 |
| SANDROCK | | | 375 | 376 |
| SANDROCK | | | 376 | 440 |
| SANDROCK & SHALE | | | 440 | 465 |
| SHALE | GRAY | | 465 | 502 |

| | |
|-----------------------------------------------------------------------|-------------------------------------------|
| Screen No Make _____ Type _____ Diameter Slot Length Set | Open Hole(ft.) From 257.0 to 502.0 |
|-----------------------------------------------------------------------|-------------------------------------------|

| | |
|------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Static Water Level 55.00 ft. Land surface Date measured 1935/06/27 | Pumping Level (below land surface) ft. after hrs. pumping g.p.m. |
|------------------------------------------------------------------------------|----------------------------------------------------------------------------|

| |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wellhead Completion Pitless adapter manufacturer _____ Model _____ <input type="checkbox"/> Casing Protection <input type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY) <input type="checkbox"/> Basement offset |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| |
|----------------------------------------------------------------------------------------------------|
| Grouting Information Well grouted? <input type="checkbox"/> YES <input type="checkbox"/> NO |
|----------------------------------------------------------------------------------------------------|

| |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nearest Known Source of Contamination _____ feet Direction _____ Type _____ Well disinfected upon completion? <input type="checkbox"/> YES <input type="checkbox"/> NO |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pump <input type="checkbox"/> Not Installed Date Installed _____ Manufacture's name _____ Model number _____ HP 0.00 Volts _____ Length of drop pipe _____ Material _____ Capacity _____ g.p.m. Type _____ |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| |
|----------------------------------------------------------------------------------------------------------------------------------------------|
| Abandoned Wells Does property have any not in use and not sealed well(s)? <input type="checkbox"/> YES <input type="checkbox"/> NO |
|----------------------------------------------------------------------------------------------------------------------------------------------|

| |
|--------------------------------------------------------------------------------------------------------------------------------|
| Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> YES <input type="checkbox"/> NO |
|--------------------------------------------------------------------------------------------------------------------------------|

| |
|-------------------------------------------------------------------------|
| Well Contractor Certification Minnesota Geological Survey MGS |
|-------------------------------------------------------------------------|

| |
|----------------------------------------------|
| License Business Name Lic. or Reg No. |
|----------------------------------------------|

Remarks
GAMMA LOGGED 1-13-05 BY JIM TRAEN

First Bedrock OPVL **Aquifer** Multiple
Last Strat CSTL **Depth to Bedrock** 74.00 ft.

| | | | |
|------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------|---------------------|
| Well Name METHODIST HOSPITAL Township Range Dir Section Subsection Field Located MGS 117 21 W 20 ADACAD Elevation 890.00 ft. | Well Depth 485.00 ft | Depth Completed 485.00 ft | Date Well Completed |
|------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------|---------------------|

| | | | | |
|-----------------------------------------------------------------------------|-----------------|----------------------------------------------------------------------|----------------|----------------------------------------------------------------------------------------------|
| Well and Contact Address METHODIST HOSPITAL ST LOUIS PARK MN Changed | Drillhole Angle | Drilling Method | Drilling Fluid | Well Hydrofractured? <input type="checkbox"/> YES <input type="checkbox"/> NO From ft. to |
| Use Public Supply/non-community | | | | |
| Casing Type | | Drive Shoe? <input type="checkbox"/> YES <input type="checkbox"/> NO | | Hole Diameter (in.) |
| Diameter 20 | | Depth 255 | | |
| 20.00 in. from 0.00 to 255.00 ft. lbs/ft | | | | |

| Description | Color | Hardness | From | To (ft.) |
|------------------------|-------|----------|------|----------|
| DRIFT | | | 0 | 85 |
| PLATTEVILLE LIMESTONE | | | 85 | 94 |
| ST. PETER SANDSTONE | | | 94 | 257 |
| PRAIRIE DU CHIEN | | | 257 | 262 |
| PRAIRIE DU CHIEN | | | 262 | 368 |
| PRAIRIE DU CHIEN | | | 368 | 377 |
| JORDAN FORMATION | | | 377 | 466 |
| ST. LAWRENCE FORMATION | | | 466 | 485 |

| | |
|-----------|------------------------------------|
| Screen No | Open Hole(ft.) From 255.0 to 485.0 |
| Make | Type |
| Diameter | Slot Length Set |

Remarks
U.S.G.S. W-48 U.S.G.S. W-48 OLD P.A. 66-5517 127104A
1172120ADACA GAMMA LOGGED & TV 2-11-1989.

First Bedrock OSTP Aquifer Multiple
Last Strat CSTL Depth to Bedrock 94.00 ft.

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Static Water Level 69.00 ft. Land surface Date measured 1978/06/12 | |
| Pumping Level (below land surface) ft. after hrs. pumping g.p.m. | |
| Wellhead Completion Pitless adapter manufacturer _____ Model _____ <input type="checkbox"/> Casing Protection <input type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY) <input type="checkbox"/> Basement offset | |
| Grouting Information Well grouted? <input type="checkbox"/> YES <input type="checkbox"/> NO | |
| Nearest Known Source of Contamination _____ feet Direction _____ Type _____ Well disinfected upon completion? <input type="checkbox"/> YES <input type="checkbox"/> NO | |
| Pump <input type="checkbox"/> Not Installed Date Installed _____ Manufacture's name _____ Model number _____ HP 0.00 Volts _____ Length of drop pipe _____ Material _____ Capacity _____ g.p.m. Type _____ | |
| Abandoned Wells Does property have any not in use and not sealed well(s)? <input type="checkbox"/> YES <input type="checkbox"/> NO | |
| Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> YES <input type="checkbox"/> NO | |
| Well Contractor Certification Mccarthy Well Co. 27022 | |
| License Business Name Lic. or Reg No. | |



Environmental Health Division
 Drinking Water Protection Section
 Source Water Protection Unit
 P.O. Box 64975
 St. Paul, Minnesota 55164-0975

Determination of Aquifer Properties and Aquifer Test Plan (DAP-ATP) Form

| | | | |
|--------------------------------|--|------------------|--|
| Public Water Supply ID: | | PWS Name: | |
|--------------------------------|--|------------------|--|

Contact Information for Person Completing this Form

| | |
|----------------------------|--|
| Name: | |
| Address: | |
| | |
| City, State, Zip: | |
| Phone, Fax, e-mail: | |

Aquifer Properties Determination Methods

- 1) An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on a well connected to the public water supply system.
- 2) An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on another well in a hydrogeologic setting determined by the department to be equivalent.
- 3) A proposed new test to be conducted on a new or existing well connected to the public water supply system and that meets the requirements for larger-sized water systems (wellhead protection rule part 4720.5520). A test plan must be approved before conducting the test.
- 4) A proposed new test to be conducted on a new or existing public well connected to the public water supply system and that meets the requirements for smaller-sized water systems (wellhead protection rule part 4720.5530). A test plan must be approved before conducting the test.
- 5) An existing pumping test that does not meet the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on: 1) a public water supply well or 2) another well in a hydrogeologic setting determined by the department to be equivalent.
- 6) Existing specific capacity test(s) conducted on the public water supply well(s) or specific capacity tests conducted on other wells in a hydrogeologic setting determined by the department to be equivalent.
- 7) An existing published transmissivity value.
 - Include all test data and analysis documentation with the estimated transmissivity, ft²/day, when the aquifer properties determination method is; 1, 2, 5, 6, or 7, listed above.
 - Attach detailed aquifer test plan for methods 3 or 4.

| | | |
|----------------------|-----------------------|--------------|
| Submitted by: | Prof. License: | Date: |
|----------------------|-----------------------|--------------|

To request this document in another format, please call our Section Receptionist (651/201-4700) or Division TTY (651/201-5797).



Rationale for: 1) Aquifer Properties Determination or 2) Proposed New Test

Briefly describe the rationale for: 1) selected method to determine aquifer properties from existing data, or 2) a new aquifer test to be conducted on the pumped well referenced below. Include unique well numbers of all wells that were (or will be) monitored during data collection. How does the existing or proposed test deviate from the ideal. (e.g. rate, duration, no. of obwells, interfering wells, etc.) Attach documentation as necessary.

| | | | | |
|----------------------|--|----------|------------|----------------|
| Aquifer Name: | | Confined | Unconfined | Fractured Rock |
|----------------------|--|----------|------------|----------------|

Proposed New Test Information Summary

| | | | |
|---------------------------------------------------------------------------------------------------|--|-----------------------------------------|--|
| Pumped Well Name (Unique Number): | | Test Duration (Hours): | |
| Location: X, Y (meters) UTM-Z15N <u>or</u> Lat-Lon (decimal degrees) datum: NAD83 | | Pump Type: | |
| | | Discharge Rate: | |
| Number of Observation Wells: | | Flow Rate Measuring Device Type: | |

▪ A map showing the location of the pumping well and observation well(s) must be included.

List the unique number of each public water supply well to which this DAP-ATP Form applies

| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| | | |
|---------------------|------------------------------|-----------------------|
| Reviewed by: | Approved: Yes No | Approval Date: |
|---------------------|------------------------------|-----------------------|

12
Analysis of the Minnetonka #6A (208021) Pumping Test
August 15, 1994
Confined Prairie du Chien - Jordan Aquifer

Introduction

The MDH was requested to assist in the delineation of wellhead protection areas by the City of Minnetonka, Minnesota, around the public water supply wells serving the community. An important part of the delineation process is to determine aquifer properties at the well site as accurately as possible. This is normally accomplished by performing a pumping test. Because of the need to test most public water supply wells, the MDH agreed to help with the pumping test as a part of technical assistance for communities, and program and staff development.

The pumping test conducted by the MDH at Minnetonka #6A was conducted as described below. The only problem in conducting the test was that data from the first three minutes of the recovery period were lost. The results were analyzed using standard nonequilibrium and semisteady-state methods, cited in references. Data plots are included in Appendix 1 and test results are summarized on Table 1. The analysis shows that the aquifer responds as generally expected from the geologic setting.

Description of the Test

One nearby public supply well, #6 (204054), was used as a monitoring point for this test because there was no access to the pumped well for water level measurements. There were no other nearby wells to cause well interference for this test. All wells were turned off at 12:00 on August 12, 1994, providing a sixty-eight hour resting period before the start of the test. A pressure transducer was placed in Well 6A at this time to obtain background readings.

The test started at 08:40 on August 15, 1994. Well #6A was pumped at an average rate of 1000 gallons per minute. The flowmeter on the well was not used because the flowmeter data was recorded electronically and displayed at the Minnetonka City public works offices.

The pump was turned off at 08:50 on August 16, 1994 to start the recovery period. The recovery was extended to 16:43 on August 17th and about 90 percent of full recovery was obtained.

Summary of Results

A transmissivity value of 2.400 ft²/day and a storativity value of 0.000015 are chosen as being representative of aquifer properties in the area of the well field for the capture zone analysis.

The results are also consistent with the conceptual model of a confined aquifer receiving water from adjacent leaky layers.

Problems with the Analysis

None of the problems that occurred during this test affected the analysis and the analysis is quite straight forward.

References:

- Jacob, C. E. and Lohman, S. W., (1952) Nonsteady Flow to a Well of Constant Drawdown in an Extensive Aquifer. Trans. American Geophysical Union, Vol. 33, No. 4. August. 1952. pp. 559-69.
- Theis, C. V., (1935) The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground-Water Storage, Trans. American Geophysical Union. 16th Annual Meeting. April. 1935. pp. 519-24.

Table 1.

Minnetonka #6A Pumping Test
August 15, 1994

| | Transmissivity T (gpd/ft) ----- | Storage Coefficient S ----- | Time Period Emphasized ----- | Analysis Method ----- |
|------------------------------|---------------------------------------|--------------------------------------|---------------------------------------|-----------------------------|
| Pumping Well #6A (208012) | No data | | | |
| Observation Wells | | | | |
| #6 (204054) | 2,360 | 0.000015 | Early Pumping | Theis |
| | 11,800 | | Late Pumping | Jacob |
| | 2,510 | 0.000015 | Early Recovery | Theis |
| | 5,430 | | Late Recovery | Jacob t/t' |

Representative aquifer values are best shown by the early pumping and recovery value from the observation well, giving an average T of 2,400, S of 0.000015, and r/B of 0.07.

Appendix 1.
Graphical Analysis

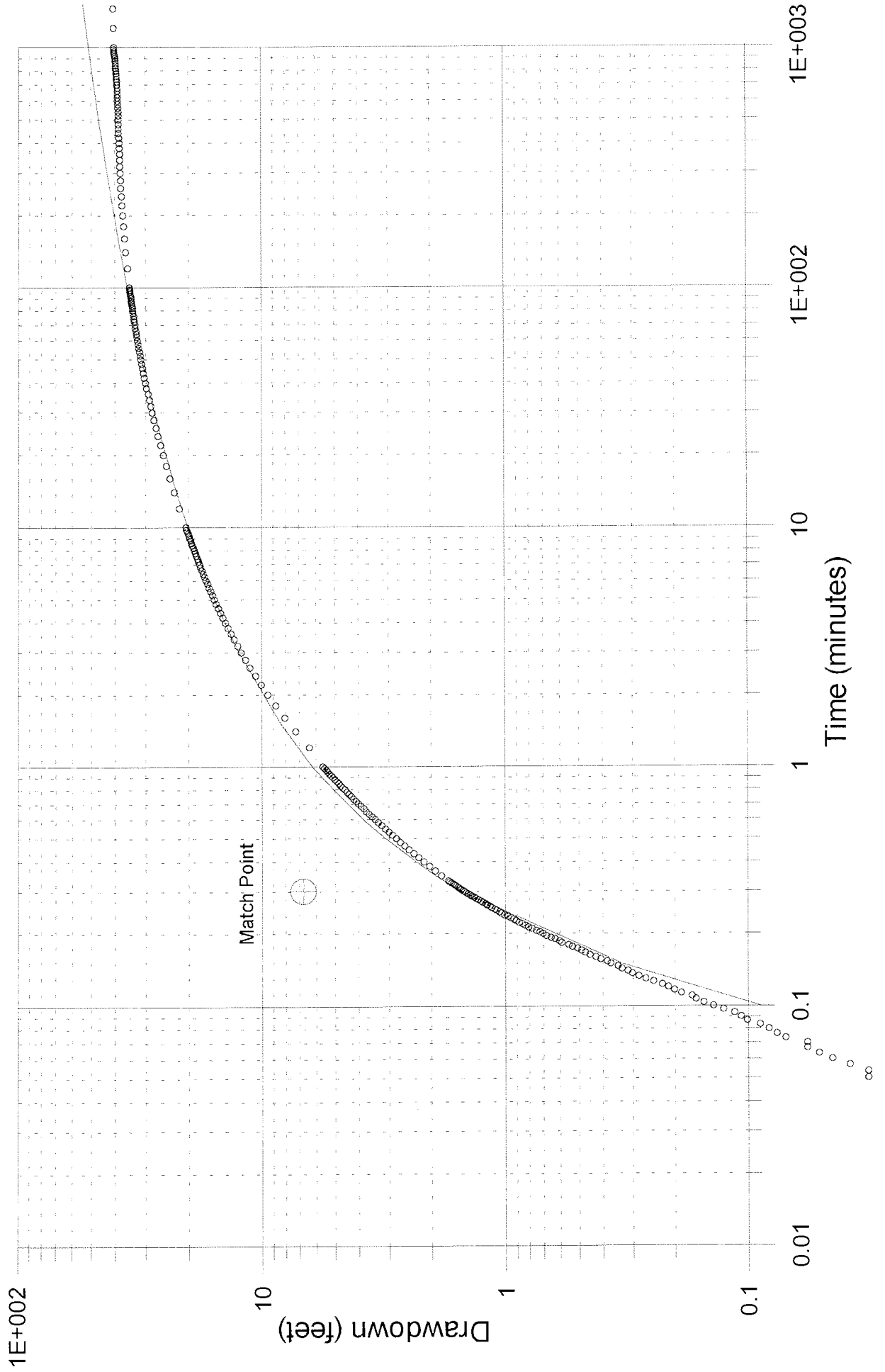
Test of Minnetonka #6A (208021)
at #6 (204054)
August 15, 1994



Time (Minutes) from August 12, 1994 12:00

Test of Minnetonka #6A (208021)
at #6 (204054)
August 15, 1994
Pumping Data

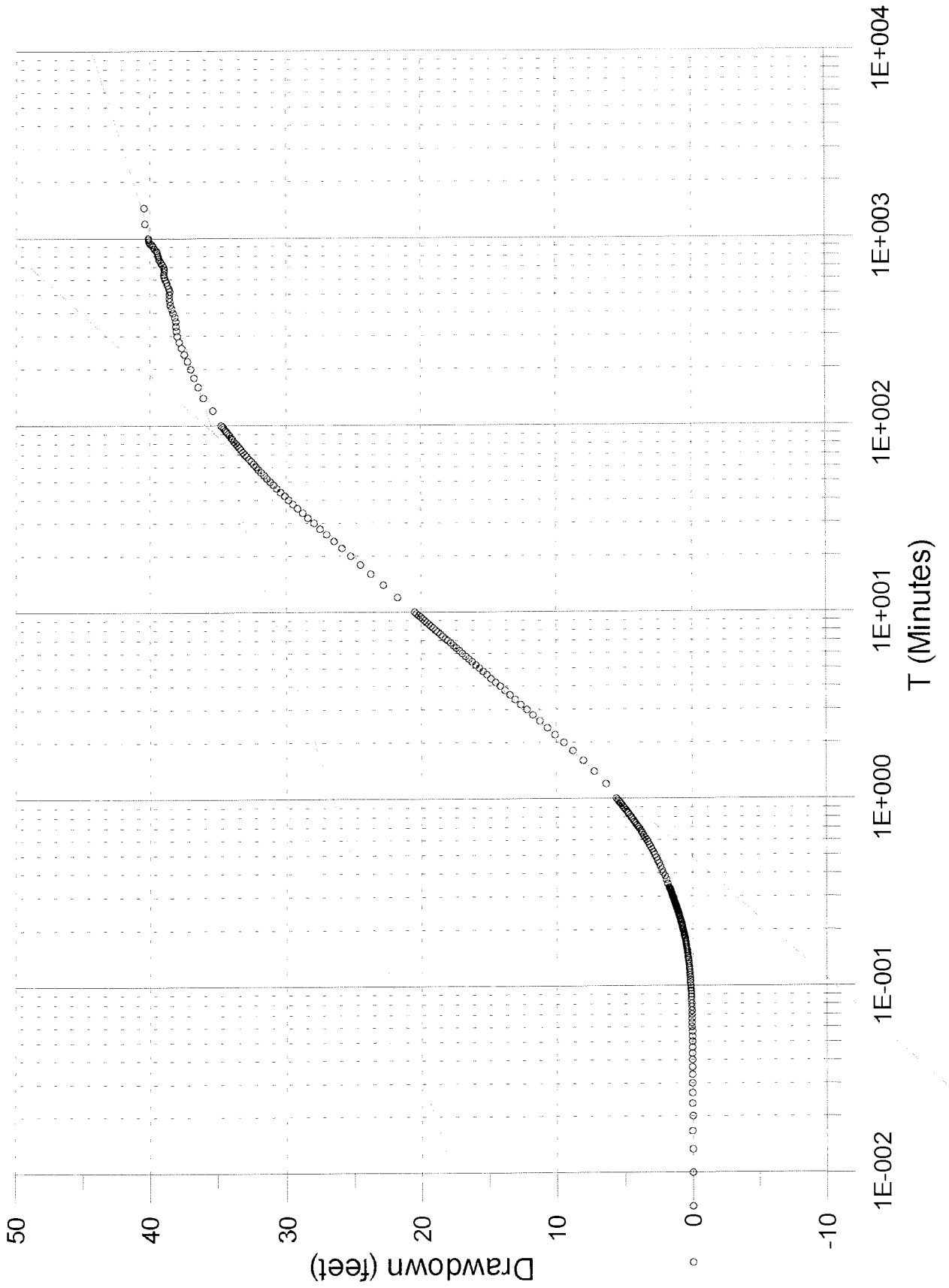
$$T = 15.32 \frac{1000}{6.5} = 2,360 \text{ ft}^2/\text{day}$$
$$S = 2,360 \cdot 0.3 / (359)^2 = 0.000015$$



Test of Minnetonka #6A (208021)
at #6 (204054)
August 15, 1994
Pumping

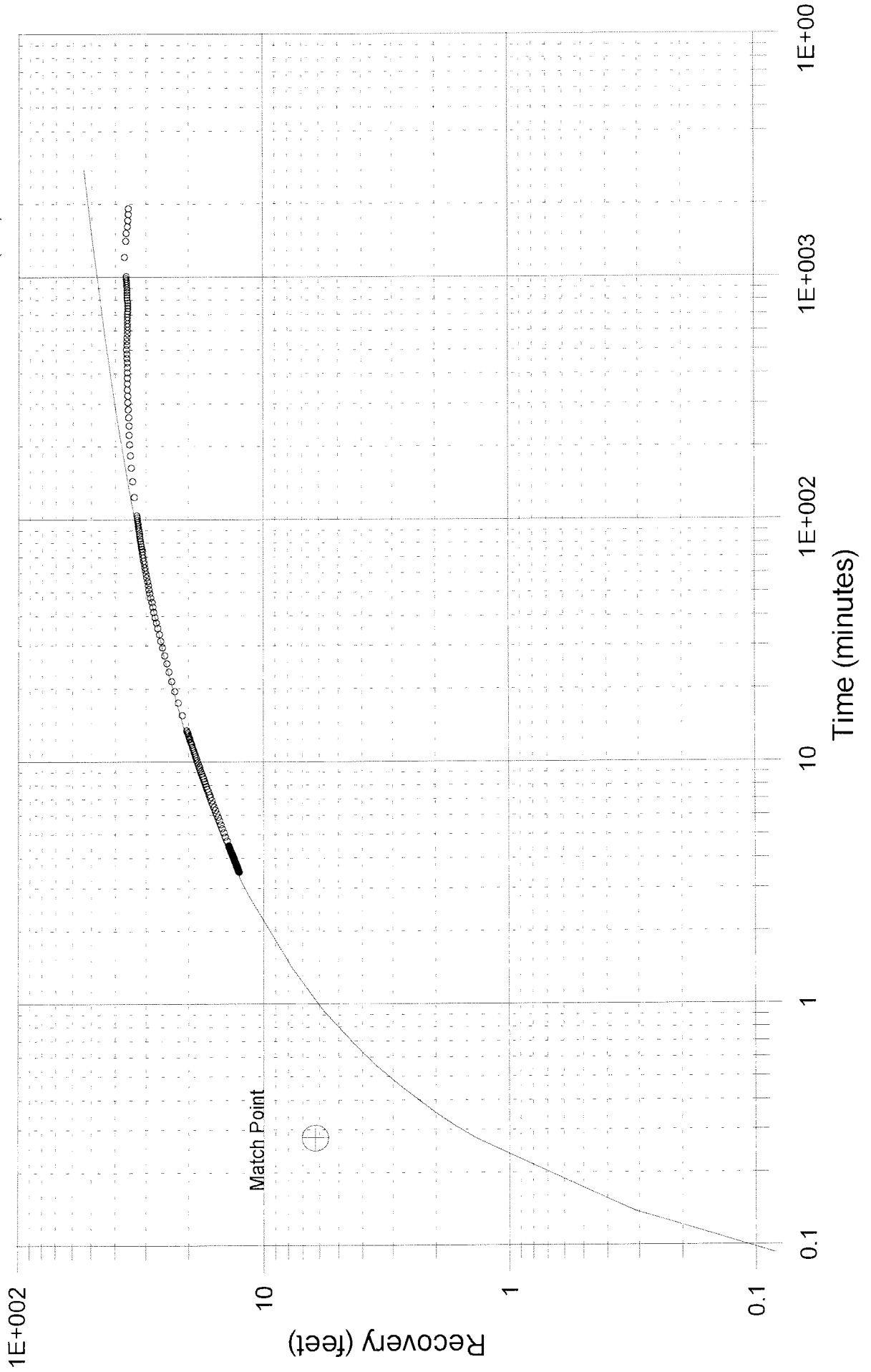
$T1 = 35.3 \text{ 1000} / 15.7 = 2,250 \text{ ft}^2/\text{day}$
 $S1 = 2,250 \text{ 0.5} / 359^2 \text{ 640} = 0.00013$

$T2 = 35.3 \text{ 1000} / 3 = 11,800 \text{ ft}^2/\text{day}$



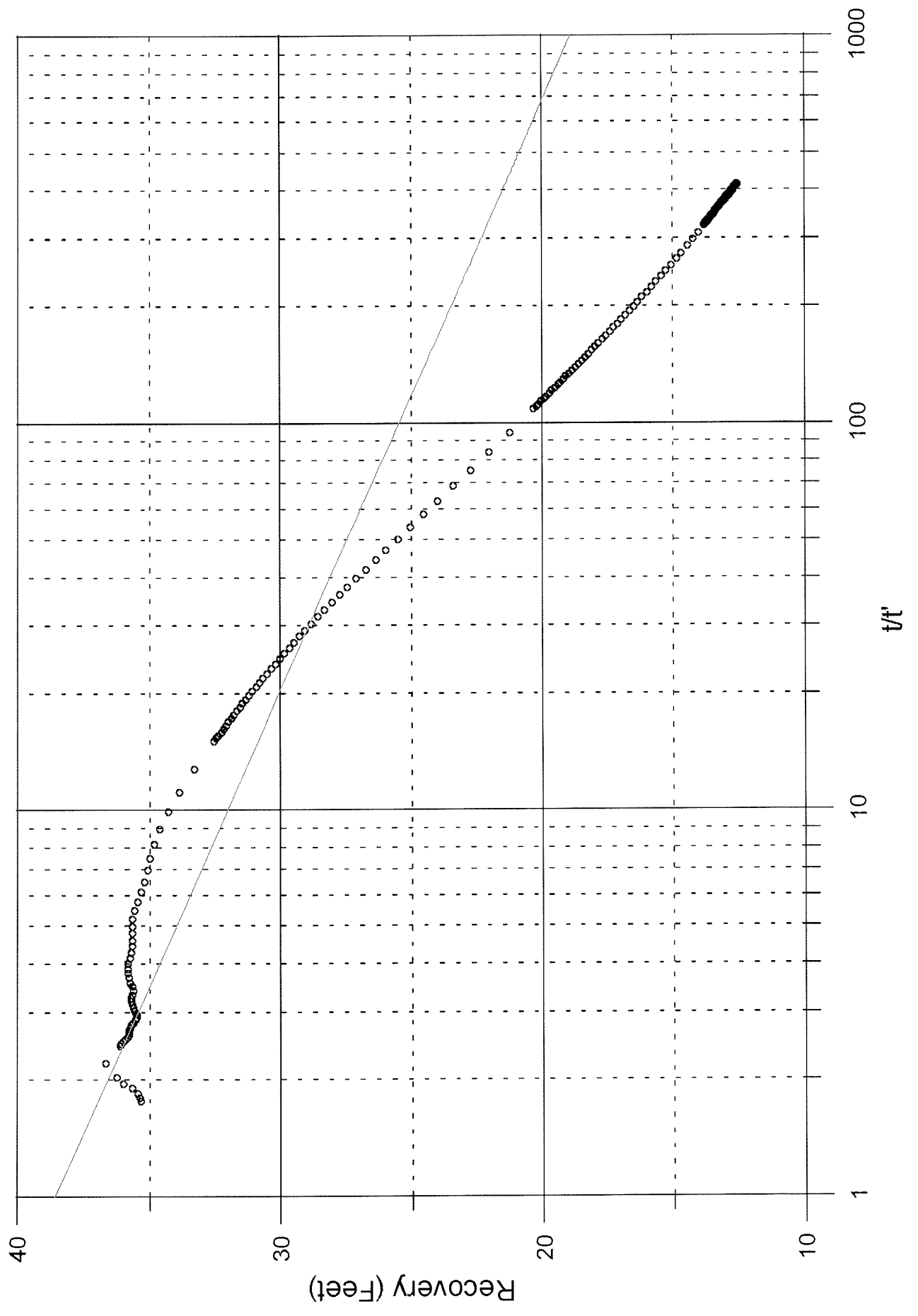
Test of Minnetonka #6A (208021)
at #6 (204054)
August 15, 1994
Recovery

$T = 15.32 \cdot 1000 / 6.1 = 2,510 \text{ ft}^2/\text{day}$
 $S = 2,510 \cdot 0.27 / (359)^2 = 0.000015$



Test of Minnetonka #6A (208021)
at #6 (204054)
August 15, 1994

$$T = 35.3 \cdot 1000 / 6.5 = 5,430 \text{ ft}^2/\text{day}$$



| | | |
|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Unique No. 00208012 | MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i> | Update Date 2005/06/22 |
| County Name Hennepin | | Entry Date 1991/08/24 |
| Township Name Township Range Dir Section Subsection 117 22 W 12 CDCBCD | Well Depth 486 ft. Depth Completed 486 ft. Date Well Completed 1967/07/00 | |
| Well Name MINNETONKA 6A | Drilling Method | |
| Contact's Name MINNETONKA 7 10701 CEDAR LAKE RD MINNETONKA MN | Drilling Fluid | Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From ft. to ft. |
| | Use Community Supply (municipal) | |
| | Casing Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> No | Hole Diameter |
| GEOLOGICAL MATERIAL COLOR HARDNESS FROM TO | Casing Diameter Weight(lbs/ft) | |
| DRIFT 0 104 | 24 in. to 114 ft. | |
| SHALE 104 112 | 20 in. to 315 ft. | |
| LIMEROCK 112 121 | 16 in. to 341 ft. | |
| SHALE 121 136 | | |
| SANDROCK SOFT 136 248 | Screen | Open Hole From ft. to ft. |
| SHALE 248 261 | Make | Type |
| SANDROCK 261 304 | | |
| SHAKOPEE BROKEN 304 315 | Static Water Level 86 ft. from Land surface Date 1967/07/00 | |
| SHAKOPEE SANDY 315 392 | PUMPING LEVEL (below land surface) | |
| JORDAN SANDROCK 392 485 | 157 ft. after hrs. pumping 1571 g.p.m. | |
| SHALE 485 486 | Well Head Completion | |
| | Pitless adapter mfr Model | |
| | Casing Protection 12 in. above grade | |
| | At-grade(Environmental Wells and Borings ONLY) | |
| | Grouting Information Well grouted? <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| | Nearest Known Source of Contamination | |
| | ft. direction. type | |
| | Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| | Pump Not Installed Date Installed | |
| | Mfr name | |
| | Model HP 0 Volts | |
| | Drop Pipe Length ft. Capacity g.p.m | |
| | Type | |
| REMARKS, ELEVATION, SOURCE OF DATA, etc. | Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| CASING: 024 TO 0114;020 TO 0315;016 TO 0341;012 TO 0397. | Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| USGS Quad: Hopkins Elevation: 912 | Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. <u>62012</u> | |
| Aquifer: CJDN Alt Id: 79-6207 | License Business Name | |
| | Name of Driller | |

Report Copy

| | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| Unique No. 00204054 County Name Hennepin | MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i> | Update Date 2004/12/29 Entry Date 1991/08/24 |
| Township Name Township Range Dir Section Subsection 117 22 W 12 CDCBDB | Well Depth 488 ft. Depth Completed 488 ft. Date Well Completed 1967/06/00 | |
| Well Name MINNETONKA 6 Contact's Name MINNETONKA 6 10701 CEDAR LAKE RD MINNETONKA MN | Drilling Method Drilling Fluid _____ Well Hydrofractured? Yes No From _____ ft. to _____ ft. | |
| | Use Community Supply (municipal) | |
| | Casing _____ Drive Shoe? Yes No Hole Diameter _____ | |
| GEOLOGICAL MATERIAL COLOR HARDNESS FROM TO DRIFT _____ 0 101 LIMEROCK _____ 101 117 SHALE _____ 117 133 SANDROCK _____ SOFT 133 248 SHALE _____ 248 261 SANDROCK _____ SOFT 261 310 SHAKOPEE BROKEN _____ 310 322 SHAKOPEE SANDY _____ 322 392 JORDAN _____ SOFT 392 435 JORDAN SHALE _____ 435 442 JORDAN _____ 442 486 SHALE _____ 486 488 | Casing Diameter Weight(lbs/ft) 24 in. to 103 ft. 23 in. to 52 ft. 19 in. to 165 ft. 0 in. to 394 ft. | |
| | Screen _____ Open Hole From _____ ft. to _____ ft. Make _____ Type _____ | |
| | Static Water Level 90 ft. from Land surface Date 1967/06/00 | |
| | PUMPING LEVEL (below land surface) 160 ft. after 2 hrs. pumping 2103 g.p.m. | |
| | Well Head Completion Pitless adapter mfr _____ Model _____ Casing Protection _____ 12 in. above grade _____ At-grade(Environmental Wells and Borings ONLY) | |
| | Grouting Information Well grouted? Yes No | |
| | Nearest Known Source of Contamination _____ ft. _____ direction. _____ type Well disinfected upon completion? Yes No | |
| | Pump _____ Not Installed Date Installed _____ Mfr name _____ Model _____ HP 0 Volts _____ Drop Pipe Length _____ ft. Capacity _____ g.p.m. Type _____ | |
| REMARKS, ELEVATION, SOURCE OF DATA, etc. 16" CASING FROM 312' TO 394'. CASING: 024 TO 0103;020 TO 0320;016 TO 0394. CASING: 026 TO 0103;020 TO 0320;016 TO 0394. USGS Quad: Hopkins Elevation: 915 Aquifer: CJDN Alt Id: 79-6207 | Any not in use and not sealed well(s) on property? Yes No Was a variance granted from the MDH for this Well? Yes No | |
| | Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 62012 License Business Name _____ Name of Driller _____ | |

Report Copy

| | | | | | | | | |
|----------------------|-----------------------------------------------------------------------------------------------------------|-----------|-----|---------|------------|-----------------------|------------------------|---------------------|
| Unique No. 00204054 | MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i> | | | | | | Update Date 2004/12/29 | |
| County Name Hennepin | | | | | | | Entry Date 1991/08/24 | |
| Township Name | Township | Range | Dir | Section | Subsection | Well Depth | Depth Completed | Date Well Completed |
| | 117 | 22 | W | 12 | CDCBDB | 488 ft. | 488 ft. | 1967/06/00 |
| Well Name | MINNETONKA 6 | | | Lic. Or | Reg. No. | 62012 Name of Driller | | |
| USGS Quad | Hopkins | Elevation | 915 | Aquifer | CJDN | Alternative Id | 79-6207 | |

| GEOLOGICAL MATERIAL | COLOR | HARDNESS | FROM TO | STRAT | LITH PRIM | LITH SEC | LITH MINOR |
|--------------------------------------------------|------------------|----------|---------|-------|-----------|----------|------------|
| DRIFT QUUU = Unknown deposit type | DRFT = Drift | | 0 101 | QUUU | DRFT | | |
| LIMEROCK OPVL = Platteville | LMSN = Limestone | | 101 117 | OPVL | LMSN | | |
| SHALE OGWD = Glenwood | SHLE = Shale | | 117 133 | OGWD | SHLE | | |
| SANDROCK OSTP = St.Peter | SNDS = Sandstone | SOFT | 133 248 | OSTP | SNDS | | |
| SHALE OSTP = St.Peter | SHLE = Shale | | 248 261 | OSTP | SHLE | | |
| SANDROCK OSTP = St.Peter | SNDS = Sandstone | SOFT | 261 310 | OSTP | SNDS | | |
| SHAKOPEE BROKEN OPDC = Prairie Du Chien Group | DLMT = Dolomite | | 310 322 | OPDC | DLMT | | |
| SHAKOPEE SANDY OPDC = Prairie Du Chien Group | DLMT = Dolomite | | 322 392 | OPDC | DLMT | | |
| JORDAN CJDN = Jordan | SNDS = Sandstone | SOFT | 392 435 | CJDN | SNDS | | |
| JORDAN SHALE CJDN = Jordan | SHLE = Shale | | 435 442 | CJDN | SHLE | | |
| JORDAN CJDN = Jordan | SNDS = Sandstone | | 442 486 | CJDN | SNDS | | |
| SHALE CSTL = St.Lawrence | SHLE = Shale | | 486 488 | CSTL | SHLE | | |

| | | | | | | | |
|----------------------------------------|---------------------------------------|----------------|-------------------------------|-------------------|-------------------------------|----------------------------|-------------------------------|
| Unique No. 00208012 | MINNESOTA DEPARTMENT OF HEALTH | | | | | | Update Date 2005/06/22 |
| County Name Hennepin | WELL AND BORING RECORD | | | | | | Entry Date 1991/08/24 |
| <i>Minnesota Statutes Chapter 1031</i> | | | | | | | |
| Township Name Township | Range Dir | Section | Subsection | Well Depth | Depth Completed | Date Well Completed | |
| 117 | 22 W | 12 | CDCBCD | 486 ft. | 486 ft. | 1967/07/00 | |
| Well Name MINNETONKA 6A | | | Lic. Or Reg. No. 62012 | | Name of Driller | | |
| USGS Quad Hopkins | Elevation 912 | | Aquifer CJDN | | Alternative Id 79-6207 | | |


| GEOLOGICAL MATERIAL | COLOR | HARDNESS | FROM TO | STRAT | LITH PRIM | LITH SEC | LITH MINOR |
|--------------------------------------------------|------------------|-----------------|----------------|--------------|------------------|-----------------|-------------------|
| DRIFT QUUU = Unknown deposit type | DRFT = Drift | | 0 104 | QUUU | DRFT | | |
| SHALE OPVL = Platteville | SHLE = Shale | | 104 112 | OPVL | SHLE | LMSN | |
| | | | | | | | LMSN = Limestone |
| LIMEROCK OPVL = Platteville | LMSN = Limestone | | 112 121 | OPVL | LMSN | | |
| SHALE OGWD = Glenwood | SHLE = Shale | | 121 136 | OGWD | SHLE | | |
| SANDROCK OSTP = St.Peter | SNDS = Sandstone | SOFT | 136 248 | OSTP | SNDS | | |
| SHALE OSTP = St.Peter | SHLE = Shale | | 248 261 | OSTP | SHLE | | |
| SANDROCK OSTP = St.Peter | SNDS = Sandstone | | 261 304 | OSTP | SNDS | | |
| SHAKOPEE BROKEN OPDC = Prairie Du Chien Group | DLMT = Dolomite | | 304 315 | OPDC | DLMT | | |
| SHAKOPEE SANDY OPDC = Prairie Du Chien Group | DLMT = Dolomite | | 315 392 | OPDC | DLMT | | |
| JORDAN SANDROCK CJDN = Jordan | SNDS = Sandstone | | 392 485 | CJDN | SNDS | | |
| SHALE CSTL = St.Lawrence | SHLE = Shale | | 485 486 | CSTL | SHLE | | |



"Djerrari, Amal (MDH)"
<Amal.Djerrari@state.mn.us>
05/10/2010 08:59 AM

To Erik Tomlinson <etomlinson@sehinc.com>
cc
bcc
Subject Jordan T

For Follow Up:  Normal Priority

History:  This message has been forwarded.

Hi Erik

Here is the aquifer test report for Minnetonka Well 7 (6A in the report). Although the report says that the aquifer is the Prairie du Chien/Jordan, in fact both wells (6 and 7) are open to the Jordan only. I think you could use this value for the Jordan.

I had a look at your minutes. They look good, except that you did not mention the calibration. You should look at how the model represents heads in observation wells at the regional level, but more importantly verify the calibration at the local level.

I checked also the refinement that Barr did. They used the refine grid command in GWV, using a spacing of 20 m as a base. You can do the same and use a 1.35 ratio for adjacent cells.

Let me know if you have any question.

Amal



mtk_a_aquifer_test.pdf

Appendix D

Model Files (CD)

Appendix E

GIS Shapefiles (CD)

Appendix F

Vulnerability Assessments



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1270050
SYSTEM NAME: Saint Louis Park
WELL NAME: Well #10

TIER: 2
WHP RANK:
UNIQUE WELL #: 00206442

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 21 W SECTION: 8 QUARTERS: DCDB

| <u>CRITERIA</u> | <u>DESCRIPTION</u> | <u>POINTS</u> |
|------------------------------------------|---------------------------|---------------|
| Aquifer Name(s) | : Prairie Du Chien-Jordan | |
| DNR Geologic Sensitivity Rating | : Very low | 0 |
| L Score | : 0 | |
| Geologic Data From | : Well Record | |
| Year Constructed | : 1955 | |
| Construction Method | : Cable Tool/Bored | 0 |
| Casing Depth | : 316 | 5 |
| Well Depth | : 500 | |
| Casing grouted into borehole? | Yes | 0 |
| Cement grout between casings? | Yes | 0 |
| All casings extend to land surface? | Yes | 0 |
| Gravel - packed casings? | No | 0 |
| Wood or masonry casing? | No | 0 |
| Holes or cracks in casing? | Unknown | 0 |
| Isolation distance violations? | | 0 |
| Pumping Rate | : 800 | 10 |
| Pathogen Detected? | | 0 |
| Surface Water Characteristics? | | 0 |
| Maximum nitrate detected | : <.4 08/14/1991 | 0 |
| Maximum tritium detected | : Unknown | 0 |
| Non-THMS VOCs detected? | | 0 |
| Pesticides detected? | | 0 |
| Carbon 14 age | : Unknown | 0 |
| Wellhead Protection Score | : | 15 |
| Wellhead Protection Vulnerability Rating | : | VULNERABLE |
| Vulnerability Overridden | : | Jim Walsh |

COMMENTS

Very low rating is based on the presence of the Glenwood and St. Peter confining layers. Drift rating is L-2. VULNERABLE RATING BASED ON TRITIUM DATA FROM OTHER CITY WELLS.



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1270050
SYSTEM NAME: Saint Louis Park
WELL NAME: Well #11

TIER: 2
WHP RANK:
UNIQUE WELL #: 00206439

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 21 W SECTION: 8 QUARTERS: DCDB

| <u>CRITERIA</u> | <u>DESCRIPTION</u> | <u>POINTS</u> |
|------------------------------------------|---------------------|----------------|
| Aquifer Name(s) | : Mt. Simon | |
| DNR Geologic Sensitivity Rating | : Very low | 0 |
| L Score | : 14 | |
| Geologic Data From | : Well Record | |
| Year Constructed | : 1960 | |
| Construction Method | : Cable Tool/Bored | 0 |
| Casing Depth | : 880 | 0 |
| Well Depth | : 1093 | |
| Casing grouted into borehole? | Unknown | 0 |
| Cement grout between casings? | Unknown | 5 |
| All casings extend to land surface? | Yes | 0 |
| Gravel - packed casings? | No | 0 |
| Wood or masonry casing? | No | 0 |
| Holes or cracks in casing? | Unknown | 0 |
| Isolation distance violations? | | 0 |
| Pumping Rate | : 1000 | 10 |
| Pathogen Detected? | | NOT VULNERABLE |
| Surface Water Characteristics? | | NOT VULNERABLE |
| Maximum nitrate detected | : .1 01/15/1987 | NOT VULNERABLE |
| Maximum tritium detected | : <.8 07/23/2009 | NOT VULNERABLE |
| Non-THMS VOCs detected? | | 0 |
| Pesticides detected? | | 0 |
| Carbon 14 age | : A | -20 |
| Wellhead Protection Score | : | -5 |
| Wellhead Protection Vulnerability Rating | : | NOT VULNERABLE |
| Vulnerability Overridden | : | |

COMMENTS



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1270050
SYSTEM NAME: Saint Louis Park
WELL NAME: Well #12

TIER: 2
WHP RANK:
UNIQUE WELL #: 00206456

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 21 W SECTION: 21 QUARTERS: CDBD

| <u>CRITERIA</u> | <u>DESCRIPTION</u> | <u>POINTS</u> |
|------------------------------------------|---------------------|----------------|
| Aquifer Name(s) | : Mt. Simon | |
| DNR Geologic Sensitivity Rating | : Very low | 0 |
| L Score | : 12 | |
| Geologic Data From | : Well Record | |
| Year Constructed | : 1965 | |
| Construction Method | : Cable Tool/Bored | 0 |
| Casing Depth | : 900 | 0 |
| Well Depth | : 1095 | |
| Casing grouted into borehole? | Unknown | 0 |
| Cement grout between casings? | Unknown | 5 |
| All casings extend to land surface? | Yes | 0 |
| Gravel - packed casings? | No | 0 |
| Wood or masonry casing? | No | 0 |
| Holes or cracks in casing? | Unknown | 0 |
| Isolation distance violations? | | 0 |
| Pumping Rate | : 1000 | 10 |
| Pathogen Detected? | | NOT VULNERABLE |
| Surface Water Characteristics? | | NOT VULNERABLE |
| Maximum nitrate detected | : <.4 04/12/1990 | NOT VULNERABLE |
| Maximum tritium detected | : <.8 12/17/2009 | NOT VULNERABLE |
| Non-THMS VOCs detected? | | 0 |
| Pesticides detected? | | 0 |
| Carbon 14 age | : A | -20 |
| Wellhead Protection Score | : | -5 |
| Wellhead Protection Vulnerability Rating | : | NOT VULNERABLE |
| Vulnerability Overridden | : | |

COMMENTS



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1270050
SYSTEM NAME: Saint Louis Park
WELL NAME: Well #13

TIER: 2
WHP RANK:
UNIQUE WELL #: 00206424

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 21 W SECTION: 4 QUARTERS: CCDA

| <u>CRITERIA</u> | <u>DESCRIPTION</u> | <u>POINTS</u> |
|------------------------------------------|---------------------|----------------|
| Aquifer Name(s) | : Mt. Simon | |
| DNR Geologic Sensitivity Rating | : Very low | 0 |
| L Score | : 14 | |
| Geologic Data From | : Well Record | |
| Year Constructed | : 1964 | |
| Construction Method | : Cable Tool/Bored | 0 |
| Casing Depth | : 891 | 0 |
| Well Depth | : 1045 | |
| Casing grouted into borehole? | Yes | 0 |
| Cement grout between casings? | Yes | 0 |
| All casings extend to land surface? | Yes | 0 |
| Gravel - packed casings? | No | 0 |
| Wood or masonry casing? | No | 0 |
| Holes or cracks in casing? | Unknown | 0 |
| Isolation distance violations? | | 0 |
| Pumping Rate | : 1000 | 10 |
| Pathogen Detected? | | 0 |
| Surface Water Characteristics? | | 0 |
| Maximum nitrate detected | : <.4 04/12/1990 | 0 |
| Maximum tritium detected | : Unknown | 0 |
| Non-THMS VOCs detected? | | 0 |
| Pesticides detected? | | 0 |
| Carbon 14 age | : A | -20 |
| Wellhead Protection Score | : | -10 |
| Wellhead Protection Vulnerability Rating | : | NOT VULNERABLE |
| Vulnerability Overridden | : | |

COMMENTS



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1270050
SYSTEM NAME: Saint Louis Park
WELL NAME: Well #14

TIER: 2
WHP RANK:
UNIQUE WELL #: 00227965

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 21 W SECTION: 4 QUARTERS: CCDA

| <u>CRITERIA</u> | <u>DESCRIPTION</u> | <u>POINTS</u> |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|---------------|
| Aquifer Name(s) | : Jordan | |
| DNR Geologic Sensitivity Rating | : Low | 20 |
| L Score | : 1 | |
| Geologic Data From | : Data Inferred From Nearby Wells | |
| Year Constructed | : 1964 | |
| Construction Method | : Cable Tool/Bored | 0 |
| Casing Depth | : 389 | 5 |
| Well Depth | : 485 | |
| Casing grouted into borehole? | Yes | 0 |
| Cement grout between casings? | Yes | 0 |
| All casings extend to land surface? | No | 10 |
| Gravel - packed casings? | No | 0 |
| Wood or masonry casing? | No | 0 |
| Holes or cracks in casing? | Unknown | 0 |
| Isolation distance violations? | | 0 |
| Pumping Rate | : 1000 | 10 |
| Pathogen Detected? | | 0 |
| Surface Water Characteristics? | | 0 |
| Maximum nitrate detected | : <.4 04/12/1990 | 0 |
| Maximum tritium detected | : 10.1 | VULNERABLE |
| Non-THMS VOCs detected? | cis-1,2-Dichloroethene 06/06/1992 Trichloroethene (TCE) 06/06/1992 trans-1,2-Dichloroethene 06/06/1992 | VULNERABLE |
| Pesticides detected? | | 0 |
| Carbon 14 age | : M | 0 |
| Wellhead Protection Score | : | 45 |
| Wellhead Protection Vulnerability Rating | : | VULNERABLE |
| Vulnerability Overridden | : | |

COMMENTS

L score is taken from the geologic log of city well # 13.



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1270050
SYSTEM NAME: Saint Louis Park
WELL NAME: Well #15

TIER: 2
WHP RANK:
UNIQUE WELL #: 00215447

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 21 W SECTION: 8 QUARTERS: DCDB

| <u>CRITERIA</u> | <u>DESCRIPTION</u> | <u>POINTS</u> |
|------------------------------------------|-----------------------------------|---------------|
| Aquifer Name(s) | : Jordan-St. Lawrence | |
| DNR Geologic Sensitivity Rating | : Very low | 0 |
| L Score | : 0 | |
| Geologic Data From | : Data Inferred From Nearby Wells | |
| Year Constructed | : 1969 | |
| Construction Method | : Cable Tool/Bored | 0 |
| Casing Depth | : 402 | 0 |
| Well Depth | : 503 | |
| Casing grouted into borehole? | Yes | 0 |
| Cement grout between casings? | Yes | 0 |
| All casings extend to land surface? | Yes | 0 |
| Gravel - packed casings? | No | 0 |
| Wood or masonry casing? | No | 0 |
| Holes or cracks in casing? | Unknown | 0 |
| Isolation distance violations? | | 0 |
| Pumping Rate | : 1200 | 20 |
| Pathogen Detected? | | 0 |
| Surface Water Characteristics? | | 0 |
| Maximum nitrate detected | : <1 08/01/1975 | 0 |
| Maximum tritium detected | : Unknown | 0 |
| Non-THMS VOCs detected? | | 0 |
| Pesticides detected? | | 0 |
| Carbon 14 age | : Unknown | 0 |
| Wellhead Protection Score | : | 20 |
| Wellhead Protection Vulnerability Rating | : | VULNERABLE |
| Vulnerability Overridden | : | Jim Walsh |

COMMENTS

Very low rating is based on the presence of the Glenwood and St. Peter confining layers. VULNERABLE BASED ON TRITIUM DATA FROM OTHER CITY WELLS.



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1270050
SYSTEM NAME: Saint Louis Park
WELL NAME: Well #16

TIER: 2
WHP RANK:
UNIQUE WELL #: 00203187

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 21 W SECTION: 7 QUARTERS: BBAA

| <u>CRITERIA</u> | <u>DESCRIPTION</u> | <u>POINTS</u> |
|------------------------------------------|---------------------|----------------|
| Aquifer Name(s) | : Jordan | |
| DNR Geologic Sensitivity Rating | : Very low | 0 |
| L Score | : 0 | |
| Geologic Data From | : Well Record | |
| Year Constructed | : 1973 | |
| Construction Method | : Cable Tool/Bored | 0 |
| Casing Depth | : 425 | 0 |
| Well Depth | : 500 | |
| Casing grouted into borehole? | Yes | 0 |
| Cement grout between casings? | Yes | 0 |
| All casings extend to land surface? | Yes | 0 |
| Gravel - packed casings? | No | 0 |
| Wood or masonry casing? | No | 0 |
| Holes or cracks in casing? | Unknown | 0 |
| Isolation distance violations? | | 0 |
| Pumping Rate | : 1000 | 10 |
| Pathogen Detected? | | NOT VULNERABLE |
| Surface Water Characteristics? | | NOT VULNERABLE |
| Maximum nitrate detected | : .06 07/18/2006 | NOT VULNERABLE |
| Maximum tritium detected | : 3 12/17/2009 | VULNERABLE |
| Non-THMS VOCs detected? | | 0 |
| Pesticides detected? | | 0 |
| Carbon 14 age | : Unknown | 0 |
| Wellhead Protection Score | : | 10 |
| Wellhead Protection Vulnerability Rating | : | VULNERABLE |
| Vulnerability Overridden | : | Jim Walsh |

COMMENTS

Very low rating is based on the presence of the Glenwood and St. Peter confining layers. Drift score is L-2. VULNERABLE RATING BASED ON TRITIUM DATA FROM OTHER CITY WELLS.



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1270050
SYSTEM NAME: Saint Louis Park
WELL NAME: Well #3

TIER: 2
WHP RANK:
UNIQUE WELL #: 00206440

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 21 W SECTION: 8 QUARTERS: DCDB

| <u>CRITERIA</u> | <u>DESCRIPTION</u> | <u>POINTS</u> |
|------------------------------------------|---------------------|---------------|
| Aquifer Name(s) | : St. Peter | |
| DNR Geologic Sensitivity Rating | : High | 0 |
| L Score | : 0 | |
| Geologic Data From | : Well Record | |
| Year Constructed | : 1939 | |
| Construction Method | : Cable Tool/Bored | 0 |
| Casing Depth | : 103 | 10 |
| Well Depth | : 286 | |
| Casing grouted into borehole? | Unknown | 0 |
| Cement grout between casings? | Unknown | 5 |
| All casings extend to land surface? | Yes | 0 |
| Gravel - packed casings? | No | 0 |
| Wood or masonry casing? | No | 0 |
| Holes or cracks in casing? | Unknown | 0 |
| Isolation distance violations? | | 0 |
| Pumping Rate | : 900 | 10 |
| Pathogen Detected? | | 0 |
| Surface Water Characteristics? | | 0 |
| Maximum nitrate detected | : <1 08/01/1975 | 0 |
| Maximum tritium detected | : 1.3 07/23/2009 | VULNERABLE |
| Non-THMS VOCs detected? | | 0 |
| Pesticides detected? | | 0 |
| Carbon 14 age | : Unknown | 0 |
| Wellhead Protection Score | : | 25 |
| Wellhead Protection Vulnerability Rating | : | VULNERABLE |
| Vulnerability Overridden | : | |

COMMENTS

High score is based on the well is cased only to the top of the Platteville and open hole into the St. Peter.



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1270050
SYSTEM NAME: Saint Louis Park
WELL NAME: Well #4

TIER: 2
WHP RANK:
UNIQUE WELL #: 00200542

COUNTY: Hennepin TOWNSHIP NUMBER: 28 RANGE: 24 W SECTION: 7 QUARTERS: BDAD

| <u>CRITERIA</u> | <u>DESCRIPTION</u> | <u>POINTS</u> |
|------------------------------------------|--------------------------------|---------------|
| Aquifer Name(s) | : Prairie Du Chien-Jordan | |
| DNR Geologic Sensitivity Rating | : Very low | 0 |
| L Score | : 0 | |
| Geologic Data From | : Well Record | |
| Year Constructed | : 1946 | |
| Construction Method | : Cable Tool/Bored | 0 |
| Casing Depth | : 304 | 5 |
| Well Depth | : 503 | |
| Casing grouted into borehole? | Yes | 0 |
| Cement grout between casings? | Yes | 0 |
| All casings extend to land surface? | Yes | 0 |
| Gravel - packed casings? | No | 0 |
| Wood or masonry casing? | No | 0 |
| Holes or cracks in casing? | Unknown | 0 |
| Isolation distance violations? | | 0 |
| Pumping Rate | : 900 | 10 |
| Pathogen Detected? | | 0 |
| Surface Water Characteristics? | | 0 |
| Maximum nitrate detected | : .31 04/16/2013 | 0 |
| Maximum tritium detected | : Unknown | 0 |
| Non-THMS VOCs detected? | Vinyl chloride 11/02/1996 | VULNERABLE |
| Pesticides detected? | | 0 |
| Carbon 14 age | : Unknown | 0 |
| Wellhead Protection Score | : | 15 |
| Wellhead Protection Vulnerability Rating | : | VULNERABLE |
| Vulnerability Overridden | : | Jim Walsh |

COMMENTS

Very low score is based on the presence of the Glenwood and basal St. Peter confining layers. VULNERABLE BASED ON TRITIUM DATA FROM OTHER CITY WELLS.



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1270050
SYSTEM NAME: Saint Louis Park
WELL NAME: Well #6

TIER: 2
WHP RANK:
UNIQUE WELL #: 00206457

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 21 W SECTION: 21 QUARTERS: CDBD

| <u>CRITERIA</u> | <u>DESCRIPTION</u> | <u>POINTS</u> |
|------------------------------------------|---------------------------|---------------|
| Aquifer Name(s) | : Prairie Du Chien-Jordan | |
| DNR Geologic Sensitivity Rating | : Very low | 0 |
| L Score | : 1 | |
| Geologic Data From | : Well Record | |
| Year Constructed | : 1948 | |
| Construction Method | : Cable Tool/Bored | 0 |
| Casing Depth | : 303 | 5 |
| Well Depth | : 482 | |
| Casing grouted into borehole? | Yes | 0 |
| Cement grout between casings? | Yes | 0 |
| All casings extend to land surface? | Yes | 0 |
| Gravel - packed casings? | No | 0 |
| Wood or masonry casing? | No | 0 |
| Holes or cracks in casing? | Unknown | 0 |
| Isolation distance violations? | | 0 |
| Pumping Rate | : 1000 | 10 |
| Pathogen Detected? | | 0 |
| Surface Water Characteristics? | | 0 |
| Maximum nitrate detected | : <.4 04/12/1990 | 0 |
| Maximum tritium detected | : 9.5 12/17/2009 | VULNERABLE |
| Non-THMS VOCs detected? | | 0 |
| Pesticides detected? | | 0 |
| Carbon 14 age | : Unknown | 0 |
| Wellhead Protection Score | : | 15 |
| Wellhead Protection Vulnerability Rating | : | VULNERABLE |
| Vulnerability Overridden | : | |

COMMENTS

Very low rating is based on the presence of the Glenwood and basal St.Peter confining layers. Previous tritium result of 8.0 TU on 12/17/1991.



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1270050
SYSTEM NAME: Saint Louis Park
WELL NAME: Well #8

TIER: 2
WHP RANK:
UNIQUE WELL #: 00203678

COUNTY: Hennepin TOWNSHIP NUMBER: 117 RANGE: 22 W SECTION: 1 QUARTERS: DACD

| <u>CRITERIA</u> | <u>DESCRIPTION</u> | <u>POINTS</u> |
|------------------------------------------|---------------------------|----------------|
| Aquifer Name(s) | : Prairie Du Chien-Jordan | |
| DNR Geologic Sensitivity Rating | : Very low | 10 |
| L Score | : 10 | |
| Geologic Data From | : Well Record | |
| Year Constructed | : 1955 | |
| Construction Method | : Cable Tool/Bored | 0 |
| Casing Depth | : 314 | 5 |
| Well Depth | : 507 | |
| Casing grouted into borehole? | Unknown | 0 |
| Cement grout between casings? | Unknown | 5 |
| All casings extend to land surface? | Yes | 0 |
| Gravel - packed casings? | No | 0 |
| Wood or masonry casing? | No | 0 |
| Holes or cracks in casing? | Unknown | 0 |
| Isolation distance violations? | | 0 |
| Pumping Rate | : 1000 | 10 |
| Pathogen Detected? | | 0 |
| Surface Water Characteristics? | | 0 |
| Maximum nitrate detected | : <.4 04/12/1990 | 0 |
| Maximum tritium detected | : Unknown | 0 |
| Non-THMS VOCs detected? | | 0 |
| Pesticides detected? | | 0 |
| Carbon 14 age | : Unknown | 0 |
| Wellhead Protection Score | : | 30 |
| Wellhead Protection Vulnerability Rating | : | NOT VULNERABLE |
| Vulnerability Overridden | : | |

COMMENTS

Appendix G

Fracture Flow Calculations

| Well 16 | | | |
|---------------|----------|----------|----------|
| Description | Inflow | Outflow | |
| Xmin | 493.23 | 24.69 | |
| Xmax | 472.52 | 12.93 | |
| Y top | 626.81 | 10.18 | |
| Y bottom | 448.78 | 38.74 | |
| Z top | 612.24 | 0.00 | |
| Z bottom | 64.29 | 1.41 | |
| Recharge | 0.00 | 0.00 | |
| ET | 0.00 | 0.00 | |
| Constant Head | 0.00 | 0.00 | |
| River | 0.00 | 0.00 | |
| Lake | 0.00 | 0.00 | |
| Drain | 0.00 | 0.00 | |
| GHB | 0.00 | 0.00 | |
| Well | 490.81 | 3,121.63 | 2,630.82 |
| Stream | 0.00 | 0.00 | |
| Storage | 0.00 | 0.00 | |
| TOTAL | 3,208.68 | 3,209.58 | |
| ERROR | -0.03 | | |

% from OPDC 19.61% 23.27%

| Well 14 | | | |
|---------------|----------|----------|--|
| Description | Inflow | Outflow | |
| Xmin | 893.37 | 0.00 | |
| Xmax | 407.01 | 269.95 | |
| Y top | 797.99 | 0.00 | |
| Y bottom | 603.26 | 180.10 | |
| Z top | 863.38 | 0.00 | |
| Z bottom | 65.98 | 0.91 | |
| Recharge | 0.00 | 0.00 | |
| ET | 0.00 | 0.00 | |
| Constant Head | 0.00 | 0.00 | |
| River | 0.00 | 0.00 | |
| Lake | 0.00 | 0.00 | |
| Drain | 0.00 | 0.00 | |
| GHB | 0.00 | 0.00 | |
| Well | 0.00 | 3,181.06 | |
| Stream | 0.00 | 0.00 | |
| Storage | 0.00 | 0.00 | |
| TOTAL | 3,631.00 | 3,632.02 | |
| ERROR | -0.03 | | |

% from OPDC 27.14%

Well# = 10
 X = 470,979.000, Y = 4,977,506.000

5 Year Pumping Volume (1825 days)

| | | | | |
|-------------------------------------|------------------------------|-----------------------|-------------------|---------------------|
| Pumping Volume (Q): | 2,938.50 m ³ /day | 103,772.15 cu.ft./day | 539.076 gal./min. | 776,269.57 gal./day |
| Water Producing Zone Thickness (L): | 36.271 m | 119 ft. | | |
| Effective Porosity (n): | 0.056 | | | |
| Original (Calculated) Radius: | 916.736 m | 3,007.67 ft. | | |

1st Bearing from Well = 310° from North.

2nd Bearing from Well = 320° from North.

Well# = 4
 X = 473,203.000, Y = 4,975,132.000

5 Year Pumping Volume (1825 days)

| | | | | |
|-------------------------------------|------------------------------|-----------------------|-------------------|-----------------------|
| Pumping Volume (Q): | 5,061.00 m ³ /day | 178,727.53 cu.ft./day | 928.455 gal./min. | 1,336,974.75 gal./day |
| Water Producing Zone Thickness (L): | 36.881 m | 121 ft. | | |
| Effective Porosity (n): | 0.056 | | | |
| Original (Calculated) Radius: | 1,193.11 m | 3,914.40 ft. | | |

1st Bearing from Well = 310° from North.

2nd Bearing from Well = 320° from North.

Well# = 8
 X = 468,215.000, Y = 4,979,510.000

5 Year Pumping Volume (1825 days)

| | | | | |
|-------------------------------------|------------------------------|-----------------------|--------------------|-----------------------|
| Pumping Volume (Q): | 5,465.70 m ³ /day | 193,019.37 cu.ft./day | 1,002.70 gal./min. | 1,443,885.18 gal./day |
| Water Producing Zone Thickness (L): | 33.528 m | 110 ft. | | |
| Effective Porosity (n): | 0.056 | | | |
| Original (Calculated) Radius: | 1,300.41 m | 4,266.45 ft. | | |

1st Bearing from Well = 315° from North.

2nd Bearing from Well = 325° from North.

Well# = 14
 X = 471,881.000, Y = 4,979,130.000

5 Year Pumping Volume (1825 days)

| | | | | |
|-------------------------------------|---------------------------|----------------------|-------------------|---------------------|
| Pumping Volume (Q): | 863.4 m ³ /day | 30,490.68 cu.ft./day | 158.393 gal./min. | 228,086.15 gal./day |
| Water Producing Zone Thickness (L): | 33.528 m | 110 ft. | | |
| Effective Porosity (n): | 0.056 | | | |
| Original (Calculated) Radius: | 516.85 m | 1,695.70 ft. | | |

1st Bearing from Well = 300° from North.

2nd Bearing from Well = 310° from North.

Unique Well# = 8
 X = 468,215.000, Y = 4,979,510.000

5 Year Pumping Volume (1825 days)

| | | | | |
|-------------------------------------|------------------------------|-----------------------|--------------------|-----------------------|
| Pumping Volume (Q): | 5,465.70 m ³ /day | 193,019.37 cu.ft./day | 1,002.70 gal./min. | 1,443,885.18 gal./day |
| Water Producing Zone Thickness (L): | 33.528 m | 110 ft. | | |
| Effective Porosity (n): | 0.056 | | | |
| Original (Calculated) Radius: | 1,300.41 m | 4,266.45 ft. | | |
| New Radius: | 1,358.89 m | 4,458.29 ft. | | |

Unique Well# = 16
 X = 468,730.000, Y = 4,978,917.000

5 Year Pumping Volume (1825 days)

| | | | | |
|-------------------------------------|----------------------------|----------------------|-------------------|---------------------|
| Pumping Volume (Q): | 612.24 m ³ /day | 21,621.05 cu.ft./day | 112.317 gal./min. | 161,736.70 gal./day |
| Water Producing Zone Thickness (L): | 40.843 m | 134 ft. | | |
| Effective Porosity (n): | 0.056 | | | |
| Original (Calculated) Radius: | 394.333 m | 1,293.74 ft. | | |
| New Radius: | 394.333 m | 1,293.74 ft. | | |

OVERLAP SUMMARY INFORMATION

| | | |
|----------------------------------------|-----------------------------|----------------------|
| Original (Calculated) Area for Well# : | 5,312,671.94 m ² | 57,185,069.44 sq.ft. |
| New Area for Well# : | 5,801,185.69 m ² | 62,443,382.63 sq.ft. |
| Original (Calculated) Area for Well# : | 488,513.75 m ² | 5,258,313.19 sq.ft. |
| New Area for Well# : | 488,513.75 m ² | 5,258,313.19 sq.ft. |
| Overlap Area to Well# : | 488,513.75 m ² | 5,258,313.19 sq.ft. |
| Overlap Area to Well# : | 0 m ² | 0 sq.ft. |
| Total Overlap Area: | 488,513.75 m ² | 5,258,313.19 sq.ft. |

UP-GRADIENT EXTENSION (UGE)

(area beyond the New Areas of both Wells)
 (area beyond the New Areas of both Wells)
 Bearing from Well# = 320° from North +/- 10°.
 Bearing from Well# = 320° from North +/- 10°.
 Up-Gradient Extension Area: 7,115,784.19 m² 76,593,589.40 sq.ft.

Wetland Management Plan



City of St. Louis Park Wetland Management Plan

Prepared for:
City of St. Louis Park



City of St. Louis Park
Wetland Management Plan

August 13, 2001

Prepared by:

WSB & Associates, Inc.
4150 Olson Memorial Highway
Minneapolis, MN 55422
(763)541-4800

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SECTION I

I. Executive Summary

Wetlands provide many benefits and, as such, are important resources to a community. They provide critical habitat for many types of birds, mammals, amphibians, reptiles, invertebrates, and plants. Wetlands can also act to improve water quality and provide water quantity control by storing water during storm events. Wetlands allow for groundwater interactions, whether it be recharge or discharge. Additionally, wetlands provide aesthetic value, nature observation areas, and areas for education and scientific research. Because of the importance of wetlands and the role wetlands play within a community, they must be considered during development review and city-wide planning in order to balance protection for these wetlands and development and growth of the city.

Section II provides the introduction and purpose of the Wetland Management Plan (WMP). It includes a description of existing resources, a discussion of the development within the City, and outlines the intent of this Plan. The WMP encompasses wetlands within the City that have been identified on the National Wetland Inventory (NWI).

Section III discusses the regulatory framework for wetlands. This section provides information of the role of the Minnehaha Creek Watershed District and Bassett Creek Watershed Management Organization as the Local Government Unit (LGU) for the Wetland Conservation Act and also provides a brief overview of other agency jurisdiction over wetlands, including the Department of Natural Resources (DNR), U.S. Corps of Engineers, the Minnesota Pollution Control Agency (MPCA).

The methods used to inventory and classify the wetlands within the City of St. Louis Park are contained in **Section IV**. The Minnesota Routine Assessment Method (MnRAM) version 2.0 (**Appendix B**) was used to identify the functions and values of the wetlands. This section also outlines the Circular 39 and Cowardin method of wetland classification. Wetlands within St. Louis Park were classified using both methods. No wetlands were delineated as part of these procedures.

Section V provides the results of the wetland inventory and assessment and provides classification of the wetlands. Wetland Types 2, 3, 4, and 5 are represented within the City of St. Louis Park. All of these wetlands receive stormwater from the storm sewer system. Detailed information about each wetland is included in **Appendix C**.

Section VI provides information on enforcement, appeals, and the amendment procedure for this Plan.

SECTION II

II. Introduction and Purpose

A. Description of Existing Resources

The City of St. Louis Park is located in the southeast quadrant of Hennepin County. There are approximately 38 wetlands within the City. All known National Wetland Inventory (NWI) wetlands within the City were evaluated with the exception of those areas where permission to access the site was either not granted or the site could not be accessed due to safety issues.

Wetlands and other natural resources of special interest exist within the City of St. Louis Park. These include Minnehaha Creek, Twin Lake, Bass Lake, and Westwood Lake. Westwood Lake is located within the Westwood Nature Center, an environmental education facility. A more detailed description of the City's existing resources can be reviewed in the Comprehensive Water Resource Management Plan.

B. Extent of Development

The City of St. Louis Park is fully developed and as such, most of the wetlands receive directed stormwater. Due to the fully developed nature of the City, little space is available to pretreat stormwater prior to discharge to wetlands. However, as areas redevelop, it is the intent of the City to provide pretreatment as feasible as outlined by the functions and values of the wetlands.

C. Intent of plan

The intent of the City of St. Louis Park WMP is to provide a means for the City to manage its wetlands. This plan provides guidelines for wetland management and assistance with Wetland Conservation Act. By evaluating the functions and values of wetlands, the City can more effectively evaluate the impact of redevelopment on the resource and the potential for restoration of wetland functions and values. This plan is not intended to replace rules or policies of the Watershed Districts.

SECTION III

III. Existing Regulatory Framework

The current regulatory framework for wetlands in Minnesota involves a variety of agencies. These agencies include the Department of Natural Resources (DNR), U.S. Corps of Engineers, and Watershed Districts. A brief discussion of the regulatory agencies and their jurisdiction is outlined below:

A. Department of Natural Resources

Public Waters and Wetlands are those that are regulated by the Minnesota Department of Natural Resources (DNR) at and below the ordinary high water level (OHW). The location of these wetlands can be found on the DNR Protected Waters and Wetland Maps. Any water appropriation from or impact to a public water may require a permit from the DNR. The DNR Protected Waters and Wetlands are shown in **Appendix C**. The DNR Area Hydrologist can be contacted for more information on DNR regulations at (651) 772-7910.

B. U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers regulates the discharge of dredged or fill materials to wetlands and other water bodies through Section 404 of the Clean Water Act. Any impact, including filling, draining, or excavation, may require a permit from the Corps. Wetland delineations are also subject to U.S. Corps of Engineer approval. The area regulatory branch can be contacted for additional information of the Corps regulations at (651) 290-5375. Depending on the size and extent of the wetland impact, the Corps may involve the Minnesota Pollution Control Agency (MPCA). The MPCA can be contacted to obtain more information at (651) 296-8852.

GP/LOP-98MN

The GP/LOP-98-MN replaces all Nationwide Permits (NWP) under Section 404 of the Clean Water Act within Minnesota. The GP/LOP-98-MN went into effect on January 31, 2000. The intent of this permit is to create a more streamlined procedure by which projects will be covered under a General Permit (GP) or Letter of Permission (LOP). The MPCA has provided 401 certification for most of the GP/LOP-98-MN permit with a few exceptions.

The GPs are intended to be non-reporting and cover the following projects:

- Projects that impact 400 sf or less of wetland

SECTION III

- Projects that impact 1/3 acre or less of wetland for maintenance activities
- Projects that are currently eligible for authorization under some Corps existing, non-controversial, non-reporting NWP's.

The LOPs require submission of an application and confirmation of approval in writing from the Corps. Eligible projects include projects that affect between 400 sf and 2 acres of wetland (or less than 5 acres of wetland for a road improvement project). The LOP eligible projects that affect more than 10,000 sf of wetland are subject to interagency review similar to the existing NWP review process.

Projects that affect more than 2 acres of wetland (or more than 5 acres for public road improvements and upgrades on existing roads), all projects in calcareous fens, or a project that affects Federal Wild and Scenic River would require Individual Permit review procedures.

For more information, the Corps of Engineers can be contacted at (651) 290-5375 or access their website at www.mvp.usace.army.mil.

C. Wetland Conservation Act

The Wetland Conservation Act (WCA) was first passed in 1991 and has been subsequently amended. The Board of Water and Soil Resources (BWSR) published MN Rules 8420 in accordance with the Wetland Conservation Act laws.

The intent of the WCA is to achieve a "no net loss" of wetlands in Minnesota. Therefore, the Wetland Conservation Act prohibits the filling and/or draining of wetlands unless the activity is exempt or wetlands are replaced by restoration/creation of wetland areas of at least equal public value.

The WCA is administered by Local Government Units (LGU's). The Minnehaha Creek Watershed District (MCWD) and Bassett Creek Watershed Management Organization (BCWMO) act as the LGU for any wetland filling or draining within the City boundaries. Information about the MCWD can be obtained by calling (952)471-0590 or at their website at www.minnehahacreek.org. Information about the BCWMO rules can be obtained by calling (763)541-8210.

SECTION IV

IV. Wetland Inventory Methods

A. Background Information

Mapping for the City was initially reviewed to identify potential areas where wetlands may exist within the City. The City of St. Louis Park Comprehensive Water Resource Management Plan (2000) had identified and provided a limited evaluation of the wetlands within the City. The wetlands identified within the Water Resource Management Plan were based on wetlands shown on the National Wetland Inventory Map (NWI). The NWI was used to identify the wetland locations for the City's WMP.

After potential locations of wetlands were identified in the office on the NWI, these locations were field verified for their presence. The presence or absence of a wetland was determined using the criteria for a wetland set forth in the 1987 Manual for Delineating and Identifying Jurisdictional Wetlands (U.S. Corps of Engineers, 1987).

It is important to note that wetland edges were not delineated as part of this project. A wetland delineation would need to be performed as part of any potential impact or development activity near the wetland. In addition, the absence of a wetland from this plan does not necessarily mean that a wetland is not present on the site. Additionally, only the large wetlands complexes associated with Minnehaha Creek were evaluated rather than the entire Minnehaha Creek stream system.

B. Existing Typing Systems for Wetlands

Outlined below are the two different wetland typing systems that are utilized in Minnesota.

- Circular 39 adapted from *Wetlands of the United States*
- Cowardin System adapted from *Classification of Wetlands and Deepwater Habitats of the United States*

Circular 39

The Circular 39 was developed in 1956 by the U.S. Fish and Wildlife Service. This system breaks wetlands into eight categories. This system is a simple, quick way to categorize wetlands. These categories include the following:

Type 1: Seasonally flooded basin or floodplain

Type 2: Wet meadow

SECTION IV

- Type 3: Shallow marsh
- Type 4: Deep marsh
- Type 5: Shallow open water
- Type 6: Shrub swamp
- Type 7: Wooded swamp
- Type 8: Bog

Cowardin System

The Cowardin System was developed in 1979 also by the U.S. Fish and Wildlife Service. This system is more precise than the Circular 39 system. Cowardin describes wetlands using a tier system with each tier describing the wetland in more detail. The tier system is outlined as follows:

Tier 1 - Systems

- Marine (not used in Minnesota)
- Estuarine (not used in Minnesota)
- Riverine
- Lacustrine
- Palustrine

Tier 2 - Subsystems

- Riverine - Tidal, lower perennial, upper perennial, intermittent
- Lacustrine - limnetic, littoral
- Palustrine - no subsystems

Tier 3 - Classes

- Rock
- Unconsolidated bottom
- Streambed
- Aquatic bed
- Emergent
- Scrub-shrub
- Forested
- Open Water
- Moss-Lichen

Finally, modifiers are added to the description to identify the type of water regime. These modifiers include the wetland being saturated, temporarily flooded, permanently flooded, etc. Other modifiers can be used as well that describe water chemistry, soil type, and whether the wetland has been ditched or farmed, etc.

SECTION IV

An example of a Cowardin described wetland would be a PEMCd wetland. This classification indicates that the wetland has been described as palustrine (P) with emergent vegetation (EM) that is seasonally flooded (C) and has been affected by ditching or draining (d).

C. Wetland Functions and Values Assessment

After background information about the location of a potential wetland was obtained and the wetland was field verified, a functions and values assessment was performed and a photograph of the wetland was taken for reference.

Functions and values of each wetland were evaluated using Minnesota Routine Assessment Method (MnRAM) 2.0. MnRAM was developed by the Interagency Wetland Group. MnRAM evaluates wetland functions and values based on the following categories in accordance with Wetland Conservation Act Rules:

- Floral diversity and integrity
- Water quality protection
- Fish and wildlife habitat
- Flood/stormwater attenuation
- Groundwater interaction
- Shoreline protection
- Aesthetic/recreation/education and science
- Commercial uses

A copy of MnRAM 2.0 can be found in **Appendix B**.

Due to the lack of available groundwater information, the groundwater interaction function of the wetlands within the City of St. Louis Park was not evaluated. Commercial uses were also not evaluated during this assessment since none of the wetlands within the City perform this function.

SECTION V

V. Wetland Inventory and Classification Results

A. Overview of MnRAM Results

Approximately 36 wetlands within the City of St. Louis Park were evaluated using MnRAM 2.0 as discussed in **Section IV**. Wetland types 2, 3, 4, and 5 are represented within the City limits. Detail about the results of the evaluation can be seen in **Appendix C**.

All of the wetlands show signs of impact by stormwater or other disturbance. Nearly all of the wetlands receive direct storm water from the storm sewer system. There is very little opportunity to provide treatment for storm water adjacent to many of these wetlands due to the fully developed nature of the City. Retrofitting the storm sewer system is not feasible or cost effective on a city-wide basis.

B. Wetland Management Classification

Based on the MnRAM Assessment, the location of the wetlands, the size of the wetlands, and any special uses for the wetlands, the City has placed wetlands into Manage I or Manage II classifications. Manage I wetlands are of higher quality, special purpose, and are located primarily on public land. These wetlands include Westwood Lake, Bass Lake, and Meadowbrook Lake. The remainder of the wetlands within the City have been placed in the Manage II category.

Manage I wetlands will be managed as follows:

- A 20 foot minimum buffer around the perimeter of wetlands will be implemented, where feasible, by eliminating mowing activities. Wider buffer widths will be implemented in accordance with Watershed District standards if wetlands are proposed to be impacted by filling or draining.
- Perimeter stormwater treatment systems will be allowed where upstream treatment cannot be provided. Grit chamber systems will be constructed upon redevelopment if a perimeter system cannot be constructed. Maintenance to remove accumulated sediment is anticipated to occur on an "as-needed" basis.

Manage II wetlands will be managed as follows:

- Continue to utilize wetlands for stormwater management as wetlands are used in their present condition.

SECTION V

- A 10 foot buffer around the perimeter of wetlands will be encouraged through public education efforts. Wider buffer widths will be implemented in accordance with Watershed District standards if wetlands are proposed to be impacted by filling or draining.

In the management of surface water and wetlands for all wetlands, the City anticipates the following:

- Upon redevelopment, developers will be required to pretreat stormwater from the site in accordance with the Comprehensive Water Resource Management Plan. **Section IV and Appendix U** of the Comprehensive Water Resource Management Plan outline treatment requirements for redevelopment.
- As flood problem areas are addressed (as outlined in the Comprehensive Water Resource Management Plan), functions and values improvements may be incorporated as feasible and cost effective in the design of these improvements.
- Remove sediment from the storm sewer systems and existing treatment basins as outlined in the Comprehensive Water Resource Management Plan (**Appendix J**).
- The City will implement the NPDES Phase II program as outlined in the Comprehensive Storm Water Management Plan to meet the guidelines from the Minnesota Pollution Control Agency.
- The City will continue its public education program to educate residents about the importance of wetlands, how to improve water quality, and landscaping alternatives available for residents with property abutting water / wetlands.
- The development of a wetland buffer and stormwater management ordinance will be investigated as part of the implementation of the Comprehensive Water Resource Management Plan.
- As opportunities arise to pretreat stormwater prior to discharge or complete other improvements to enhance wetland functions and values, the City will evaluate and implement these opportunities as funding is available based on the functions and values assessment.

SECTION V

- The City will develop a no or low phosphorous ordinance.
- The City will investigate the use of biological control of purple loosestrife as part of the implementation of this plan.
- The City Council has determined that the City will not purchase homes or private property to provide pretreatment for water bodies. The displacement of residents and businesses is not feasible for the City. Retrofitting the storm sewer system is not economically or physically possible.

It is anticipated that the Minnehaha Creek Watershed District will complete functions and values assessment of the wetlands within the City in the next few years. The City will review the results of these assessments and will amend the plan, if necessary, after receiving the results.

C. **Public Education Plan**

As part of the implementation of the Wetland Management Plan (and the Water Resources Management Plan), a public education plan has been developed. The implementation of this plan is anticipated to include the following:

- Expand water quality monitoring through citizen volunteers to 5-7 more lakes/wetlands within the City.
- Provide articles in the *Sun Sailor* and *Park Perspective* paper and newsletter about water quality, wetlands, buffers, and other water resource related topics.
- Expand the water resource related information available on the City's Internet site.
- Create and/or show water resource / wetland informational videos on the City's cable access channel.
- Utilize existing neighborhood groups for wetland and neighborhood clean-up days, shoreline restoration projects, or other projects identified through the neighborhood groups.

C. **Potential Wetland Mitigation / Restoration Locations**

Wetlands and adjoining upland and wetlands that could be enlarged or restored within the City were evaluated for their potential to be possible locations for wetland mitigation or wetland improvement areas. To determine if an area had the potential for wetland mitigation or restoration, the following factors were taken into account:

SECTION V

- Open space existed adjacent to the wetland where the wetland could be expanded, or
- Portions of the wetland could be restored through revegetating a disturbed wetland and/or reestablishing hydrology of a partially drained wetland, or
- Wetlands were degraded and an improvement project could be undertaken if the funding were available.

This plan did not take into account if the land owner was willing to sell the land, nor was a feasibility study undertaken to determine if other outstanding factors may play a role in the use of these lands for wetland mitigation. The following wetlands have been identified as potential areas for improvement/restoration projects if funding becomes available:

1. **Lamplighter Pond - Wetland No. 8:** Lamplighter Pond has been expanded in the City's past to hold stormwater. This wetland experiences significant flooding during large storm events. There is no buffer adjacent to most of the wetland and the slope of the wetland below the normal water level is too steep to allow emergent vegetation to become established. Steps that could be taken to improve the Pond could include establishment of a buffer adjacent to the wetland and re-grading the side slopes below the normal water level to create a more gradual shelf that would encourage emergent vegetation growth. This wetland could also benefit from other shoreline restoration through planting the buffer and emergent area with native species.
2. **Wolfe Park Pond - Wetland No. 39 :** While a water quality project has been completed in the past near Wetland # 39, the wetland itself has no buffer and no emergent vegetation. This wetland could benefit from a shoreline restoration project and measures to reduce the goose population from disrupting the vegetation. By establishing a buffer of taller grass, the geese may be deterred from disrupting the upland vegetation.
3. **South Twin Lakes - Wetland No. 2:** There is existing space adjacent to this wetland that could be used, if needed, to expand the wetland for wetland credit. This option does not include an analysis as to if the land is available or if the project would be feasible to construct or if public support is available .
4. **Oak Lake - Wetland No. 34:** There is existing space adjacent to this wetland that could be used, if needed, to expand the wetland for wetland credit. This option does not include an analysis as to if the land is available, if the project would be feasible to construct, or if public support is available.

SECTION V

5. **Wetland No. 4:** There is existing space adjacent to this wetland that could be used, if needed, to expand the wetland for wetland credit. This option does not include an analysis as to if the land is available, if the project would be feasible to construct, or if public support is available

6. **Water Quality Improvement Projects:** With the implementation of expanded water quality monitoring, the need for water quality improvement projects could be identified. It is anticipated that the results of the monitoring will be evaluated as the data becomes available. If the need for a water quality project is identified, it could be undertaken provided that funding is available. This could include providing pretreatment prior to discharge to a wetland or retrofitting existing treatment facilities.

7. **Purple Loosestrife Control:** The City is currently undertaking a program to use biocontrol agents to reduce the purple loosestrife within selected areas within the City.

Appendix D shows the locations of these areas.

SECTION VI

VI. Enforcement and Amendments

It is the intention of the City of St. Louis Park to have this Wetland Management Plan reviewed and approved by the Board of Water & Soil Resources (BWSR) and adopted as part of the Comprehensive Water Resource Management Plan. Once approved, no significant changes to this Plan can be made without the approval of BWSR. Significant changes to this Plan shall be made known to the following parties:

- The Mayor, City Council, City Staff, and City Engineer
- Minnehaha Creek Watershed District (MCWD)
- Bassett Creek Watershed Management Organization (BCWMO)
- Board of Water and Soil Resources

The intent of this plan is to provide guidelines for management of wetlands within the City. This plan is not intended to replace the rules of the MCWD and BCWMO. If impacts to wetlands are proposed and/or redevelopment occurs, the project is subject to the St. Louis Park Comprehensive Water Resource Management Plan and the MCWD and BCWMO rules and policies.

The City will review the Watershed District wetland functions and values assessments when completed, and will amend the Plan, if necessary, after receiving the results.

Appendix A
List of Technical Panel Members & Citizen Members

Technical Advisory Panel

Doug Snyder, Board of Water and Soil Resources

Wayne Barstad, DNR Ecological Services

Jack Frost, Metropolitan Council

Glenda Spiotta, Minnehaha Creek Watershed District

Andrea Moffatt, WSB & Associates (for the City)

Citizen Input

To obtain public input, a letter was sent to residents within 150' of a wetland summarizing the Wetland Management Plan, its potential impact on the City, and inviting participation in a public meeting. An article on the *Park Perspective* and *Sun Sailor* was also published that provided information about the Wetland Management Plan and invited participation in a public meeting. The meeting was held May 23, 2001 and was attended by 14 interested residents. The comments provided by these residents are included in this Appendix.



Memorandum

To: *Honorable Mayor and City Council
Carlton Moore
City of St. Louis Park*

From: *Andi Moffatt, WSB & Associates*

Date: *July 2, 2001*

Re: *Wetland Management Plan
WSB Project No. 1007-35*

The purpose of this memo is to provide a summary of the comments that were received as part of the public meeting that was held on May 23, 2001 to discuss the City's Wetland Management Plan and provide a recommendation to the City about the Plan.

The City Council requested on February 12, 2001 that extra efforts be taken to inform residents about the Wetland Management Plan and its potential impact on the City. In order to inform the public about the Wetland Management Plan and public meeting, articles were published in the *Park Perspective* newsletter and the *Sun Sailor* paper. Residents within 150' of a wetland were sent letters in the mail inviting them to the attend the meeting. The meeting was attended by 14 interested residents. The comments provided by these residents are outlined below:

1. A suggestion was made for the City to provide an incentive to homeowners to create a buffer strip around the wetland. This could be in the form of the City purchasing the plant material for residents who were interested in creating a buffer strip.
2. A suggestion was made that wider buffer widths be incorporated into the Plan. Currently the Plan states that city-owned wetlands will have a 10 foot buffer and owners who have wetlands within their property would be encouraged to have 5 foot buffers. (Please note that the Minnehaha Creek Watershed District has wider buffer widths depending on the size of the wetland. These widths would go into effect if a permit is required by the MCWD for erosion control, wetland impact, floodplain impact, or stormwater management.)
3. A suggestion was made to have organized neighborhood clean-up days to clean up wetland areas.
4. Many of the residents indicated they were willing to participate in wetland clean-up projects or wetland buffer planting projects but need the technical information on the best way to create buffers and need assistance in organizing the neighborhoods.

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Minnesota
55422
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763-541-1700 FAX

5. A suggestion was made to control the purple loosestrife in the wetlands. The residents were informed that the Plan currently provides for the City to investigate the use of biological control to eradicate the purple loosestrife plants.
6. Support for a low/no phosphorous ordinance was indicated by many of the residents.
7. A question was asked as to whether the DNR could stock fish in Cobble Crest Pond.
8. A question was asked if the City would allow a resident to hire a 3rd party to treat a lake. Mr. Moore indicated that if a resident were to give a formal proposal for such a project, the City would review it.
9. A suggestion was made to develop more detailed management plans for each wetland within the Manage I category, which includes Westwood Lake, Bass Lake, and Meadowbrook Lake.

Additionally, comments were received from the Metropolitan Council and the Department of Natural Resources, who have been involved in the development of the Wetland Management Plan. These agencies encouraged the City to provide a more aggressive approach to improve the water quality of the Manage I wetlands, increase the buffer widths, and include plans to restore the functions and values of some of the poorer quality wetlands. The comment letters from the agencies are enclosed for your information and review.

In order for the City to complete the Wetland Management Plan and submit it for Board of Water and Soil Resources approval (BWSR), as required by Minnesota Rules 8420, we recommend the following changes to the Plan:

- To respond to Comment #1, #2, and the agency comments, increase the buffer widths for the city-owned Manage I wetlands from 10 feet to 20 feet and encourage homeowners to create buffer widths of 10 feet or greater. Discussion can be added to the Plan that as part of implementation of the Plan, the City will investigate providing incentives to homeowners to create buffers around wetlands as part of the public education plan.
- To respond to Comments #3 and #4, add discussion about the City's public education plan which could include utilizing neighborhood groups to complete wetland clean-up projects.
- To respond to the agency comments, add discussion regarding wetlands that are of poor quality but have the potential to be restored to a higher

quality wetland. This would include outlining steps that could be taken to improve the wetland quality if funds were available and identifying wetlands that would benefit from such a project.

- In response to Comment # 5, the Wetland Management Plan currently contains a plan to address purple loosestrife within wetlands. No additional changes are needed to address this issue.
- In response to Comment #6, the a no/low phosphorous ordinance is part of the implementation of the Stormwater Management Plan. No additional changes are needed to address this issue.
- In response to Comments #7 and #8, the Wetland Management Plan is not intended to address stocking fish or allowing residents to treat lakes. These items could be addressed through a different process with the City, if the City Council so chooses.
- In response to Comment #9, developing detailed lake management plans is beyond the scope of the Wetland Management Plan. However. The development of these plans could be included as part of the implementation of the Wetland Management Plan. If the City Council so chooses, development of detailed lake management plans can be added to the Wetland Management Plan as part of an implementation task.

We recommend revising the Plan to increase buffer widths, expand the discussion of the City's public education/involvement process, and add discussion about the potential to restore some of the poorer quality wetlands within the City as outlined above prior to submission of the Wetland Management Plan for BWSR approval. If these items are not addressed, it is anticipated that approval of the Plan by BWSR may not be secured. Once the Plan is revised, it is anticipated that the City's Comprehensive Surface Water Management Plan with the Wetland Management Plan could be presented to the City Council for adoption.

If you have any questions, please feel free to contact us at (763)541-4800.



Metropolitan Council

Improve regional competitiveness in a global economy

Environmental Services

February 1, 2001

Andi Moffatt
Wetland Biologist
WSB and Associates
4150 Olson Memorial Highway, Suite 300
Minneapolis MN 55422

RE: City of St. Louis Park Wetland Management Plan

Dear Mr. Moffatt:

Thank you for sending the Metropolitan Council a copy of the draft of the St. Louis Park Wetland Management Plan.

Obviously, given the fully developed urban condition of the City, opportunities for managing the wetlands to improve their condition are extremely limited. Council staff is pleased to see that the City will use any re-development opportunities to improve the quality of the runoff before it is discharged to the wetlands.

Staff would recommend, however, that where a wetland is within publicly owned land, such as a park, and also for those wetlands classified as "Managed I" class, the City pursue a more aggressive approach to improve the quality of these resources. For Example the City of Richfield has been able to pursue a runoff improvement program for Wood Lake, a small urban lake with numerous stormwater discharges and extremely limited areas along the shoreline. Grants may be available for such work. You may wish to contact Jack Frost about such opportunities. Jack can be reached at 651-602-1078 or via e-mail: jack.frost@merc.state.mn.us

Staff would also recommend that whenever possible the City adopt somewhat more generous standards for the width of buffers. A five-foot buffer in the case of the "Manage II" class will provide little in terms of either wildlife protection or runoff improvement.

Again, thank you for the opportunity to comment. If you wish to discuss these comments, please contact me at 651-602-1145, or feel free to contact Jack Frost the Watershed Coordinator for your area.

Sincerely,

Marcel R. Jouseau, Manager
Environmental Planning and Resources Management

Cc. Jack Frost, MCES Watershed Coordinator

| | | | | | |
|-------------------|--------------|---------|----------------|------------|--------|
| Post-it* Fax Note | 7671 | Date | 02-01-01 | # of pages | 1 of 1 |
| To | Andi Moffatt | From | Marcel JOUSEAU | | |
| Co./Dept | | Co | | | |
| Phone # | | Phone # | 651-602-1145 | | |
| Fax # | 763-541-1700 | Fax # | | | |

Metro Region
1200 Warner Road
Saint Paul, MN 55106

651-772-7940

January 30, 2001

Ms. Andi Moffatt
WSB & Associates
4150 Olson Memorial Highway
Suite 300
Minneapolis, MN 55422

RE: City of St. Louis Park Draft Wetland Management Plan.

Dear Ms Moffatt;

Andi, thanks for the opportunity to review this draft plan. In general, it looks good and it's pretty much what I had expected. I have just a few minor comments.

1. You'll recall that in September I indicated that I'd like to see a "restore" management classification included in the plan. What I was looking for was some stronger acknowledgment that opportunities exist for the restoration of the diminished functions of otherwise medium to high quality wetlands. Perhaps a separate classification is asking too much, considering the small number of wetlands and the extent of development in St. Louis Park. So, short of that, I'd recommend the inclusion of language stating that, given the values of wetlands (as stated in Section I), the City will make every effort to restore functions and values as the opportunities arise. The third sentence in Section IIC could be amended to read, "By evaluating the functions and values of wetlands, the City can more effectively evaluate the impact of redevelopment on the resource and the potential for restoration of wetland functions and values." This adds a perspective that goes beyond the situations within which wetland mitigation is needed and signals the City's recognition that restoration is an important end in itself.
2. It appears that Appendix B is intended to contain a number of items, only one of which (the MnRAM) is included. Missing are the outlines for Circular 39 and the Cowardin methods and the DNR Protected Waters and Wetlands. The protected waters and wetlands are listed in Appendix C, so it may not be necessary to repeat that information in Appendix B.
3. The proposed 10 foot minimum buffer for Manage I wetlands and 5 foot buffer for Manage II wetlands are insufficient for providing protection from adjacent land uses. If you look at other

St. Louis Park Wetland Management Plan
page 2

wetland plans, i.e., City of Eden Prairie or City of Rosemount, you'll see minimum buffers of 60-75 feet for high quality wetlands and 10-25 feet for low quality wetlands. I assume that existing development conditions limit buffer width, but it would be good if these minimum widths could be increased.

Thank you again. If you'd like to discuss these comments, please give me a call at 651-772-7940.

Sincerely,

Wayne Barstad
Regional Environmental Assessment Ecologist

c: Kathleen Wallace, Regional Director
Doug Norris, Wetlands Coordinator

Appendix B
St. Louis Park MnRAM 2.0

**MINNESOTA ROUTINE ASSESSMENT METHOD
FOR EVALUATING WETLAND FUNCTIONS (MnRAM) -
Version 2.0**

GENERAL INFORMATION:

| | |
|-------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| Project Number or Name: 1007-35 | Wetland Number: |
| Name of Wetland Owner (if necessary): | |
| Location: County: Hennepin Section <u> </u> ; ¼ ¼ ¼ Township Range | |
| Major Watershed: Miss. Rvr - Metro | Minor Watershed: Local Government Unit: MCWD |
| Evaluator(s): A. Moffatt | Date(s) of Site Visit(s): August , 2000 |

SCOPE AND LIMITATIONS:

1. Description of **temporal factors** of this assessment due to seasonal considerations and/or existing hydrologic and climatologic conditions (e.g., after heavy rains, snow or ice cover, frozen soil, during drought period, during spring flood, during bird migration). Circle those that apply and list others (use back of page if necessary):

2. Description of the **Wetland Assessment Area**: the project site, the wetland, wetland portion or wetland complex being evaluated. (If the evaluation area consists of more than one wetland type it may be necessary to complete an assessment for more than one **Wetland Assessment Area**.) (Use back of page if necessary):

Wetland #

3. Description of the **Wetland Comparison Domain**: the geographic area (e.g., the political boundary, major or local watershed boundary or ecoregion subsection) used for functional comparison. Briefly explain the reason(s) for the choice of the Wetland Comparison Domain. The Wetland Comparison Domain should generally be of a size so as to include some relatively undisturbed Reference Standard Wetlands. (Use back of page if necessary.):

City of St. Louis Park

4. Describe the **purpose** of this assessment: i. regulatory/impact determination; ii. replacement/mitigation design; iii. restoration; iv. monitoring; v. inventory/planning/classification; vi. educational; vii. other

#iv and #v

* *Functional level is based on a comparison with a REFERENCE STANDARD WETLAND. A REFERENCE STANDARD WETLAND is a wetland judged to have the highest level of overall sustainable functional capacity for a particular type (based on a classification system such as Circular 39, Cowardin/NWI or HGM) within the Wetland Comparison Domain. See page 1 for more information about Reference Standard Wetlands.*

SITE DESCRIPTION

I. HYDROLOGIC SETTING

A. Describe the hydrogeomorphology of the wetland (check those that apply):

- Depressional
- Riverine (within the river/stream banks)
- Lacustrine Fringe (edge of deepwater areas)
- Extensive Peatland
- Slope
- Floodplain
- Other _____

B. The hydrology source is primarily: Ground water only Surface water only
See Appendix B Both (Surface and Ground water) Unknown

Additional Observations/Descriptions: _____

C. Has the hydrology of (a.) the wetland, or (b.) the wetland's immediate watershed, been substantially altered by excavation, ditching, tiles, dams, culverts, pumping, diversion of surface flow, or changes to runoff within the immediate watershed (circle those that apply)?

- a.) Yes No If Yes; when and how?
 b.) Yes No If Yes; when and how?

D. Does the wetland have discernable inlets or outlets? _____ If Yes, describe each inlet and outlet.
 inlets: _____
 outlets: _____

E. Does the wetland have standing water? _____ If yes, maximum depth (if known)? _____
 Approximately how much of the wetland is inundated? _____% Date of observation ___/___/___

F. What is the predominant hydroperiod (seasonal water level pattern) of the wetland(s)?

- Permanently Inundated (surface water present all year in every year)
- Intermittently Exposed (surface water present all year, except during severe droughts)
- Semi-Permanently Inundated (surface water present throughout growing season in most years)
- Seasonally Inundated (surface water present for extended periods in early growing season but absent by end of the growing season in most years)
- Temporarily Inundated (surface water present for brief periods during the growing season, water table usually below soil surface)
- Permanently Saturated (surface water seldom present but substrate permanently saturated except during severe drought)
- Saturated (surface water seldom present but substrate saturated for extended periods during the growing season)

III. SOILS

General Description of Soil(s) from Soil Survey and on Site:

| | Adjacent UPLAND Area | WETLAND Area |
|-------------------------------------------------------------------|----------------------|--------------|
| Soil Survey Classification(s): Is the area an inclusion? Y N U | | |
| Soil texture and drainage characteristics | | |
| Soil disturbed? If yes, describe below. | | |
| Field Observations: | | |

V. SURROUNDING LAND USES

A. What is the estimated area of the wetland's immediate watershed in acres (*optional*)? _____

B. Describe the surrounding land uses in the table:

| LAND-USE | Estimated % of Wetland's Immediate Watershed (Can be > 100%) |
|-----------------------------------------------|-----------------------------------------------------------------|
| Developed (Industrial/Commercial/Residential) | |
| Agricultural: cropland | |
| Agricultural: feedlots | |
| Agricultural: grazing | |
| Forested | |
| Grassed (without grazing) | |
| Recreation areas/parks | |
| Highways/Roads | |
| Mining (specify type) | |
| Water and wetlands | |
| Other (specify) | |

Step 2: Consult the high, moderate and low quality descriptions for the appropriate plant community. Read the descriptions in that order before making a decision as to which is most applicable. Also, read the following description for "exceptional" quality plant communities applicable to all communities.

Exceptional Quality:

Plant communities undisturbed, or sufficiently recovered from past disturbances, such that they represent pre-European settlement conditions. Non-native plant species are absent or, if present, constitute a minor percent cover of the community. Rare, threatened and/or endangered species (consider both State and Federal listings) may be present. Unique features (e.g., patterned peatlands, virgin prairie, old growth forests) may also be present. Page numbers below refer to "*Wetland Plants and Plant Communities of MN and WI*", 2nd Edition, (USACOE - St. Paul District; Eggers and Reed).

I. SHALLOW, OPEN WATER COMMUNITIES (page 28)

High Quality: Diverse aquatic bed communities dominated by 3 or more species of native aquatic plants such as pondweeds, water lilies, bladderworts, wild celery, duckweeds, water crowfoots, native milfoils, etc.

Moderate Quality: Dominated by 1 or 2 species of native aquatic plants.

Low Quality: Dominated by Eurasian water milfoil; or no aquatic vegetation present.

II.A. and B. DEEP AND SHALLOW MARSHES (page 51-53)

High Quality: Dominated by a diverse assemblage (3 or more species) of native aquatic plants (e.g., bur-reeds, bulrushes, arrowheads, cattails, sweet flag, pondweeds). Cattails comprise less than 40 percent cover. Purple loosestrife absent or comprises less than 5 percent cover.

Moderate Quality: Dominants include at least 2 species of native aquatic plants, often arranged in a band or interspersed as patches. Purple loosestrife, if present, comprises less than 25 percent cover. Cattail, if present, comprises 40 to 85 percent cover.

Low Quality: Purple loosestrife comprises more than 25 percent cover; or cattail comprises more than 85 percent cover.

III. A. SEDGE MEADOWS (page 86)

High Quality: Stands of sedges with 5 or more species of native forbs. Grazing, haying, artificial drainage, stormwater input, excavation and/or impoundment absent or minimal. Reed canary grass, purple loosestrife and/or stinging nettle absent or cumulatively comprise less than 5 percent cover. Buckthorn absent or comprises less than 10 percent cover.

Moderate Quality: Stands of sedges subjected to moderate degree of the disturbances listed above. Two to 4 species of native forbs present. Reed canary grass, purple loosestrife and/or stinging nettle cumulatively comprise less than 40 percent cover. Buckthorn absent or comprises less than 30 percent cover.

Low Quality: Stands of sedges highly impacted by grazing, haying, artificial drainage, stormwater input and/or cropping. Reed canary grass, purple loosestrife and/or stinging nettle cumulatively comprise more than 40 percent cover; and/or buckthorn, if present, comprises greater than 30 percent cover.

with minimal disturbances such as artificial drainage, peat mining, filling, impoundment, stormwater input (especially salt), etc.

Moderate Quality: Community moderately impacted by the disturbances listed above.

Low Quality: Community highly impacted by the disturbances listed above. Indicators could include die-out of sphagnum mosses and/or invasion by buckthorn, aspen, stinging nettle, dewberry, cattail, etc.

IV.B. CONIFEROUS BOGS (page 175)

High Quality: Stands of tamarack and/or black spruce undisturbed or minimally disturbed by artificial drainage, peat mining, logging, filling, impoundment, stormwater input, etc.

Moderate Quality: Stands of tamarack and/or black spruce moderately impacted by disturbances listed above.

Low Quality: Majority of stands of tamarack and/or black spruce dead or dying due to highly disturbed condition. Substantial invasion by buckthorn, aspen, stinging nettle, dewberry, cattail, etc.

V.A. SHRUB-CARRS (page 180)

High Quality: Community undisturbed or minimally disturbed by artificial drainage, grazing, filling or impoundment. Dominated by native shrubs (e.g., dogwoods, willows) with a groundlayer stratum composed of five or more species of native grasses, sedges, rushes and/or forbs. Buckthorn, honeysuckle and/or box elder, if present, cumulatively comprise less than 10 percent cover. Reed canary grass, if present, comprises less than 10 percent cover.

Moderate Quality: Community moderately impacted by the disturbances listed above. One of two types: (1) shrub canopy composed of native species with a nearly monotypic reed canary grass groundlayer; or (2) shrub canopy composed of up to 50 percent non-native or disturbance indicator species (e.g., buckthorn, honeysuckle, box elder) with a groundlayer stratum composed of less than 5 species of native grasses, sedges, rushes and forbs; reed canary grass may be present but comprises less than 50 percent cover.

Low Quality: Community highly impacted by the disturbances listed above. Buckthorn, honeysuckle and/or box elder comprise more than 50 percent canopy cover and the groundlayer stratum is composed of greater than 50 percent cover of reed canary grass or non-native grasses/forbs.

V.B. ALDER THICKETS (page 192)

High Quality: Community undisturbed or minimally disturbed by artificial drainage, grazing, filling, impoundment, etc. Non-native shrubs (e.g., buckthorn), if present, comprise less than 10 percent cover. Groundlayer stratum may be depauperate or composed of native grasses, sedges, rushes, ferns and/or forbs. Reed canary grass, if present, comprises less than 10 percent cover.

Moderate Quality: Community moderately impacted by the disturbances listed above. Non-native and/or disturbance indicator shrubs (e.g., buckthorn, box elder, honeysuckle) cumulatively comprise less than 40 percent cover. The groundlayer stratum, if present, has less than 50 percent cover of reed canary grass.

Low Quality: Community highly impacted by the disturbances listed above with greater than 40 percent cover contributed by buckthorn, box elder and/or honeysuckle; and/or reed canary grass

| | | |
|----------------------------|-----------------------------------------------------|--------------------------|
| Plant community #1 = _____ | % of Wetland Assessment Area (can be >100%) = _____ | functional level = _____ |
| Plant community #2 = _____ | % of Wetland Assessment Area (can be >100%) = _____ | functional level = _____ |
| Plant community #3 = _____ | % of Wetland Assessment Area (can be >100%) = _____ | functional level = _____ |
| Plant community #4 = _____ | % of Wetland Assessment Area (can be >100%) = _____ | functional level = _____ |

if more than 4 plant communities are present list them on the back of this page

Maintenance of Characteristic Hydrologic Regime

Wetlands with a natural outlet and mostly undisturbed conditions in the wetland and its local watershed would be rated as **exceptional** for this function.

1. Describe the wetland outlet characteristics:
 - High = Lacks constructed outlet; or the watercourse/stream has not been ditched/channelized.
 - Med. Hi. = Constructed outlet is at or above temporary wetland zone or outlet is managed to duplicate natural conditions;
 - Medium = Constricted or managed outlet; outlet lowered to significantly reduce temporary (< 7 days) and/or long-term (> 7 days) storage; evidence of ditched/channelized watercourse.
 - Low = Excavated or enlarged outlet; outlet removes most/all long-term storage, no/little/some temporary storage remains.

2. Describe the dominant land use and condition of the upland watershed that contributes to the wetland:
 - High = Watershed conditions essentially unaltered; e.g., land use development minimal, idle lands, lands in hay or forests or low intensity grazing on gentle (< 3%) to moderate (3 - 9%) slopes in good to excellent condition.
 - Medium = Watershed conditions somewhat modified; e.g., moderate grazing or recent logging on steep (> 9%) slopes; conventional till with residue management on moderate slopes, no-till on steep slopes
 - Low = Watershed conditions highly modified; e.g., intensive agriculture or grazing, no residue management on moderate or steep slopes, urban semi-pervious or impervious surface, intensive mining activities.

3. Describe the conditions of the wetland itself:
 - High = No evidence of recent tillage, temporary wetland zone intact; e.g., idle land, hayed or lightly to moderately grazed or logged. No compaction, rutting, or trampling damage to wetland.
 - Medium = Temporary wetland zone tilled or heavily grazed most years. Zones wetter than temporary receive tillage occasionally. Some compaction, rutting, or trampling in wetland is evident.
 - Low = Wetland receives conventional tillage most (> 75%) years; or otherwise significantly impacted (e.g., fill, cleared). Severe compaction, rutting, or trampling damage to wetland.

High = Clays or shallow to bedrock
Moderate = Silts or loams
Low = Sands

5. For flow-through wetlands, describe the functional level of the wetland in providing flood or stormwater storage/attenuation in relation to primary wetland vegetation cover type:

High = Dense vegetation
Moderate = Combination of vegetation and open water
Low = Primarily open water
N/A = not applicable, wetland is not a flow-through type

6. Describe the functional level of the wetland in retarding or altering flood flows:

High = No channels present
Moderate = Channels present, but not connected
Low = Channels connecting inlet to outlet

7. Describe the flood/stormwater management level of the wetland.

High = Receives directed stormwater and water level managed to maximize flood/stormwater retention
Moderate = Receives directed stormwater and water level unmanaged for flood/stormwater retention
Low = Receives no directed stormwater and water level unmanaged for flood/stormwater retention

8. Describe the history of wetland losses in the major watershed. Estimate percentage of wetlands lost:
_____ %

High = Most wetlands drained or filled (more than 50% lost).
Moderate = Some wetlands drained or filled (20 - 50% lost).
Low = Few wetlands drained or filled (less than 20% lost).

9. Describe the location of the wetland within the watershed:

| | | | |
|------------------|-------|-----|-------|
| local watershed: | upper | mid | lower |
| major watershed: | upper | mid | lower |

Functional Level of Flood/Stormwater Attenuation = _____ (record on page 5 summary).

Water Quality Protection

1. Y N Does the wetland receive direct discharge of managed water (e.g. municipal or road stormwater drainage, agricultural drainage outlet, industrial or municipal wastewater)?
2. Y N Do the surrounding or upstream land uses have the potential to deliver significant nutrient and/or sediment loads to the wetland?
3. Y N Does the wetland shape, flow inputs, and outlet configuration allow adequate residence time so that sediments are able to settle?
4. Y N N/A For non-isolated wetlands, does the wetland have significant vegetative density to decrease

Rare/Unique Species and Specialized Habitat

1. Y N Is the wetland known to be used by locally rare species or species that are state or federally listed? (A list of state and federally listed species is attached in Appendix B.) If yes, wildlife habitat functional level rating = exceptional.
2. Y N Is the wetland known to provide specialized habitat components for particular species or groups of species that are not generally available elsewhere (e.g. colonial waterbird nesting colonies, significant amphibian breeding sites, deer wintering yards). If yes, wildlife habitat functional level rating = exceptional.
3. Y N Does the wetland provide seasonal or intermittent habitat components (e.g., amphibian breeding, resting/feeding by migratory waterfowl/shorebirds)?

Habitat Structure

4. Indicate below how the plant species diversity of the evaluation wetland compares with a reference standard wetland of the same type and similar size within the wetland comparison domain.



5. What is the maintenance of characteristic hydrologic regime functional level from the Hydrology Section (on page 18)?
Exceptional High Medium Low

Habitat Interspersion and Connectivity

6. Describe the dominant land use and condition of the immediate watershed that contributes to the wetland:

High = Watershed conditions essentially unaltered, e.g., land use development minimal, idle lands, low intensity grazing or haying, forests.
Med. = Watershed conditions somewhat modified, e.g., moderate intensity grazing or haying; dispersed rowcrop agriculture; low density residential.
Low = Watershed conditions highly modified, e.g., intensive rowcrop agriculture; urban semi-pervious or impervious surface, high density residential, intensive mining activities.
7. For depressional wetlands, describe the relative abundance (no. of basins/sq. mi.), relative density (acres of wetlands per sq. mi.) and interspersion of various wetland types within a 1 mile radius from the center of the assessment wetland:

High = Abundance, density and interspersion very similar to Reference Standard Wetland
Med. = Abundance, density and interspersion somewhat dissimilar to Reference Standard Wetland
Low = Abundance, density and interspersion differs considerably from Reference Standard Wetland
8. Indicate below the extent to which the wetland either by itself or in conjunction with other habitat types provides a connection between larger wetlands or other habitat types that would otherwise be isolated by intensive agricultural or urban land use.

4. Y N Does the public have direct access to the wetland from public roads or waterways?
5. Is the wetland itself relatively free of obvious human influences, such as:
 - a. Y N Structures?
 - b. Y N Trash/pollution?
 - c. Y N Filling/dredging/draining?
 - d. Y N Invasive vegetation?
6. Is the area surrounding the wetland relatively free of obvious human influences, such as:
 - a. Y N Buildings?
 - b. Y N Roads?
 - c. Y N Other structures?
 - d. Y N Altered land uses?
7. Y N Does the wetland provide a spatial buffer between developed areas?
8. Y N Is the wetland and immediately adjacent area currently being used for (or does it have the potential to be used for) the following recreational activities? (Check all that apply.)

| ACTIVITY | CURRENT USE | POTENTIAL USE |
|-------------------------------------|-------------|---------------|
| Education/cultural/scientific study | | |
| Hiking/biking/skiing | | |
| Hunting/fishing/trapping | | |
| Boating/canoeing | | |
| Food harvesting | | |
| Wildlife observation | | |
| Exploration/play/photography | | |
| Others (list) | | |

Functional Level of Aesthetics/Recreation/Education/Cultural and Science = _____ (record on page 5 summary)

Appendix C
Wetland Assessment Results

w:\1007-35\Cad\wmp2.dgn

PLYMOUTH WATERSHED

LANDLOCKED WATERSHED
HANNAN LAKE WATERSHED

PLYMOUTH

WESTWOOD LAKE WATERSHED

GOLDEN VALLEY

GOLDEN VALLEY WATERSHED

MINNEAPOLIS WATERSHED

MINNETONKA

TWIN LAKE WATERSHED

MINNEAPOLIS

HOPKINS

BASS LAKE WATERSHED

WOLF LAKE WATERSHED

MINNEHAHA CREEK WATERSHED

HOPKINS

MINNEAPOLIS WATERSHED



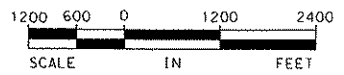
LEGEND

- NWI WETLAND
- DNR PROTECTED WETLAND/WATER
- DNR PROTECTED WATERCOURSE
- 659W DNR PROTECTED WETLAND I.D.
- 657P DNR PROTECTED WATER I.D.
- 1 CITY OF ST. LOUIS PARK WETLAND IDENTIFICATION.

NOTE:

NWI WETLANDS ARE SHOWN AS DEPICTED ON THE NWI USGS HOPKINS & MPLS. SQ. QUAD. MAPS. DNR PROTECTED WETLAND/WATERS ARE SHOWN AS DEPICTED ON THE MDNR PROTECTED WETLANDS/WATERS SHEET 2 OF 4 FOR HENNEPIN CO. THE WETLAND BOUNDARIES HAVE NOT BEEN FIELD VERIFIED FOR THIS MAP.

1. CEDAR ST.
2. QUEBEC DR.
3. OAK PARK VILLAGE DR.
4. CEDARSHORE DR.
5. GLENHURST PL.
6. FOREST LA.
7. 42 1/2 ST.
8. QUENTIN CT.
9. PRINCETON CT.
10. VICTORIA WAY
11. VICTORIA CIR.
12. VICTORIA CURVE
13. VICTORIA LA.
14. EXCELSIOR WAY



WETLAND INVENTORY MAP

| | |
|--------------|----------|
| SCALE: | AS NOTED |
| PLAN BY: | MSS |
| DESIGNED BY: | PRW |
| PROJECT NO.: | 1007-35 |
| DATE: | 1999B |

WETLAND MANAGEMENT PLAN
ST. LOUIS PARK, MINNESOTA

350 Westwood Lake Office
8441 Wayzata Boulevard
Minneapolis, MN 55426
812-541-4800
FAX 541-1700



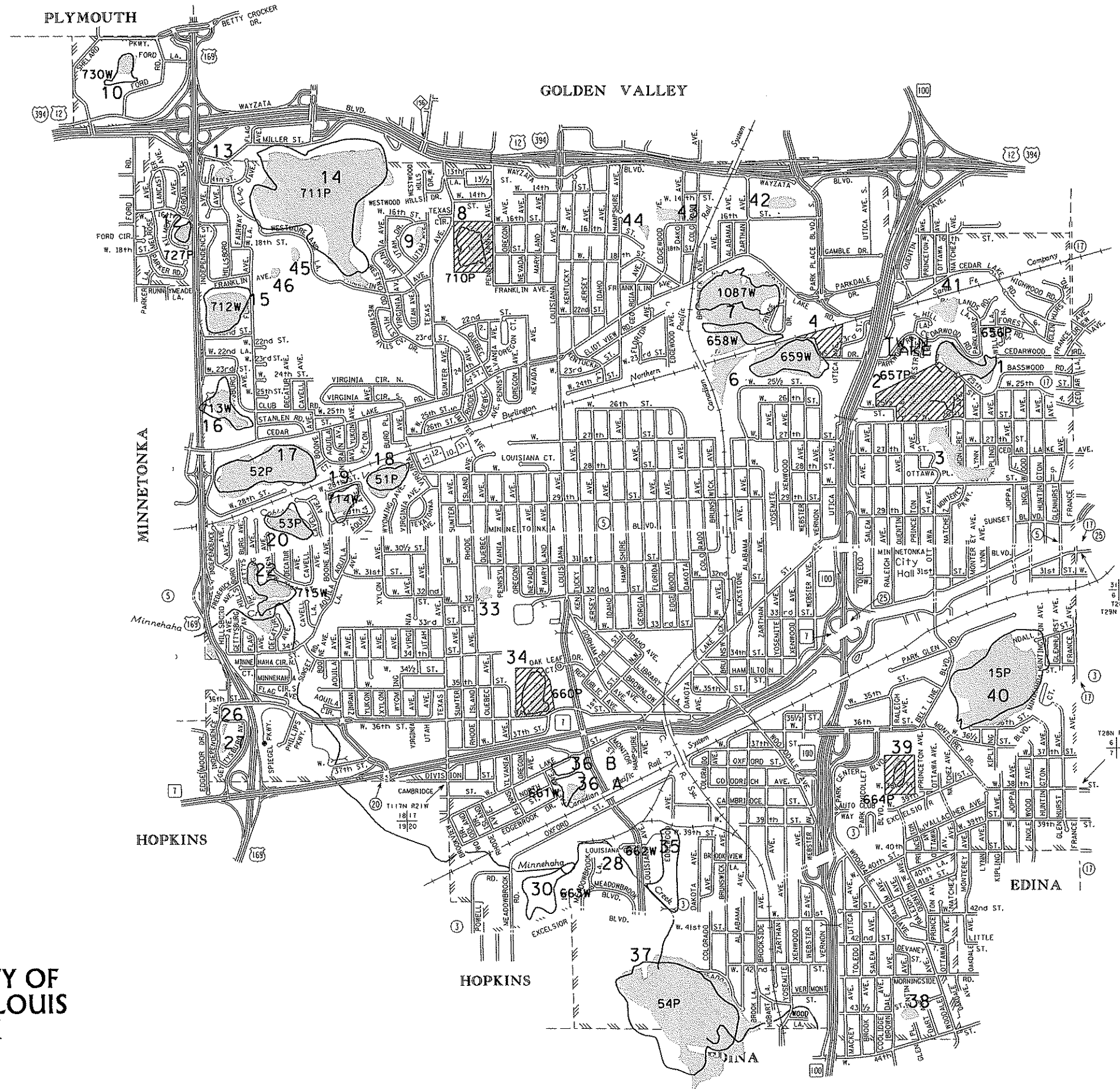
Summary of MnRAM 2.0 Assessments

| Wetland Number | Wetland Name | Management Classification | DNR Number | Wetland Type | | Plant Community | | | Functions and Values ¹ | | | | | | |
|----------------|-------------------------|---------------------------|----------------|-----------------------------------------|-------------|-----------------|----|---|-----------------------------------|------------------------------|--------------------------|----------------------|------------------|-----------------|-------------------------------------|
| | | | | Cowardin | Circular 39 | 1 | 2 | 3 | Maintenance of Hydrologic Regime | Flood/Stormwater Attenuation | Water Quality Protection | Shoreline Protection | Wildlife Habitat | Fishery Habitat | Aesthetics/Recreation/Educ/Cultural |
| 1 | Twin Lake | Manage II | 656P | PEM/UBF | Type 5 | L | M | L | M | H | H | NA | M | M | M |
| 2 | Unnamed | Manage II | 657P | PEMCd/ PEMFd | Type 3 | M | | | M | H | M | NA | MH | L | H |
| 3 | Unnamed | Manage II | | PEMB/ PFO1B | Type 2 | L | L | | M | H | MH | NA | M | L | LM |
| 4 | Unnamed | Manage II | 659W | PEMCd | Type 3 | L | L | | H | H | M | NA | M | L | M |
| 6 | Unnamed | Manage II | | PEMB | Type 2 | L | | | M | H | ML | NA | ML | L | L |
| 7 | Unnamed | Manage II | 1087W/ 658W | PEMAd/ PEMCd/ PEMFd/ PFO1/SS1C | Type 3 | M | M | | H | H | M | NA | H | L | M |
| 8 | Lampighter Pond | Manage II | 710P | PUBG | Type 4 | L | L | | M | H | M | NA | M | L | H |
| 9 | Unnamed | Manage II | | PUBG | Type 5 | L | M | | M | H | M | NA | M | L | M |
| 10 | Unnamed | Manage II | 730W | PEMF | Type 4 | M | M | M | H | H | M | NA | M | M | MH |
| 12 | Klimer Park Pond | Manage II | 727P | PUBG | Type 5 | L | L | | M | H | M | NA | M | M | M |
| 13 | Unnamed | Manage II | | PSS1/EMB | Type 2 | M | | | H | H | M | NA | M | L | L |
| 14 | Westwood Lake | Manage I | 711P | L1UBH/ PEMF/ PFO1C | Type 5 | M | M | | H | H | M | NA | H | M | E |
| 15 | Unnamed | Manage II | 712W | PEMF | Type 3 | L | | | H | H | M | NA | M | M | M |
| 16 | Unnamed | Manage II | 713W | PEMF | Type 4 | M | M | | H | H | M | NA | M | M | M |
| 17 | Hannan Lake | Manage II | 52P | PEMF/ PUBG | Type 5 | L | ML | | H | H | M | NA | M | M | M |
| 18 | Victoria Lake | Manage II | 51P | PUBG | Type 5 | M | M | | M | H | M | NA | M | M | MH |
| 19 | Westling Pond | Manage II | 714W | PUBG | Type 5 | L | M | | M | H | M | NA | M | M | M |
| 20 | Cobble Crest Lake | Manage II | 53P | PUBG | Type 5 | L | L | | M | H | M | NA | M | M | M |
| 22 | Unnamed | Manage II | 715W | PUBG/ PEMC | Type 4 | L | L | | MH | H | M | NA | M | M | M |
| 26 | Unnamed | Manage II | | PUBFx | Type 4 | M | | | M | H | M | NA | ML | L | M |
| 27 | Unnamed | Manage II | | PUBFx | Type 4 | M | | | M | H | M | NA | M | L | M |
| 28 | Part of Minnehaha Creek | Manage II | Yes | PEMCd | Type 3 | M | | | M | H | M | H | H | M | M |
| 29 | Unnamed | Manage II | | PEMF | Type 3 | M | | | H | H | M | NA | ML | L | L |
| 30 | Part of Minnehaha Creek | Manage II | 663W | PEMCd | Type 3 | M | | | H | H | M | H | H | M | M |
| 33 | Unnamed | Manage II | | PEMB | Type 2 | L | M | | M | H | M | NA | M | L | L |
| 34 | Oak Lake | Manage II | 660P | PUBG | Type 5 | L | M | | M | H | M | NA | M | L | M |
| 35 | Part of Minnehaha Creek | Manage II | 662W | PEMCd/ PEMFd | Type 3 | M | | | H | H | M | H | H | M | M |
| 36a | Unnamed | Manage II | 661W | PUBGx | Type 5 | L | M | M | M | H | M | NA | M | L | M |

| Wetland Number | Wetland Name | Management Classification | DNR Number | Wetland Type | | Plant Community | | | Functions and Values ¹⁾ | | | | | | |
|----------------|-------------------------------------------|---------------------------|------------|-----------------------|-------------|-----------------|---|---|------------------------------------|------------------------------|--------------------------|----------------------|------------------|-----------------|-------------------------------------|
| | | | | Cowardin | Circular 39 | 1 | 2 | 3 | Maintenance of Hydrologic Regime | Flood/Stormwater Attenuation | Water Quality Protection | Shoreline Protection | Wildlife Habitat | Fishery Habitat | Aesthetics/Recreation/Educ/Cultural |
| 36b | Unnamed | Manage II | | PEMA | Type 2 | L | | | H | H | M | NA | M | L | M |
| 37 | Meadowbrook Lake | Manage I | 54P | PEMC/L1UBH | Type 5 | M | M | | M | H | M | H | H | M | H |
| 38 | Browndale Park Pond | Manage II | | PEMF/PEMC | Type 4 | L | M | | MH | H | M | NA | M | L | M |
| 39 | Wolfe Park | Manage II | 664P | PUBG | Type 5 | L | L | | M | H | M | NA | ML | L | L |
| 40 | Bass Lake | Manage I | 15P | PEMC/PUBG/PUBF/PSS1Cd | Type 4 | L | L | L | H | H | M | NA | H | M | H |
| 41 | Unnamed | Manage II | | PEMB | Type 2 | L | | | H | H | M | NA | ML | L | L |
| 42 | Unnamed | Manage II | | PUBG | Type 5 | L | | | M | H | M | NA | ML | L | M |
| 43 | Otten Pond | Manage II | | PUBG | Type 5 | L | M | | H | H | M | NA | M | L | H |
| 44 | Unnamed | Manage II | | PUBG | Type 5 | L | L | M | M | H | M | NA | M | L | M |
| 45 | Golf Course water hazards - not evaluated | | | | | | | | | | | | | | |
| 46 | Golf Course water hazards - not evaluated | | | | | | | | | | | | | | |

- 1) E = Exceptional
H = High
M = Moderate
L = Low

Appendix D
Potential Mitigation Locations

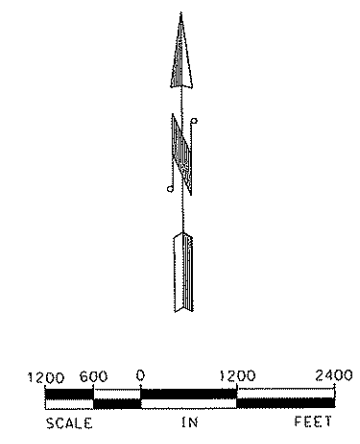


LEGEND

- NWI WETLAND
- DNR PROTECTED WETLAND/WATER
- DNR PROTECTED WATERCOURSE
- 659W** DNR PROTECTED WETLAND I.D.
- 657P** DNR PROTECTED WATER I.D.
- 1** CITY OF ST. LOUIS PARK
- WETLAND IDENTIFICATION.
- POTENTIAL PUBLIC VALUE CREDIT AREA

NOTE:
 NWI WETLANDS ARE SHOWN AS DEPICTED ON THE NWI USGS HOPKINS & MPLS. SO. QUAD. MAPS. DNR PROTECTED WETLAND/WATERS ARE SHOWN AS DEPICTED ON THE MNDNR PROTECTED WETLANDS/WATERS SHEET 2 OF 4 FOR HENNEPIN CO. THE WETLAND BOUNDARIES HAVE NOT BEEN FIELD VERIFIED FOR THIS MAP.

1. CEDAR ST.
2. QUEBEC DR.
3. OAK PARK VILLAGE DR.
4. CEDARSHORE DR.
5. GLENHURST PL.
6. FOREST LA.
7. 42 1/2 ST.
8. QUENTIN CT.
9. PRINCETON CT.
10. VICTORIA WAY
11. VICTORIA CIR.
12. VICTORIA CURVE
13. VICTORIA LA.
14. EXCELSIOR WAY



POTENTIAL MITIGATION RESTORATION LOCATIONS

| | |
|-----------------------------|----------|
| SCALE: | AS NOTED |
| DESIGN BY: | AMS |
| CHECKED BY: | OTM |
| PROJECT NO.: | 1007-35 |
| DATE: | 1599B |
| PETER R. WILLENBRING - P.E. | |

WETLAND MANAGEMENT PLAN ST. LOUIS PARK, MINNESOTA

350 Westwood Lake Office
 8441 Wayzata Boulevard
 Minneapolis, MN 55425
 612-541-4800
 FAX 641-1700

WSB & Associates, Inc.
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Barr Engineering Company
4700 West 77th Street • Minneapolis, MN 55435-4803
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Minneapolis, MN • Hibbing, MN • Duluth, MN • Ann Arbor, MI • Jefferson City, MO

December 31, 2007

Storm Water Management Unit
Storm Water Section
Municipal Division
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Re: St. Louis Park Nondegradation Report Submittal

On behalf of the City of St. Louis Park, I am enclosing copies of the St. Louis Park Nondegradation Report Submittal to meet the requirements of Appendix D of the NPDES Permit (#MNR040000) for the City of St. Louis Park to Discharge Storm Water Associated with Municipal Separate Storm Sewer Systems (MS4).

With respect to the Nondegradation Report Submittal, the City of St. Louis Park believes that there are two primary issues with which the local water authorities should be concerned, and they are:

- **Do the Best Management Practices (BMP's) that are being implemented by the City meet the requirements of the local water authorities?**
- **Will the implementation of the BMP's be reasonable and practical for addressing water quality degradation as development and redevelopment occurs in the future?**

The Permit requires the preparation of a loading assessment for total suspended solids (TSS), phosphorus (TP) and runoff volume for the land use that existed in 1988 and a similar loading assessment for current conditions, and for land uses expected in 2020. The results of the loading assessment are shown in Table 2-5, St. Louis Park Nondegradation Loading Assessment Summary. The results of the loading assessment provide conservatively low estimates for water quantity and quality improvement associated with BMP implementation because it does not factor in past implementation of BMPs and assumes the minimal NURP pond BMP design requirements will be applied to future BMP implementation. The city intends to continue to utilize the Minnehaha Creek Watershed District and the Bassett Creek Watershed Management Commission to permit activities within the city that fall under their jurisdiction. **As a result, the BMP's that will be implemented by the city of St. Louis Park with future redevelopment will meet or exceed the requirements of the local water authorities.**

As discussed in Section 2.4, the loading assessment indicates that without accounting for BMP implementation, the total imperviousness, average annual flow volume, and the TP and TSS loadings from the city have not increased since 1988 and would continue to decrease by 2020. Current and future implementation of BMPs have provided additional treatment for flow volume and TP and TSS loadings in runoff to the city's receiving waters, compared to the 1988 condition. **Combining implementation of the BMP's minimally assumed for the loading assessment with the BMP's from the City's SWPPP will be reasonable and practical for addressing water quality**

degradation as development and redevelopment occurs in the future and water quality tributary to the receiving waters will be better than it was in 1988 following implementation of the planned BMP's.

As discussed in Section 3.4, the nondegradation report discusses the implications of the impaired waters listings within the city. The MPCA's Draft 2008 impaired waters listings indicate that Cobblecrest, Windsor, Twin Lake, Bass Lake, Sweeney Lake, Lake Hiawatha and Lake of the Isles receive storm water runoff from St. Louis Park and do not meet the MPCA's water quality standards for excess nutrients. Total Maximum Daily Load (TMDL) studies have not currently been approved for any of these impaired water bodies. The Minnehaha Creek Watershed District Comprehensive Water Resources Management Plan calls for an annual phosphorus load reduction of 172 lbs. from the City of St. Louis Park to ensure that the water quality standards will be met in Lake Hiawatha. The results of the loading assessment show that there is a TP load reduction of 446 lbs. expected from the City of St. Louis Park with continued implementation of BMPs that are consistent with or equivalent to the NURP design criteria, for future redevelopment projects. It is conceivable that the pollutant load allocations developed as part of future TMDL studies will dictate that the city will need to provide further loading reductions, beyond those currently projected in the nondegradation load assessment. As a result, the city will update its SWPPP to consider all reasonable and practical BMPs given the potential implications of future TMDL allocations. Based on the Nondegradation Report, no changes are proposed for the SWPPP at this time.

Please respond via email at gwilson@barr.com or contact me at 952-832-2672 with questions or comments.

Sincerely,



Gregory J. Wilson, P.E.
Senior Civil Engineer

Enclosure

Cc: Scott Anderson, City of St. Louis Park
Laura Adler, City of St. Louis Park

***Nondegradation Report Submittal to the
Minnesota Pollution Control Agency for
Selected MS4 Permit Requirements***

***Prepared for
City of St. Louis Park***

***Submitted by
Barr Engineering Company***

December 2007

Executive Summary

The Minnesota Pollution Control Agency (MPCA) revised the General National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) Permit MNR040000 (Permit) for the city of St. Louis Park to Discharge Storm Water Associated with Municipal Separate Storm Sewer Systems (MS4), effective June 1, 2006. St. Louis Park had previously completed a Storm Water Pollution Prevention Program (SWPPP) to address the six minimum control measures required by the previous permit. This report has been developed to address modifications to the SWPPP for measures that may be necessary to meet the new, applicable requirements of Appendices C and D in the re-issued permit. Appendix C covers discharges to wetlands that are applicable to the city of St. Louis Park. Appendix D covers the nondegradation requirements for Selected MS4s (30 permittees including the city of St. Louis Park), including the development of a loading assessment and nondegradation report.

For the loading assessment, the Simple Method was used to determine the pollutant loadings and runoff volumes from each of the land uses within each watershed and the P8 Model was used to account for the effects of Best Management Practice (BMP) implementation for the time periods of interest in the Permit conditions. The loading assessment modeling results were summarized for the city to show the Simple Method loading and volume estimates for each time period, as well as the total phosphorus (TP) and total suspended solids (TSS) loading and volume estimates after applying the P8 model design criteria for future BMP implementation. The loading assessment was completed assuming that future BMP implementation would follow the city's current policies and standards. The results of the loading assessment provide conservatively low estimates for water quantity and quality improvement associated with BMP implementation because it assumes the minimal NURP pond BMP design requirements.

The results show that, without accounting for BMP implementation, the total imperviousness, average annual flow volume, and the TP and TSS loadings from the city have not increased since 1988 and would continue to decrease by 2020. 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 to 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 MPCA's Draft 2008 impaired waters listings indicate that Cobblecrest, Windsor, Sweeney, Twin Lake, Bass Lake, Lake Hiawatha and Lake of the Isles receive storm water runoff from St. Louis Park and do not meet the MPCA's water quality standards for excess nutrients. The Minnehaha Creek Watershed District Comprehensive Water Resources Management Plan (2007) calls for an annual phosphorus load reduction of 172 lbs. from the City of St. Louis Park to ensure that the water quality standards will be met in Lake Hiawatha. The results of the loading assessment show that there is a TP load reduction of 446 lbs. expected from the City of St. Louis Park with continued implementation of BMPs that are consistent with or equivalent to the NURP design criteria, for future redevelopment projects. It is conceivable that the pollutant load allocations developed as part of future TMDL studies will dictate that the city will need to provide further loading reductions, beyond those currently projected in the nondegradation load assessment. As a result, the city will update its SWPPP as the TMDL studies are implemented to consider all reasonable and practical BMPs given the potential implications of future TMDL allocations associated with the impaired waters that are receiving storm water discharge. This approach will ensure the following:

- Receiving water quality should be improved for lakes, wetlands and streams in St. Louis Park
- Channel erosion and stream morphology changes will be controlled
- Further protection will be provided for the physical and biological integrity of the stream and wetland corridors
- Controlled bounce and duration of inundation in the city's wetlands and preservation of the functions and values for each type of wetland classification

City of St. Louis Park Nondegradation Report Submittal to the Minnesota Pollution Control Agency for Selected MS4 Permit Requirements

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1.0 Introduction

1.1 MS4 Permit Requirements

The Minnesota Pollution Control Agency (MPCA) revised the General NPDES/SDS Permit MNR040000 (Permit) for the city of St. Louis Park to Discharge Storm Water Associated with Municipal Separate Storm Sewer Systems (MS4), effective June 1, 2006. St. Louis Park had previously completed a Storm Water Pollution Prevention Program (SWPPP) to address the six minimum control measures required by the previous permit. This report has been developed to address modifications to the SWPPP for measures that may be necessary to meet the new, applicable requirements of Appendices C and D in the re-issued permit. Appendix C covers discharges to wetlands that are applicable to the city of St. Louis Park. Appendix D covers the nondegradation requirements for Selected MS4s (30 permittees including the city of St. Louis Park), including the development of a loading assessment and nondegradation report. The following sections describe the sections of the permit that are relevant for the city of St. Louis Park.

1.1.1 Loading Assessment

Each Selected MS4 must assess the change in storm water discharge loading for its permitted area using a pollutant loading water quality model that, at minimum, addresses changes in average annual flow volume, total suspended solids (TSS), and phosphorus (TP). This modeling should be based on two time periods: from 1988 to the present, and from the present to 2020. The Selected MS4s must use a simple model, or another more complex model that they find to be more appropriate, that addresses the parameters of concern. This may include a model that the Selected MS4 has already used. Other assessment methods may be used if they can be shown to be as effective at quantifying the increase in loading as the modeling methods. The models and/or other methods will be used as part of the assessment to develop the Nondegradation Report, to help in selecting appropriate best management practices (BMPs) that address nondegradation, to determine whether additional control measures can reasonably be taken to reduce pollutant loading.

1.1.2 Nondegradation Report

Selected MS4s that have significant new or expanded discharges are required to complete a Nondegradation Report and, upon approval, to incorporate its findings on BMPs that address nondegradation into their SWPPP. The BMPs should address changes in pollutant loadings as far as is reasonable and practical through future development. Additionally, the BMPs shall address, as far as is reasonable and practical, the negative impacts of increased storm water discharge volumes that

cause increased depth and duration of inundation of wetlands having the potential for a significant adverse impact to a designated use of the wetland, or changes in stream morphology that have the potential for a significant adverse impact to a designated use of the streams.

The Nondegradation Report must include consideration of the Loading Assessment, which must include analysis of flow and may include removal of pollutants by BMPs already initiated. For purposes of the permit, 1988 levels consistently attained means runoff that would have been produced under approximately average conditions of rainfall. Local storm water management plans and other pertinent factors may also be considered. BMPs implemented by other parties may be considered when those BMPs affect the storm water from the area of the Selected MS4. If the pollutant loadings cannot be reduced to levels consistently attained in 1988, the Nondegradation Report must describe reasonable and practical BMPs that the Selected MS4 plans to incorporate into a modified SWPPP. The Selected MS4 must consider alternatives, explain which alternatives have been studied but rejected and why, and propose alternatives that are reasonable and practical. The Nondegradation Report must give high priority to BMPs that address impacts of future growth, such as ordinances for new development. Where increases in pollutant loading have already occurred due to past development, the Nondegradation Report must consider retrofit and mitigation options (BMPs) that the Selected MS4 determines to be reasonable, practical and appropriate for the community. The Selected MS4 is responsible for developing any site specific cost/benefit, social, and environmental information that the Selected MS4 wishes to bring to the Agency's attention. The Selected MS4 must incorporate the BMPs into a modified SWPPP and include an implementation schedule that addresses new development and retrofit BMPs it proposes to implement.

1.1.3 Proposed SWPPP Modifications and Submittals to MPCA

Prior to submittal to the MPCA, the proposed SWPPP modifications to address nondegradation will be public noticed at the local level. Each Selected MS4 shall also submit its SWPPP modifications to address nondegradation to the appropriate local water authority (e.g. watershed organizations or county water planning authority) in time to allow for their review and comment. The Nondegradation Report explaining the proposed BMPs and the entire SWPPP must be made available to the public and local water authority upon request.

Selected MS4s must submit their proposed changes to the SWPPP, reports addressing nondegradation for all waters, together with other supporting documents, to the MPCA in accordance with the schedule in Appendix E of the permit. This submittal must include:

1. The Loading Assessment;
2. The Nondegradation Report;
3. The proposed SWPPP modifications to address nondegradation;
4. The public and local water authority comments on the proposed SWPPP modifications to address nondegradation, with a Record of Decision on the comments; and
5. An application to modify the permit.

1.1.4 Discharges to Wetlands

The permit does not authorize physical alterations to wetlands, or other discharge adversely affecting wetlands, if the alteration will have a significant adverse impact to the designated uses of a wetland. Any physical alterations to wetlands that will cause a potential for a significant adverse impact to a designated use must be implemented in accordance with the avoidance, minimization and mitigation requirements of Minn. R. 7050.0186 and other applicable rules.

1.1.5 Discharges Affecting Source Water Protection Areas

BMPs shall be incorporated into the SWPPP to protect any of the following drinking water sources that the MS4 discharge may affect, and a map of these sources shall be included with the SWPPP, if they have been mapped:

1. Wells and source waters for drinking water supply management areas identified as vulnerable under Minn. R. 4720.5205, 4720.5210, and 4720.5330, and
2. Source water protection areas for surface intakes identified in the source water assessments conducted by or for the Minnesota Department of Health under the federal Safe Drinking Water Act.

1.2 Discussion of MPCA Guidance

1.2.1 Responses to Comments

Following the close of the comment period on the draft permit, the MPCA issued responses to comments received through April 15, 2005 on the Permit. To provide further guidance on

compliance with the Permit requirements, this section describes responses to comments that pertain to the following subjects:

- Loading Assessment modeling approach and complexity
- Addressing volume as a parameter of concern for the Loading Assessment and Nondegradation Report
- Nondegradation requirements for Wetlands
- Nondegradation requirements for Special Waters

1.2.1.1 Modeling Approach and Complexity

In response to several comments regarding the modeling approach and complexity required for the Loading Assessment described in the Permit, the MPCA stated that the Loading Assessment should include changes to pollutant loadings associated with changes due to past land use changes and changes due to anticipated land use changes. The Loading Assessment is intended to be used as a planning tool to compare 1988 levels to present and 2020 levels of discharge. It is to be presented as comparative results (increase), not absolute (accurate) flow, total suspended solids (TSS), and phosphorus discharge levels from the MS4. It is acceptable for MS4s to do more extensive modeling for design of BMPs, but it should be explained.

The Permit does not, however, specifically require that BMPs be factored into the Loading Assessment, but the MPCA clearly states that BMP analysis could be provided if any Selected MS4 so desires. The assessment can include changes due to BMPs that have already been implemented, if increase in the loading since 1988 is explicitly stated, as well as changes due to BMPs that are planned to be implemented and written into the MS4's ordinances or other regulatory mechanisms.

MPCA further states that the Loading Assessment was developed after considerable discussion, including discussion with consultants, cities, and the League of Minnesota Cities. It was determined that to limit costs the nature of the assessment must be limited. The MPCA chose not to include treatment options in this requirement since the level of modeling must be significantly increased to model treatment. Many communities will not be conducting other modeling, therefore this requirement will be a cost that needs careful distinction between what is desirable and what is required. The MPCA chose a level that will prevent undue burden while still developing useful information.

The Loading Assessment is comparable to an influent analysis, while the Nondegradation Report addresses the actual discharges of storm water to receiving water. The permittees are allowed to show reduction in discharge or to make other arguments they believe are appropriate in the development of the Nondegradation Report. A detailed Loading Assessment can support the Nondegradation Report.

Under the provisions of Minn. R. 7050.0185, subp. 4, the MPCA must “determine whether additional control measures beyond those required by subpart 3 can reasonably be taken to minimize the impact of the discharge on the receiving water.” The MPCA does not have absolute numeric or other criteria that it will use in making this determination for each of the Selected MS4s. The criterion of “reasonableness” requires flexibility and site specific determinations. Reasonableness determinations will therefore be made on a case-by-case basis. Site specific variations in situation, funding, population, and receiving water will be as critical to the determination of reasonableness as a specific increase in loading. Additionally, the MPCA must note that the required analysis and documentation for the Nondegradation Plans are relative, not absolute, in nature. For example, the Loading Assessments required by the permit are net changes; we do not request the actual pollutant loading, just estimates of the relative quantity of the change.

1.2.1.2 Average Annual Flow Volume

In response to several comments regarding the requirement for addressing volume as a parameter of concern for the Loading Assessment and Nondegradation Report described in the Permit, the MPCA stated that permit and guidance were revised to include more specifics on how flow volume will be addressed in BMPs and the Nondegradation Report. The responses were qualified by first stating that when an MS4 develops a Nondegradation Report, site specific objections, costs and other considerations can be raised, which the MPCA must consider in its determinations. Reasonable measures, not any and all measures, must be installed. For this permit, the reasonableness of volume control policy is not general and applicable for all MS4s, but is determined on an individual, site specific basis. In some situations the problems created by increased flow volume can be reduced and minimized by effective implementation of appropriate BMPs based on site specific conditions.

The MPCA asserts that based on the following statutory definition (**Minn. Stat. § 115.01 Definitions Subd. 13. *Pollution of water, water pollution, pollute the water.***) and actual environmental impacts, volume may qualify as water pollution under many specific conditions:

"Pollution of water," "water pollution," or "pollute the water" means: (a) the discharge of any pollutant into any waters of the state or the contamination of any waters of the state so as to create a nuisance or render such waters unclean, or noxious, or impure so as to be actually or potentially

harmful or detrimental or injurious to public health, safety or welfare, to domestic, agricultural, commercial, industrial, recreational or other legitimate uses, or to livestock, animals, birds, fish or other aquatic life; or (b) the alteration made or induced by human activity of the chemical, physical, biological, or radiological integrity of waters of the state.

MPCA staff looked at the rules that are applicable to nondegradation (Minn. R. 7050.0185) and studied the concept of increased loading of one or more pollutants as used in the rule. They determined that the rule directs the MPCA to consider the adverse effects of increased flow volume, and where effects are adverse, to consider flow volume as a pollutant. It is not volume per se that was asked to be addressed but the change in volume related to MS4 development. Additionally, it is well known that increases in flow can have a variety of negative environmental impacts. A discussion of the reasoning for the inclusion of volume of storm water as a pollutant was provided in excerpts from Chapter 11 of the Minnesota 2001-2005 Nonpoint Source Management Program Plan. These excerpts are summarized below:

- Hydromodification, which involves changes in flow patterns in natural waterways such as rivers or streams and wetlands, is the second leading cause of impairment of fresh waters. Removal of perennial vegetation led to a decrease in infiltration and an increase in the volume of runoff. Exposing soils to wind and water increased sediment loads carried by runoff. Impervious surfaces and artificial drainage systems increased the volume of runoff and accelerated the rate at which water was removed from the landscape. Impervious surfaces in urban areas also transported runoff more rapidly and in greater volumes than before development.
- Minn. Stat. § 155.01, subd. 13 (b) defines pollution of waters as “the alteration made or induced by human activity of the chemical, physical, biological, or radiological integrity of waters of the state”. The basis for this statute is that human activity, such as hydromodification, affects these waters in many adverse ways. Under natural conditions and at bank-full capacity, studies have shown that streams can handle a flow approximately equal to the 1.5- to 2-year frequency peak discharge within their banks (Rosgen, 1994; Leopold *et al.*, 1964). After urbanization, increased runoff can cause bank-full flow to be exceeded several times each year. In addition to increased flooding, this condition causes previously stable channels to erode and widen. Much of the eroded material becomes bed load and can smother bottomdwelling organisms.

- In this process, stream habitat diversity is damaged or lost. Water that was once slowed by bends, pools, and woody debris in the water column moves faster and with greater volume cutting into the bed and eroding the banks. This faster flowing water carries with it an increased sediment load, some of which is deposited in the downstream reaches. Many fish and invertebrate species cannot use substrates that are laden with excessive silt for reproduction, feeding, or cover. Riffles and pools become scarce or absent as the stream is converted from riffle, run, pool sequences to long runs or pipes. Not only is habitat diversity affected but the stream hydrology becomes inherently less stable. As water leaves the system faster, the natural hydrologic timing is altered. The overall effect is an increase in the intensity of the high flows and decreased duration of low flow events. If the water is stored to prevent increased peak flows, then the flow duration is extended. Streams in which the surrounding vegetation has been removed or altered are usually compromised by an increase in the amount of silt-laden runoff. Also, water temperatures within the stream may rise as the overhead canopy is removed exposing the stream to full sunlight.
- Urbanization also changes the extent and duration of inundation in wetlands, which can modify the established wetland vegetation. Measures to control discharges to wetlands must control the peaks and volume of flow to wetlands, if they are to be protected. This also means that reduced surface and ground water flow caused by diversion to storm sewers is also an area of concern, especially for sensitive wetlands.
- Urbanizing areas increase runoff from small events in greater proportion than large events. This is important because, in Minnesota, more than 90% of the precipitation events are less than 1.0 inch. These rainfall events also account for approximately 65% of the cumulative runoff quantity in urban areas and proportionately large amounts of the pollutant loading associated with these rainfall events (Pitt, 1998). While the significance of large flood events should not be underestimated, the smaller flows with an approximately nine month to two-year return period frequency, are probably as important or more important to overall water quality. These flows can be very erosive and can be the major source of increased pollutant loading. Pollutant loading is more closely associated with total runoff volume than with peak runoff rates. Utilizing methods to maintain volumes and peaks closer to those that originally shaped the channel can reduce the channel reshaping process in a watershed. Examples of appropriate management techniques are the volume reduction that results from the use of swales instead of curb and gutter, reduced impervious surfaces or infiltration structures. Wetland and upland vegetation can affect or be significantly affected by hydrologic changes.

For example, drainage can obviously change the vegetation at a site, but increased water that drains from a project area into an off-site drainage basin can impact trees and other vegetation, including wetland vegetation. In such cases, water itself is the damaging agent even if it is clean. The increase in water level, both surface and subsurface, can result in the death of roots. Roots require oxygen from the air, and saturated soils create an anaerobic condition that will eventually kill the roots. A case in point is a tamarack swamp that receives water from several developments. As water levels increase through the swamp, the increased flow depth results in the death of many of the tamarack trees, even though they are tolerant of wet conditions. In Minnesota, we have several tree species that tolerate short periods of flooding, but we should be encouraging diversity and be mindful of sensitive areas downstream. Likewise vegetation in upland areas can change the infiltration capacity or evapotranspiration capacity of a watershed. By using native plantings that have denser canopies and/or deeper root networks the storage capacity of the upland areas are significantly increased reducing run-off volumes, especially in the smaller storms.

Addressing average annual flow volume in the nondegradation plan may show that the modeling effort indicates a significant increase in flow from 1988. This is an indication to the MPCA that your loading of one or more pollutants has increased, and the plan will need to address what is reasonable and practical to get the flow back to 1988 levels. Alternatively, you may wish to demonstrate that your flow increase has not resulted in water quality degradation and therefore does not need to be addressed. The MPCA has found flow volume to be related to significant degradation, therefore claims to the contrary will be carefully scrutinized. To address flow volume some of the options include consideration of BMPs for flows existing before 1988, BMPs for flows developed since 1988, and limitations on future flows. The MPCA notes that the 1.0 inch event is about the 90th percentile event for 24 hour storm on an average annual basis, and that this represents 67% of the cumulative volume of precipitation. This means that runoff reduction often can be related to BMPs that reduce flow from events smaller than 1.0 inches in depth. If properly designed the BMPs could also treat some percentage of flow related to larger events without loss of effectiveness for reasons such as re-suspension. Depending on development patterns, zoning, soils, water table, and other factors, many communities may be able to meet the non degradation goal of returning the flow to pre-1988 levels. Treatment BMPs that reduce flow include infiltration basins, trenches, bio-retention, enhanced swales, evapo-transpiration, disconnection of impervious surfaces, reduced imperviousness, filterstrips, and variations and combinations of these and other BMPs.

In some instances, a community may not be able to reduce the flows to 1988 levels. If so, the basis for this conclusion should be explained. For example the current problems may be related to past development patterns, past or present zoning, soils, water table, and other factors that may be pertinent. In establishing the case, any cost information that is available, especially site specific information, should be provided. The MPCA must consider the potential impact of the discharge on the receiving water and cumulative impacts of multiple discharges. While MS4s are not required to develop information on this aspect of the analysis, they may find it beneficial to supply information that supports their position.

1.2.1.3 Wetlands

In response to several comments and questions regarding the designated uses and nondegradation requirements for wetlands in the Permit, the MPCA clarified that the terms “designated uses” of the permit relate to MPCA rules and requirements and are set by MPCA through notice and comment rulemaking under state law and any changes to designated uses would have to be made through notice and comment rulemaking. The MPCA has included, in guidance, the pertinent parts of those rules to help describe the context of these terms. The permit and rules are under MPCA authority and the permit implements the rules.

Under this NPDES permit, the permittee is required to comply with conditions that are established to protect the water quality standards of wetlands as listed in Minn. R. 7050. One of the purposes of the NPDES permit is to establish requirements or conditions that the permittee must operate under in order to assure compliance with the water quality standards. While the WCA for LGUs does regulate the activities that cause draining, filling and some excavation to certain wetlands, the WCA does allow for ten categories of exemptions to these requirements, does not have jurisdiction over all wetlands that are considered waters of the state, and does allow the LGU to vary wetland sequencing requirements if a local wetland plan is developed. The permittee must recognize the nondegradation standards for wetlands and the required mitigation sequence of Minn. R. 7050.0186 to mitigate for degradation of wetlands, apply to all wetlands that are considered waters of the state. The MPCA water quality standards provide more comprehensive water quality protection for all wetlands in Minnesota than is required of the LGU to implement under WCA. Application of the WCA by the LGU will provide comparable wetland protection to wetland impacts in many to most cases and the WCA determination would also satisfy the Minn. R. 7050.0186 determination. However, in the few projects where the requirements of the WCA are not as comprehensive as MPCA water quality standards, then the requirements of the NPDES permit will require an LGU to make a determination that will also satisfy Minn. R. 7050.0186. Considering those

exceptions, allowing the permittee to only reference the WCA requirements for wetland protection would not be adequate to assure compliance with the NPDES permit for all cases.

The MPCA does not anticipate that it will review and make a separate determination (a duplicate effort) regarding the evaluation of the sequence mitigation requirements when that determination has been conducted by the permittee. MPCA enforcement of the NPDES permit requirements of Minn. R. 7050.0186 regarding wetland impacts associated with a component of the storm water system should only be necessary if the LGU does not apply the permit requirements to their determinations. A separate determination by the permittee under the NPDES requirements that a wetland alteration activity satisfy Minn. R. 7050.0186 sequencing is only initiated when the WCA requirements exempt or consider the wetland or the activity nonjurisdictional or if the local wetland plan designation of the wetland does not require full sequence evaluation for impacts of a wetland alteration. It should be noted the WCA also recognizes that there may be other agencies or programs that have regulatory jurisdiction regarding wetland impacting activities. The WCA rules contained in Minn. R. 8420.0105, item B state that WCA rule is in addition to other regulations including those of the United States Army Corps of Engineers, United States Department of Agriculture, Minnesota state agencies, watershed districts, and local governments. Also, specifically the WCA requires that the person conducting an activity in a wetland under an exemption ensure the activity is conducted in compliance with all other applicable federal, state, and local requirements (see Minn. R. 8420.0115).

1.2.1.4 Special Waters Considerations

The evaluation for special waters is contained in Appendix C and the evaluation of other waters is contained in Appendix D. The test for ORVWs is that feasible and prudent alternatives must be used. The test for other waters is reasonable and practical BMPs to be implemented. These analyses have a different criteria and standard of judgment with a long history of precedent that must be considered. The exact format of the evaluation is not described, but this distinction should be kept in mind as evaluations are planned; the MPCA will also address this in guidance.

1.2.2 Guidance Manual for MS4s

The purpose of this draft report (MPCA, 2006) is to provide guidance for MS4s to comply with the Permit requirements, including the nondegradation policy. Nondegradation is achieved if 1988 levels of flow and pollutants can be maintained. If it is not feasible for a Selected MS4 to demonstrate that it has achieved 1988 levels of flow and pollutants, the MPCA must find if additional measures (BMPs) are “reasonable and practical” (Minn. R. 7050.0185). These measures are in addition to the minimum measures of the permit. The MPCA will review required submittals such as the loading

assessments, and other information such as water plans, population growth data and development plans to determine appropriate measures. During the review, the MPCA will consider what additional control measures would be reasonable to reduce the impact on the receiving water in light of the relative importance of the economic and social impacts. The objective is to allow the MPCA to make an informed, public decision that reasonably balances additional BMP costs against the adverse impact on the environment posed by the new or expanded discharge.

Under Minn. R. 7050.0185, the MPCA is free to consider whatever information is available while the MS4 has the opportunity, albeit the burden, to demonstrate to the MPCA why expanded discharges are necessary to accommodate important economic or social development and what treatment is reasonable and practical. This burden is appropriately placed upon the MS4 since the discharger is in the position to know the relative costs and benefits of the proposed actions. The MPCA must consider the economic and social development of the community; this means the houses, jobs, taxes, recreational opportunities, and other impacts on the public at large that will result from development. Therefore, the MS4 should point out to the MPCA how and why the public has benefited from the development that created the new or expanded significant discharge, and why the public costs associated with the proposed BMPs are reasonable.

1.2.2.1 Loading Assessment

Loading Assessment modeling must be conducted for the entire MS4, not for individual watersheds or areas unless the MS4 will model these for their own interests. Some communities may wish to use models that address peak flows, or site specific increased loading. While this makes some sense in terms of overall plan development, it is not required by the permit; it is an option that the MPCA encourages but does not require. Modeling examples of methods that may be acceptable include but are not limited to the following:

- The Simple Method
- PONDNET
- SLAMM
- P8 Urban Catchment Model
- XP-SWMM

Modeling or assessment methods will be used to estimate increases in loading based on two time periods, 1988 to current development and current to projected (2020 or ultimate, whichever is first) development. Modeling may also be used to help in the decision making process of determining appropriate BMPs to implement to bring those discharges back to 1988 levels, or maintaining those levels into the future if they are not already exceeded. Use of the models in this manner is not required but is encouraged.

The MPCA expects that the model will produce relative values. For this effort, the MPCA is more concerned with the average annual increases than about specific event increases. It is not as important for this particular requirement of the permit to get the actual loads correct as it is to model consistently, showing the relative change in loads rather than the actual loads. Also note, the permit does not require the development of annual rainfall tables or calculation of hydrographs and/or store and release calculation.

All models need to be adapted for use in the specific circumstances of each MS4. Gather available information on land use/imperviousness and other pertinent facts from conditions that existed or will exist from 1988 to 2020. Selection of the appropriate method is often dependant on the readily available or collectable data as well as on the outputs or results required. Since the MPCA's goal is to show relative increases or decreases in loading, a simple method can be used rather than a more complex model. MS4s may still want to use models that are more complex for your own purposes. The permit requirement is to consistently model between time periods so that the result can be objectively compared. An MS4 may want to select a model that can model BMPs to show removal from various practices that you may have installed or that you may want to install. This is not necessary for compliance with the permit, but makes sense when it comes to justifying your nondegradation plan. The model does not need to calculate design features such as hydrographs, but can show removal rates based on design criteria which can be just as useful for planning purposes. Design calculations may need to be run before implementation but often these can be run on a much smaller scale. Runoff and loading factors should be developed based on available information. BMP modeling, while optional, can be used in plan development and could consider BMP measures taken since 1988 to present and proposed BMP measures for present to 2020 or ultimate development conditions. The MPCA has examples of how the "simple method" can be applied to every community in the metro area.

The modeler must provide an explanation of assumptions and calculation methods. The inputs will need to be listed and the values shown. All values will need to be explicitly stated. The modeler must also provide an explanation of assumptions and calculation used in the model, whether they are inherent to the model or assigned by the user. The exact algorithms must be shown. The results of the model must be

examined to demonstrate reasonable results from the model runs. Outlier values that do not seem in line with reasonable results must be explained or discussed in enough detail to help the MPCA decide the significance of the results.

1.2.2.2 Nondegradation Report

Based on the modeling, local storm water management plans, and other pertinent factors, permittees must develop a Nondegradation Report to get new or expanded discharges back to 1988 levels. Where increases in runoff or pollutant loading has occurred due to new or expanded discharges from storm water runoff, the Nondegradation Report must include retrofit and mitigation options (BMPs) that the permittee has determined to be reasonable and practical to be included in the permittee's SWPPP.

Each Selected MS4 will submit its SWPPP, including BMPs proposed to be included, to the appropriate water authority, watershed organizations or county water planning authority, for their review and comment. The Nondegradation Report, as the basis for the SWPPP, will also be available to the water authority. The intention is that these groups will work together to create a Nondegradation Report that is acceptable to the public and other affected parties. As required in the permit, the proposed SWPPP, as based on the Nondegradation Report, will be public noticed at the local level for public participation.

The Nondegradation Report explains the decisions made by the permittee regarding the incorporation of BMPs into their SWPPP to meet the nondegradation requirements. The purpose of the Nondegradation Report is “to allow the MPCA to make an informed, public decision that reasonably balances additional BMP costs against the adverse impact on the environment posed by the new or expanded discharge” (Minn. R. 7050.0185). The report is an explanation of the nondegradation implementation plan proposed to be adopted by the MS4 community, explaining why some measures have been rejected and why the measures taken are reasonable and practicable given the circumstances for the community they serve.

To help the MPCA determine if discharge loads should be allowed to increase, Selected MS4s must submit pertinent information that demonstrates how potentially adverse water quality impacts from a new or expanded discharge have been addressed. The goal of the Nondegradation Report is to demonstrate what additional control measures would be reasonable to reduce the impact on the receiving water in light of the relative importance of the environmental, economic and social impacts. The Report should explain all aspects of the proposed Report that the permittee intends to implement. It is understood that the SWPPP itself may have already addressed some specific aspects of nondegradation, and it may be beneficial to note these in the Report. The Report should also address the alternatives that have been studied but rejected. It is not necessary to include all rejected alternatives, but it will be very important to

establish the general thinking regarding why some option have been rejected and the basis for such rejection.

1.3 Storm Water Management Planning and Water Quality Improvement Projects

In addition to its SWPPP (St. Louis Park, 2006), the City of St. Louis Park has completed, participated in, and implemented several storm water management planning and water quality improvement projects since 1988. These projects are summarized below:

- Comprehensive Water Resources Management Plan (CWRMP, 2001)—Established water quality goals and BMP implementation requirements for all new development within the city.
- Capital Improvement Program projects specifically designed for water quality improvement and erosion control.
- The City has continued work on the following ongoing water quality monitoring and improvement programs and projects:
 - Lawn fertilizer application control, erosion control, shoreland zoning, and animal control ordinances
 - Street sweeping program
 - Pond maintenance
 - Storm water education presentations, outreach, meetings and training
 - Wellhead Protection Program

2.0 Loading Assessment

2.1 Land Use/Land Cover Compilation

To meet the Permit requirements, it will be necessary to estimate average annual runoff volumes, TP and TSS loadings for 1988 (the base year), 2000-2002 (existing conditions), and 2020. An important parameter for estimating historical TP and TSS loading and stormwater runoff volumes is an accurate determination of land use for the city of St. Louis Park for the years of interest. These land use data are available in Geographic Information System (GIS) data format for various years in the Twin City Metropolitan area, but due to land use changes in St. Louis Park, the land use data available does not reflect the development status of the City during all of the years specifically analyzed for this study. A generalized classification system was developed to get a consistent comparison of land use for the existing and future conditions using the data that were available. The land use classes used are shown in Table 2-1.

Table 2-1 Land Use and Land Cover (LULC) Classes

| County Landuse Code based on Existing Conditions Data | Converted Land Use Classification | |
|-------------------------------------------------------|-----------------------------------|--------------------------------------------------------------------|
| | Converted Landuse Code | Landuse Description Used in Analysis |
| ABP | IND | Industrial |
| ADU | COM | Commercial |
| ANM | COM | Commercial |
| BAR | COM | Commercial |
| BLB | COM | Commercial |
| BNK | COM | Commercial |
| BNK | COM | Commercial |
| CCR | CIV | Institutional |
| CDO | COM,RH,RM* | Commercial, Medium Density Residential or High Density Residential |
| CLB | COM | Commercial |
| CLR | RM | Medium Density Residential |
| EDU | CIV | Institutional |
| ELD | RH | High Density Residential |
| ENT | COM | Commercial |
| FDS | COM | Commercial |
| FUH | COM | Commercial |
| GAS | COM | Commercial |
| GHN | RL | Low Density Residential |
| GHS | RL | Low Density Residential |
| HOS | OFC | Office |
| HOT | OFC | Office |

| | | |
|-----|-----------------------------|--------------------------------------------------------------------------------------------------------------|
| LIB | CIV | Institutional |
| MED | OFC | Office |
| MFG | IND | Industrial |
| MFR | RM | Medium Density Residential |
| MIX | COM, IND, OFC, PRK, RH, RM* | Commercial, Industrial, Office, Park/Open Space/Vacant, High Density Residential, Medium Density Residential |
| MUS | CIV | Institutional |
| MVR | COM | Commercial |
| MVS | COM | Commercial |
| NUR | RH | High Density Residential |
| OFC | OFC | Office |
| OWH | IND | Industrial |
| PKG | IND | Industrial |
| PKR | OFC | Office |
| PND | PRK | Park/Open Space/Vacant** |
| POF | IND | Industrial |
| PRK | PRK | Park/Open Space/Vacant |
| PRT | COM, IND* | Commercial or Industrial |
| PSS | CIV | Institutional |
| RCY | IND | Industrial |
| REC | PRK | Park/Open Space/Vacant |
| REL | CIV | Institutional |
| REP | COM | Commercial |
| RET | COM | Commercial |
| ROW | COM, TRANS, ROW* | Highway Right of Way, Municipal Right of Way, or Railroad Right of Way |
| RRR | TRANS | Railroad Right of Way |
| RSC | COM | Commercial |
| RWL | COM | Commercial |
| RWO | COM | Commercial |
| SDO | IND | Industrial |
| SFR | RL | Low Density Residential |
| SHW | COM | Commercial |
| STR | IND | Industrial |
| SUB | IND | Industrial |
| SVC | COM | Commercial |
| TFR | RM | Medium Density Residential |
| TWR | IND | Industrial |
| VAC | PRK | Park/Open Space/Vacant |
| WHS | IND | Industrial |

*Actual classification was chosen based on examination of existing development as observed from 2004 Aerial Photography

**Water surfaces were assigned based on Met Council Landcover data (2000) and Aerial Photography. If appropriate, non-water areas around ponds were assigned Park/Open Space/Vacant classification.

Land use data for the city of St. Louis Park for the 2000/2002 and 2020 time periods are summarized in Table 2-2. Table 2-2 shows that approximately 400 acres of the city is expected to undergo a change in land use between the current and future conditions. Sources used to derive the data for 1988 and existing conditions include the 1990 and 2000 Metropolitan Council land use GIS data, 1991 and 2004 aerial photography. The City of St. Louis Park's Existing Conditions and 2020 Comprehensive Plan land use GIS layers were obtained from the City's Planning Department staff were also used.

Table 2-2 St. Louis Park Land Use/Land Cover (LULC) and Imperviousness Calculations for 2000/2002 and 2020

| Land Use Description | Land Use Impervious Percentage (based on average of 2000 and 2002 imperviousness data) | Area (acres) | | | Impervious Area (acres) | | |
|-------------------------------------|----------------------------------------------------------------------------------------|--------------|--------------|----------|-------------------------|--------------|-----------|
| | | 2000/2002 | 2020 | Change | 2000/2002 | 2020 | Change |
| | | Commercial | 82.1% | 302 | 364 | 61 | 248 |
| Industrial | 70.4% | 400 | 410 | 11 | 281 | 289 | 8 |
| Office | 69.1% | 275 | 206 | -69 | 190 | 142 | -48 |
| Highway ROW | 60.8% | 360 | 360 | 0 | 219 | 219 | 0 |
| High Density Residential | 59.2% | 49 | 182 | 132 | 29 | 107 | 78 |
| Medium Density Residential | 50.5% | 440 | 393 | -46 | 222 | 199 | -23 |
| Institutional | 47.2% | 227 | 234 | 7 | 107 | 111 | 3 |
| Highway ROW Transportation (RR ROW) | 40.2% | 1,184 | 1,183 | -1 | 476 | 475 | 0 |
| Low Density Residential | 35.6% | 163 | 163 | 0 | 58 | 58 | 0 |
| Water | 27.2% | 2,319 | 2,495 | 176 | 631 | 678 | 48 |
| Park/Vacant/Undeveloped | 0.0% | 155 | 155 | 0 | 0 | 0 | 0 |
| Commercial Mix** | 14.9% | 1,059 | 772 | -287 | 158 | 115 | -43 |
| Mix** | 82.1% | 0 | 13 | 13 | 0 | 11 | 11 |
| | 59.2% | 0 | 3 | 3 | 0 | 2 | 2 |
| Total | | 6,935 | 6,935 | 0 | 2,620 | 2,705 | 85 |
| Percent Imperviousness | | | | | 37.8% | 39.0% | |

**Estimated

2.2 Watershed Imperviousness Determination

The MPCA and the University of Minnesota have developed GIS-based datasets that estimate imperviousness based on analysis of color-infrared Landsat photography (University of Minnesota). These datasets were developed for the following years for the Twin Cities Metropolitan Area: 1986, 1991, 1998, 2000, and 2002. Since there is no data available for 1988, an average of 1986 and 1991 city-wide imperviousness values were assumed to be adequate for estimating 1988 conditions. To estimate future imperviousness, the 2000 and 2002 imperviousness data were used to determine existing percent imperviousness for specific land uses within the City. These percentages were then applied to the city using land use data from the City’s 2020 Comprehensive Plan.

Historical imperviousness was determined by overlaying the impervious layers onto the boundary of the City of St. Louis Park. The average impervious is calculated by determining the average value of all of the pixel values of the impervious layer that fall within the City (each pixel value has a value of zero to 100 corresponding to the percent imperviousness of the area represented by that pixel). However, some adjustments had to be made to the data to account for error that can be introduced for water surfaces. It was found that some water surfaces would return false positives for imperviousness. Therefore, water surface areas were identified using 1990 Metropolitan Council land cover data and 1991 aerial photos. A zero percent imperviousness was assigned to these water areas rather than the value in the imperviousness layer.

The impervious values calculated for 1986 and 1991 are summarized in Table 2-3. Table 2-3 shows about a 2 percent difference between the imperviousness estimates for 1986 and 1991. This difference is likely due to errors introduced in developing the imperviousness layer and less likely from any land use changes during the period. The average of the two years of data is 40.0%, which was used as the 1988 estimate of imperviousness for the loading assessment.

Table 2-3 St. Louis Park Imperviousness Calculations for 2000/2002 and 2020

| Year | Total Area (acres) | Impervious Area (acres) | Citywide Impervious Percentage |
|--------|--------------------|-------------------------|--------------------------------|
| 1986 | 6,935 | 2,700 | 38.9% |
| 1991 | 6,935 | 2,846 | 41.0% |
| 2000 | 6,935 | 2,596 | 37.4% |
| 2002 | 6,935 | 2,644 | 38.1% |
| 2020* | 6,935 | 2,681 | 38.7% |
| 2020** | 6,935 | 2,730 | 39.4% |

*Estimate using 2000 imperviousness data estimates and comprehensive plan data

**Estimate using 2002 imperviousness data estimates and comprehensive plan data

The estimate of 2020 imperviousness was done in three steps:

1. Determination of a common land use classification system for “existing” (2000-2002) conditions and 2020
2. Estimation of imperviousness for these land use classes for the 2000 and 2002 time period using Landsat-based imperviousness data
3. Calculation of imperviousness estimates for 2020 by applying the imperviousness calculated for each of the common land use classes provided in the City’s 2020 Comprehensive Plan

To estimate future imperviousness of the city (in 2020), an estimate of imperviousness for representative land uses were made for the 2000 and 2002 data sets. Once these values were determined, estimates could be calculated based on land uses in the City’s 2020 Comprehensive Plan.

The first step in doing this involved the development of a consistent classification system for existing conditions and for the 2020 land use projections. A parcel-based GIS layer showing existing land use and expected land use in 2020 (based on the City’s Comprehensive Plan) was developed by city staff. This data set provides a very detailed description of existing land uses for most of the cities parcels. It also provided a land use classification expected for the parcel in 2020. The 2020 Comprehensive Plan land use classes were more general than the detailed existing land use classes. Table 2-1 shows how the existing land uses relate to those assigned in the City’s Comprehensive Plan. For some of the land use classes, the conversion of the existing land use classes was done manually, particularly with the MIX and CDO classes.

Water surfaces were designated by using the 2000 Metropolitan Council Land Use Layer. Adjustments were made to the water surface layer using 2004 USGS Aerial Photography, where necessary.

The existing land use data GIS layer, based on the land use classifications shown in last column of Table 2-1, was intersected with the imperviousness data for 2000 and 2002. Table 2-2 shows the results of this analysis for each land use class using an average of the 2000 and 2002 values to estimate future (2020) imperviousness.

The highest percent imperviousness occurs with the commercial land use (about 82 percent) and the lowest (not including water surfaces) was 15 percent for the Park/Vacant/Undeveloped land class. Note that the Park/Vacant/Undeveloped land class can have impervious areas such as park buildings,

parking lots and trails. The estimated average city wide imperviousness data for 2000 and 2002 is 37.8% (see Tables 2-2 and 2-3). The difference in imperviousness using the 2000 and 2002 data was approximately 1 percent.

The imperviousness calculated for each land use class using the 2000 and 2002 impervious layers was applied to those same classes as designated in the City's 2020 Comprehensive Plan. For example, if a parcel is shown to be "Commercial" in 2020, the commercial imperviousness percentage calculated using the average of the 2000 and 2002 data were applied for that parcel. In most cases there was no change in imperviousness (the land use did not change). However, in some cases the imperviousness of a parcel increased (such as a parcel currently designated low density residential converting to high density residential land use in 2020). In other cases there were parcels in the City where imperviousness was expected to decrease or not change. Table 2-2 provides a summary of land use areas and the calculation of the estimated imperviousness for 2020.

Table 2-2 provides the estimated 2020 imperviousness calculated using the average of the 2000 and 2002 land use impervious values shown in Table 2-3. The average imperviousness value shown for 2020 is approximately 39%. The estimates for all three time periods indicate that the imperviousness of the City will not change significantly from 1988 to 2020, and should stay within a range of approximately 2 to 4 percent, which is less than the standard error of the Landsat data (University of Minnesota).

2.3 Modeling Approach and Methodology for Loading Estimates

Complex models used to answer simple questions are not advantageous and simple models that do not model important or required physical processes are not useful. In keeping with the Permit conditions and guidance discussed in Section 1.2, our modeling approach was developed based on the following requirements:

- The loading assessment should include changes to pollutant loadings associated with changes due to past land use changes and changes due to anticipated land use changes
- The modeling will produce relative values, as the MPCA is more concerned with the average annual increases than about specific event increases. It is not as important to get the actual loads correct as it is to model consistently, showing the relative change in loads rather than the actual loads

- The assessment can include changes due to BMPs that have already been implemented, if increase in the loading since 1988 is explicitly stated, as well as changes due to BMPs that are planned to be implemented and written into the MS4's ordinances or other regulatory mechanisms
- The model does not need to calculate design features such as hydrographs, but can show removal rates based on design criteria, which can be just as useful for planning purposes. Design calculations may need to be run before implementation but often these can be run on a much smaller scale.

Currently, there are several water quality models available for simulating urban runoff and the treatment effectiveness of BMPs. Table 2-4 presents a qualitative comparison of several of the important attributes associated with some of the more common runoff water quality model capabilities based on the various selection criteria. The compiled model attributes and capabilities come primarily from peer-reviewed manuals (U.S. EPA, 1997; Burton and Pitt, 2001), with additional updated information based on our own experience and professional judgment. The water quality models included in the table are generally listed in increasing order of complexity (from left to right). For each attribute or selection criteria the models are categorized by possessing low, medium (intermediate) or high capabilities. Those capabilities that are not incorporated into a particular model, or were not applicable, were also indicated. Our approach for model selection for this assessment involved comparison of the advantages and limitations of the various models as they pertain to the Permit requirements, available data, and objectives of the city.

Table 2-4 shows that the only limitation with the P8 model, as it relates to the modeling requirements for the loading assessment, is that it is not intended to be used to determine pollutant loadings from non-urban land uses. However, the Simple Method, PONDNET and GWLF can be used to determine pollutant loadings from both urban and non-urban land uses. Both the Simple Method and PONDNET are typically used on an annual time scale. Table 2-4 also shows that the Simple Method, PONDNET and GWLF lack the ability to model the BMPs that would typically be considered for implementation by the City (such as vegetated drainage ways, extended detention, infiltration/filtration practices and street sweeping). SLAMM lacks a snowmelt runoff routine, does not have any capabilities for including baseflow in BMP analysis, and does not have the model output features contained in the P8 model. XP-SWMM is more complex, but is not in the public domain, is significantly more expensive, and BMP modeling is more cumbersome, less accurate and less intuitive than the P8 model.

Table 2-4 Comparison of Modeling Attributes/Capabilities by Selection Criteria

| Criteria/Attributes | | Simple Method | PONDNET | SLAMM | P8 | GWLF | XP-SWMM |
|-----------------------------------|-------------------------|---------------|---------|-------|----|------|---------|
| Time Scale | Annual | H | H | -- | -- | -- | -- |
| | Single Event | H | -- | -- | H | -- | H |
| | Continuous | -- | -- | H | H | H | H |
| Hydrology | Runoff | L | L | H | H | H | H |
| | Baseflow | -- | -- | -- | L | H | H |
| | Snowmelt | -- | -- | -- | H | -- | H |
| Pollutant Loading (Constituents) | Sediment (TSS) | H | -- | H | H | H | H |
| | Nutrients | H | H | H | H | H | H |
| Pollutant Loading (Land Uses) | Urban | H | H | H | H | H | H |
| | Agricultural | H | H | -- | -- | H | -- |
| Pollutant Routing | Transport | -- | -- | L | L | L | H |
| | Erosion | -- | -- | -- | -- | H | H |
| | Transformation | -- | -- | -- | -- | -- | L |
| Hydraulic Flow Routing/Diversions | | -- | -- | -- | L | L | H |
| Model Output | Statistics | L | L | L | H | L | H |
| | Graphics | -- | -- | L | H | M | H |
| | Hydro/Pollutographs | -- | -- | -- | H | -- | H |
| | Format Options | L | L | H | H | H | H |
| | Sensitivity Analysis | -- | -- | -- | H | -- | -- |
| Input Data | Requirements | L | L | M | M | M | H |
| | Calibration | L | L | L | M | L | H |
| | Default Data | L | H | H | H | H | M |
| | User Interface | L | L | H | H | H | H |
| GIS Compatibility | | L | L | -- | M | L | M |
| BMPs-General | Evaluation | -- | H | M | H | L | H |
| | Design Criteria | -- | H | L | H | -- | H |
| Specific BMPs | Ponds/Wetlands | -- | H | H | H | -- | H |
| | Extended Detention | -- | -- | M | H | -- | H |
| | Infiltration/Filtration | -- | -- | H | H | -- | M |
| | Street Sweeping | -- | -- | H | H | -- | M |
| | Others | -- | -- | H | H | -- | L |
| Documentation | Peer Acceptance | H | H | H | H | H | H |
| | Technical Support | L | L | M | H | L | H |
| Cost | Software | L | L | M | L | L | H |
| | Use | L | L | M | M | M | H |

H – High M – Medium (Intermediate) L – Low -- Not Incorporated (Not Applicable)

For this loading assessment, we have chosen to use the Simple Method to determine the pollutant loadings and runoff volumes from each of the land uses within each watershed and then use the P8 model to account for the effects of BMP implementation for the time periods of interest in the Permit conditions. In addition to the discussion associated with Table 2-4, the following information provides further justification for choosing the Simple Method/P8 model combination for the loading assessment modeling, in comparison to SLAMM, PONDNET, XP-SWMM, or some combination thereof:

- The Simple Method inputs can be directly derived within GIS
- PONDNET does not model TSS loadings and is only intended for modeling TP within wet detention ponds
- SLAMM is more detailed than P8 with respect to distinguishing source loading areas (such as driveways, parking lots, lawns, etc.), but P8 exceeds the capabilities of SLAMM when it comes to networking of watersheds/BMPs and many of the graphics and advanced output features
- P8 provides routines for performing sensitivity analyses and can also be run in design mode to determine required sizes of BMP(s) to meet treatment criteria
- P8 has the highest peer acceptance in Minnesota for urban runoff and BMP water quality modeling and enhancements have been supported by the MPCA
- P8 is free, user-friendly and easy to learn with its menu driven system
- P8 allows for some GIS compatibility via ASCII text file import of watershed data and export of results
- P8 models actual hourly precipitation and climatic data as it occurs, with its associated antecedent moisture conditions, while SLAMM only reads in the total precipitation and duration of each rainfall event and does not model actual runoff events in real-time with their associated antecedent moisture conditions
- Unlike SLAMM, P8 allows for hydrologic calibration within the program and can be calibrated/validated to time series runoff events continuously simulated from climatic data

While the City of St. Louis Park has conducted some monitoring of stormwater runoff and receiving water quality/quantity, none of the studies included monitoring of runoff from individual land uses or specific land cover types.

Following the initial assessment of TSS, TP and volume contributions with the Simple Method, the benefit that future BMP implementation will have on the flow, TP and TSS loadings is assessed within the city limits using the P8 water quality modeling for developments based on P8 model design criteria examples that are indicative of the ordinances and design standards that are currently in place by the City, the watershed management organizations, the Wetland Conservation Act and the MPCA. Based on the available data, combining the Simple Method and P8 Model for the loading assessment ensures full compliance with the Permit requirements, for the following reasons:

- The Simple Method ensures that a consistent method for calculating average annual volumes and loadings will be applied to all land uses to produce relative values across the two times periods of interest, as discussed in the Permit and Guidance Manual (see Sections 1.1.1 and 1.2.2.1 of this report)
- The P8 Model simulations of volume and pollutant loading reductions associated with BMP implementation, according to the various ordinances and design standards that were in place when development occurred, is consistent with the Permit conditions and Guidance Manual and provides a consistent method for calculating relative removal rates as suggested in Section 1.2.2.1 (which includes the following excerpts from the Guidance Manual, “The model...can show removal rates based on design criteria... Design calculations may need to be run before implementation but often these can be run on a much smaller scale.)
- Excludes the effects that natural wetlands would have on improving the storm water quality within each watershed, which ensures that the loading assessment estimates that include BMPs (discussed in Section 2.4) do not take credit for treatment by natural wetlands
- The city will not have to revise and update existing P8 models to exclude the effects of natural wetlands or collect significantly more data on every BMP to develop new P8 models for the rest of the city, which would represent significantly more cost for a product that would not provide a “distinction between what is desirable and what is required. The MPCA chose a level [in its loading assessment requirements] that will prevent undue burden while still developing useful information.” (MPCA Guidance Manual, 2006)

The loading assessment modeling results were summarized for the City to show the Simple Method loading and volume estimates for each time period, as well as the loading and volume estimates after applying the P8 model design criteria examples to the future conditions, based on the minimum ordinances and design standards that are expected to be in-place when the various developments or redevelopments occur.

2.3.1 Average Annual Flow Volume

The conversion of land areas to urban land uses leads to changes in watershed hydrology and pollutant load rates. The areal increase in impervious surfaces in urban areas over undeveloped rural and natural land uses leads to greater surface water runoff volumes. The increased runoff coupled with human activities increases the types of pollutants and delivery rate of these pollutants to surface waters. Impermeable surfaces shed water as surface runoff which reduces the infiltration and evapotranspiration components of the hydrologic cycle. Surface runoff in urbanized areas is generally directed to storm sewers and other conveyance systems to rapidly move the large volumes to receiving waters and prevent flooding. This section provides a general discussion about the methodology used to quantify the amount of runoff from the various land uses in the St. Louis Park watersheds during the two time periods of interest for the Permit conditions.

As previously discussed, the Simple Method was used to estimate the average annual runoff volumes, which in turn, are also used to calculate the TP and TSS loadings, for the various land uses present within the St. Louis Park watersheds. In the urbanized portion of each watershed, average annual runoff volume was calculated using the following relationships (as described in Schueler, 1987):

$$\text{Annual Runoff Coefficient [RC]} = 0.05 + ((0.009) \times (\text{Impervious Fraction}) \times 100)$$

$$\text{Annual Runoff Volume (acre-feet)} = \text{RC} \times \text{Annual Rainfall (inches)} \times \text{Urban Area (acres)} / 12$$

As previously discussed, there is no monitoring data available for runoff volumes or quality from individual land uses or specific land cover types within the city. The annual rainfall amount of 29.41 inches was used for this analysis, based on the long-term (1971-2000) average annual precipitation measured at the Minneapolis-St. Paul International Airport and published by NCDC.

2.3.2 Total Phosphorus and Total Suspended Solids

As previously discussed, there is no monitoring data available for runoff volumes or quality from individual land uses or specific land cover types within the city. Since the city is fully urbanized, the TSS and TP average annual runoff concentrations were assumed to be 100 mg/L and 0.33 mg/L,

respectively, based on the median Nationwide Urban Runoff Program (NURP) studies concentrations cited by Athayede et al. (1983).

The TSS and TP loadings from the City were then calculated according to the following equation:

$$TSS \text{ and } TP \text{ Load (lbs.)} = \text{Concentration (mg/L)} \times \text{Annual Runoff Volume (acre-feet)} \times 2.72$$

2.3.3 BMP Implementation Modeling

As previously discussed, P8 water quality modeling was used to assess the benefit that expected future BMP implementation would have on the flow volume, TP and TSS loadings within the city limits for developments and redevelopments based on the ordinances and design standards that control the treatment efficiency of the BMPs. The NURP pond BMP design requirements have controlled the treatment efficiency of the BMPs associated with each new development and will be the minimum design requirements that control the treatment efficiency for BMPs that are implemented through 2020 for the city. The NURP design scenario was run in P8 for a hypothetical low-density residential development with 25% imperviousness and a commercial development with 80% imperviousness to obtain a range of treatment efficiencies, as well as the average efficiency, that would be expected for the same design standard. For the NURP design scenario, the P8 Model estimated average TP and TSS load reductions of 56% and 87%, respectively. It was assumed that a negligible volume reduction would be realized from implementation of the NURP design requirements.

As a result, the NURP design scenario has been used to conservatively represent the results of the loading assessment, following future BMP implementation. The loading assessment results do not attempt to quantify the amount of stormwater treatment that has occurred in the past. As discussed in Section 2.2, a parcel-based GIS layer showing existing land use and expected land use in 2020 (based on the City's Comprehensive Plan) was developed and reviewed by city staff to determine whether redevelopment, for those parcels with changing land use, would result in increased or decreased imperviousness. This review indicated that approximately 723 acres of the city would undergo redevelopment between 2000/2002 and 2020, with approximately 157 acres experiencing increased imperviousness and the remaining 566 acres experiencing decreased or no change in imperviousness. For this analysis, it was assumed that the 723 acres of future redevelopment area would receive stormwater treatment that meets or exceeds the NURP design requirements, so the loading assessment results provide the city-wide TP and TSS loadings with and without the reductions attributed to the aforementioned NURP design scenario.

2.4 Results and Discussion

Table 2-5 shows the overall results of the loading assessment modeling, which were summarized for the city to show the Simple Method loading and volume estimates for each time period (without BMPs), as well as the future loading and volume estimates after applying the P8 model NURP design criteria (with BMPs), based on the parcel-based GIS coverage that showed all of the areas that are expected to redevelop in the city.

2.4.1 Average Annual Flow Volume

Table 2-5 shows that the total average annual flow volume from the city has not increased or changed significantly since 1988 and would continue to remain approximately the same by 2020, regardless of the future BMP implementation, since it was assumed that no volume reduction would be realized from implementation of the NURP design requirements. The flow volumes estimated for current and future (2020) conditions are approximately 4 and 2 percent lower than the estimated flow volume for 1988.

2.4.2 Total Phosphorus

Table 2-5 shows that the TP loading from the city has not increased or changed significantly since 1988 and would continue to remain approximately the same by 2020. Without implementation of BMPs, the TP loading estimated for current and future (2020) conditions are approximately 4 and 2 percent lower than the estimated TP loading for 1988. Table 2-5 also shows that by 2020, the TP loading should be approximately 9 percent lower than the 1988 condition, with future BMP implementation following the NURP design requirements for redevelopments.

2.4.3 Total Suspended Solids

Table 2-5 shows that the TSS loading from the city has not increased or changed significantly since 1988 and would continue to remain approximately the same by 2020. Without implementation of BMPs, the TSS loading estimated for current and future (2020) conditions are approximately 4 and 2 percent lower than the estimated TP loading for 1988. Table 2-5 also shows that by 2020, the TSS loading should be approximately 13 percent lower than the 1988 condition, with future BMP implementation following the NURP design requirements for redevelopments.

Table 2-5 St. Louis Park Nondegradation Loading Assessment Summary

| TIME PERIOD | WATERSHED TOTAL RUNOFF (acre-feet) | WATERSHED TP YIELD (LBS) | WATERSHED TSS YIELD (LBS) |
|----------------------------------------------|------------------------------------|--------------------------|---------------------------|
| <i>Without BMPs</i> | | | |
| 1988 | 6,811 | 6,113 | 1,852,452 |
| Current | 6,511 | 5,843 | 1,770,691 |
| 2020 | 6,665 | 5,982 | 1,812,605 |
| <i>With Future BMP Implementation</i> | | | |
| 2020 | 6,665 | 5,536 | 1,603,031 |

2.4.4 Other BMPs and Considerations Not Included in the Loading Assessment

The results of the Loading Assessment with BMP implementation present the estimated volumes and pollutant loading estimates associated with the minimum structural BMP requirements for future developments or redevelopments. There are several other structural and nonstructural BMPs that have been, or will continue to be, implemented in the city that, collectively, would also be expected to make significant reductions in volume and pollutant loadings beyond those indicated in Table 2-5. These BMPs include the following:

- Capital Improvement Program projects specifically designed for water quality improvement
- The lawn fertilizer phosphorus ban
- Street sweeping program
- Public education/participation/outreach
- Illicit discharge detection and elimination
- Pollution prevention/good housekeeping measures for municipal operations
- Public nuisance ordinance controlling pet waste
- Shoreland zoning ordinances controlling setbacks and requiring buffers for all public waters and wetlands

In addition, there are other assumptions that were made about BMP implementation considered in the Loading Assessment that were especially conservative, which meant that the 2007 and 2020 loadings, with BMP implementation, shown in Table 2-5 were higher for the following reasons:

- There is increased seepage to groundwater from storm water pretreatment measures and wet detention ponds
- Disconnection of impervious surfaces from drainageways

3.0 Nondegradation Report

3.1 BMP Selection Considerations for Development

The loading assessment indicates that implementation of watershed BMPs within the City of St. Louis Park, both in the past and as planned for the future, will ensure that the TP and TSS loads from the city will be reduced and the runoff flow volumes will not increase or slightly decrease between 1988 and 2020. As a result, the following sections of the Nondegradation Report discuss how BMPs, incorporated into the current SWPPP, will address and mitigate any localized increases in average annual flow volume and TP or TSS loading, as far as is reasonable and practical.

The following sections also include discussion about the BMP selection considerations, the alternatives that were evaluated, and the basis for the selected BMP approach for both new development and retrofits of existing development. The BMP selection considerations primarily consist of stream morphology/channel erosion, wetlands and source water protection.

3.1.1 Stream Morphology/Channel Erosion

While much of the storm water runoff generated in the St. Louis Park watersheds is conveyed to the lakes, streams and wetlands via storm sewer, there are some open channels within these watersheds, in addition to the streams, that could be subject to channel erosion due to increased flow volumes. In general, channels with culvert crossings experiencing localized increases in flow volume would still have controlled the peak flows since the policy in the St. Louis Park Comprehensive Water Resources Management Plan (CWRMP) (St. Louis Park, 2001) would have required rate control due to new development. As previously discussed, the loading assessment shows that runoff flow volumes have not increased or may have experienced a slight decrease between 1988 and 2020. As a result, with the exception of portions of Minnehaha Creek, the city has not observed significant channel erosion.

Both the St. Louis Park WRMP and the zoning ordinance require minimum structural setbacks and stormwater management along stream corridors, which will provide further protection for the physical and biological integrity within each watershed. Erosion and sedimentation control plans will be reviewed and enforced by the City for all new development and redevelopment. The City may prohibit work in areas having steep or very steep slopes and high erosion potential where the impacts of significant erosion cannot be protected against or mitigated in accordance with the erosion control regulations contained in the City's Zoning Ordinance. In addition, St. Louis Park will

continue to educate landowners and residents of existing developments about the importance of maintaining existing stream buffers.

Future implementation of infiltration practices represents another BMP alternative that may be reasonable and practical. However, the city's policies will need to include flexibility for new developments and redevelopments that have site constraints that would otherwise limit the BMP feasibility or cost-effectiveness and/or lose excessive amounts of useable space due to infiltration storage volume requirements.

3.1.2 Wetlands

This section addresses, as far as is reasonable and practical, the potential negative impacts of increased storm water discharge volumes that have caused increased depth and duration of inundation of wetlands having the potential for a significant adverse impact to a designated use of the wetland.

The Permit uses terms such as “designated uses” and/or “functions and values” which come from MPCA rules. The term “significant adverse impact” in the Permit is based on the existing water quality standards and applicable rules. The term implies “significant adverse impact to a designated use” of the water, as defined in water quality standards. The following rules apply to wetland mitigation. Wetland mitigation maintains nondegradation of wetland designated uses. The wetland mitigative sequence incorporates the following principles in descending order of priority:

1. Avoid the impact altogether by not taking a certain action or parts of an action;
2. Minimize the impact by limiting the degree or magnitude of the action and its implementation, and by taking affirmative actions to rectify the impact and reduce or eliminate the impact over time; and
3. Mitigate the unavoidable impact to the designated uses of a wetland by compensation. Compensatory mitigation shall be accomplished in the following descending order of priority of replacement:
 - a. Restoration of a previously diminished wetland; and
 - b. Creation of a wetland.

If compensatory mitigation is accomplished by restoration or creation, the replacement wetland shall be of the same type and in the same watershed as the impacted wetland, to the extent prudent and

feasible. Compensatory mitigation shall be completed before or concurrent with the actual physical alteration of the wetland affected by the proposed project to the extent prudent and feasible.

The City of St. Louis Park has deferred the local governmental unit (LGU) responsibility for wetland management to the Minnehaha Creek Watershed District and the Bassett Creek Watershed Management Commission. The LGUs requires full sequence evaluation for impacts of a wetland alteration and provides wetland mitigation and replacement requirements. The City will not allow any mowing, burning, or other non-filling related alteration to an existing wetland without the City's expressed written approval.

As discussed in Section 1.2.1.3, the WCA does allow for ten categories of exemptions to the requirements and does not have jurisdiction over all wetlands that are considered waters of the state. In the few projects where the requirements of the WCA are not as comprehensive as MPCA water quality standards, then the requirements of the NPDES permit will require an LGU to make a determination that will also satisfy Minn. R. 7050.0186. As a result, St. Louis Park will reference both the WCA and Minn. R. 7050.0186 requirements for wetland protection in the zoning ordinance and CWRMP.

The City believes it is reasonable and practical to continue to implement BMPs that are consistent with or equivalent to the NURP design criteria, for future redevelopment projects. Combining the BMP requirements with the existing policies and ordinances for setbacks, buffers and storm water management represents the most reasonable and practical means of preventing significant adverse impacts to the designated use of wetlands in the City of St. Louis Park.

3.1.3 Source Water Protection Areas

All 11 of the St. Louis Park drinking water wells have high aquifer sensitivity and the source water protection areas in the city have variable vulnerability. As a result, the city will define the appropriate measures that will reduce the threat to drinking water to the maximum extent practicable. These measures will be developed in accordance with the Minnesota Department of Health's, Evaluating Proposed Storm Water Infiltration Projects in Vulnerable Wellhead Protection Areas, and the MPCA's, Minnesota Stormwater Manual guidance for potential stormwater hotspots. Infiltration practices will not be allowed within the 1-year time-of-travel (emergency response zone) Drinking Water Supply Management Area (DWSMA).

3.2 Retrofit and Mitigation BMP Options

The city currently applies its water quality policies to redevelopments that are greater than 2.5 acres or create more than 1 acre of additional impervious surfaces. Erosion control permits are required for projects that disturb more than 5,000 square feet or move more than 50 cubic yards of soil. The City believes it is reasonable and practical to continue to implement BMPs that are consistent with or equivalent to the NURP design criteria, for future redevelopment projects. Implementation of these practices is expected to fully mitigate past increases in storm water runoff volume and further improve receiving water quality and habitat. Variances to some of the requirements may occasionally be granted in the case of hardships or when site conditions do not allow for proper or successful BMP implementation.

3.3 Cost/Benefit, Social and Environmental Considerations

Kuo et al. (1988) determined that extended wet detention ponds provided the most cost-effective performance, compared to infiltration trenches and porous pavements, to control storm water quantity and quality. Weiss et al. (2007) determined that constructed wetlands provide the most cost-effective treatment for TSS and TP, compared to wet basins, sand filters, bioretention filters and infiltration trenches, if land acquisition costs are ignored. If land acquisition costs are factored into the analysis, wet basins would typically become more cost-effective in comparison to constructed wetland and bioretention systems. Ignoring land acquisition costs, Wossink and Hunt (2003) determined that the following BMPs would be expected to have decreasing levels of cost-effectiveness for treatment of TP loadings: bioretention in sandy soils, stormwater wetlands or wet ponds, bioretention in clay soils, and sand filters.

The City intends to continue to implement BMPs that are consistent with or equivalent to the NURP design criteria, at a minimum, based on the cost-benefit considerations for future redevelopment projects.

3.4 Implications of Impaired Waters for Addressing Loading Assessment

The MPCA's Draft 2008 impaired waters listings indicate that Cobblecrest, Windsor, Sweeney, Twin Lake, Bass Lake, Lake Hiawatha and Lake of the Isles receive storm water runoff from St. Louis Park and do not meet the MPCA's water quality standards for excess nutrients. The MPCA's water quality standard that pertains to lakes for excess nutrients, requires that the average summer (May-

September) total phosphorus concentration be maintained at or below 40 µg/L. While it is expected that the MPCA will adopt a new shallow lakes standard of 60 µg/L, some of these city lakes may still have total phosphorus concentrations that will exceed the applicable water quality standards for nutrients. The Minnehaha Creek Watershed District Comprehensive Water Resources Management Plan (2007) calls for an annual phosphorus load reduction of 172 lbs. from the City of St. Louis Park to ensure that the water quality standards will be met in Lake Hiawatha. Table 2-5 shows that there is a TP load reduction of 446 lbs. expected from the City of St. Louis Park with continued implementation of BMPs that are consistent with or equivalent to the NURP design criteria, for future redevelopment projects.

The Environmental Protection Agency (EPA) requires that the MPCA develop and submit Total Maximum Daily Load (TMDL) studies for each water body that they have on the impaired waters list. TMDL studies are used to determine what the maximum allowable pollutant loadings are for each water body without exceeding the water quality standards. The allowable pollutant loading is then allocated to each of the NPDES-permitted (including MS4s) and non-regulated sources of pollutants in the watershed. TMDL studies to be completed for Cobblecrest, Windsor, Twin Lake, Bass Lake, Brownie Lake, and Lake of the Isles may require that the City provide further reductions in total phosphorus loadings to these water bodies to comply with the MPCA's water quality standards.

Minnehaha Creek is on the impaired waters list for biota-fish, fecal coliform and chloride. The biota listing may be due to poor water quality or poor fish habitat associated with flows or excess turbidity. As a result, pollutant load allocations associated with the creek impairments would also require the city to reduce nutrient and/or sediment loadings, while possibly addressing flow volume and peak runoff rates. The fecal coliform and chloride listings will require a more detailed assessment of the specific sources of these pollutants in a TMDL study before the City can develop an approach to meet the future wasteload allocations.

It is conceivable that the pollutant load allocations developed as part of future TMDL studies will dictate that the city will need to provide further loading reductions, beyond those currently projected in the nondegradation load assessment. As a result, as TMDL studies are implemented, the City's SWPPP will also consider all reasonable and practical BMPs given the potential implications of future TMDL allocations associated with the impaired waters that are receiving storm water discharge. Since the City is fully developed, the City's SWPPP will also consider reasonable and practical BMPs for redevelopment projects.

4.0 Proposed SWPPP Modifications

This section describes the modifications that are proposed for City of St. Louis Park SWPPP, based on the results of the loading assessment and discussion in the nondegradation report.

The loading assessment and nondegradation report were completed assuming that future BMP implementation would follow the NURP design criteria, at a minimum. As necessary, the city will update its development review policies, standards and procedures, as cited in the SWPPP. The City's current approach for storm water management from the SWPPP has ensured the following:

- Receiving water quality should be improved for lakes, wetlands and streams in St. Louis Park
- Channel erosion and stream morphology changes will be proactively managed
- Further protection will be provided for the physical and biological integrity of the stream and wetland corridors
- Limiting bounce and duration of inundation in the city's wetlands to preserve the functions and values for each type of wetland classification
- Where feasible, rules will be applied to redevelopment to mitigate impacts from storm water runoff, including TSS, phosphorus, and volume
- The City will encourage a disconnect from impervious surfaces to the City's drainage system

In addition, the SWPPP will be modified to address further protection for the impaired waters within the city or downstream of the city as TMDLs and their associated implementation plans are developed.

In the few projects where the requirements of the WCA are not as comprehensive as MPCA water quality standards, then the requirements of the NPDES permit will require an LGU to make a determination that will also satisfy Minn. R. 7050.0186. As a result, St. Louis Park should reference both the WCA and Minn. R. 7050.0186 requirements for wetland protection in the St. Louis Park Zoning Ordinance and the CWRMP. Based on the Nondegradation Report, no changes are proposed for the SWPPP at this time.

5.0 Comments on Proposed Nondegradation Report

5.1 Local Water Authority Comments on Proposed Nondegradation Report

Prior to submittal to the MPCA, the City of St. Louis Park submitted its draft Nondegradation Report submittal to the appropriate local water authorities (the Bassett Creek Water Management Commission and the Minnehaha Creek Watershed District) in time to allow for their review and comment. The Nondegradation Report explaining the proposed BMPs and the entire SWPPP was also made available to the local water authorities. The following sections summarize the comments received from the local water authorities on the draft Nondegradation Report submittal.

5.1.1 Bassett Creek Water Management Commission (BCWMC)

Since the loading assessment showed that there was no increase in pollutant loadings or flow volume, the BCWMC decided there is no need to perform additional review and did not have any comments on the draft Nondegradation Report.

5.1.2 Minnehaha Creek Watershed District (MCWD)


There were no comments received on the draft Nondegradation Report submittal.

5.2 Record of Decision on the Comments

Since there were no comments, the draft Nondegradation Report submittal was not revised.

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HYDROLOGIC, HYDRAULIC, AND WATER QUALITY MODELING FOR THE CITY OF ST. LOUIS PARK

TOPICAL REPORT RSI-2858




PREPARED FOR

City of St. Louis Park
5005 Minnetonka Boulevard
St. Louis Park, Minnesota 55416

FEBRUARY 2019





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FEBRUARY 2019

Project Number 3259





EXECUTIVE SUMMARY

As part of the Metropolitan Surface Water Management Act, all communities in the metropolitan area are required to prepare Surface Water Management Plans in response to their governing watershed district plans. Minnesota Statutes require, in part, that these local plans define drainage areas, volumes, rates, and paths of stormwater runoff. This report documents the hydrologic and hydraulic modeling used to delineate the drainage areas and quantify the stormwater runoff from the City of St. Louis Park (City).

The City is part of the Minnehaha Creek Watershed District and the Bassett Creek Watershed Management Commission, which provide oversight of stormwater runoff and water quality in the City. Stormwater runoff from the City enters the cities of Edina, Golden Valley, Minneapolis, and Minnetonka. This report documents the rates of runoff entering the City's neighboring communities, as well as identifying constraints in the existing storm sewer system and flood-prone areas within the City.

The City also has three impaired waterbodies within its limits: Cobblecrest Lake, Minnehaha Creek, and Twin Lake. The City intends to manage its water resources to improve the water quality of all of its lakes, wetlands, and streams, not just those that are impaired. This report identifies areas that are contributing to the pollutant loading of the City's natural resources.

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1.0 BACKGROUND

The goal of this project was to develop comprehensive models for the entirety of the City using available data and existing models as a starting point and establish the rate and quantity of stormwater. The City is covered by a total of eight models, including off-site drainages from the cities of Edina, Minnetonka, Plymouth, and Minneapolis, as well as runoff from Minnesota Department of Transportation (MnDOT) right-of-way. The City is within the Minnehaha Creek Watershed District (MCWD) and the Bassett Creek Watershed Management Commission (BCWMC). The stormwater runoff from the City generally discharges either in Minnehaha Creek or Bassett Creek, both of which discharge into the Mississippi River.

The City is divided into the following eight drainage districts, based on the larger waterbodies within the City.

- / Bass Lake
- / Edina
- / Golden Valley
- / Hannan Lake
- / Minneapolis
- / Minnehaha Creek
- / Twin Lake
- / Westwood Lake.

The City also receives and discharges runoff from neighboring communities, including the following:

- / Edina
- / Golden Valley
- / Minneapolis
- / Minnetonka
- / Plymouth
- / MnDOT right-of-way.

1.1 EXISTING MODELS

The City had access to several models that were developed by MCWD and BCWMC, including the following:

- / Beltline
- / Twin Lake
- / BCWMC Phase 2 Regional Model
- / MCWD Regional Model.

1.2 CURRENT MODEL

The US Environmental Protection Agency's (EPA's) Storm Water Management Model 5 (SWMM5) was selected as the platform to model the City. SWMM5 is flexible, open-source, and unlimited in multiple features that may be modeled. SWMM5 is used throughout the world for planning, analysis and design related to stormwater runoff, particularly in urban areas, and the propriety PCSWMM (which runs on the SWMM5 engine) was used to develop the models for this study. Where possible, the new models were evaluated against existing observed data, including the July 1987 flood event.

1.2.1 BASS LAKE

The Bass Lake model includes 403 subcatchments across 1,362 acres within the City, primarily the Lenox, Sorensen, Elmwood, Triangle, and Wolfe Park neighborhoods. This drainage district discharges to the City of Minneapolis' storm sewer along France Avenue and into the Minikahda Club Golf Course. Major waterbodies in this model include the Bass Lake Preserve, Klodt Pond, Wolfe Lake, and Cattail Pond, and many stormwater ponds for private and public development, including MnDOT right-of-way ponds and the newly constructed Carpenter Park underground stormwater storage facility.

1.2.2 EDINA

The Edina model includes 113 subcatchments across 497 acres in the Minikahda Vista and Browndale neighborhoods of St. Louis Park, as well as the Cities of Edina and Minneapolis. This model discharges into the City of Edina storm sewer system primarily at Vale Gardens Park and reenters the City south of Minikahda Vista Park, before discharging into the City of Minneapolis' storm sewer under France Avenue. Major waterbodies in this model include Browndale Pond and Weber Pond in Edina.

1.2.3 GOLDEN VALLEY

The Golden Valley model includes 38 subcatchments across 219 acres from the Pennsylvania Park and Eliot neighborhoods, which discharge to MnDOT I-394 right-of-way in the City of Golden Valley along the City's north border. Major waterbodies in this model include Hampshire Pond (i.e., Otten Pond South) and Otten Pond. This drainage district is part of the Bassett Creek Watershed and followed the model methodology outlined in the BCWMC *Bassett Creek Hydrologic and Hydraulic Analyses – Phase 2 XPSWMM Model Report*.

1.2.4 HANNAN LAKE

The Hannan Lake model includes 47 subcatchments across 605 acres from the City and City of Minnetonka. Stormwater runoff from a small portion of the St. Louis Park Kilmer Pond neighborhood enters the City of Minnetonka to the west of US 169 and reenters the City at the land-locked wetland to the east of US 169 in the Crestview neighborhood and to the south at Cedar Manor Lake in the Cedar Manor neighborhood. The connection under US 169 is confirmed to exist; however, the size and type of pipe is unknown. Major waterbodies include land-locked wetland, Cedar Manor Lake, and Hannan Lake in the City and Windsor Lake (impaired for nutrients) in the City of Minnetonka.

1.2.5 MINNEAPOLIS

This model includes portions of the Triangle, Fern Hill, Lake Forest, Cedarhurst, and Blackstone and neighborhoods in the City, which discharges to the north into the MnDOT I-394 right-of-way and east into Brownie and Cedar Lakes, which are both impaired for mercury and located in the City of Minneapolis. This model includes 89 subcatchments across 649 acres from both cities, and major waterbodies include Candlestick Pond and Blackstone Park Pond. A stormwater lift station is located at Candlestick Pond along West 16th Street.

1.2.6 MINNEHAHA CREEK

The Minnehaha Creek model was built off of the MCWD regional XPSWMM model and uses existing off-site drainage areas from the Cities of Hopkins and Minnetonka to estimate the flows entering the City from upstream communities. This model includes 406 subcatchments, covering a total of 3,783 acres from many neighborhoods in the City. Major waterbodies include Lake Victoria, Westling Pond, Cobblecrest Lake (impaired for nutrients), Amhurst Ponds, Oak Pond, Oregon & 32nd Pond, Summer Sediment Basin, South Oak Pond, Meadowbrook Lake, and Minnehaha Creek, which is impaired for dissolved oxygen. This drainage district also includes seven stormwater lift stations to move stormwater and prevent flooding on Cobblecrest Lake, Lake Victoria, Westling Pond, South Oak Pond (two lift stations), Oregon Pond, and the Maryland Avenue Pond.

1.2.7 TWIN LAKE

The Twin Lake model includes 286 subcatchments across 1,636 acres in the City. This model covers the neighborhoods of Pennsylvania Park, Willow Park, Eliot View, Blackstone, Bronx Park, Birchwood, Lake Forest, and Fern Hill. Major waterbodies include Utah Pond, Lamplighter Pond, Boneyard Ditch, Natchez Pond, Twin Lakes Sediment Basin, and Twin Lake (impaired for nutrients). This district drains to Twin Lake, which discharges to the northeast into the Minneapolis drainage district. This drainage district includes stormwater lift stations at Lamplighter Pond and Nelson Park to move stormwater from these low-laying areas.

1.2.8 WESTWOOD LAKE

The Westwood Lake model was built using the BCWMC regional XPSWMM model as a foundation and uses existing off-site drainage areas from the Cities of Plymouth and Golden Valley to estimate the runoff entering the City from upstream communities. The model includes 93 subcatchments across 739 acres in the Shelard Park, Kilmer Pond, Westdale, Crestview, and Westwood Hills neighborhoods of the City, as well as portions of Minnetonka, Plymouth and Golden Valley. Major waterbodies in this drainage district include Shelard Sedimentation Basin, Kilmer Pond, Westwood Lake, and the Minneapolis Golf Course basins. This drainage district ultimately discharges to the Bassett Creek, which is impaired because of chloride and *E. coli* bacteria and the City of Golden Valley storm sewer system, which discharges to Bassett Creek. This drainage district is part of the Bassett Creek Watershed and followed the model methodology outlined in the BCWMC *Bassett Creek Hydrologic and Hydraulic Analyses – Phase 2 XPSWMM Model Report*.

2.0 METHODOLOGY

The procedures and methodology used in this study are outlined in *XP-SWMM Hydrology and Hydraulics Model Development Guidance Manual for the City of Minneapolis*, for all of the models within the Minnehaha Creek watershed. For all of the models within the Bassett Creek Watershed (Golden Valley and Westwood Drainage Districts only), the procedures and methodology outlined in the *Bassett Creek Hydrologic and Hydraulic Analyses – Phase 2 XPSWMM Model Report* are used. This additional step was done to simplify the future transmittal of data between the City and watershed districts.

2.1 DATA SOURCES

The Storm Water Management Plan (SWMP) modeling relies on data from multiple sources, which include the following:

- / **City of St. Louis Park:** as-built records, GIS data, survey data, and existing XPSWMM modeling
- / **Hennepin County:** 2017 aerial imagery
- / **BCWMC:** regional XPSWMM model
- / **MCWD:** regional XPSWMM model
- / **Metropolitan Council:** 2016 Generalized Land Use dataset
- / **Minnesota Department of Natural Resources:** Hennepin County LiDAR data
- / **MnDOT:** HydInfra database, construction plans for I-394, TH 7, TH 100, and US 169
- / **Federal Emergency Management Agency (FEMA):** 2016 Hennepin County Flood Insurance Study
- / **US Geological Survey Soil (USGS):** Soil Survey Data for Twin Cities, Minnesota.

After reviewing these datasets, converting the vertical datums to a consistent value for the purposes of this study was determined to be necessary. The listed datasets varied depending on whether the data used a local datum or used NGVD29 or NAVD88. After discussions with City staff, NGVD29 was used for this study because the majority of the City’s data and data from neighboring communities, review agencies, and FEMA reference this datum.

The first conversion used converts the local datum from the City’s local vertical datum to the National Geodetic Vertical Datum of 1929 (NGVD29). This conversion is presented below:

$$\text{Local Datum} + 710.3 = \text{NGVD29}$$

We also established the conversion between NGVD29 and the North American Vertical Datum of 1988 (NAVD88) by examining the shift at five locations across the City, using National Oceanic and Atmospheric Administration’s (NOAA’s) VertCon website. The average of all five locations was used to convert the NAVD88 elevations to NGVD29 in this study; the conversion is presented below:

$$\text{NAVD88} - 0.18 = \text{NGVD29}$$

2.2 RAINFALL DATA

As requested by the City, the following events have been included in the updated models.

Table 2-1. Design Storm Depths Used in the City of St. Louis Park Storm Water Management Plan Modeling

| Storm | Duration (hours) | Depth (in) | Source |
|----------|------------------|------------|---------------|
| 10-year | 24 | 4.1 | NOAA TP-40 |
| 10-year | 24 | 4.29 | NOAA Atlas 14 |
| 100-year | 24 | 5.9 | NOAA TP-40 |
| 100-year | 24 | 7.47 | NOAA Atlas 14 |

in = inches.

Rainfall data were determined using the NOAA's Technical Paper 40 (TP-40) maps published in May 1961 and used until recently for most stormwater design. Rainfall data from NOAA's 2013 revised Atlas 14, Volume 8 were also used in this modeling effort to evaluate present and future conditions.

2.3 SUBWATERSHEDS

Using the Minnesota Department of Natural Resources (MnDNR) light and detection ranging (LiDAR) elevation dataset combined with the City's storm sewer infrastructure GIS data and recent MnDOT construction plans, subwatersheds were delineated to each 18-inch or larger pipe in the City, as well as the direct drainage to all waterbodies and local sinks. Individual catch basins and lead pipes were not modeled in this effort, nor was inlet capacity of the storm sewer system. A total of 1,475 separate subwatershed were delineated as part of this study and are shown in Appendix A.

2.4 HYDROLOGY PARAMETERS

In the EPA's SWMM5 model, the following parameters are needed to quantify runoff: impervious land cover, watershed slope, catchment width, and soil infiltration.

2.4.1 IMPERVIOUS COVER

The process for determining the directly connect impervious area (DCIA) was based on the Basset Creek WMC regional model report. Using the 2016 Generalized Landuse dataset from Metropolitan Council, we separated areas of the city that are traditionally "heavily impervious areas," including classifications of: Industrial and Utility, Institutional, Major Highways, Manufactured Housing Parks, Mixed Use Commercial, Mixed Use Industrial, Mixed Use Residential, Multifamily, Office, Open Water, Railways and Retail and Other Commercial. These areas were assumed to have 100 percent of the total impervious area identified as directly-connected impervious. Using the Twin Cities Metropolitan Area 1-meter Land Cover Classification developed by the University of Minnesota, Twin Cities, we extracted roads and buildings as the directly impervious surface in "heavily impervious areas" and only roads for the remainder of the City. DCIA was the area of directly-connected impervious cover as a percent of the total subwatersheds area.

For residential and open-space areas, we followed the City of Minneapolis's XPSWMM Manual recommendations to include a reduction for impervious areas that flow onto pervious areas, such as gutters from rooftops or the surface area of lakes.

2.4.2 WATERSHED SLOPE

By using the MnDNR LiDAR elevation dataset, the average slope for each subwatershed was calculated in GIS, including for existing off-site subcatchments for consistency.

2.4.3 CATCHMENT WIDTH

The catchment width factor is a parameter that controls how quickly water travels from one end of the subcatchment to the outlet, which is similar to the time of concentration in other hydrology methods. In SWMM, the width factor is often used as calibration parameter, and in these models, the width factor was generally estimated by dividing the drainage area by the longest overland flow. Because most of the City is heavily urbanized, this flow length was assumed to be 100–300 feet (ft) (before water enters the storm sewer system); this parameter will likely need to be modified in future modeling efforts as calibration data was not readily available for all watersheds.

2.4.4 SOIL INFILTRATION

The City is covered by two watershed districts and each watershed district's regional XPSWMM model. To incorporate the City's models into the larger regional models in the future, the overlying regional model soil infiltration methodology was used. For the Bassett Creek models (Golden Valley and Westwood drainage districts), these models used the Horton infiltration parameters outlined in the *Bassett Creek Hydrologic and Hydraulic Analyses – Phase 2 XPSWMM Model Report*. For the Minnehaha Creek models, the Green-Ampt parameters estimated in the City of Minneapolis's *XP-SWMM Hydrology and Hydraulics Model Development Guidance Manual for the City of Minneapolis* were used.

2.5 HYDRAULICS

After parameterizing the subcatchments, SWMM routes the storm hydrographs through the modeled storm sewer, stream, and overland drainage networks to determine the water surface elevations and depths at ponding locations.

2.5.1 STORM SEWER NETWORK

GIS data and as-built records of the storm sewer network were obtained from the City and cities of Minnetonka and Edina. The MnDOT also provided their as-built GIS database and construction plans for the recently reconstructed TH 7, TH 100, I-394, and US 169. The City also provided supplemental survey data for inverts and pipes that were not provided in the GIS data. A total of 2,483 manholes, catchbasins, and junctions are included in the model.

Multiple pipe sizes, shapes, and materials make up the 83.2 miles of storm sewer modeled. Pipe material and Manning's roughness value are provided in Table 2-2.

Table 2-2. Pipe Material Hydraulic Coefficients Used in the City of St. Louis Park SWMP Modeling

| Pipe Material | Manning's n-value | Hazen-Williams Coefficient |
|-----------------|-------------------|----------------------------|
| DIP/Cast Iron | 0.013 | 140 |
| VCP | 0.014 | — |
| RCP | 0.013 | — |
| CMP/PVC | 0.024 | 130 |
| PP/PVC | 0.010 | — |
| Steel Pipe | 0.012 | — |
| Clay Drain Tile | 0.013 | — |

Because discrepancies occurred in the data, the original as-designed data were used for modeled development and a note was appended to the model data to identify any assumptions made. When no data existed for a node invert or pipe diameter, the values were estimated based on the nearest up and downstream data and our professional judgement.

2.5.2 STORMWATER STORAGE AREAS AND SINKS

Using the MnDNR LiDAR elevation dataset and the 2011 *Stormwater Pond Evaluation and Prioritization – Assessment of Twenty-Six Basins* report, available flood storage for each pond above the normal water surface elevation was determined and combined with the dead storage provided in the report. These data were incorporated into the model to evaluate the flood detention and water quality benefits of the City’s existing ponds and lakes. Using the LiDAR dataset, low-laying areas with a depth of more than 2-ft were identified and incorporated in the modeling. These areas are typically low points in backyards or intersections and provide live storage during flood events when the storm sewer system is at capacity and surcharges into streets or out of the system. Locations where the subsurface system surcharges are connected to the subsurface system via drainage pathways that occur in streets or swales and allow stormwater to reenter the subsurface system at a downstream point. A total of 390 storage areas were included in the models.

2.6 WATER QUALITY

EPA SWMM5 can also model water quality and pollutant loading. This module was added to establish the existing loading from watersheds and roughly estimate the reduction occurring from the City’s waterbodies and regional best management practices (BMPs).

The event mean concentration (EMC) data from the Minnesota Pollution Control Agency’s (MPCA) *Minnesota Stormwater Manual* was incorporated into the SWMM models to evaluate the watershed loading rates for total phosphorus (TP) and total suspended solids (TSS), shown in Table 2-3.

To evaluate the pollutant mass loading from the City, the models were run using a 10-year daily rainfall record developed from precipitation data at Minneapolis-St. Paul International Airport. These data are shown in Table 2-4.

Table 2-3. Total Phosphorus and Total Suspended Solids Event Mean Concentrations by Land Use in St. Louis Park

| Land Use | Total Phosphorus (mg/L) | Total Suspended Solids (mg/L) |
|-------------------------------|-------------------------|-------------------------------|
| Low Density Residential | 0.5 | 150 |
| Medium Density Residential | 0.3 | 120 |
| High Density Residential | 0.4 | 140 |
| Mixed Use | 0.4 | 140 |
| Commercial | 0.25 | 140 |
| Industrial | 0.25 | 150 |
| Office/Business Park | 0.25 | 140 |
| Civic | 0.3 | 140 |
| Park and Open Space | 0.2 | 90 |
| Highway and Rail Right-of-Way | 0.04 | 135 |
| Streets | 0.5 | 135 |

mg/L = milligrams per liter.

Table 2-4. Total Precipitation at Minneapolis-St. Paul Airport (2008–2017)

| Year | Precipitation |
|--------------------|---------------|
| 2008 | 22.38 |
| 2009 | 24.8 |
| 2010 | 32.89 |
| 2011 | 26.91 |
| 2012 | 29.59 |
| 2013 | 32.77 |
| 2014 | 35.4 |
| 2015 | 36.14 |
| 2016 | 40.32 |
| 2017 | 32.36 |
| Mean Annual | 31.36 |

Areas outside of the City, including the MnDOT right-of-way, are not included in this analysis. The pollutant removal efficiencies of existing stormwater facilities were not incorporated into this study; however, the existing facilities within the City were estimated to provide the removal efficiencies shown in Table 2-5.

Table 2-5. Pollutant Removal Efficiencies for Stormwater Best Management Practices in St. Louis Park

| Practice | Total Phosphorus (%) | Total Suspended Solids (%) |
|--------------------------------------|----------------------|----------------------------|
| Constructed Wet Pond | 50 | 84 |
| Constructed Wetland | 38 | 73 |
| Biofiltration With Underdrain | 80 | 85 |
| Structural Pollutant Removal Devices | N/A | Varies by manufacturer |

3.0 RESULTS

3.1 JULY 1987 FLOOD EVENT

The hydrology and hydraulic components of the SWMM models were compared to high water elevations collected during the July 23–25, 1987, storm event. The 15-minute rainfall record at Golden Valley COOP Station 213202 was collected from NOAA's Climate Data Online clearinghouse. This precipitation record was run in all of the final models to evaluate how well the model predicted the observed high water conditions. In general, the model overestimated high water elevations by approximately 0.26 percent on average, with a maximum error of 2.91 percent at the intersection of Lake Street and Hamilton Street (SA-7-045) in the Bass Lake model. This area has been redeveloped and may no longer reflect the 1987 conditions. No observed hydrograph data were available for calibration, and future modeling efforts are recommended to include collecting the data necessary for calibration.

3.2 HYDRAULIC RESULTS

The model results for all of the events were exported to GIS and analyzed to evaluate the approximate extents of surface flooding and pipe capacities in the City. The results of these analyses are presented in Appendix A. Areas of excessive flooding, which are defined as more than 2-ft deep even during the 10-year event, 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 B. 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 actually have negative freeboard, indicating the potential for the flooding of

residential structures. Lakes with negative freeboard (i.e. flooding) are shown in Table 3-2 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 3-3.

Table 3-1. Model Results and Comparison With July 1987 Observed Data

| Node Name | Location | 1987 Peak Flood Elevation | Modeled Elevation | Difference (ft) | Difference (%) |
|----------------------|----------------------------------------------|---------------------------|-------------------|-----------------|----------------|
| CE-16K-06 | 4725 Highway 7 | 878.83 | 880.07 | 1.24 | 0.14 |
| SA-7-045 | Lake Street and Hamilton Street | 892.18 | 918.11 | 25.93 | 2.91 |
| SA-7-058 | Beltline Road & West 35 th Street | 877.83 | 880.05 | 2.22 | 0.25 |
| SA-7-BassLake | Bass Lake Outlet | 877.98 | 880.05 | 2.07 | 0.24 |
| SA-2-OttenPond | Otten Pond | 876.72 | 878.37 | 1.65 | 0.19 |
| Cedar_Manor_Lake | Cedar Manor Lake | 898.46 | 900.39 | 1.93 | 0.21 |
| Hannan_Lake | Hannan Lake | 897.87 | 899.57 | 1.7 | 0.19 |
| Landlocked | Landlocked Basin | 900.15 | 903.37 | 3.22 | 0.36 |
| SA-6-CandlestickPond | Candlestick Pond | 879.02 | 880.6 | 1.58 | 0.18 |
| 4-CC-09J-12 | 3100 Oregon Avenue South | 897.14 | 896.8 | -0.34 | -0.04 |
| 4-MC-56UFN14 | Upstream 37 th St Bridge | 901.03 | 903.08 | 2.05 | 0.23 |
| 4-SC-11N-05 | Louisiana Street and Oxford Street | 891.24 | 891.72 | 0.48 | 0.05 |
| 4-SC-10N-21 | Oregon Street and Lake Street | 892.42 | 892.37 | -0.05 | -0.01 |
| SA-4-032 | Oak Hill Park | 895.71 | 896.81 | 1.1 | 0.12 |
| SA-4-CobblecrestLake | Cobblecrest Lake | 899.64 | 896.91 | -2.73 | -0.30 |
| SA-4-MC-53 | Minnehaha Creek Wetlands | 899.49 | 903.6 | 4.11 | 0.46 |
| SA-4-MC-54 | Upstream 34 th Street Bridge | 902.34 | 903.6 | 1.26 | 0.14 |
| SA-4-MC-69 | Upstream Excelsior Boulevard | 888.58 | 891.51 | 2.93 | 0.33 |
| SA-4-OakPond | Oak Lake | 892.21 | 893.12 | 0.91 | 0.10 |
| SA-4-WestlingPond | Westling Pond | 897.62 | 899.58 | 1.96 | 0.22 |
| SA-5-004 | 7520 Cedar Lake Road and Oregon Court Sink | 885.09 | 886.4 | 1.31 | 0.15 |
| SA-5-Boneyard | Boneyard Ditch | 879.38 | 882.36 | 2.98 | 0.34 |
| SA-5-Lamplighter | Lamplighter Pond | 885.32 | 886.34 | 1.02 | 0.12 |
| SA-5-Natchez | Natchez Pond | 874.51 | 874.36 | -0.15 | -0.02 |
| SA-5-TwinLakes | Twin Lake | 875.68 | 874.2 | -1.48 | -0.17 |
| SA-1-KilmerLake | Kilmer Pond | 905.72 | 910.34 | 4.62 | 0.51 |
| SA-1-WestwoodLake | Westwood Lake | 888.45 | 888.7 | 0.25 | 0.03 |

3.3 WATER QUALITY RESULTS

Using the EMC data collected for the various land use types in the City and a 10-year rainfall record, the watershed loading rates were calculated in the models.

Table 3-2. City of St. Louis Park Lakes With Modeled Negative Freeboard

| Lake | 10-Year Technical Paper-40 | 100-Year Technical Paper-40 | 10-Year Atlas 14 | 100-Year Atlas 14 |
|------------------|----------------------------|-----------------------------|------------------|-------------------|
| Bass Lake | | ● | ● | ● |
| Browndale Pond | | | | ● |
| Candlestick Pond | | | | ● |
| Kilmer Pond | | | | ● |
| Lampighter Pond | | | | ● |
| Natchez Pond | | ● | | ● |
| Oak Pond | | ● | | ● |
| Oregon Pond | ● | ● | ● | ● |
| Otten Pond | | ● | | ● |
| Rhino Pond | | | | ● |
| South Oak Pond | ● | ● | ● | ● |
| Sumter Pond | | | | ● |

Table 3-3. Intercommunity 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 | 208 | 299 | 243 | 410 |
| Minneapolis | Edina | 127 | 190 | 153 | 276 |
| 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).

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 are provided in Table 3-5. The loads within the drainage areas of the three impaired lakes in the City are included in Table 3-6. Note that a very small part of the Bass Lake drainage area is located within the City of Minneapolis.

Table 3-4. City of St. Louis Park Modeled Pollutant Loading

| | Model Total | St. Louis Park Only |
|-------------------------------------|-------------|---------------------|
| Area (ac) | 9,489 | 6,864 |
| Annual TP Load (2008-2017) (lb/yr) | 11,465 | 8,538 |
| TP Loading Rate (lb/ac/yr) | 1.21 | 1.24 |
| Annual TSS Load (2008-2017) (lb/yr) | 4,079,726 | 3,068,247 |
| TSS Loading Rate (lb/ac/yr) | 429.94 | 447.04 |

ac = acres.

lb/yr = pounds per year.

lb/ac/yr = pounds per acre per year.

Table 3-5. Allocated Watershed Loading From the City of St. Louis Park and Minnesota Department of Transportation

| | City of St. Louis Park | Minnesota Department of Transportation |
|-------------------------------------|------------------------|----------------------------------------|
| Area (ac) | 6,645 | 219 |
| Annual TP Load (2008-2017) (lb/yr) | 7,989 | 549 |
| TP Loading Rate (lb/ac/yr) | 1.20 | 2.51 |
| Annual TSS Load (2008-2017) (lb/yr) | 2,893,431 | 174,816 |
| TSS Loading Rate (lb/ac/yr) | 435.45 | 798.84 |

Table 3-6. Annual Total Phosphorus Load (2008–2017) to Nutrient-Impaired Waters in St. Louis Park

| Impaired Water | City of St. Louis Park (lb/yr) | MnDOT (lb/yr) | External to St. Louis Park (lb/yr) |
|------------------|--------------------------------|---------------|------------------------------------|
| Bass Lake | 1,975.7 | 276.7 | 0.5 (City of Minneapolis) |
| Cobblecrest Lake | 327.6 | 0.1 | n/a |
| Twin Lake | 2,303.9 | 28.1 | n/a |

lb/yr = pounds per year.

4.0 CONCLUSIONS

4.1 HYDRAULIC RECOMMENDATIONS

As the City is well-aware, multiple flood-prone areas exist in the City. The areas identified in this study should be verified against the Public Works' maintenance records or resident complaints to validate the model results, in absence of calibration data. Additional efforts are recommended and include the following:

- / Establishing a monitoring and data collection network for future calibration efforts. Because the models appear to be overestimating runoff, the catchment width factor should be closely reviewed during any calibration effort.
- / Reviewing model assumptions. Some of these locations may indicate the need for future City maintenance, given the high groundwater table and underlying soils in the City.
- / Reviewing surface inundation areas with the City Engineer and Public Works Department to validate these problem areas against citizen complaint and/or maintenance records.
- / Confirming pump operations with the Public Works Department. Available as-built data were used, but the records were incomplete, and in many cases, pump size and rules were assumed.
- / Reviewing intercommunity and inter-model flows and assumptions. The inflow hydrographs from Minnehaha Creek could not be obtained in the time frame for finalizing this report; however, the model results have been verified against the current FEMA mapping and are consistent with FEMA's results in the creek.
- / Coordinating routine street reconstruction projects with flood improvement projects to maximize opportunities to improve drainage.

4.2 WATER QUALITY RECOMMENDATIONS

The model results indicate that the City contributes nearly 8,000 pounds of TP and 4 million pounds of TSS annually. The City intends to improve these numbers and has made progress toward that goal with projects such as the Carpenter Park Underground Stormwater Facility. The watershed loading identified in this study is recommended to prioritize the siting of future regional water quality projects and modeling efforts. Future work includes:

- / Refining the models to allow for long-term simulation of flow routing and water quality data and establishing the City's reductions and contributions to meeting existing total maximum daily loads (TMDLs).
- / Incorporating private BMPs. These BMPs were not generally included in this modeling effort, but they do play a role in improving water quality.
- / Combining maintenance projects in the Birchwood, Bronx Park, Fern Hill, and Elliot View neighborhoods with water quality improvement projects, as the runoff from these neighborhoods contributes to the nutrient-impaired Twin Lake.
- / Coordinating with future private and public developments in the Aquila and Meadowbrook neighborhoods to look for enhanced water quality improvements to benefit the impaired Minnehaha Creek.



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APPENDIX A

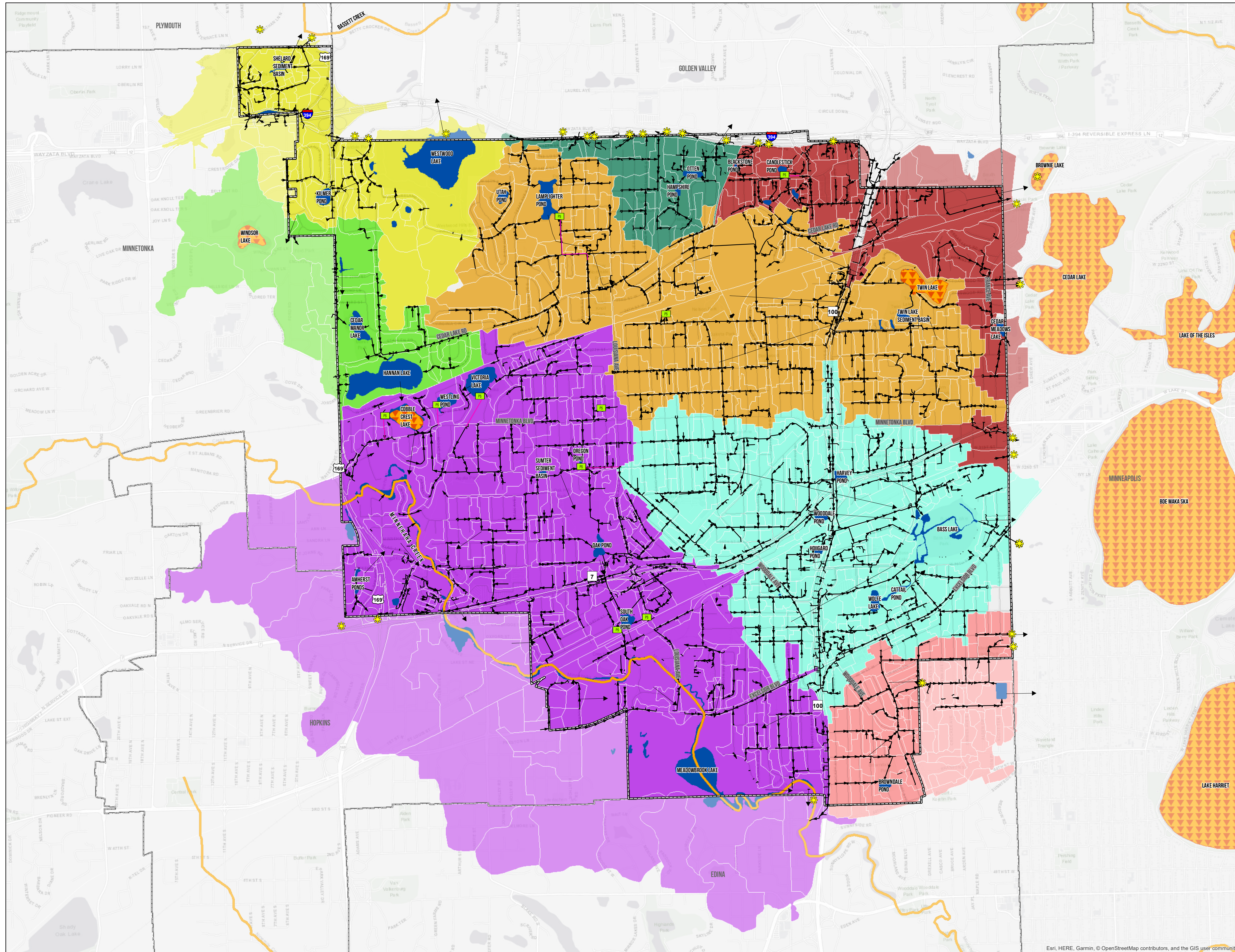
FIGURES



- Figure A-1** Storm Sewer Conveyance System and Impaired Waterbodies.
- Figure A-2** 100-Year Atlas 14 Surface Flooding.
- Figure A-3** 100-Year Atlas 14 Pipe Capacity.
- Figure A-4** 10-Year Atlas 14 Surface Flooding.
- Figure A-5** 10-Year Atlas 14 Pipe Capacity.
- Figure A-6** 100-Year TP-40 Surface Flooding.
- Figure A-7** 100-Year TP-40 Pipe Capacity.
- Figure A-8** 10-Year TP-40 Surface Flooding.
- Figure A-9** 10-Year TP-40 Pipe Capacity.
- Figure A-10** Total Phosphorus Mass Loading.
- Figure A-11** Total Suspended Solids Mass Loading.

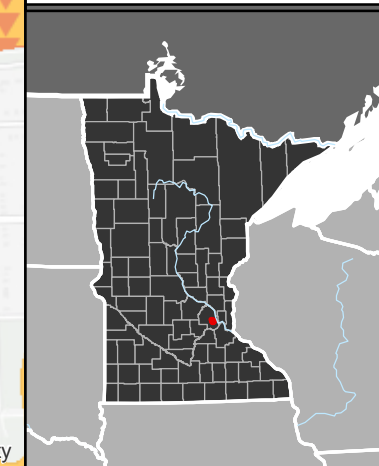
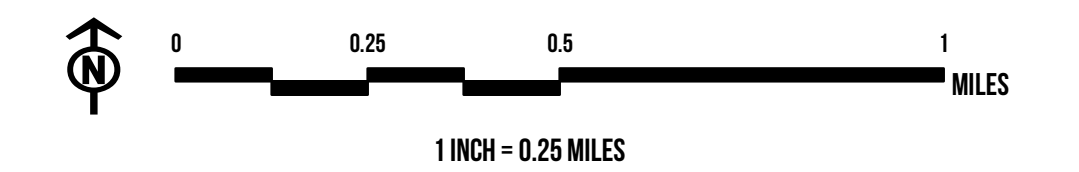


**FIGURE A-1: STORM SEWER
CONVEYANCE SYSTEM AND IMPAIRED
WATERBODIES**



LEGEND

- Intercommunity Flow Locations
- Stormwater Lift Stations
- Stormwater Discharge Points
- Storm Mains (Pressure)
- Storm Mains (Gravity)
- Flow Arrows
- 01-Westwood Lake District (740 acres)
- 02-Golden Valley District (219 acres)
- 03-Hannan Lake District (605 acres)
- 04-Minneha Creek District (3,783 acres)
- 05-Twin Lake District (1,636 acres)
- 06-Minneapolis District (649 acres)
- 07-Bass Lake District (1,362 acres)
- 08-Edina District (497 acres)
- Impaired Streams
- Impaired Lakes
- Lakes
- City Boundary









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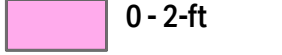
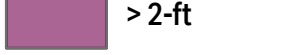

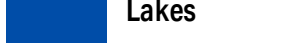



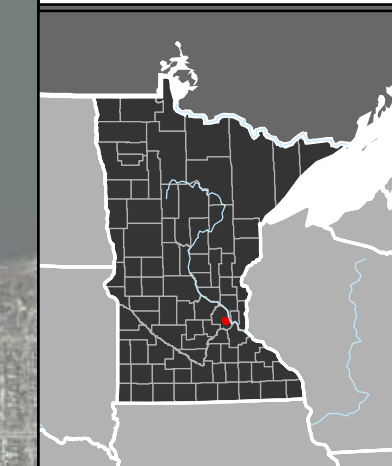
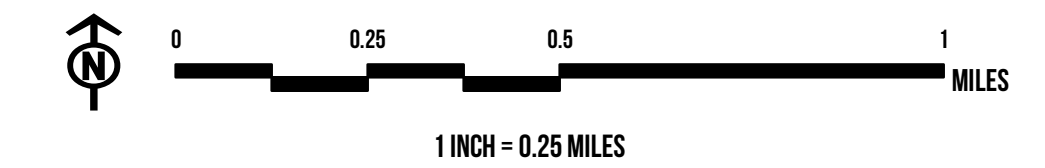
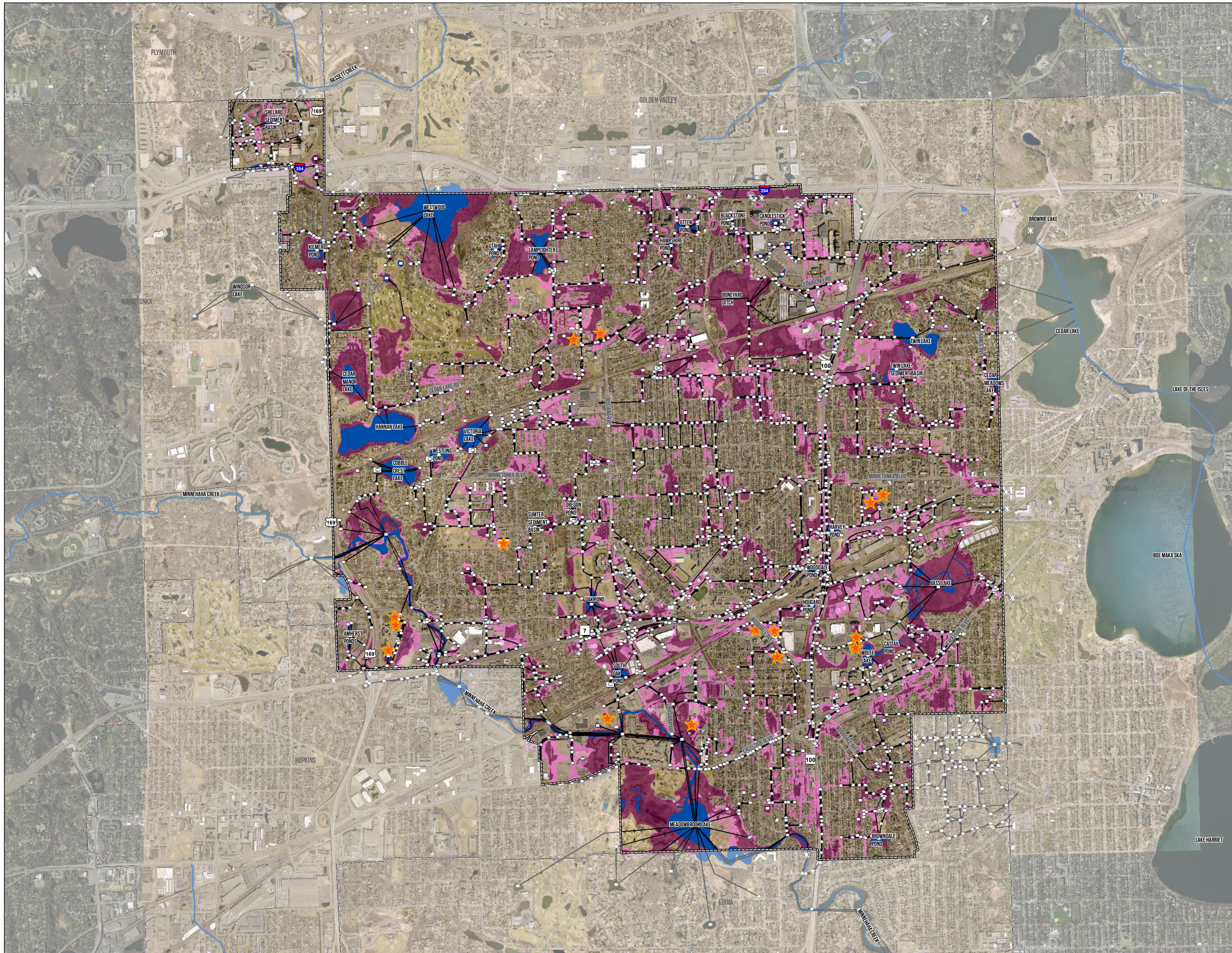
**FIGURE A-2: NOAA ATLAS 14
100-YEAR 24-HOUR SURFACE FLOODING**

LEGEND

-  Critical Infrastructure
-  Modeled Junctions
-  Modeled Storage Nodes
-  Stormwater Lift Stations
-  Model Outfalls
-  Modeled Storm Mains

Depth of Flooding

-  No Flooding
-  0 - 2-ft
-  > 2-ft
-  Creeks
-  Lakes
-  City Boundary















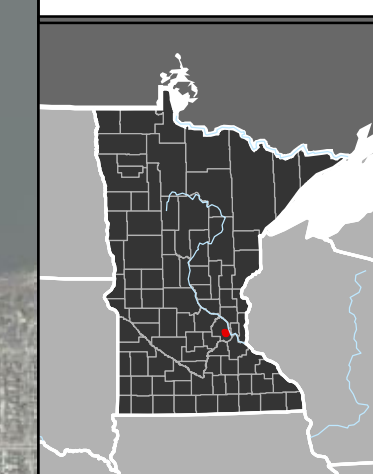
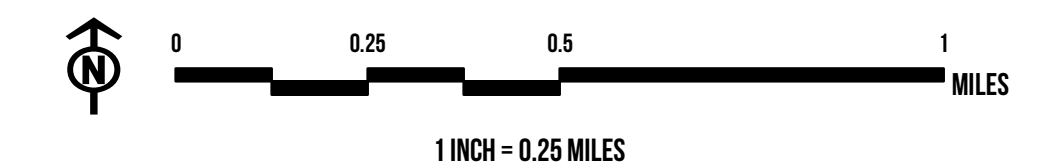
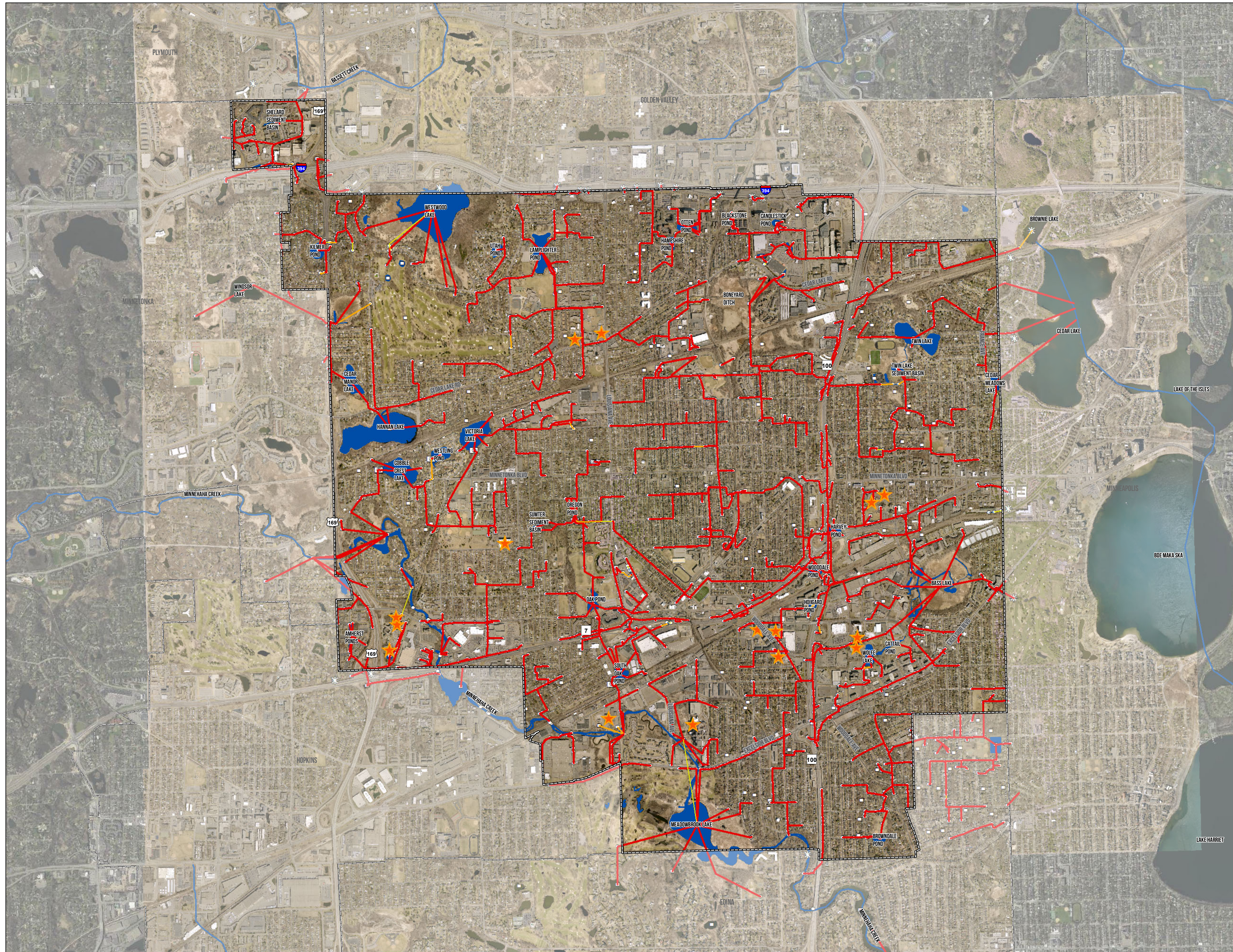
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**FIGURE A-3: NOAA ATLAS 14
100-YEAR 24-HOUR SYSTEM CAPACITY**

LEGEND

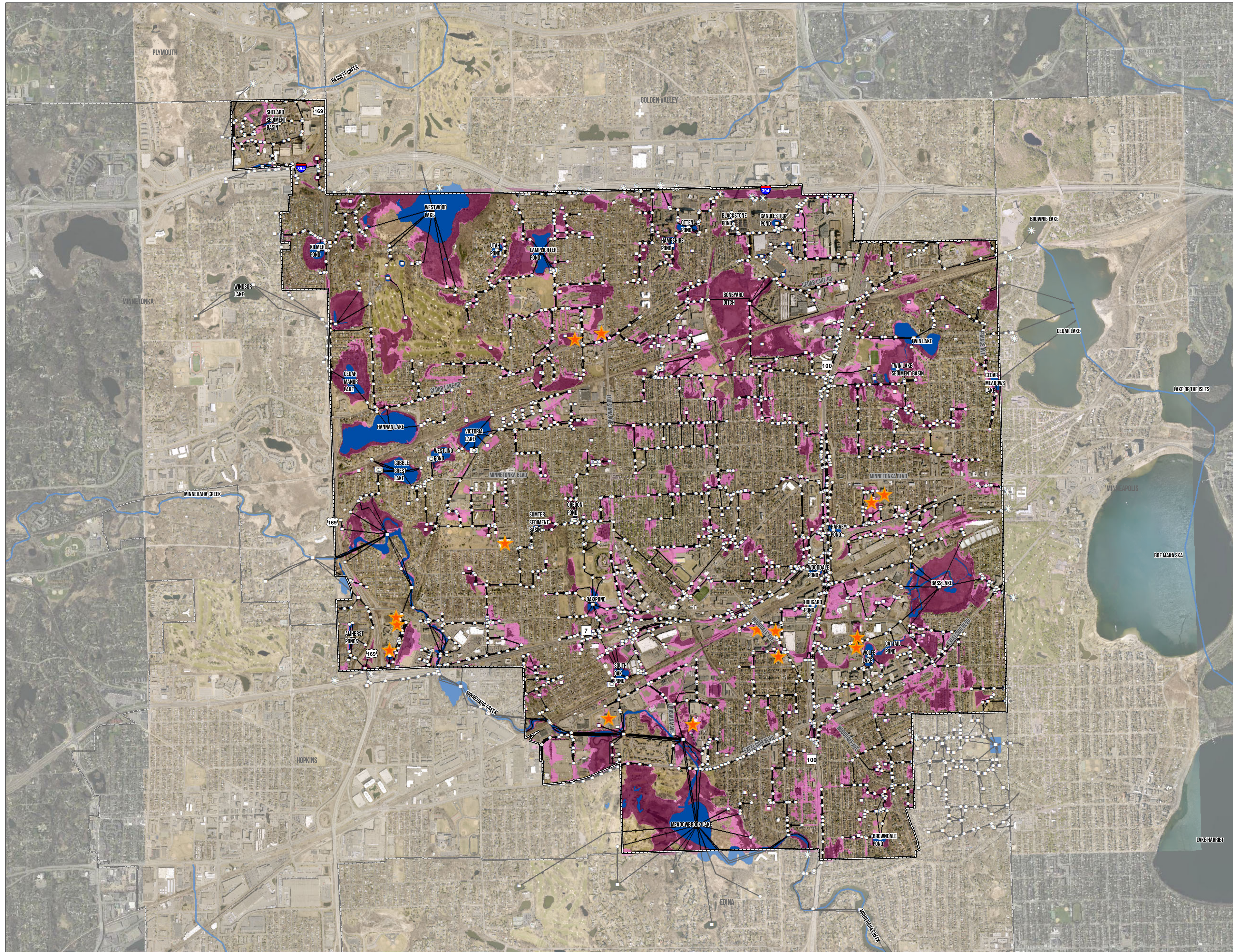
-  Critical Infrastructure
- Modeled Conduits Percent Full**
-  0% - 25%
-  26% - 50%
-  51% - 75%
-  76% - 100%
-  Modeled Junctions
-  Modeled Storage Nodes
-  Stormwater Lift Stations
-  Model Outfalls
-  Creeks
-  Lakes
-  City Boundary



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**FIGURE A-4: NOAA ATLAS 14
10-YEAR 24-HOUR SURFACE FLOODING**

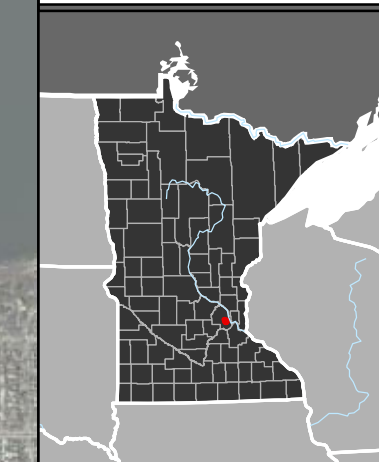
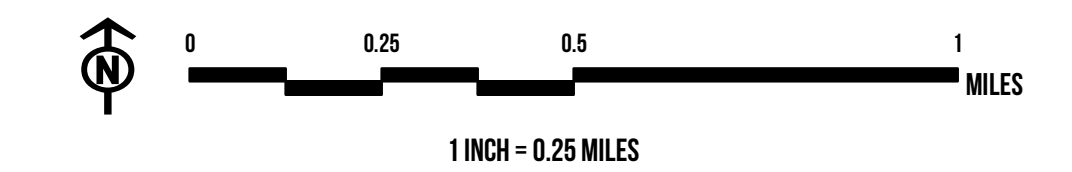


LEGEND

- Critical Infrastructure
- Modeled Junctions
- Modeled Storage Nodes
- Stormwater Lift Stations
- Model Outfalls
- Modeled Storm Mains

Depth of Flooding

- No Flooding
- 0 - 2-ft
- > 2-ft
- Creeks
- Lakes
- City Boundary















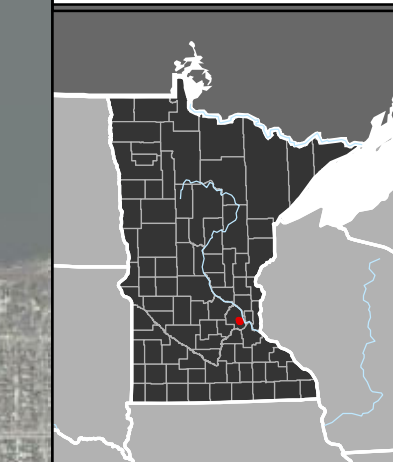
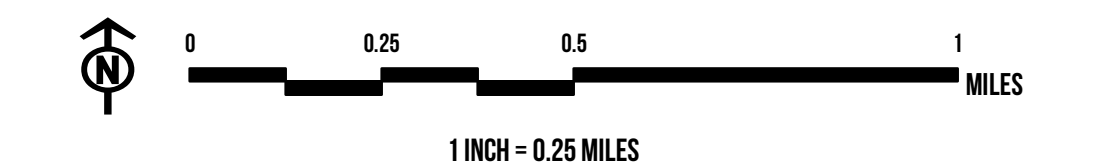
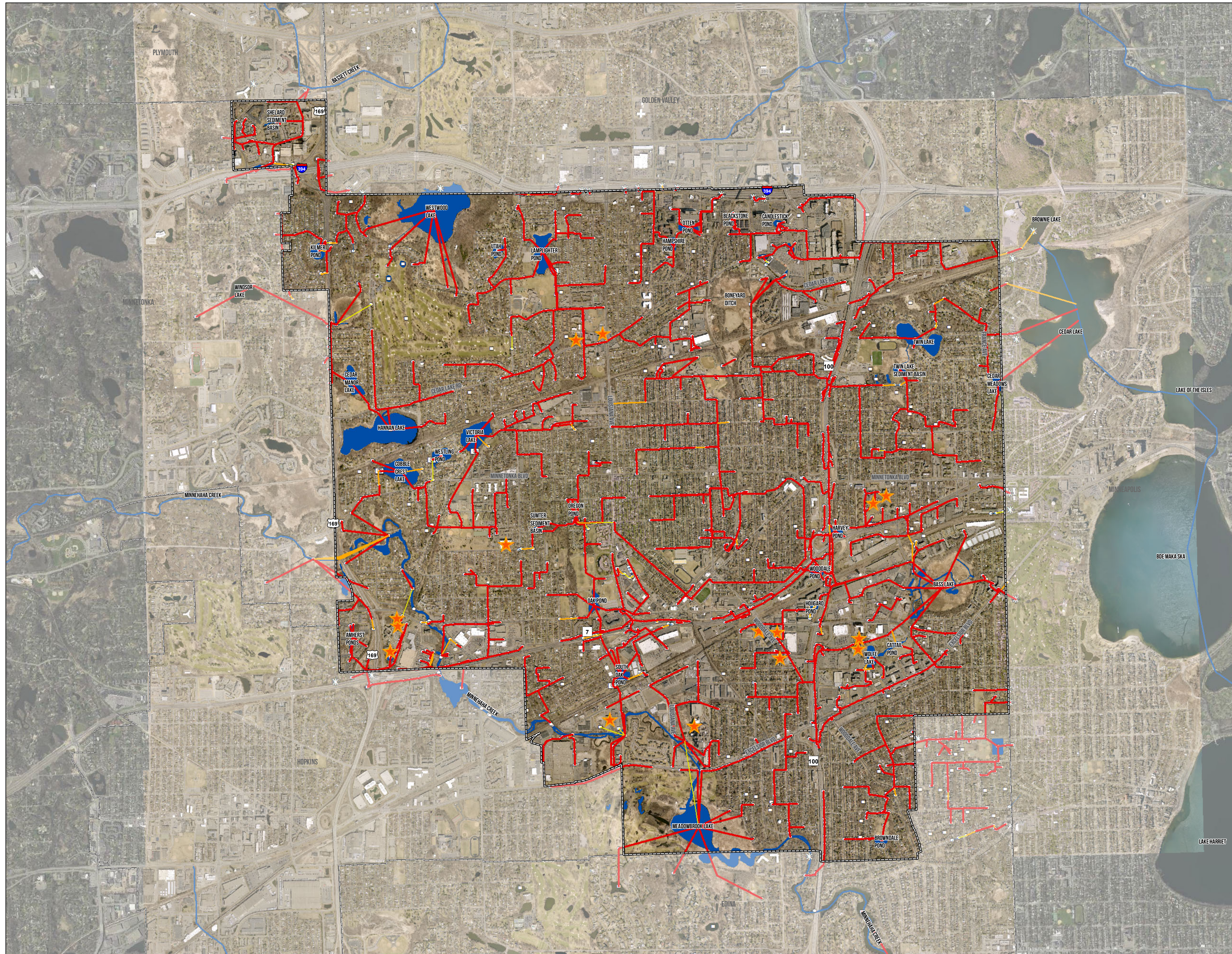
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**FIGURE A-5: NOAA ATLAS 14
10-YEAR 24-HOUR SYSTEM CAPACITY**

LEGEND

-  Critical Infrastructure
- Modeled Conduits Percent Full**
-  0% - 25%
-  26% - 50%
-  51% - 75%
-  76% - 100%
-  Modeled Junctions
-  Modeled Storage Nodes
-  Stormwater Lift Stations
-  Model Outfalls
-  Creeks
-  Lakes
-  City Boundary









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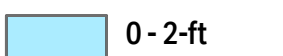
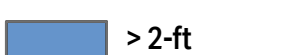





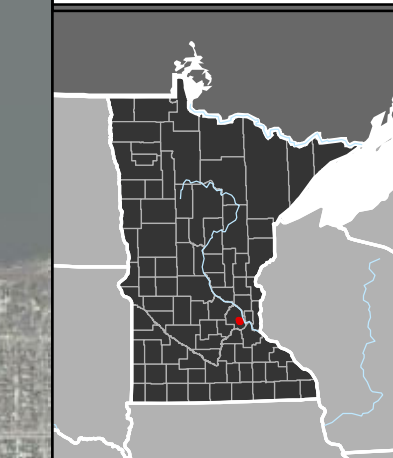
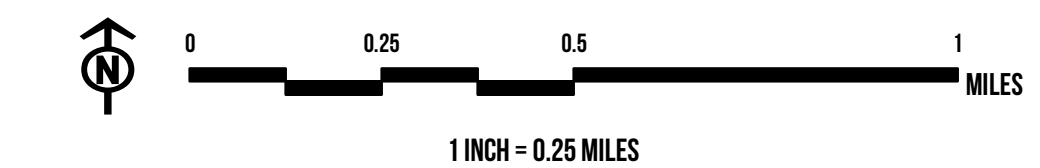
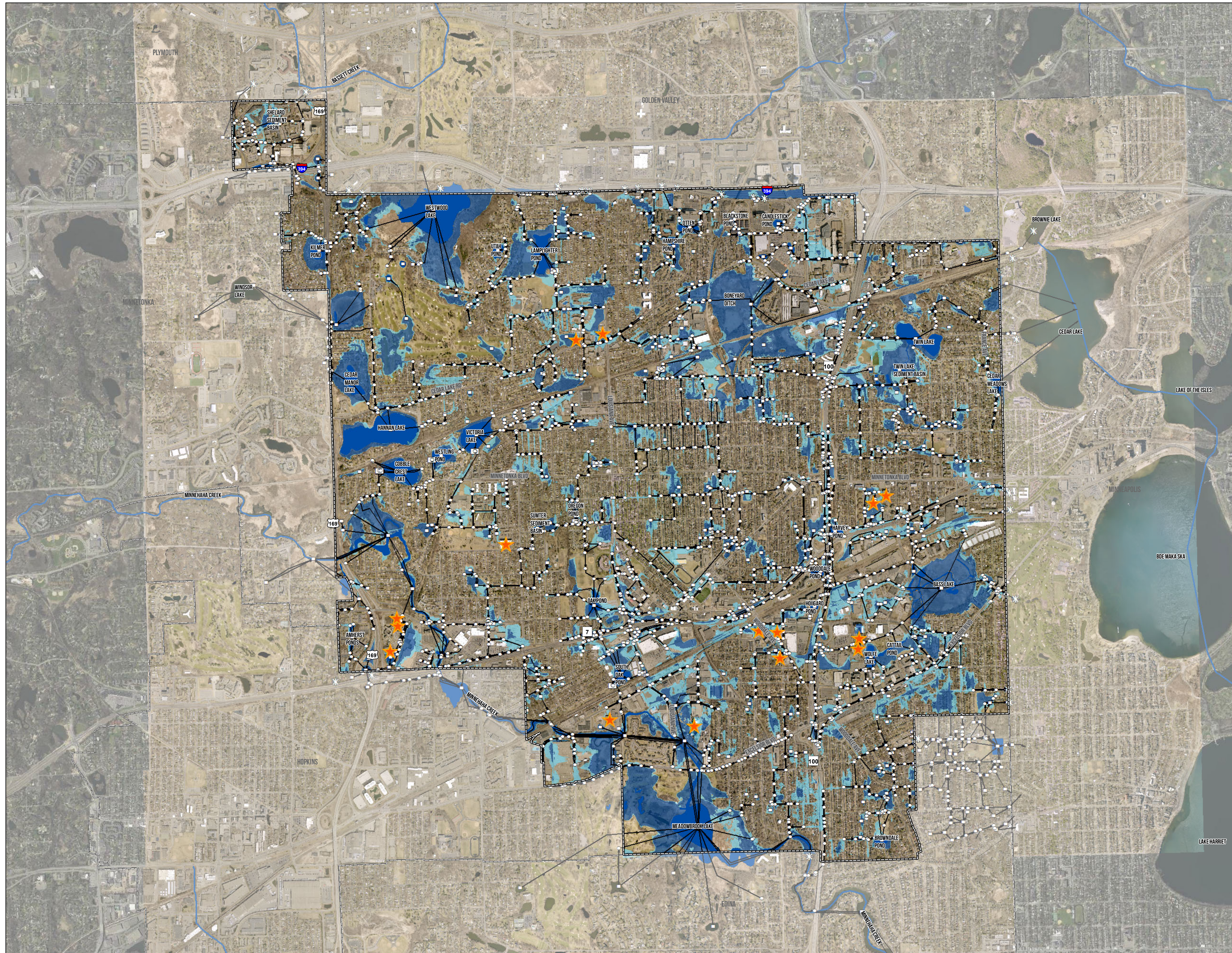
**FIGURE A-6: NOAA TP-40
100-YEAR 24-HOUR SURFACE FLOODING**

LEGEND

-  Critical Infrastructure
-  Modeled Junctions
-  Modeled Storage Nodes
-  Stormwater Lift Stations
-  Model Outfalls
-  Modeled Storm Mains

Depth of Flooding

-  No Flooding
-  0 - 2-ft
-  > 2-ft
-  Creeks
-  Lakes
-  City Boundary















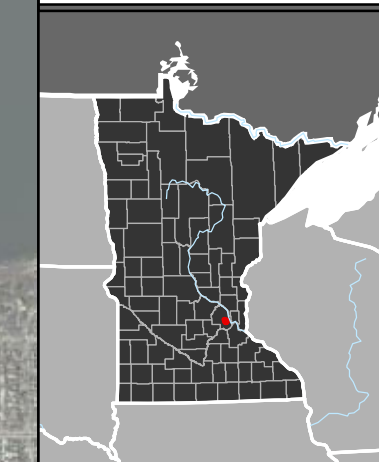
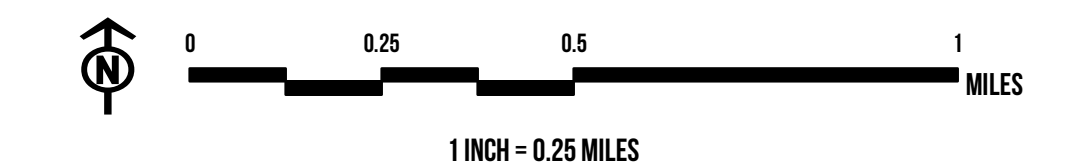
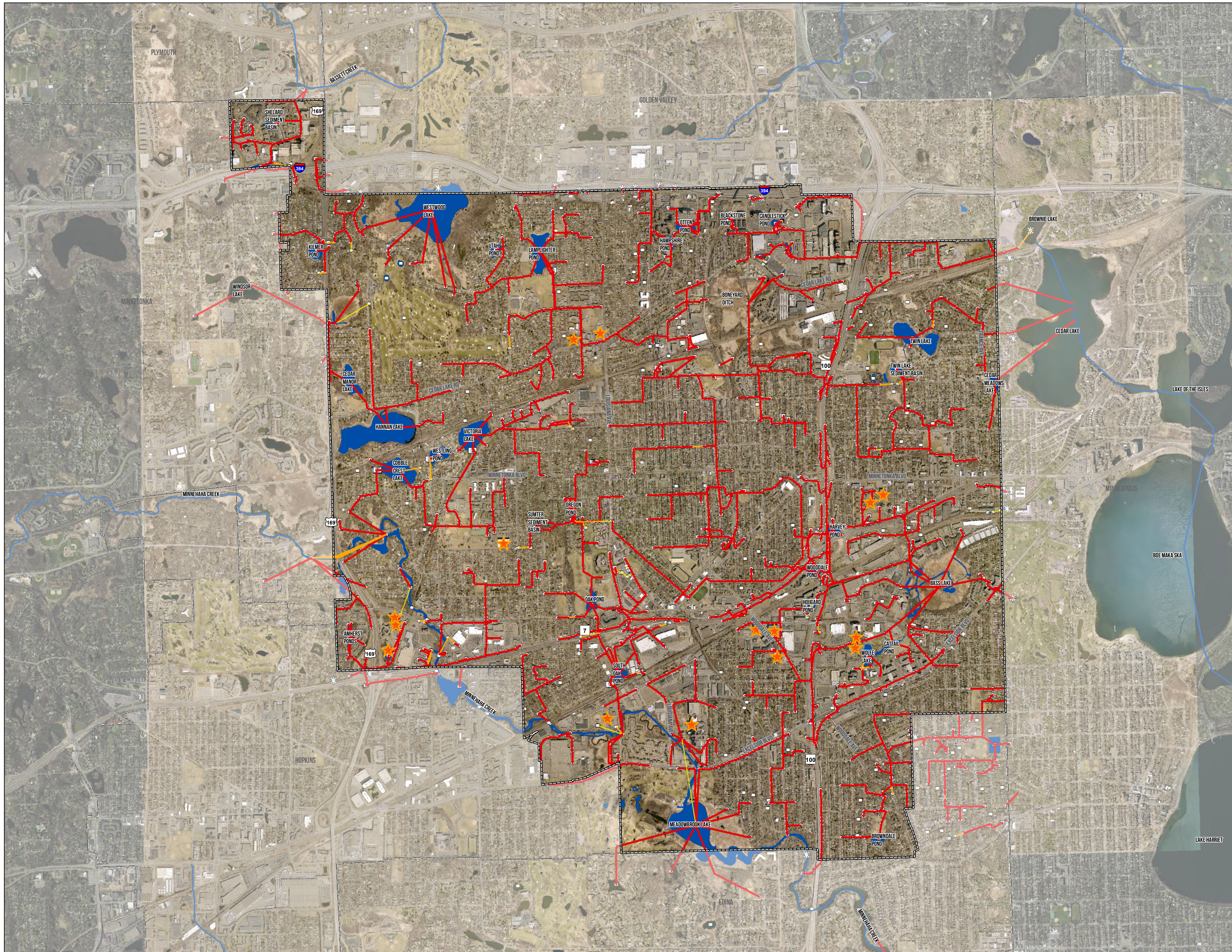
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| Scale: As Shown |
| Drawn By: KAT |
| Checked By: |
| Proj. #: 03259 |
| Date: 2018.11.08 |



**FIGURE A-7: NOAA TP-40
100-YEAR 24-HOUR SYSTEM CAPACITY**

LEGEND

-  Critical Infrastructure
- Modeled Conduit Percent Full**
-  0% - 25%
-  26% - 50%
-  51% - 75%
-  76% - 100%
-  Modeled Junctions
-  Modeled Storage Nodes
-  Stormwater Lift Stations
-  Model Outfalls
-  Creeks
-  Lakes
-  City Boundary









Scale: As Shown
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 Checked By:
 Proj. #: 03259
 Date: 2018.11.08


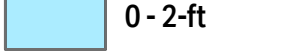
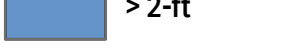
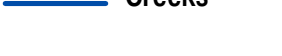




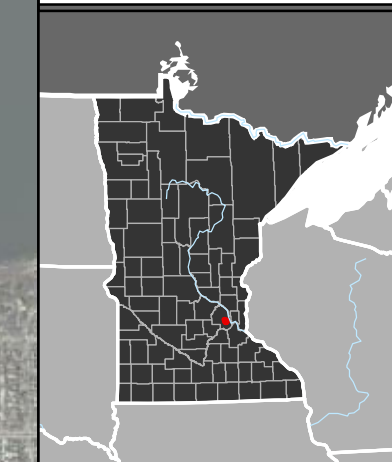
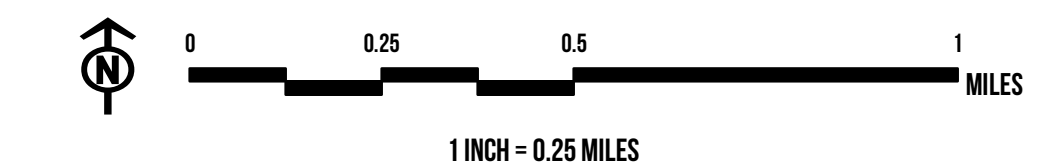
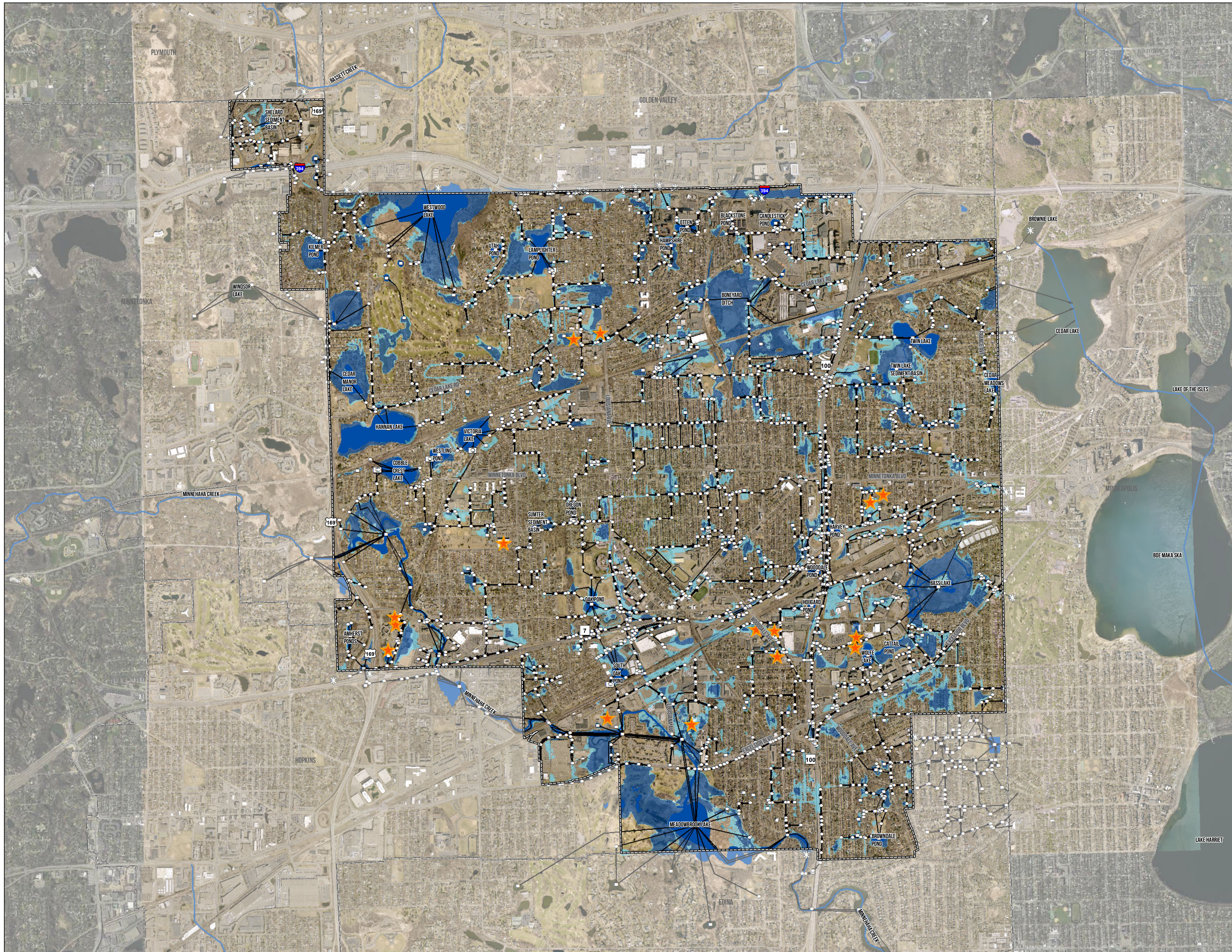
**FIGURE A-8: NOAA TP-40
10-YEAR 24-HOUR SURFACE FLOODING**

LEGEND

-  Critical Infrastructure
-  Modeled Junctions
-  Modeled Storage Nodes
-  Stormwater Lift Stations
-  Model Outfalls
-  Modeled Storm Mains

Depth of Flooding

-  No Flooding
-  0 - 2-ft
-  > 2-ft
-  Creeks
-  Lakes
-  City Boundary















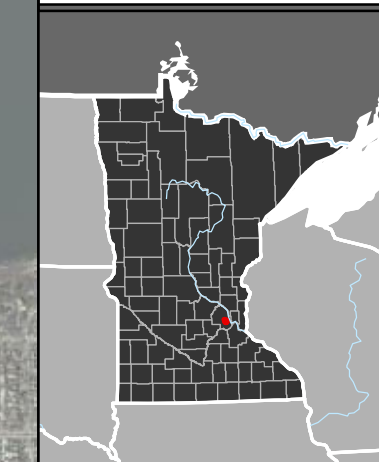
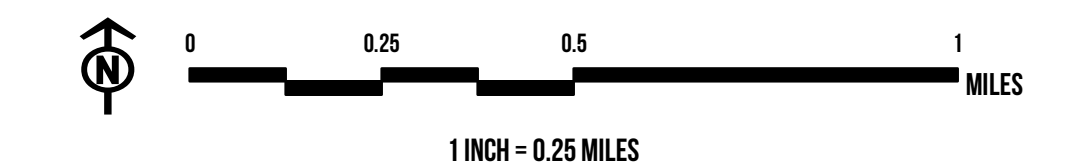
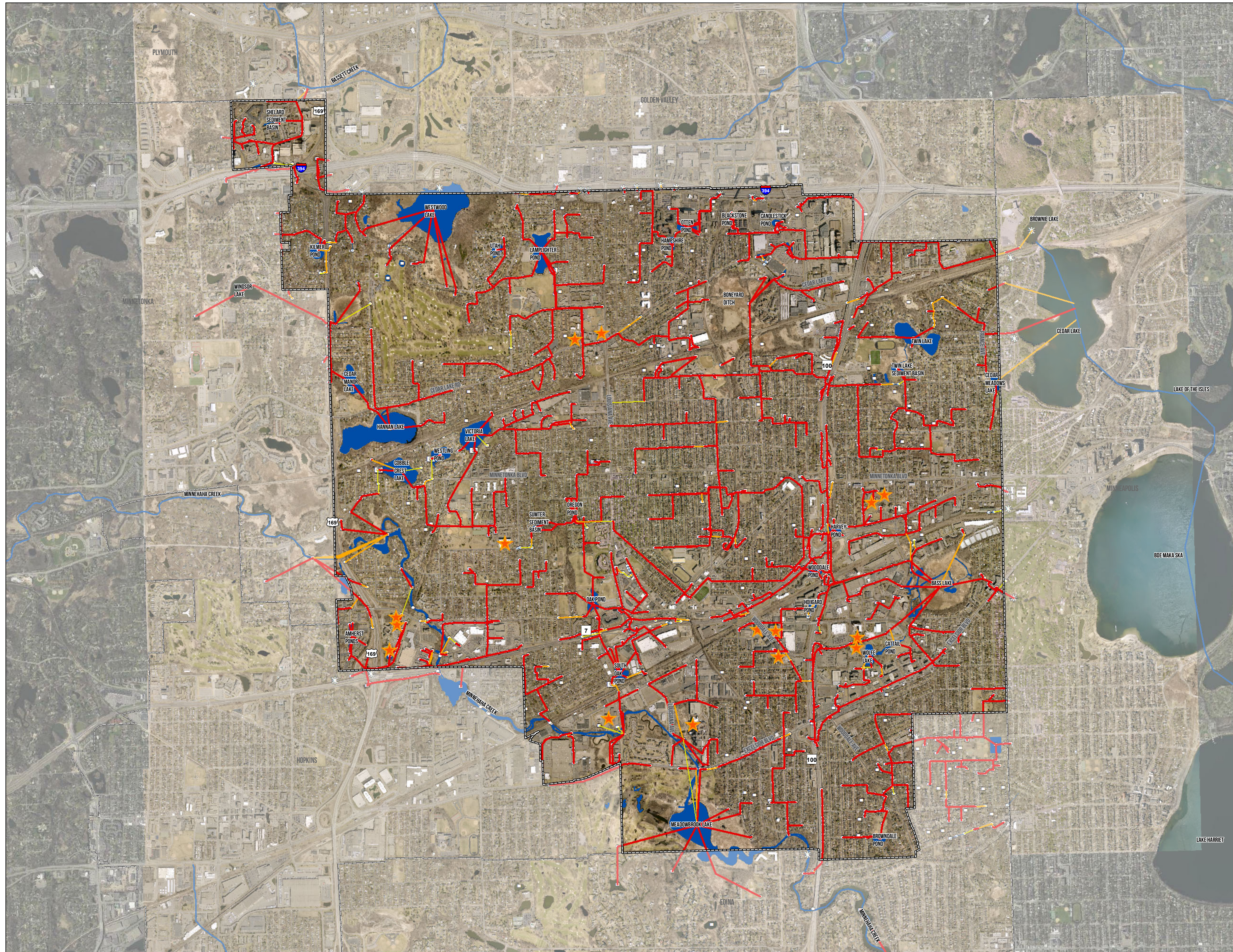
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| Scale: As Shown |
| Drawn By: KAT |
| Checked By: |
| Proj. #: 03259 |
| Date: 2018.11.08 |



**FIGURE A-9: NOAA TP-40
10-YEAR 24-HOUR SYSTEM CAPACITY**

LEGEND

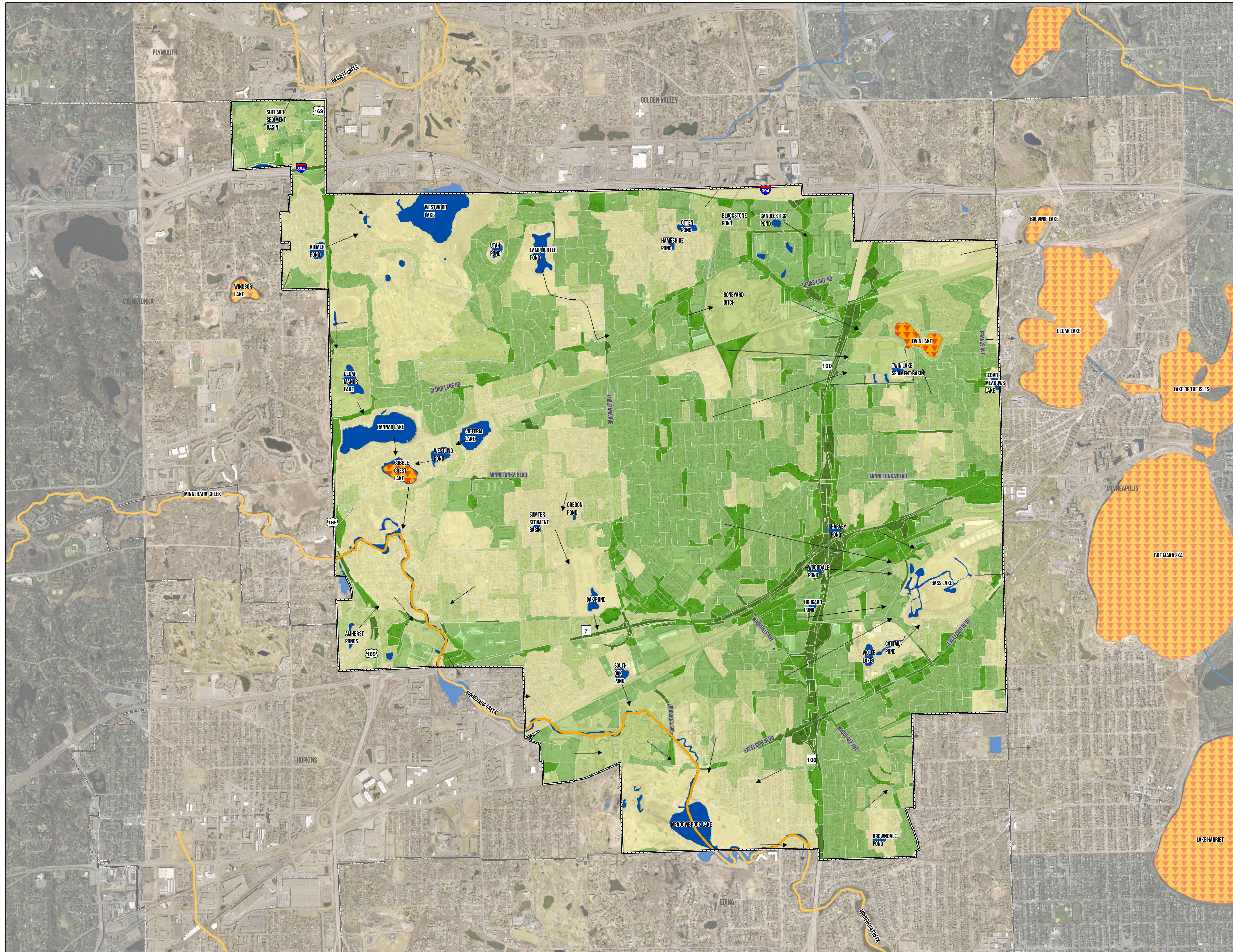
-  Critical Infrastructure
- Modeled Conduit Percent Full**
-  0% - 25%
-  26% - 50%
-  51% - 75%
-  76% - 100%
-  Modeled Junctions
-  Modeled Storage Nodes
-  Stormwater Lift Stations
-  Model Outfalls
-  Creeks
-  Lakes
-  City Boundary



Scale: As Shown
 Drawn By: KAT
 Checked By:
 Proj. #: 03259
 Date: 2018.11.08

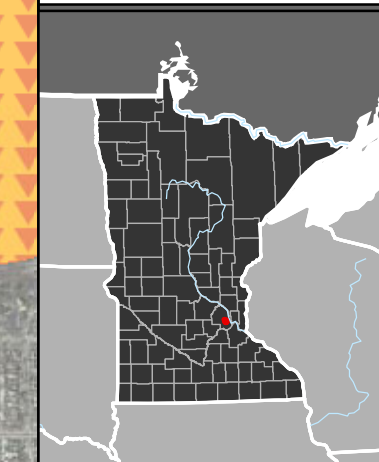


**FIGURE A-10: TOTAL PHOSPHORUS
MASS LOADING**



LEGEND

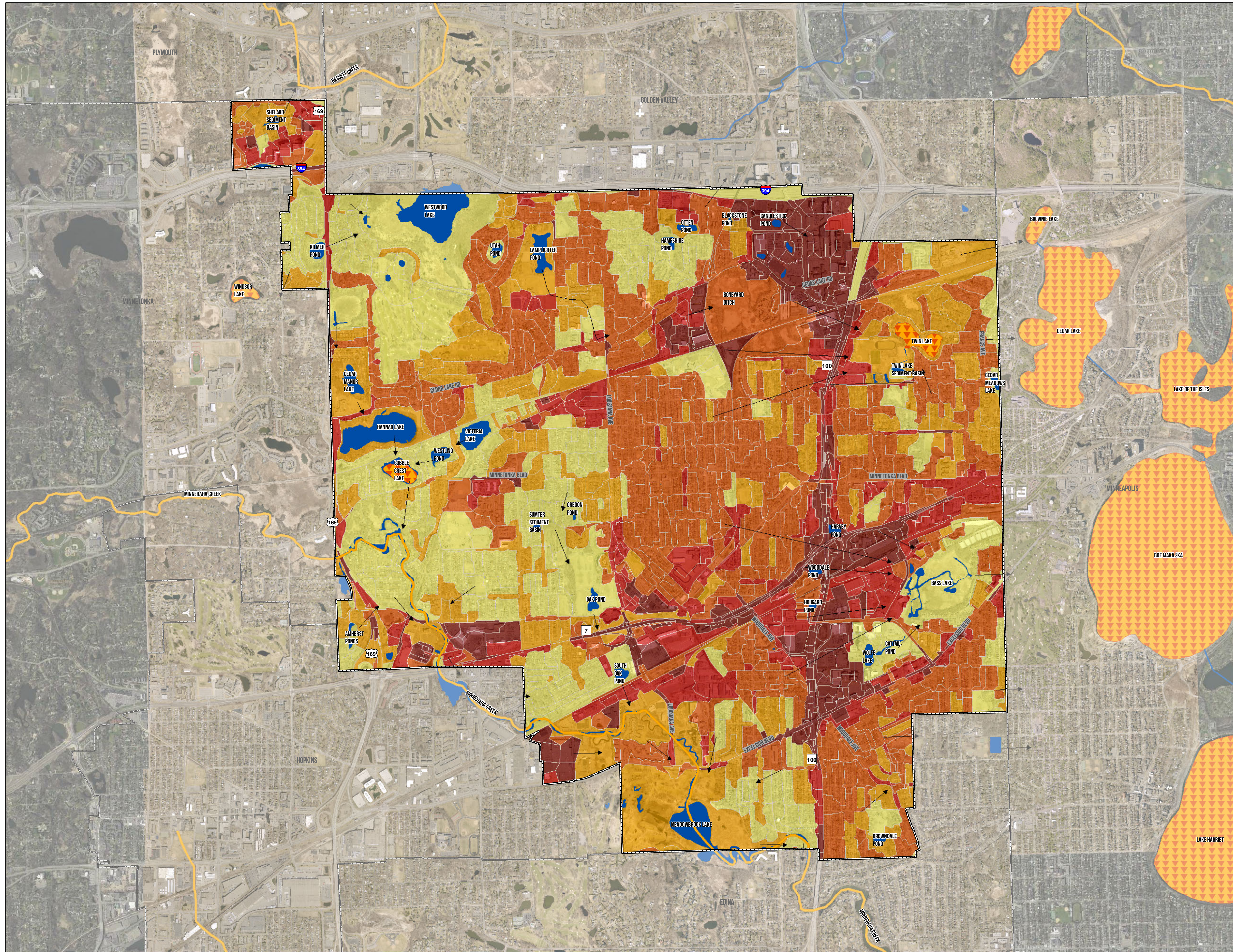
- Flow Arrows
- Impaired Streams
- ▨ Impaired Lakes
- Annual Loading (lb/ac/yr)
- 0.00 - 0.78
- 0.79 - 1.43
- 1.44 - 1.99
- 2.00 - 2.76
- 2.77 - 3.50
- Creeks
- Lakes
- ▭ City Boundary



Scale: As Shown
 Drawn By: KAT
 Checked By:
 Proj. #: 03259
 Date: 2018.11.08

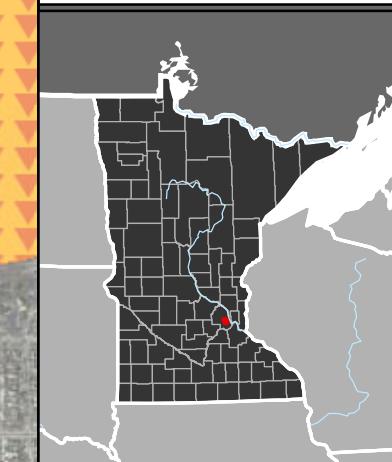


**FIGURE A-11: TOTAL SUSPENDED SOLIDS
MASS LOADING**



LEGEND

- Flow Arrows
- Impaired Streams
- ▨ Impaired Lakes
- Annual Loading (lb/ac/yr)
- 0 - 236
- 237 - 439
- 440 - 640
- 641 - 869
- 870 - 1,213
- Creeks
- Lakes
- ▭ City Boundary



Scale: As Shown
 Drawn By: KAT
 Checked By:
 Proj. #: 03259
 Date: 2018.11.08





APPENDIX B

LAKE RESULTS



APPENDIX B: MODELED LAKE RESULTS

For all of the tables in this appendix, the Lowest Adjacent Grade was determined from the nearest light and detection ranging (LiDAR) contour to the lowest primary residential structure.

B.1 BASS LAKE MODEL LAKE RESULTS

Table B-1. Bass Lake Modeled Water Surface Elevations

| | TP-40 Results (NVGD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 876.58 | 877.08 | +0.5 |
| 100-year, 24-hour Water Surface Elevation | 878.51 | 879.85 | +1.34 |
| Lowest Adjacent Grade | 877.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 0.42 | -0.08 | -0.5 |
| Minimum Freeboard (100-year, 24-hour) | -1.51 | -2.85 | -1.34 |

ft = feet.

Table B-2. Cattail Pond Modeled Water Surface Elevations

| | TP-40 Results (NVGD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 877.58 | 877.66 | +0.08 |
| 100-year, 24-hour Water Surface Elevation | 878.48 | 879.8 | +1.32 |
| Lowest Adjacent Grade | 880.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 2.42 | 2.34 | -0.08 |
| Minimum Freeboard (100-year, 24-hour) | 1.52 | 0.20 | -1.32 |

Table B-3. Harvey Pond Modeled Water Surface Elevations

| | TP-40 Results (NVGD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 881.6 | 881.75 | +0.15 |
| 100-year, 24-hour Water Surface Elevation | 882.16 | 883.15 | +0.99 |
| Lowest Adjacent Grade | 886.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 4.40 | 4.25 | -0.15 |
| Minimum Freeboard (100-year, 24-hour) | 3.84 | 2.85 | -0.99 |

Table B-4. Hoiigaard Pond

| | TP-40 Results (NVD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 887.01 | 887.07 | +0.06 |
| 100-year, 24-hour Water Surface Elevation | 887.31 | 887.7 | +0.39 |
| Lowest Adjacent Grade | 898.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 10.99 | 10.93 | -0.06 |
| Minimum Freeboard (100-year, 24-hour) | 10.69 | 10.30 | -0.39 |

Table B-5. Roxbury Pond Modeled Water Surface Elevations

| | TP-40 Results (NVD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 898.24 | 898.55 | +0.31 |
| 100-year, 24-hour Water Surface Elevation | 899.4 | 902.53 | +3.13 |
| Lowest Adjacent Grade | 904.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 5.76 | 5.45 | -0.31 |
| Minimum Freeboard (100-year, 24-hour) | 4.60 | 1.47 | -3.13 |

Table B-6. Wolfe Lake Modeled Water Surface Elevations

| | TP-40 Results (NVD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 876.63 | 877.05 | +0.42 |
| 100-year, 24-hour Water Surface Elevation | 878.48 | 879.8 | +1.32 |
| Lowest Adjacent Grade | 880.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 3.37 | 2.95 | -0.42 |
| Minimum Freeboard (100-year, 24-hour) | 1.52 | 0.20 | -1.32 |

Table B-7. Wooddale Pond Modeled Water Surface Elevations

| | TP-40 Results (NVD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 880.9 | 881.18 | +0.28 |
| 100-year, 24-hour Water Surface Elevation | 881.84 | 882.77 | +0.93 |
| Lowest Adjacent Grade | 889.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 8.10 | 7.82 | -0.28 |
| Minimum Freeboard (100-year, 24-hour) | 7.16 | 6.23 | -0.93 |

B.2 EDINA MODEL LAKE RESULTS

Table B-8. Browndale Pond Modeled Water Surface Elevations

| | TP-40 Results (NVGD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 876.97 | 877.33 | +0.36 |
| 100-year, 24-hour Water Surface Elevation | 877.98 | 879.22 | +1.24 |
| Lowest Adjacent Grade | 878.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 1.03 | 0.67 | -0.36 |
| Minimum Freeboard (100-year, 24-hour) | 0.02 | -1.22 | -1.24 |

B.3 GOLDEN VALLEY MODEL LAKE RESULTS

Table B-9. Otten Pond Modeled Water Surface Elevations

| | TP-40 Results (NVGD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 876.3 | 876.46 | +0.16 |
| 100-year, 24-hour Water Surface Elevation | 877.12 | 878.37 | +1.25 |
| Lowest Adjacent Grade | 877.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 0.70 | 0.54 | -0.16 |
| Minimum Freeboard (100-year, 24-hour) | -0.12 | -1.37 | -1.25 |

B.4 HANNAN LAKE MODEL LAKE RESULTS

Table B-10. Cedar Manor Lake Modeled Water Surface Elevations

| | TP-40 Results (NVGD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 898.7 | 899.09 | +0.39 |
| 100-year, 24-hour Water Surface Elevation | 899.62 | 900.27 | +0.65 |
| Lowest Adjacent Grade | 902.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 3.30 | 2.91 | -0.39 |
| Minimum Freeboard (100-year, 24-hour) | 2.38 | 1.73 | -0.65 |

Table B-11. Hannan Lake Modeled Water Surface Elevations

| | TP-40 Results (NVGD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 898.02 | 898.24 | +0.22 |
| 100-year, 24-hour Water Surface Elevation | 898.81 | 899.58 | +0.77 |
| Lowest Adjacent Grade | 907.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 8.98 | 8.76 | -0.22 |
| Minimum Freeboard (100-year, 24-hour) | 8.19 | 7.42 | -0.77 |

B.5 MINNEAPOLIS MODEL LAKE RESULTS

Table B-12. Blackstone Pond Modeled Water Surface Elevations

| | TP-40 Results (NVGD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 878.15 | 878.79 | +0.64 |
| 100-year, 24-hour Water Surface Elevation | 879.99 | 881.35 | +1.36 |
| Lowest Adjacent Grade | 882.82 | | |
| Minimum Freeboard (10-year, 24-hour) | 4.67 | 4.03 | -0.64 |
| Minimum Freeboard (100-year, 24-hour) | 2.83 | 1.47 | -1.36 |

Table B-13. Candlestick Pond Modeled Water Surface Elevations

| | TP-40 Results (NVGD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 876.22 | 876.92 | +0.7 |
| 100-year, 24-hour Water Surface Elevation | 879.02 | 880.33 | +1.31 |
| Lowest Adjacent Grade | 879.82 | | |
| Minimum Freeboard (10-year, 24-hour) | 3.60 | 2.90 | -0.70 |
| Minimum Freeboard (100-year, 24-hour) | 0.80 | -0.51 | -1.31 |

B.6 MINNEHAHA CREEK MODEL LAKE RESULTS

Table B-14. Amhurst Ponds Modeled Water Surface Elevations

| | TP-40 Results (NVGD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 918.52 | 918.77 | +0.25 |
| 100-year, 24-hour Water Surface Elevation | 919.25 | 919.83 | +0.58 |
| Lowest Adjacent Grade | 920.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 1.48 | 1.23 | -0.25 |
| Minimum Freeboard (100-year, 24-hour) | 0.75 | 0.17 | -0.58 |

Table B-15. Cobblecrest Lake Modeled Water Surface Elevations

| | TP-40 Results (NVGD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 894.33 | 894.77 | +0.44 |
| 100-year, 24-hour Water Surface Elevation | 895.89 | 897.63 | +1.74 |
| Lowest Adjacent Grade | 907.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 12.67 | 12.23 | -0.44 |
| Minimum Freeboard (100-year, 24-hour) | 11.11 | 9.37 | -1.74 |

Table B-16. Oak Pond Modeled Water Surface Elevations

| | TP-40 Results (NVGD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 891.3 | 891.58 | +0.28 |
| 100-year, 24-hour Water Surface Elevation | 892.22 | 893.14 | +0.92 |
| Lowest Adjacent Grade | 892.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 0.70 | 0.42 | -0.28 |
| Minimum Freeboard (100-year, 24-hour) | -0.22 | -1.14 | -0.92 |

Table B-17. Oregon Pond Modeled Water Surface Elevations

| | TP-40 Results (NVGD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 894.13 | 894.69 | +0.56 |
| 100-year, 24-hour Water Surface Elevation | 895.34 | 896.65 | +1.31 |
| Lowest Adjacent Grade | 894.00 | | |
| Minimum Freeboard (10-year, 24-hour) | -0.13 | -0.69 | -0.56 |
| Minimum Freeboard (100-year, 24-hour) | -1.34 | -2.65 | -1.31 |

Table B-18. Rhino Pond Modeled Water Surface Elevations

| | TP-40 Results (NVGD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 914.06 | 914.43 | +0.37 |
| 100-year, 24-hour Water Surface Elevation | 914.77 | 915.39 | +0.62 |
| Lowest Adjacent Grade | 915.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 0.94 | 0.57 | -0.37 |
| Minimum Freeboard (100-year, 24-hour) | 0.23 | -0.39 | -0.62 |

Table B-19. South Oak Pond Modeled Water Surface Elevations

| | TP-40 Results (NVGD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 891.3 | 891.54 | +0.24 |
| 100-year, 24-hour Water Surface Elevation | 892.18 | 892.76 | +0.58 |
| Lowest Adjacent Grade | 890.00 | | |
| Minimum Freeboard (10-year, 24-hour) | -1.30 | -1.54 | -0.24 |
| Minimum Freeboard (100-year, 24-hour) | -2.18 | -2.76 | -0.58 |

Table B-20. Sumter Pond Modeled Water Surface Elevations

| | TP-40 Results (NVGD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 893.84 | 894.53 | +0.69 |
| 100-year, 24-hour Water Surface Elevation | 895.32 | 897.32 | +2.00 |
| Lowest Adjacent Grade | 896.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 2.16 | 1.47 | -0.69 |
| Minimum Freeboard (100-year, 24-hour) | 0.68 | -1.32 | -2.00 |

Table B-21. Victoria Lake Modeled Water Surface Elevations

| | TP-40 Results (NVD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 901.1 | 901.48 | +0.38 |
| 100-year, 24-hour Water Surface Elevation | 902.47 | 903.77 | +1.3 |
| Lowest Adjacent Grade | 905.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 3.90 | 3.52 | -0.38 |
| Minimum Freeboard (100-year, 24-hour) | 2.53 | 1.23 | -1.3 |

Table B-22. Westling Pond Modeled Water Surface Elevations

| | TP-40 Results (NVD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 898.64 | 898.78 | +0.14 |
| 100-year, 24-hour Water Surface Elevation | 899.02 | 899.57 | +0.55 |
| Lowest Adjacent Grade | 900.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 1.36 | 1.22 | -0.14 |
| Minimum Freeboard (100-year, 24-hour) | 0.98 | 0.43 | -0.55 |

B.7 TWIN LAKE MODEL LAKE RESULTS

Table B-23. Boneyard Ditch Modeled Water Surface Elevations

| | TP-40 Results (NVD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 881.28 | 881.5 | +0.22 |
| 100-year, 24-hour Water Surface Elevation | 882.09 | 882.85 | +0.76 |
| Lowest Adjacent Grade | 887.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 5.72 | 5.50 | -0.22 |
| Minimum Freeboard (100-year, 24-hour) | 4.91 | 4.15 | -0.76 |

Table B-24. Lamplighter Pond Modeled Water Surface Elevations

| | TP-40 Results (NVD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 883.73 | 884.4 | +0.67 |
| 100-year, 24-hour Water Surface Elevation | 885.57 | 886.77 | +1.2 |
| Lowest Adjacent Grade | 886.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 2.27 | 1.60 | -0.67 |
| Minimum Freeboard (100-year, 24-hour) | 0.43 | -0.77 | -1.2 |

Table B-25. Natchez Pond Modeled Water Surface Elevations

| | TP-40 Results (NVGD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 871.8 | 872.03 | +0.23 |
| 100-year, 24-hour Water Surface Elevation | 871.14 | 874.44 | +1.3 |
| Lowest Adjacent Grade | 873.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 1.20 | 0.97 | -0.23 |
| Minimum Freeboard (100-year, 24-hour) | -0.14 | -1.44 | -1.3 |

Table B-26. Twin Lake Modeled Water Surface Elevations

| | TP-40 Results (NVGD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 874.18 | 874.31 | +0.21 |
| 100-year, 24-hour Water Surface Elevation | 874.89 | 875.38 | +0.49 |
| Lowest Adjacent Grade | 877.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 2.90 | 2.69 | -0.21 |
| Minimum Freeboard (100-year, 24-hour) | 2.11 | 1.62 | -0.49 |

Table B-27. Utah Pond Modeled Water Surface Elevations

| | TP-40 Results (NVGD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 915.64 | 915.7 | +0.06 |
| 100-year, 24-hour Water Surface Elevation | 915.81 | 916.04 | +0.23 |
| Lowest Adjacent Grade | 917.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 1.36 | 1.30 | -0.06 |
| Minimum Freeboard (100-year, 24-hour) | 1.19 | 0.96 | -0.23 |

B.8 WESTWOOD LAKE MODEL LAKE RESULTS

Table B-28. Kilmer Pond Modeled Water Surface Elevations

| | TP-40 Results (NGVD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 905.15 | 905.96 | +0.81 |
| 100-year, 24-hour Water Surface Elevation | 907.27 | 909.51 | +2.24 |
| Lowest Adjacent Grade | 909.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 3.85 | 3.04 | -0.81 |
| Minimum Freeboard (100-year, 24-hour) | 1.73 | -0.51 | -2.24 |

Table B-29. Westwood Lake Modeled Water Surface Elevations*

| | TP-40 Results (NGVD29) (ft) | Atlas 14 Results (NGVD29) (ft) | Change (ft) |
|-------------------------------------------|-----------------------------------|--------------------------------------|----------------|
| 10-year, 24-hour Water Surface Elevation | 887.82 | 887.89 | +0.07 |
| 100-year, 24-hour Water Surface Elevation | 888.2 | 888.56 | +0.36 |
| Lowest Adjacent Grade | 889.00 | | |
| Minimum Freeboard (10-year, 24-hour) | 1.18 | 1.11 | -0.07 |
| Minimum Freeboard (100-year, 24-hour) | 0.80 | 0.44 | -0.36 |

Please note, elevations presented in these tables are for information and planning purposes only. Contact Minnehaha Creek Watershed District or Bassett Creek Watershed Management Commission for the regulatory floodplain elevations, as they may be higher than presented in this study. The SWMM modeling assumed clean and as-built conditions in order to evaluate the existing system's capacity and may result in locally lower flood elevations in some areas. For example, sediment build up in the outlet channel of Westwood Lake has been shown to affect the water elevations in the lake. As a result, BCWMC has adopted an elevation of 889.8 NGVD29 for the regulatory 100-year flood elevation of Westwood Lake, due to the outlet channel sedimentation.

DIVISION 11. FLOODPLAIN DISTRICTS

Sec. 36-291. Statutory Authorization. The legislature of the State of Minnesota has, in Minnesota Statutes Chapter 103F and Chapter 462 delegated the responsibility to local government units to adopt regulations designed to minimize flood losses. Therefore, the City Council of St. Louis Park, Minnesota does ordain as follows:

Sec. 36-292. Purpose.

- (a) This ordinance regulates development in the flood hazard areas of St. Louis Park. These flood hazard areas are subject to periodic inundation, which may result in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base. It is the purpose of this ordinance to promote the public health, safety, and general welfare by minimizing these losses and disruptions.
- (b) National Flood Insurance Program Compliance. This ordinance is adopted to comply with the rules and regulations of the National Flood Insurance Program codified as 44 Code of Federal Regulations Parts 59 -78, as amended, so as to maintain the community's eligibility in the National Flood Insurance Program.

(Code 1976, § 14:5-9.1, Ord. No. 2276-04, 8-16-2004, Ord. No. 2509-16, 9-19-16)

Sec. 36-293. General Provisions.

- (a) **How to Use this Ordinance.** This ordinance adopts the floodplain maps applicable to the City of St. Louis Park includes three floodplain districts: Floodway, Flood Fringe, and General Floodplain.
 - (1) Where Floodway and Flood Fringe districts are delineated on the floodplain maps, the standards in Sections 4 or 5 will apply, depending on the location of a property.
 - (2) Locations where Floodway and Flood Fringe districts are not delineated on the floodplain maps are considered to fall within the General Floodplain district. Within the General Floodplain district, the Floodway District standards in Section 36-296 apply unless the floodway boundary is determined, according to the process outlined in Section 36-298. Once the floodway boundary is determined, the Flood Fringe District standards in Section 36-297 may apply outside the floodway.
- (b) **Lands to Which Ordinance Applies.** This ordinance applies to all lands within the jurisdiction of St. Louis Park shown on the Official Zoning Map and/or the attachments to the map as being located within the boundaries of the Floodway, Flood Fringe, or General Floodplain Districts.
 - (1) The Floodway, Flood Fringe and General Floodplain Districts are overlay districts that are superimposed on all existing zoning districts. The standards imposed in the overlay districts are in addition to any other requirements in this ordinance. In case of a conflict, the more restrictive standards will apply.
- (c) **Incorporation of Maps by Reference.** The following maps together with all attached material are hereby adopted by reference and declared to be a part of the Official Zoning Map and this ordinance. The attached material includes the Flood Insurance Study for Hennepin County, Minnesota, and Incorporated Areas, dated November 4, 2016 and the Flood Insurance Rate Map panels enumerated below, dated November 4, 2016, all prepared by the Federal Emergency Management Agency. These materials are on file in the office of the Zoning Administrator.

Effective Flood Insurance Rate Map panels:

| | | | |
|-------------|-------------|-------------|-------------|
| 27053C0331F | 27053C0342F | 27053C0353F | 27053C0362F |
| 27053C0332F | 27053C0351F | 27053C0354F | |
| 27053C0334F | 27053C0352F | 27053C0361F | |

- (d) **Regulatory Flood Protection Elevation.** The regulatory flood protection elevation (RFPE) is an elevation no lower than two feet above the elevation of the regional flood plus any increases in flood elevation caused by encroachments on the floodplain that result from designation of a floodway.
- (e) **Interpretation.** The boundaries of the zoning districts are determined by scaling distances on the Flood Insurance Rate Map.
 - (1) Where a conflict exists between the floodplain limits illustrated on the official zoning map and actual field conditions, the flood elevations shall be the governing factor. The Zoning Administrator must interpret the boundary location based on the ground elevations that existed on the site on the date of the first National Flood Insurance Program map showing the area within the regulatory floodplain, and other available technical data.
 - (2) Persons contesting the location of the district boundaries will be given a reasonable opportunity to present their case to the Board of Zoning Appeals and City Council and to submit technical evidence.
- (f) **Abrogation and Greater Restrictions.** It is not intended by this ordinance to repeal, abrogate, or impair any existing easements, covenants, or other private agreements. However, where this ordinance imposes greater restrictions, the provisions of this ordinance prevail. All other ordinances inconsistent with this ordinance are hereby repealed to the extent of the inconsistency only.
- (g) **Warning and Disclaimer of Liability.** This ordinance does not imply that areas outside the floodplain districts or land uses permitted within such districts will be free from flooding or flood damages. This ordinance does not create liability on the part of the City of St. Louis Park or its officers or employees for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made hereunder.
- (h) **No stage increase permitted.** No structure, fill, deposit, obstruction or storage of materials or equipment shall be allowed in any floodway, or general floodplain district which will cause any increase in the stage of the 100-year flood or will cause an increase in flood damages in the reaches affected.
- (i) **Compensating storage.** The city may approve such structure, fill, deposit, obstruction or storage of materials or equipment if it otherwise complies with the provisions of this chapter and provision is made for compensating storage of floodwaters displaced by the activity listed in this subsection (f). Such compensating storage shall be located where it will achieve the goal of eliminating a stage increase.
(Ord. No. 2496-16, 8-1-16; Ord. No. 2509-16, 9-19-16)

Sec. 36-294. Definitions.

Unless specifically defined below, words or phrases used in this ordinance must be interpreted according to common usage and so as to give this ordinance its most reasonable application. If any of the words defined are used elsewhere in this chapter, their meaning shall be those assigned by section 36-4.

Base Flood Elevation means the elevation of the “regional flood.” The term “base flood elevation” is used in the flood insurance survey.

Basement means any area of a structure, including crawl spaces, having its floor or base subgrade (below ground level) on all four sides, regardless of the depth of excavation below ground level.

Equal degree of encroachment means a method of determining the location of floodway boundaries so that floodplain lands on both sides of a stream are capable of conveying a proportionate share of flood flows.

Flood means a temporary increase in the flow or stage of a stream or in the stage of a wetland or lake that results in the inundation of normally dry areas.

Flood frequency means the frequency for which it is expected that a specific flood stage or discharge may be equaled or exceeded.

Flood fringe means the portion of the Special Flood Hazard Area (one percent annual chance flood) located outside of the floodway. Flood fringe is synonymous with the term “floodway fringe” used in the Flood Insurance Study for Hennepin County, Minnesota.

Flood Insurance Rate Map (FIRM) means an official map of a community, on which the Administrator has delineated both the special hazard areas and the risk premium zones applicable to the community.

Flood Prone Area means any land susceptible to being inundated by water from any source (see “Flood”).

Floodplain means the beds proper and the areas adjoining a wetland, lake or watercourse which have been or hereafter may be covered by the regional flood.

Flood proofing means a combination of structural provisions, changes or adjustments to properties and structures subject to flooding, primarily for the reduction or elimination of flood damages.

Floodway means the bed of a wetland or lake and the channel of a watercourse and those portions of the adjoining floodplain which are reasonably required to carry or store the regional flood discharge.

Lowest Floor means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, used solely for parking of vehicles, building access, or storage in an area other than a basement area, is not considered a building’s lowest floor; provided, that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of 44 Code of Federal Regulations, Part 60.3.

New Construction means structures, including additions and improvements, and placement of manufactured homes, for which the start of construction commenced on or after the effective date of this ordinance.

Obstruction means any dam, wall, wharf, embankment, levee, dike, pile, abutment, projection, excavation, channel modification, culvert, building, wire, fence, stockpile, refuse, fill, structure or matter in, along, across or projecting into any channel, watercourse or regulatory floodplain which may impede, retard or change the direction of the flow of water, either in itself or by catching or collecting debris carried by such water.

One Hundred Year Floodplain means lands inundated by the “Regional Flood” (see definition).

Reach means a hydraulic engineering term to describe a longitudinal segment of a stream or river influenced by a natural or man-made obstruction. In an urban area, the segment of a stream or river between two consecutive bridge crossings would most typically constitute a reach.

Regional flood means a flood which is representative of large floods known to have occurred generally in Minnesota and reasonably characteristic of what can be expected to occur on an average frequency in the magnitude of the 1% chance or 100-year recurrence interval. Regional flood is synonymous with the term "base flood" used in a flood insurance study.

Regulatory Flood Protection Elevation (RFPE) means an elevation not less than two feet above the elevation of the regional flood plus any increases in flood elevation caused by encroachments on the floodplain that result from designation of a floodway.

Repetitive Loss means flood related damages sustained by a structure on two separate occasions during a ten year period for which the cost of repairs at the time of each such flood event on the average equals or exceeds 25% of the market value of the structure before the damage occurred.

Special Flood Hazard Area means a term used for flood insurance purposes synonymous with "One Hundred Year Floodplain."

Start of Construction means includes substantial improvement, and means the actual start of construction, repair, reconstruction, rehabilitation, addition, placement or other improvement that occurred before the permit's expiration date. The actual start is either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, foundations, or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

Structure means anything constructed or erected on the ground or attached to the ground or on-site utilities, including, but not limited to, buildings, factories, sheds, detached garages, cabins, manufactured homes, recreational vehicles not meeting the exemption criteria specified in Section 36-295(b)(1) of this ordinance and other similar items.

Substantial Damage means damage of any origin sustained by a structure where the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

Substantial Improvement means within any consecutive 365-day period, any reconstruction, rehabilitation (including normal maintenance and repair), repair after damage, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures that have incurred "substantial damage," regardless of the actual repair work performed. The term does not, however, include either:

- (1) Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions.
- (2) Any alteration of a "historic structure," provided that the alteration will not preclude the structure's continued designation as a "historic structure." For the purpose of this ordinance, "historic structure" is as defined in 44 Code of Federal Regulations, Part 59.1.

(Code 1976, § 14:5-9.3, Ord. No. 2276-04, 8-16-2004, Ord. No. 2509-16, 9-19-16)

Cross reference(s) -- Definitions generally, § 1-2.

Sec. 36-295. Establishment of zoning districts.**(a) Districts.**

(1) *Floodway district (FW)*. The Floodway District includes those areas within Zones AE that have a floodway delineated as shown on the Flood Insurance Rate Map adopted in Section 36-293(c). For lakes, wetlands and other basins within Zones AE that do not have a floodway delineated, the Floodway District also includes those areas that are at or below the ordinary high water level as defined in Minnesota Statutes, Section 103G.005, subdivision 14.

(2) *Flood fringe district (FF)*. The Flood Fringe District includes areas within Zones AE that have a floodway delineated on the Flood Insurance Rate Map adopted in Section 36-293(c), but are located outside of the floodway. For lakes, wetlands and other basins within Zones AE that do not have a floodway delineated, the Flood Fringe District also includes those areas below the 1% annual chance (100-year) flood elevation but above the ordinary high water level as defined in Minnesota Statutes, Section 103G.005, subdivision 14.

(3) *General floodplain district (FP)*. The General Floodplain District includes those areas within Zones A and AH that do not have a delineated floodway as shown on the Flood Insurance Rate Map adopted in Section 36-293(c).

(b) Applicability. Within the floodplain districts established in this ordinance, the use, size, type and location of development must comply with the terms of this ordinance and other applicable regulations. In no cases shall floodplain development adversely affect the efficiency or unduly restrict the capacity of the channels or floodways of any tributaries to the main stream, drainage ditches, or any other drainage facilities or systems.

(c) Compliance. Provisions for compliance are as follows:

(1) Recreational vehicles that do not meet the exemption criteria specified in Section 36-295(c)(1)a below shall be subject to the provisions of this Ordinance and as specifically spelled out in Sections 36-295(c)(1)c below.

a. Exemption - Recreational vehicles are exempt from the provisions of this Ordinance if they are placed in any of the areas listed in Section 36-295(c)(1)b below and further they meet the following criteria:

1. Have current licenses required for highway use.
2. Are highway ready meaning on wheels or the internal jacking system, are attached to the site only by quick disconnect type utilities commonly used in campgrounds and recreational vehicle parks and the recreational vehicle has no permanent structural type additions attached to it.
3. The recreational vehicle and associated use must be permissible in any preexisting, underlying zoning use district.

b. Areas Exempted For Placement of Recreational Vehicles:

1. Individual lots or parcels of record.
2. Existing commercial recreational vehicle parks or campgrounds.
3. Existing condominium type associations.

c. Recreational vehicles exempted in Section 36-295(c)(1)b lose this exemption when development occurs on the parcel exceeding \$500 for a structural addition to the recreational vehicle or exceeding \$500 for an accessory structure such as a garage or storage building. The recreational vehicle and all additions and accessory structures will then be treated as a new structure and shall be subject to the elevation/flood proofing requirements and the use of land restrictions specified in Section 36-295(c) & Section 36-295(d) of this Ordinance. There shall be no development or

improvement on the parcel or attachment to the recreational vehicle that hinders the removal of the recreational vehicle to a flood free location should flooding occur.

- (2) Modifications, additions, structural alterations normal maintenance and repair, or repair after damage to existing nonconforming structures and nonconforming uses of structures or land are regulated by the general provisions of this chapter.

(Ord. No. 2276-04, 8-16-04; Ord. No. 2509-16, 9-19-16)

- (d) **Annexations.** The Flood Insurance Rate Map panels adopted by reference into Section 36-293(c) above may include floodplain areas that lie outside of the corporate boundaries of the City of St. Louis Park at the time of adoption of this ordinance. If any of these floodplain land areas are annexed into the City of St. Louis Park after the date of adoption of this ordinance, the newly annexed floodplain lands will be subject to the provisions of this ordinance immediately upon the date of annexation.

(Ord. No. 2509-16, 9-9-16)

Sec. 36-296. Floodway district (FW). Within the floodway district, all uses not listed as permitted uses or conditional uses shall be prohibited. No new structure or land shall hereafter be used and no structure shall be located, extended, converted or structurally altered without full compliance with the terms of this chapter and other applicable regulations which apply to uses within the jurisdiction of this chapter.

- (a) **Permitted uses.** The following uses, subject to the standards set forth in Section 36-296(b), are permitted uses if otherwise allowed in the underlying zoning district or any applicable overlay district:

- (1) Outdoor plant nurseries, horticulture, forestry, sod farming, and wild crop harvesting.
- (2) Industrial-commercial loading areas, and parking areas.
- (3) Open space uses and public golf courses, tennis courts, driving ranges, archery ranges, picnic grounds, boat launching ramps, swimming areas, parks, wildlife and nature preserves, fish hatcheries, fishing areas, and single or multiple purpose recreational trails.
- (4) Residential lawns, gardens, parking areas, and play areas.
- (5) Railroads, streets, bridges, utility transmission lines and pipelines, provided that the Department of Natural Resources' Area Hydrologist is notified at least ten days prior to issuance of any permit.

- (b) **Standards for Floodway Permitted Uses.**

- (1) The use shall have a low flood damage potential.
- (2) The use shall be permissible in the underlying zoning district.
- (3) The use shall not obstruct flood flows or increase flood elevations and must not involve structures, obstructions, or storage of materials or equipment.
- (4) Any facility that will be used by employees or the general public must be designed with a flood warning system that provides adequate time for evacuation if the area is inundated to a depth and velocity such that the depth (in feet) multiplied by the velocity (in feet per second) would exceed a product of four upon occurrence of the regional (1% chance) flood.

- (c) **Conditional Uses.** The following uses shall require a conditional use permit following the standards and procedures set forth in Section 36-301(c) of this ordinance and further subject to the standards set forth in Section 36-296(d), if otherwise allowed in the underlying zoning district or any applicable overlay district.

- (1) Structures and parking lots accessory to the uses listed in Section 36-296(a)(1) - Section 36-296(a)(3), above and the uses listed in Section 36-296(c)(2) - Section 36-296(c)(3) below.
 - (2) Docks, piers, wharves, and water control structures.
 - (3) Placement of fill or construction of fences that obstruct flood flows.
 - (4) Structural works for flood control such as levees, dikes and floodwalls, constructed to any height where the intent is to protect individual structures for a frequency flood event equal to or less than the 10-year frequency flood event.
- (d) Standards for Floodway Conditional Uses.** The standards for floodway conditional uses are as follows:
- (1) All Uses. A conditional use must not cause any increase in the state of the 1% chance or regional flood or cause an increase in flood damages in the reach or reaches affected.
 - (2) The conditional use shall be permissible in the underlying zoning district.
 - (3) Fill; Storage of Materials and Equipment:
 - a. The storage or processing of materials that are, in time of flooding, flammable, explosive, or potentially injurious to human, animal, or plant life is prohibited.
 - b. Fill, dredge spoil, and other similar materials deposited or stored in the floodplain must be protected from erosion by vegetative cover, mulching, riprap or other acceptable method. Permanent sand and gravel operations and similar uses must be covered by a long-term site development plan.
 - c. Temporary placement of fill, other materials, or equipment which would cause an increase to the stage of the 1% percent chance or regional flood may only be allowed if the City Council has approved a plan that assures removal of the materials from the floodway based upon the flood warning time available.
 - (4) *Accessory Structures.* Accessory structures, as identified in Section 36-296(c)(1), may be permitted, provided that:
 - a. Structures are not intended for human habitation;
 - b. Structures will have a low flood damage potential;
 - c. Structures will be constructed and placed so as to offer a minimal obstruction to the flow of flood waters;
 - d. Service utilities, such as electrical and heating equipment, within these structures must be elevated to or above the regulatory flood protection elevation or properly floodproofed;
 - e. Structures must be elevated on fill or structurally dry floodproofed in accordance with the FP1 or FP2 floodproofing classifications in the State Building Code. All floodproofed structures must be adequately anchored to prevent flotation, collapse or lateral movement and designed to equalize hydrostatic flood forces on exterior walls.
 - f. As an alternative, an accessory structure may be internally/wet floodproofed to the FP3 or FP4 floodproofing classifications in the State Building Code, provided the accessory structure constitutes a minimal investment and does not exceed 576 square feet in size. Designs for meeting this requirement must either be certified by a registered professional engineer or meet or exceed the following criteria:

1. To allow for the equalization of hydrostatic pressure, there must be a minimum of two “automatic” openings in the outside walls of the structure, with a total net area of not less than one square inch for every square foot of enclosed area subject to flooding; and
 2. There must be openings on at least two sides of the structure and the bottom of all openings must be no higher than one foot above the lowest adjacent grade to the structure. Using human intervention to open a garage door prior to flooding will not satisfy this requirement for automatic openings.4.44. Structural works for flood control that will change the course, current or cross section of protected wetlands or public waters are subject to the provisions of Minnesota Statutes, Section 103G.245.
- (5) A levee, dike or floodwall constructed in the floodway must not cause an increase to the 1% chance or regional flood. The technical analysis must assume equal conveyance or storage loss on both sides of a stream.
- (6) Floodway developments must not adversely affect the hydraulic capacity of the channel and adjoining floodplain of any tributary watercourse or drainage system.

(Ord. No. 2509-16, 9-19-16)

Sec. 36-297. Flood fringe district (FF).

(a) Permitted Uses. Permitted uses are those uses of land or structures allowed in the underlying zoning district(s) that comply with the standards in Section 36-297(b).

(b) Standards for Flood Fringe Permitted Uses.

- (1) All structures, including accessory structures, must be elevated on fill so that the lowest floor including basement floor, is at or above the regulatory flood protection elevation. The finished fill elevation for structures shall be no lower than the regulatory flood protection elevation and the fill shall extend at such elevation at least 15 feet beyond the outside limits of the structure erected thereon.
- (2) For all structures constructed after June 15, 1998, the lowest floor elevations shall be no lower than the regulatory flood protection elevation. For all structures existing on June 15, 1998, and additions to structures existing on June 15, 1998, the lowest floor shall be no lower than one foot below the regulatory flood protection elevation.
- (3) *Accessory Structures.* As an alternative to the fill requirements of Section 36-297(b)(1), structures accessory to the uses identified in Section 36-297(a) may be permitted to be internally/wet floodproofed to the FP3 or FP4 floodproofing classifications in the State Building Code, provided that:
 - a. The accessory structure constitutes a minimal investment, does not exceed 576 square feet in size, and is only used for parking and storage.
 - b. All portions of floodproofed accessory structures below the Regulatory Flood Protection Elevation must be:
 1. Adequately anchored to prevent flotation, collapse or lateral movement and designed to equalize hydrostatic flood forces on exterior walls, and
 2. Constructed with materials resistant to flood damage, and
 3. Must have all service utilities be water-tight or elevated to above the regulatory flood protection elevation.
 - c. Designs for meeting this requirement must either be certified by a registered professional engineer or meet or exceed the following criteria:

1. To allow for the equalization of hydrostatic pressure, there must be a minimum of two “automatic” openings in the outside walls of the structure, with a total net area of not less than one square inch for every square foot of enclosed area subject to flooding; and
 2. There must be openings on at least two sides of the structure and the bottom of all openings must be no higher than one foot above the lowest adjacent grade to the structure. Using human intervention to open a garage door prior to flooding will not satisfy this requirement for automatic openings.
- (4) The cumulative placement of fill or similar material on a parcel must not exceed 400 cubic yards, unless the fill is specifically intended to elevate a structure in accordance with Section 36-297(b)(1) of this ordinance, or if allowed as a conditional use under Section 36-297(c)(3) below.
 - (5) The storage of any materials or equipment must be elevated on fill to the regulatory flood protection elevation.
 - (6) All service utilities, including ductwork, must be elevated or water-tight to prevent infiltration of floodwaters.
 - (7) The storage or processing of materials that are, in time of flooding, flammable, explosive, or potentially injurious to human, animal, or plant life is prohibited.
 - (8) Compacted fill; protected slopes. Fill shall be properly compacted and the slopes shall be properly protected by the use of rip rap, vegetative cover or other acceptable methods. The Federal Emergency Management Agency (FEMA) has established criteria for removing the special flood hazard area designation for certain structures properly elevated on fill above the 100-year flood elevation. FEMA's requirements incorporate specific fill compaction and side slope protection standards for multistructure or multilot developments. These standards should be investigated prior to the initiation of site preparation if a change of special flood hazard area designation will be requested.
 - (9) Vehicular access. All new principal structures must have vehicular access at or above an elevation not more than two feet below the regulatory flood protection elevation.
 - (10) Commercial uses. Accessory uses such as yards, railroad tracks, and parking lots may be at an elevation lower than the regulatory flood protection elevation. However, any facilities used by employees or the general public must be designed with a flood warning system that provides adequate time for evacuation if the area is inundated to a depth and velocity such that the depth (in feet) multiplied by the velocity (in feet per second) would exceed a product of four upon occurrence of the regional (1% chance) flood.
 - (11) Hydraulic capacity. Floodplain developments shall not adversely affect the hydraulic capacity of the channel and adjoining floodplain of any tributary watercourse or drainage system where a floodway or other encroachment limit has not been specified on the official zoning map.
 - (12) Manufacturing and industrial uses. Certain accessory land uses such as yards and parking lots may be at lower elevations subject to requirements set out in subsection (b)(10) of this section. In considering permit applications, consideration shall be given to needs of an industry whose business requires that it be located in floodplain areas.
 - (13) Anchoring. All manufactured homes must be securely anchored to an adequately anchored foundation system that resists flotation, collapse and lateral movement. Methods of anchoring may include, but are not limited to, use of over-the-top or frame ties to ground anchors. This requirement is in addition to applicable state or local anchoring requirements for resisting wind forces.

(c) **Conditional Uses.** The following uses and activities may be allowed as conditional uses, if allowed in the underlying zoning district(s) or any applicable overlay district, following the procedures in Section 36-301(c) of this ordinance.

- (1) Any structure that is not elevated on fill or floodproofed in accordance with Section 36-297(b)(1) and Section 36-297(b)(3) of this ordinance.
- (2) Storage of any material or equipment below the regulatory flood protection elevation.
- (3) The cumulative placement of more than 400 cubic yards of fill when the fill is not being used to elevate a structure in accordance with Section 36-297(b)(1) of this ordinance.
- (4) The use of methods to elevate structures above the regulatory flood protection elevation, including stilts, pilings, parallel walls, or above-grade, enclosed areas such as crawl spaces or tuck under garages, shall meet the standards in Section 36-297(d)(6).

(d) **Standards for Flood Fringe Conditional Uses.**

- (1) The standards listed in Section 36-297(b)(5) through Section 36-297(b)(13) apply to all conditional uses.
- (2) Basements, as defined by Section 36-297 of this ordinance, are subject to the following:
 - a. Residential basement construction is not allowed below the regulatory flood protection elevation.
 - b. Non-residential basements may be allowed below the regulatory flood protection elevation provided the basement is structurally dry floodproofed in accordance with Section 36-297(d)(3).
- (3) All areas of nonresidential structures, including basements, to be placed below the regulatory flood protection elevation must be floodproofed in accordance with the structurally dry floodproofing classifications in the State Building Code. Structurally dry floodproofing must meet the FP1 or FP2 floodproofing classification in the State Building Code, which requires making the structure watertight with the walls substantially impermeable to the passage of water and with structural components capable of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy.
- (4) The placement of more than 400 cubic yards of fill or other similar material on a parcel (other than for the purpose of elevating a structure to the regulatory flood protection elevation) must comply with an approved erosion/sedimentation control plan.
 - a. The plan must clearly specify methods to be used to stabilize the fill on site for a flood event at a minimum of the regional (1% chance) flood event.
 - b. The plan must be prepared and certified by a registered professional engineer or other qualified individual acceptable to the City Council.
 - c. The plan may incorporate alternative procedures for removal of the material from the floodplain if adequate flood warning time exists.
- (5) Storage of materials and equipment.
 - a. The storage or processing of materials that are, in time of flooding, flammable, explosive or potentially injurious to human, animal or plant life is prohibited.
 - b. Storage of other materials or equipment may be allowed if readily removable from the area within the time available after a flood warning and in a manner required by a plan approved by the city.

- (6) Alternative elevation methods other than the use of fill may be utilized to elevate a structure's lowest floor above the regulatory flood protection elevation. The base or floor of an enclosed area shall be considered above-grade and not a structure's basement or lowest floor if: 1) the enclosed area is above-grade on at least one side of the structure; 2) it is designed to internally flood and is constructed with flood resistant materials; and 3) it is used solely for parking of vehicles, building access or storage. The above-noted alternative elevation methods are subject to the following additional standards:
- a. *Design and Certification* - The structure's design and as-built condition must be certified by a registered professional engineer as being in compliance with the general design standards of the State Building Code and, specifically, that all electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities must be at or above the regulatory flood protection elevation or be designed to prevent flood water from entering or accumulating within these components during times of flooding.
 - b. *Specific Standards for Above-grade, Enclosed Areas* - Above-grade, fully enclosed areas such as crawl spaces or tuck under garages must be designed to internally flood and the design plans must stipulate:
 1. The minimum area of openings in the walls where internal flooding is to be used as a floodproofing technique. There shall be a minimum of two openings on at least two sides of the structure and the bottom of all openings shall be no higher than one foot above grade. The automatic openings shall have a minimum net area of not less than one square inch for every square foot of enclosed area subject to flooding unless a registered professional engineer or architect certifies that a smaller net area would suffice. The automatic openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of flood waters without any form of human intervention; and
 2. That the enclosed area will be designed of flood resistant materials in accordance with the FP3 or FP4 classifications in the State Building Code and shall be used solely for building access, parking of vehicles or storage.

(Ord. No. 2509-16, 9-19-16)

36-298. General floodplain district (GF).

(a) Permitted Uses.

- (1) The uses listed in Section 36-296(a) of this ordinance, Floodway District Permitted Uses, are permitted uses.
- (2) All other uses are subject to the floodway/flood fringe evaluation criteria specified in Section 36-298(b) below. Section 36-296 applies if the proposed use is determined to be in the Floodway District. Section 36-297 applies if the proposed use is determined to be in the Flood Fringe District.

(b) Procedures for Floodway and Flood Fringe Determinations.

- (1) Upon receipt of an application for a permit or other approval within the General Floodplain District, the applicant shall be required to furnish such information deemed necessary by the Zoning Administrator for the determination of the regulatory flood protection elevation and whether the proposed use is within the floodway or flood fringe district. This information may include the following:

- a. A plan (surface view) showing elevations or contours of the ground; pertinent structure, fill or storage elevations; size, location and spatial arrangement of all proposed and existing structures on the site; and the location and elevations of streets.
 - b. The drainage area contributing to the waterbody and existing type and level of development in the drainage area.
 - c. A typical valley cross-section(s) showing the channel of the stream, elevation of land areas adjoining each side of the channel, cross-sectional areas to be occupied by the proposed development, and high water information.
 - d. Photographs showing existing land uses, vegetation upstream and downstream, and soil types.
 - e. Profile showing the slope of the bottom of the channel or flow line of the stream for at least 500 feet in either direction from the proposed development.
- (2) If regional flood elevation and floodway data are not readily available, the applicant must furnish additional information, as needed, to determine the regulatory flood protection elevation and whether the proposed use would fall within the Floodway or Flood Fringe District. Information must be consistent with accepted hydrological and hydraulic engineering standards and the standards in Section 36-298(b)(3) below.
 - (3) The determination of floodway and flood fringe must include the following components, as applicable:
 - a. Estimate the peak discharge of the regional (1% chance) flood.
 - b. Calculate the water surface profile of the regional flood based upon a hydraulic analysis of the stream channel and overbank areas.
 - c. Compute the floodway necessary to convey or store the regional flood without increasing flood stages more than one-half (0.5) foot. A lesser stage increase than 0.5 foot is required if, as a result of the stage increase, increased flood damages would result. An equal degree of encroachment on both sides of the stream within the reach must be assumed in computing floodway boundaries.
 - (4) The Zoning Administrator will review the submitted information and assess the technical evaluation and the recommended Floodway and/or Flood Fringe District boundary. The assessment must include the cumulative effects of previous floodway encroachments. The Zoning Administrator may seek technical assistance from a designated engineer or other expert person or agency, including the Department of Natural Resources. Based on this assessment, the Zoning Administrator may approve or deny the application.
 - (5) Once the Floodway and Flood Fringe District boundaries have been determined, the Zoning Administrator must process the permit application consistent with the applicable provisions of Section 36-296 and Section 36-297 of this ordinance.

(Code 1976, § 14:5-9.4, Ord. No. 2276-04, 8-16-2004; Ord. No. 2509-16, 9-9-16)

Sec. 36-299. Land development standards.

- (a) **In General.** Recognizing that flood prone areas may exist outside of the designated floodplain districts, the requirements of this section apply to all land within the City of St. Louis Park.
- (b) **Subdivisions.** No land may be subdivided which is unsuitable for reasons of flooding or inadequate drainage, water supply or sewage treatment facilities.
 - (1) All lots within the floodplain districts must be able to contain a building site outside of the Floodway District at or above the regulatory flood protection elevation.

- (2) All subdivisions must have road access both to the subdivision and to the individual building sites no lower than two feet below the regulatory flood protection elevation.
 - (3) For all subdivisions in the floodplain, the Floodway and Flood Fringe District boundaries, the regulatory flood protection elevation and the required elevation of all access roads must be clearly labeled on all required subdivision drawings and platting documents.
 - (4) In the General Floodplain District, applicants must provide the information required in Section 36-296 of this ordinance to determine the regional flood elevation, the Floodway and Flood Fringe District boundaries and the regulatory flood protection elevation for the subdivision site.
 - (5) If a subdivision proposal or other proposed new development is in a flood prone area, any such proposal must be reviewed to assure that:
 - a. All such proposals are consistent with the need to minimize flood damage within the flood prone area, and
 - b. All public utilities and facilities, such as sewer, gas, electrical, and water systems are located and constructed to minimize or eliminate flood damage, and
 - c. Adequate drainage is provided to reduce exposure of flood hazard.
- (c) **Building Sites.** If a proposed building site is in a flood prone area, all new construction and substantial improvements (including the placement of manufactured homes) must be:
- (1) Designed (or modified) and adequately anchored to prevent floatation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy;
 - (2) Constructed with materials and utility equipment resistant to flood damage;
 - (3) Constructed by methods and practices that minimize flood damage; and
 - (4) Constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

(Code 1976, § 14:5-9.5; Ord. No. 2276-04, 8-16-2004; Ord. No. 2509-16, 9-19-16)

Sec. 36-300. Public utilities, railroads, roads, and bridges.

- (a) **Public Utilities.** All public utilities and facilities such as gas, electrical, sewer, and water supply systems to be located in the floodplain must be floodproofed in accordance with the State Building Code or elevated to the regulatory flood protection elevation.
- (b) **Public Transportation Facilities.** Railroad tracks, roads, and bridges to be located within the floodplain must comply with Section 36-296 and Section 36-297 of this ordinance. These transportation facilities must be elevated to the regulatory flood protection elevation where failure or interruption of these facilities would result in danger to the public health or safety or where such facilities are essential to the orderly functioning of the area. Minor or auxiliary roads or railroads may be constructed at a lower elevation where failure or interruption of transportation services would not endanger the public health or safety.
- (c) **On-site Water Supply and Sewage Treatment Systems:** Where public utilities are not provided:
 - (1) On-site water supply systems must be designed to minimize or eliminate infiltration of flood waters into the systems and are subject to the provisions in Minnesota Rules Chapter 4725.4350, as amended; and

- (2) New or replacement on-site sewage treatment systems must be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters, they must not be subject to impairment or contamination during times of flooding, and are subject to the provisions in Minnesota Rules Chapter 7080.2270, as amended.

(Code 1976, § 14:5-9.6; Ord. No. 2276-04, 8-16-2004; Ord. No. 2509-16, 9-19-16)

Sec. 36-301. Administration.

- (a) **Zoning Administrator.** A Zoning Administrator or other official designated by the City Council must administer and enforce this ordinance.

- (b) **Permit Requirements.**

- (1) *Permit Required.* A permit must be obtained from the Zoning Administrator prior to conducting the following activities:
 - a. The erection, addition, modification, rehabilitation, or alteration of any building, structure or portion thereof.
 - b. The use or change of use of a building, structure, or land.
 - c. The construction of a dam, fences, or on-site septic system.
 - d. The change or extension of a nonconforming use.
 - e. The repair of a structure that has been damaged by flood, fire, tornado, or any other source.
 - f. The placement of fill, excavation of materials, or the storage of materials or equipment within the floodplain.
 - g. Relocation or alteration of a watercourse (including new or replacement culverts and bridges), unless a public waters work permit has been applied for.
- (2) *Application for permit.* Permit applications must be submitted to the Zoning Administrator on forms provided by the Zoning Administrator. The permit application must include the following as applicable:
 - a. A site plan showing all pertinent dimensions, existing or proposed buildings, structures, and significant natural features having an influence on the permit.
 - b. Location of fill or storage of materials in relation to the stream channel.
 - c. Copies of any required municipal, county, state or federal permits or approvals.
 - d. Other relevant information requested by the Zoning Administrator as necessary to properly evaluate the permit application.
- (3) *Certificate of Zoning Compliance for a New, Altered or Nonconforming Use.* No building, land or structure may be occupied or used in any manner until a certificate of zoning compliance has been issued by the Zoning Administrator stating that the use of the building or land conforms to the requirements of this ordinance.
- (4) *Certification.* The applicant is required to submit certification by a registered professional engineer, registered architect, or registered land surveyor that the finished fill and building elevations were accomplished in compliance with the provisions of this ordinance. Floodproofing measures must be certified by a registered professional engineer or registered architect.
- (5) *Record of First Floor Elevation.* The Zoning Administrator must maintain a record of the elevation of the lowest floor (including basement) of all new structures and alterations or additions to existing structures in the floodplain. The Zoning Administrator must also maintain a record of the elevation to which structures and alterations or additions to structures are floodproofed.

- (6) *Notifications for Watercourse Alterations.* Before authorizing any alteration or relocation of a river or stream, the Zoning Administrator must notify adjacent communities. If the applicant has applied for a permit to work in public waters pursuant to Minnesota Statutes, Section 103G.245, this will suffice as adequate notice. A copy of the notification must also be submitted to the Chicago Regional Office of the Federal Emergency Management Agency (FEMA).
- (7) *Notification to FEMA When Physical Changes Increase or Decrease the Base Flood Elevations.* As soon as is practicable, but not later than six months after the date such supporting information becomes available, the Zoning Administrator must notify the Chicago Regional Office of FEMA of the changes by submitting a copy of the relevant technical or scientific data.

(c) Factors for Conditional Use Approval.

- (1) *Administrative Review.* An application for a conditional use permit under the provisions of this ordinance will be processed and reviewed in accordance with Section(s) 36-33 Conditional Use Permits (CUP) of the zoning ordinance.
- (2) The factors upon which the decision of the city council shall be based when considering conditional use applications are as follows:
 - a. All relevant factors specified in other sections of this chapter.
 - b. The danger to life and property due to increased flood heights or velocities caused by encroachments.
 - c. The danger that materials may be swept onto other lands or downstream to the injury of others or they may block bridges, culverts or other hydraulic structures.
 - d. The proposed water supply and sanitation systems and the ability of these systems to prevent disease, contamination and unsanitary conditions.
 - e. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner.
 - f. The importance of the services provided by the proposed facility to the community.
 - g. The requirements of the facility for a waterfront location.
 - h. The availability of alternative locations not subject to flooding for the proposed use.
 - i. The compatibility of the proposed use with existing development and the development anticipated in the foreseeable future.
 - j. The relationship of the proposed use to the comprehensive plan and floodplain management program for the area.
 - k. The safety of access to the property in times of flood for ordinary and emergency vehicles.
 - l. The expected heights, velocity, duration, rate of rise, and sediment transport of the floodwaters expected at the site.
 - m. Such other factors which are relevant to the purposes of this division.
- (3) *Conditions Attached to Conditional Use Permits.* Upon consideration of the factors listed above and the purpose of this Ordinance, the city council shall attach such conditions to the granting of conditional use permits as it deems necessary to fulfill the purposes of this Ordinance. Such conditions may include, but are not limited to, the following:
 - a. Modification of waste treatment and water supply facilities.

- b. Limitations on period of use, occupancy, and operation.
 - c. Imposition of operational controls, sureties, and deed restrictions.
 - d. Requirements for construction of channel modifications, compensatory storage, dikes, levees, and other protective measures.
 - e. Flood proofing measures, in accordance with the State Building Code and this Ordinance. The applicant shall submit a plan or document certified by a registered professional engineer or architect that the flood proofing measures are consistent with the regulatory flood protection elevation and associated flood factors for the particular area.
- (4) *Submittal of Hearing Notices to the Department of Natural Resources (DNR).* The Zoning Administrator must submit hearing notices for proposed conditional uses to the DNR sufficiently in advance to provide at least ten days' notice of the hearing. The notice may be sent by electronic mail or U.S. Mail to the respective DNR area hydrologist.
- (5) *Submittal of Final Decisions to the DNR.* A copy of all decisions granting conditional uses must be forwarded to the DNR within ten days of such action. The notice may be sent by electronic mail or U.S. Mail to the respective DNR area hydrologist.

(Code 1976, § 14:5-9.7; Ord. No. 2276-04, 8-16-2004; Ord. No. 2509-16, 9-19-16)

Sec. 36-302. Nonconformities.

- (a) **Continuance of Nonconformities.** A use, structure, or occupancy of land which was lawful before the passage or amendment of this ordinance but which is not in conformity with the provisions of this ordinance may be continued subject to the following conditions. Historic structures, as defined in Section 36-294 of this ordinance, are subject to the provisions of Section 36-302(1) through Section 36-302(6) of this ordinance.
- (1) A nonconforming use, structure, or occupancy must not be expanded, changed, enlarged, or altered in a way that increases its nonconformity, its flood damage potential or degree of obstruction to flood flows except as provided in Section 36-302(2) below. Expansion or enlargement of uses, structures or occupancies within the Floodway District is prohibited.
 - (2) Any addition or structural alteration to a nonconforming structure or nonconforming use that would result in increasing its flood damage potential must be protected to the regulatory flood protection elevation in accordance with any of the elevation on fill or floodproofing techniques (i.e., FP1 thru FP4 floodproofing classifications) allowable in the State Building Code, except as further restricted in Section 36-302(3) and Section 36-302(7) below.
 - (3) The cost of any structural alterations or additions to any nonconforming structure over the life of the structure shall not exceed 50 percent of the market value of the structure unless the conditions of this section are satisfied. The cost of all structural alterations and additions constructed since the adoption of the city's initial floodplain controls must be calculated into today's current cost which will include all costs such as construction materials and a reasonable cost placed on all labor. If the current cost of all previous and proposed alterations and additions exceeds 50 percent of the current market value of the structure, then the structure must meet the standards of this chapter for new structure.
 - (4) If any nonconforming use, or any use of a nonconforming structure, is discontinued for more than one year, any future use of the premises must conform to this ordinance. The Assessor must notify the Zoning Administrator in writing of

instances of nonconformities that have been discontinued for a period of more than one year.

- (5) If any nonconformity is substantially damaged, as defined in Section 36-294 of this ordinance, it may not be reconstructed except in conformity with the provisions of this ordinance. The applicable provisions for establishing new uses or new structures in Section 36-296 or Section 36-297 will apply depending upon whether the use or structure is in the Floodway or Flood Fringe, respectively.
- (6) If any nonconforming use or structure experiences a repetitive loss, as defined in Section 36-294 of this ordinance, it must not be reconstructed except in conformity with the provisions of this ordinance.
- (7) Any substantial improvement, as defined in Section 36-294 of this ordinance, to a nonconforming structure requires that the existing structure and any additions must meet the requirements of Section 36-296 or Section 36-297 of this ordinance for new structures, depending upon whether the structure is in the Floodway or Flood Fringe District.

(Code 1976, § 14:5-9.8, Ord. No. 2276-04, 8-16-2004; Ord. No. 2509-16, 9-19-16)

Sec. 36-303. Penalties and Enforcement.

- (a) **Violation Constitutes a Misdemeanor.** Violation of the provisions of this ordinance or failure to comply with any of its requirements (including violations of conditions and safeguards established in connection with grants of variances or conditional uses) constitute a misdemeanor and will be punishable as defined by law.
- (b) Nothing herein contained shall prevent the city from taking such other lawful action as is necessary to prevent or remedy any violation. Such actions may include but are not limited to:
 - (1) In responding to a suspected Ordinance violation, the Zoning Administrator and Local Government may utilize the full array of enforcement actions available to it including but not limited to prosecution and fines, injunctions, after-the-fact permits, orders for corrective measures or a request to the National Flood Insurance Program for denial of flood insurance availability to the guilty party. The Community must act in good faith to enforce these official controls and to correct Ordinance violations to the extent possible so as not to jeopardize its eligibility in the National Flood Insurance Program.
 - (2) When an Ordinance violation is either discovered by or brought to the attention of the Zoning Administrator, the Zoning Administrator shall immediately investigate the situation and document the nature and extent of the violation of the official control. As soon as is reasonably possible, this information will be submitted to the appropriate Department of Natural Resources' and Federal Emergency Management Agency Regional Office along with the Community's plan of action to correct the violation to the degree possible.
 - (3) The Zoning Administrator shall notify the suspected party of the requirements of this Ordinance and all other official controls and the nature and extent of the suspected violation of these controls. If the structure and/or use is under construction or development, the Zoning Administrator may order the construction or development immediately halted until a proper permit or approval is granted by the Community. If the construction or development is already completed, then the Zoning Administrator may either: (1) issue an order identifying the corrective actions that must be made within a specified time period to bring the use or structure into compliance with the official controls; or (2) notify the responsible party to apply for an after-the-fact permit/development approval within a specified period of time not to exceed 30-days.

- (4) If the responsible party does not appropriately respond to the Zoning Administrator within the specified period of time, each additional day that lapses shall constitute an additional violation of this Ordinance and shall be prosecuted accordingly. The Zoning Administrator shall also upon the lapse of the specified response period notify the landowner to restore the land to the condition which existed prior to the violation of this Ordinance.

(Ord. No. 2276-04, 8-16-2004; Ord No. 2462-15, 2-2-2015; Ord. No. 2509-16, 9-19-16)

Sec. 36-304. Amendments.

- (a) **Floodplain Designation – Restrictions on Removal.** The floodplain designation on the Official Zoning Map must not be removed from floodplain areas unless it can be shown that the designation is in error or that the area has been filled to or above the elevation of the regulatory flood protection elevation and is contiguous to lands outside the floodplain. Special exceptions to this rule may be permitted by the Commissioner of the Department of Natural Resources (DNR) if the Commissioner determines that, through other measures, lands are adequately protected for the intended use.
- (b) **Amendments Require DNR Approval.** All amendments to this ordinance must be submitted to and approved by the Commissioner of the Department of Natural Resources (DNR) prior to adoption. The Commissioner must approve the amendment prior to community approval.
- (c) **Map Revisions Require Ordinance Amendments.** The floodplain district regulations must be amended to incorporate any revisions by the Federal Emergency Management Agency to the floodplain maps adopted in Section 36-293(c) of this ordinance.

(Code 1976, § 14:5-9.9, Ord. No. 2276-04, 8-16-2004; Ord. No. 2509-16, 9-19-16)

Secs. 36-305--36-320. Reserved.

(Ord. No. 2462-15, 2-2-2015; Ord. No. 2509-16, 9-19-16)

Chapter 12

ENVIRONMENT AND PUBLIC HEALTH*

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***Cross reference(s)**--Animals, ch. 4; buildings and building regulations, ch. 6; moving buildings, § 6-101 et seq.; parks and recreation, ch. 20; solid waste management, ch. 22; streets, sidewalks and other public places, ch. 24; subdivisions, ch. 26; design standards for erosion and sediment control, § 26-155; utilities, ch. 32; vegetation, ch. 34; zoning, ch. 36; erosion control, § 36-80.

State law reference(s)--Environmental protection, M.S.A. chs. 114C--116I.

ENVIRONMENT AND PUBLIC HEALTH

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ARTICLE I. IN GENERAL**Sec. 12-1. Definition**

Private residential pool means a pool connected with a single-family residence or owner-occupied duplex, located on private property under the control of the homeowner, the use of which is limited to family members or the family's invited guests. A private residential pool is not a pool used as part of a business.

(Ord. No. 2440-13, 5-6-2013)

Sec. 12-2. Environmental and public health regulations adopted by reference.

(a) *Air quality environmental emissions.* The city adopts and incorporates by reference the air emissions standards adopted by the air quality division of the state pollution control agency as Minnesota Rules Chapters 7011 and 7023, as amended. A copy of the regulations, together with any applicable amendments, shall be marked "St. Louis Park--Official Copy" and shall be kept on file in the office of the city clerk and open to inspection and use by the public.

(Ord. No. 2440-13, 5-6-2013)

Sec. 12-3. Private residential pools.

(a) *Scope.* The requirements of this section shall apply to all private residential swimming pools, wading pools, hot tubs, or spas having a potential water depth greater than 24 inches at any point, and either a surface area exceeding 250 square feet or a potential water volume of over 3,250 gallons.

(b) *Permit required.* No person may install, construct, move, or alter a private residential swimming pool, wading pool, hot tub, or spa without first obtaining a permit.

(c) *Fees.* The applicant for a pool permit must pay the appropriate fee for the type of pool installation or construction requested. Such fee shall be set from time to time by the city and a schedule of such fees is listed in appendix A to this Code.

(d) Requirements.

- (1) All new equipment purchased or installed on any swimming pool shall comply with the National Sanitation Foundation Listings for Swimming Pools, Spas, and Hot Tubs, when applicable. Equipment not covered by the standard must be preapproved by the city.
- (2) Pool use is limited to swimming or bathing by the family or their invited guests.

- (3) Fencing a minimum of four feet high from grade or other acceptable barrier, including but not limited to walls or buildings, providing equivalent restriction of access shall be provided to positively control all access to private swimming pools. Fencing shall be without handholds or footholds that would enable a child to climb over it and shall include gates at least four feet in height equipped with self-closing and self-latching apparatus capable of being locked. Openings in the gates or fence shall not allow a four-inch sphere to pass through. Maximum openings under gate and fences shall not exceed two inches.
- (4) Water depth shall be plainly marked at or above the water surface on the vertical pool wall or on the edge of the deck or walk next to inground pools. Depth markings shall be located at the minimum and maximum points, at the points of change of slope between the deep and shallow portions of the pool, and at intermediate increments of depth spaced not more than 25 feet between markers.
- (5) Decking at least three feet wide, measured from the pool water's edge, shall be provided and shall extend completely around inground pools. Aboveground pools may be provided with decking a minimum of four feet by four feet at the pool entry points provided the decking complies with the building code. A self-closing and self-latching gate shall be installed at the top or bottom of the stairs. Openings in the gate or fence shall not allow a four-inch sphere to pass through. Maximum openings under gates and fences shall not exceed two inches.
- (6) All residential private pools with a depth greater than five feet shall be provided with an outlet at the deepest point to permit the pool to be completely emptied and to provide adequate circulation. The outlet opening shall be covered by grating which is securely fastened and not readily removable by bathers. Outlet openings in the floor of the pool shall be at least four times the area of the discharge pipe or provide sufficient area so the maximum velocity of water passing through the grate will not exceed 1 1/2 feet per second. The maximum width of the grate openings shall be one-half inch. An antivortex type drain may be used in lieu of grating.
- (7) No person shall operate, maintain, or permit any swimming pool that creates a nuisance by annoying, injuring, or endangering the safety, health, comfort or repose of the public. The city shall have access to inspect all pools and equipment as deemed necessary to enforce the provisions of this Code. When a private swimming pool is deemed to be in such condition that endangers the health, safety or welfare of the public, the health authority may immediately close the pool and post a placard stating the closure. No one may remove the placard except the health authority.

Secs. 12-4--12-30. Reserved.

(Ord. No. 2440-13, 5-6-2013)

ARTICLE II. NUISANCES*

DIVISION 1. GENERALLY

Sec. 12-31. Creation; declaration of.

(a) Any person who shall knowingly cause or create any nuisance, or permit any nuisance to be created, or to be placed upon, or to remain upon, any premises owned or occupied by the individual shall be guilty of a misdemeanor.

(b) Conditions declared to be a nuisance in other sections of this Code are subject to all conditions relating to penalties and abatement unless otherwise stated in the section specific to the nuisance.

(Code 1976, § 11-101)

***Cross reference(s)**--Certain dogs declared public nuisance, § 4-83; certain cats declared nuisance, § 4-131; abatement of nuisance when owner of cat is unknown, § 4-133; litter nuisance defined, § 22-151; excavations nuisances, § 24-194; diseased trees declared public nuisance, § 34-52.

State law reference(s)--Environmental impact statements, M.S.A. § 116C.01 et seq.; authority to define and abate nuisances, M.S.A. § 412.221, subd. 23.

Sec. 12-32. Definitions.

The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Nuisance means a thing, act, occupation or use of property which shall:

- (1) Annoy, injure or endanger the safety, health, comfort or repose of the public.
- (2) Offend public decency.

- (3) Unlawfully interfere with, obstruct or tend to obstruct or render dangerous for passage, a lake, stream, basin, public park, square, street, alley or highway.
- (4) In any way render the public insecure in life or in use of property.

Cross reference(s)--Definitions generally, § 1-2.

Sec. 12-33. Nuisances affecting health.

In addition to those conditions identified elsewhere, the following are declared to be nuisances affecting health:

- (1) All diseased animals running at large.
- (2) Carcasses of animals not buried or destroyed or otherwise disposed of within 24 hours after death.
- (3) Accumulations of decaying animal or plant material, animal or human feces, trash, refuse, yard waste, rubbish, garbage, rotting lumber, packing material, scrap metal, tires or any other substances which can be breeding places for flies, mosquitoes or vermin, except compost maintained in compliance with chapter 22, article III.
- (4) Privy vaults and garbage cans which are not fly tight.
- (5) All noxious weeds and other rank growths of vegetation upon public or private property.
- (6) Dense smoke, noxious fumes, gas and soot, dust or cinders in such quantities as to render the occupancy of property uncomfortable to a person of ordinary sensibilities.
- (7) All public exposure of persons having a contagious disease.
- (8) All other acts, omissions of acts, occupations and uses of property which are a menace to the public health.
- (9) The intentional or negligent discharge of items including but not limited to refuse, leaves, grass clippings, solvents, antifreeze, oil, gas, fireplace ashes, paint, swimming pool water or cement rain sate into a street, storm sewer system, or water resource such as a wetland, creek, pond or lake. This includes illegal discharge or discard of any item on to any land within the City limits.
- (10) Improper sewage disposal to such degree that sewage or effluent is discharging onto the surface of the ground, backing up into a structure or discharging into a body of water.
- (11) Infestations of flies, fleas, cockroaches, lice, rats, mice, fly larvae or hookwork larvae.
- (12) Breeding grounds not naturally occurring which support mosquito larvae or mosquitoes carrying West Nile Virus, La Crosse Encephalitis Virus or any other disease causing microorganism.
- (13) Outdoor burners of fuel, including, but not limited to, wood, trash, corn, pellets and biomass, that are detached from or exterior to a principal building and intended for use as a water or space heating source are considered to produce excessive smoke and therefore prohibited.

(Code 1976, § 11-102; Ord. No. 2491-16, 5-2-16)

Sec. 12-34. Nuisances affecting peace and safety.

In addition to those conditions identified elsewhere, the following are declared to be nuisances affecting public peace, welfare and safety:

- (1) All limbs of trees, shrubs, bushes, weeds or any other vegetative growth which are less than eight feet above the surface of any street or sidewalk.
- (2) All wires which are strung less than 15 feet above the surface of the ground.
- (3) All buildings, walls and other structures which have been damaged by fire, decay or otherwise, and which are situated as to endanger the safety of the public.
- (4) All explosives, inflammable liquids and other dangerous substances stored in any manner or in any amount other than that provided by ordinance or state or federal law.
- (5) All use or display of fireworks except as provided by ordinance or state or federal law.
- (6) All loud or unusual noises and annoying vibrations which offend the peace and quiet of persons of ordinary sensibilities or which violate article IV of this chapter.
- (7) Obstructions and excavations affecting the ordinary use by the public of streets, alleys and sidewalks, or public grounds, except under such conditions as are provided by ordinance.
- (8) Radio aerials strung or erected over streets or alleys or attached to poles of public service companies.
- (9) Any use of the public street or sidewalk which causes large crowds of people to gather, obstructing traffic and the free use of the streets or sidewalks.
- (10) All hanging signs, awnings and other similar structures over the streets or sidewalks, and so situated as to endanger public safety.
- (11) All barbed wire fences except for barbed wire on top of non-residential fences, where barbed wire is at least six (6) feet above grade and at least three (3) feet from all public sidewalks.
- (12) All dangerous, unguarded machinery in any public place, or so situated or operated on private property as to attract the public.
- (13) All other acts, omissions of acts, occupations and uses of property which are a menace to safety as determined by the Director of Inspections.
- (14) Feeding of deer, raccoons, wild turkeys, coyotes, opossum, Canada goose or prohibited animals identified in Section 4-42.
- (15) The existence and creation of graffiti. For the purpose of this subsection, the term "graffiti" shall mean any unauthorized inscription, word, figure, painting, printing, marks, signs, symbols, figures, designs, inscriptions, or other drawings or other defacement which are written, marked, etched, scratched, sprayed, drawn, painted or engraved on or otherwise placed or affixed to any surface of objects such as buildings, walls, fences, sidewalks, curbs, vehicles, trees, rocks, or other structures or objects on public and private property or the interior surfaces of those parts of buildings accessible to the general public and which has the effect of defacing the property.

- (16) The exterior storage of firewood that either:
- a. Is infested with rodents, insects or other nuisance animals;
 - b. Is stacked less than six inches or more than five feet above grade;
 - c. Exceeds a maximum ground coverage of 64 square feet for each stack;
 - d. Has stacks on a lot that are within ten feet of each other;
 - e. Is stacked in a disorderly manner; or
 - f. Is otherwise a threat to health and safety.
- (17) Any condition that interferes with, obstructs, or renders dangerous for passage a public roadway, highway or right-of-way or waters used by the public.
- (18) Any construction materials or equipment left in the open on a residential site ninety (90) or more days after authorized work has stopped.
- (19) Discarded construction material or other litter at a construction site that is not placed in an adequate waste container or that is allowed to blow around or off the site.
- (20) Any structure that has become dangerous for further use or occupancy because of structural or sanitary defects or grossly unsanitary conditions.
- (21) Principle, accessory and other structures or improvements that have been so poorly maintained that their physical condition and appearance detract from the surrounding neighborhood are declared to be public nuisances affecting the general welfare because they are unsightly, decrease adjoining landowners' and occupants' enjoyment of their property and neighborhood, and adversely affect property values and neighborhood patterns. Nuisances include:
- a. Exterior walls with holes, breaks or loose or rotting materials, or which are not maintained as weatherproof and properly surface coated where required to prevent deterioration.
 - b. Exterior surfaces, including but not limited to, doors, door and window frames, cornices, porches, trim, balconies, decks or fences not maintained in good condition. Exterior wood surfaces, other than decay-resistant woods, not protected from the elements and decay by painting or other protective covering or treatment. Peeling, flaking or chipped paint. All siding or masonry joints as well as those between the building envelope and the perimeter of windows, doors, and skylights not maintained weather resistant and water tight. All metal surfaces subject to rust or corrosion not coated to inhibit such rust and corrosion. Surfaces with untreated rust or corrosion. Oxidation stains.
 - c. Windows, skylights, doors or frames not kept in sound condition, good repair or weather tight. Glazing materials with cracks or holes.
 - d. Exterior doors, door assemblies or hardware not maintained in good condition. Locks at all entrances to dwelling units, rooming units or guestrooms which do not tightly secure the door.
 - e. Cornices, belt courses, corbels, terra cotta trim, wall facings or similar decorative features not maintained in good repair with proper anchorage or in a safe condition.
 - f. Roof drains, gutters or downspouts not maintained in good repair and free from obstructions. Roof or flashing not sound, tight or having defects that admit rain. Roof drainage inadequate to prevent dampness or deterioration in the walls or interior portion of the structure.

- g. Chimneys, cooling towers, smoke stacks or similar appurtenances not maintained as structurally sound, or in good repair. All exposed surfaces of metal or wood not protected from the elements or against decay or rust by periodic application of weather-coating materials, such as paint or similar surface treatment.
 - h. Foundation walls not maintained plumb or free from open cracks or breaks or kept in such condition so as to prevent the entry of rodents or other pests.
- (22) An unsecured hole or opening caused by improperly abandoned cistern, well pit, sewage treatment system, unused or non-maintained swimming pool, foundation, mine shaft or tunnel or any other hole or opening in the ground of sufficient size or depth to pose a danger to the public or an attractive nuisance.
- (23) Accumulations of personal property, rubbish or debris in any residence that could prevent emergency egress.
- (24) Accumulations of animal feces, rubbish or junk remaining in any place as to become dangerous or injurious to the safety of any individual or to the public.
- (25) At single-family and two-family dwelling units, the non-temporary parking or storage of more than four vehicles, including abandoned, junk and inoperable vehicles, per unit outside of a garage or on street.

(Code 1976, § 11-103; Ord. No. 2117-98, § 1, 5-4-1998; Ord. No. 2174-00, § 1, 8-21-2000; Ord. No. 2257-03, § 3, 11-17-03; Ord. No. 2416-12, § 3, 08-10-2012, Ord. No. 2491-16, 05-02-2016)

Sec. 12-35. Nuisance abatement and assessment.

(a) *Purpose of section.* The purpose of this section is to provide the city with the authority, pursuant to M.S.A. § 429.101, as may be amended from time to time, to remove or eliminate public health or safety hazards from private property and to provide for the collection of unpaid special charges for all or any part of the costs incurred by the city to remove or eliminate the hazards.

(b) *Notice of need to abate nuisance.* Whenever the existence of any nuisance defined in this article, constituting a public health or safety hazard, within any lots or parcels of real estate situated within the city, shall come to the attention of the Director of Inspections, the Director shall cause an investigation of the reported nuisance. After the investigation, the Director of Inspections shall determine whether a nuisance exists. Upon finding a nuisance, the Director of Inspections shall prepare a written notice and mail the notice to the owner of the property. The term "owner" shall be defined as the person listed as owner according to the current records of the county auditor. Such notice shall contain the name of the owner, his address (if known), the address of the property containing the nuisance and a description of the nuisance which must be abated at the owner's expense, and the time frame within which the nuisance must be abated as determined in the sole discretion of the health official. In determining the time within which owner must abate the nuisance, the Director of Inspections shall consider, among other factors, the following:

- (1) The severity of the threat to public health and safety;
- (2) The size or magnitude of the nuisance; and
- (3) The number of persons affected by the nuisance.

The notice shall further state if owner fails to abate the nuisance within the time provided in such notice, the city may enter onto the owner's property for purpose of abating the nuisance. Noncompliance with the required action will result in city action to abate the nuisance the cost of

which will subsequently be assessed as a lien against the owner's property. If the owner's address is not known, service of the notice may be made upon a tenant, lessee or owner's agent and shall also be posted upon the property. Where no owner or owner's agent can be found, the city clerk shall cause the notice to be published once in the official city newspaper within ten days of issuance of the notice. If publication is required, the city shall allow an additional ten days from the date of publication for owner to comply with the notice of violation and abatement.

(c) *Time to respond.* The owner shall abate the nuisance, at the owner's expense, within the period of time contained within the notice. In the instance of publication of the notice, the owner shall have ten days following the date of publication of the notice, plus the amount of time provided in the notice to abate the nuisance. The Director of Inspections shall cause an inspection of the property containing the nuisance to be made the day after the last day for abatement as stated in the notice or within such other time as may be reasonable and practical.

(d) *Appeal.* The owner shall have a right to appeal the notice as served by presenting the appeal to the city manager within 48 hours of service of the notice or within two days of its publication, excluding weekends and legal holidays. Within 72 hours of presentation of the appeal, the city manager shall meet with the owner and the official to hear the matter. The city manager shall consider the issues and make a final decision within 48 hours following the meeting. The owner shall be served by mail of the manager's decision. The owner may appeal the city manager's decision to the city council. Within ten days of receipt of the mailed decision of the city manager, the owner shall make a request, in writing, to the city manager to be placed on the agenda at the next regularly scheduled city council meeting, to consider the owner's appeal of the city manager's decision. The city council shall consider the appeal and make a final decision. A final decision by the city council is not appealable.

(e) *Enforcement/abatement.* If the owner of the property does not respond to the served, posted or published notice itemizing the nuisance and ordering its abatement, within the given time as specified in such notice, the Director may order the nuisance condition to be abated by either the city or contracted employees. The cost of abating the nuisance shall be compiled and a resolution prepared containing the name of the owner, the address and legal description of the property containing the nuisance, the costs of abating the nuisance, and a recommendation to assess the property, as a special assessment, for the costs. The assessment proceedings shall be conducted as outlined in M.S.A. § 429.101. Upon its passage, the resolution shall be submitted to the county auditor by November 10 of that year for assessment of the costs as a lien against the property with the real estate taxes. The lien may be collected in a single annual installment, or spread over a period of up to ten equal annual installments, to be determined at the sole discretion of the city council.

(f) *Payment of assessment.* Upon passage by the city council of the resolution of approval for assessment of costs incurred by the city to abate such nuisance, the city clerk shall send a bill for the assessment amount to the owner. The owner may then pay the bill in full prior to its submission to the county auditor. If the owner fails to pay the assessment prior to its submission to the county auditor, the city shall forward the assessment information to the county auditor to create a lien against the owner's real estate as per M.S.A. § 429.101.

(g) *Expenses allowed.* Expenses to be included in the abatement and assessment procedure may include the cost of the abatement and any removal, publication of notice or of any notice of action of the city council, posting and service of notices, departmental costs and expenses including legal fees, allowance for city employee time, overtime and expense of any equipment used. Such costs shall be compiled and prepared for presentation to the city council by the official.

(Code 1976, §§ 11-113, 11-115--11-120; Ord. No. 2415-12, 8-10-2012)

Secs. 12-36--12-60. Reserved.

DIVISION 2. JUNK VEHICLES***Sec. 12-61. Definitions.**

The following words, terms and phrases, when used in this division, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Junk car means any motor vehicle which is not in street operable condition, or which is partially dismantled, or which is used for sale of parts or as a source of repair or replacement parts for other vehicles, or which is kept for scrapping, dismantling or salvage of any kind, or which is not properly licensed for operation within the state.

Junk car parts means abandoned, old or unattached automotive equipment, or parts thereof not currently being used as an integral part of a vehicle or trailer. This includes, but is not limited to, batteries, tires, snow plow attachments, car racks and toppers, or other car parts normally found on a vehicle or trailer.

Racing car means any motor vehicle designed or intended for operation on a speedway, race track or other facility used or designed for high speed contests between two or more vehicles or for timing of speed.

Stock car means any motor vehicle of standard design and construction which is modified, adapted or altered in any manner to increase its speed or safety, and designed or intended for operation on a speedway, race track or other facility used or designed for high speed contests between two or more vehicles or for timing of speed.

(Code 1976, § 11-710)

Cross reference(s)--Definitions generally, § 1-2.

Sec. 12-62. Parking and storage.

No person shall park, keep, place or store, or permit the parking or storage of a stock car, racing car, junk car or junk car parts on a public street or alley, or on any private lands or premises which he owns, occupies or controls unless it shall be within a building on such private premises. Such acts are hereby declared a nuisance under this article.

(Code 1976, § 11-711; Ord. No. 2491-16, 5-2-16)

Sec. 12-63. Repair, service or maintaining.

No person shall service, repair, replace parts or do maintenance work on a stock car, racing car or junk car on a public street nor on any private lands or premises unless it shall be within a building on such private premises. Such acts are hereby declared a nuisance under this article.

(Code 1976, § 11-712; Ord. No. 2491-16, 5-2-16)

Secs. 12-64--12-90. Reserved.

***Cross reference(s)**--Traffic and vehicles, ch. 30.

ARTICLE III. LITTER***Sec. 12-91. Definitions.**

The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Authorized private receptacle means a litter storage and collection receptacle as required and authorized in article II of this chapter.

Garbage means putrescible animal and vegetable wastes resulting from the handling, preparation, cooking and consumption of food.

Litter means garbage, refuse and rubbish, and all other waste material which, if thrown or deposited as prohibited in this article, tends to create a danger to public health, safety and welfare.

Newspaper means any newspaper of general circulation as defined by general law, any newspaper duly entered with the Post Office Department of the United States, in accordance with federal statute or regulation, and any newspaper filed and recorded with any recording officer as provided by general law; and, in addition thereto, shall mean and include any periodical or current magazine regularly published with not less than four issues per year, and sold to the public.

Handbill means any printed or written matter, sample, device, dodger, circular, leaflet, pamphlet, newspaper, magazine, paper, booklet, or any other printed or otherwise reproduced original or copies of any matter of literature.

Park means a park, reservation, playground, beach, recreation center or any other public area in the city, owned or used by the city and devoted to active or passive recreation.

Private premises means any dwelling, house, building or other structure, designed or used either wholly or in part for private residential purposes, whether inhabited or temporarily or continuously uninhabited or vacant, and shall include any yard, grounds, walk, driveway, porch, steps, vestibule or mailbox belonging or appurtenant to such dwelling, house, building or other structure.

Public place means any and all streets, sidewalks, boulevards, alleys or other public ways and any and all public parks, squares, spaces, grounds and buildings.

Refuse means all putrescible and nonputrescible solid wastes (except body wastes), including garbage, rubbish, trash, ashes, street cleanings, dead animals, junk, abandoned automobiles, and solid market and industrial wastes.

Rubbish means nonputrescible solid wastes consisting of both combustible and noncombustible wastes, such as paper, wrappings, cigarettes, cardboard, tin cans, wood, glass, bedding, crockery and similar materials.

***State law reference(s)--**Littering from a vehicle, M.S.A. § 169.42; unlawful deposit of garbage or litter, M.S.A. § 609.68.

Vehicle means every device in, upon, or by which any person or property is or may be transported or drawn upon a highway, including devices used exclusively upon stationary rails or tracks.

(Code 1976, § 11-401)

Cross reference(s)--Definitions generally, § 1-2.

Sec. 12-92. Littering prohibited.

No person shall, throw, sweep, scatter, drop or otherwise deposit litter in or upon any public or private lands, parks, roadways, sidewalks, fountains, shorelines or waters in the city.

Sec. 12-93. Public and private garbage receptacles.

Persons placing litter in public or authorized private receptacles shall do so in such a manner as to prevent the litter from being scattered by the elements. Where receptacles are not provided, all litter shall be carried away by the person responsible for its presence and properly disposed of elsewhere.

Sec. 12-94. Truck loads causing litter to be deposited on any public place.

No person shall drive or move any truck or other vehicle within the city unless such vehicle is equipped with covers or is so constructed or loaded as to prevent any load, contents or litter from being blown from or otherwise deposited upon any street, alley or other public place.

Sec. 12-95. Owner to maintain premises free from litter.

The owner or person in control of any private property shall at all times maintain the premises free of litter.

Sec. 12-96. Commercial and noncommercial handbills allowed.

Commercial and noncommercial handbills may be distributed in the city if handed to or transmitted directly to a person willing to accept it.

Sec. 12-97. Commercial and noncommercial handbills; prohibitions.

No person shall throw, deposit or post any commercial or noncommercial handbill in or upon any vehicle; uninhabited or vacant premises; occupied private property; vacant lot; lamppost, public utility pole or shade tree, public structure or building except as may be authorized or required by law.

Sec. 12-98. Commercial and noncommercial handbills at inhabited private premises.

(a) No person shall throw, deposit or distribute any commercial or noncommercial handbill upon any private premises if requested by anyone thereon not to do so, or if there is a sign placed in a conspicuous position indicating that the occupants do not wish to receive solicitations.

(b) In the case of an inhabited private premises which is not posted, handbills may be placed or deposited in such a manner as to secure or prevent the handbill from being blow or drifted about.

Sec. 12-99. Merchant equally liable.

Any merchant who advertises his goods, wares or merchandise by causing advertising material to be thrown or deposited in violation of any of the provisions of this article shall be guilty of violating this article along with the person throwing or depositing the litter.

Sec. 12-100. Nuisance declared.

Each of the acts forbidden by this article are hereby declared a nuisance under article II of this chapter.

Secs. 12-101--12-120. Reserved.

ARTICLE IV. NOISE, NOISE POLLUTION AND VIBRATION

Sec. 12-121. Definitions.

The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section. Any other word or phrase used in this article, and defined in regulations of the state pollution control agency noise pollution control rules, chapter 7030, has the meaning given in those regulations.

Air circulation device means a mechanism designed and used for the controlled flow of air used in ventilation, cooling or conditioning, including, but not limited to, central and window air conditioning units.

City means the City of St. Louis Park or any representative of the department of inspections, department of public safety or any other representative of the city designated by the city manager.

Cut-out, bypass and similar device means any mechanism which varies the exhaust system gas flow so as to discharge the exhaust gas and acoustic energy to the atmosphere without passing through the entire length of the exhaust system including all exhaust system sound attenuation components.

Exhaust system means a combination of components, which provides for enclosed flow of exhaust gas from engine parts to the atmosphere.

Highway means any street, road, alley or public way in the city.

Holiday means any day fixed by the United States or by state law for suspension of business, in whole or in part.

Noise means any sound not occurring in the natural environment, including, but not limited to, sounds emanating from aircraft and highways, and industrial, commercial and residential sources.

Noise pollution means the presence of any noise or combination of noises in such quantity, at such levels, or of such nature and duration or under such conditions as could potentially be injurious to human health, safety, welfare or property, or to animal life, or could interfere unreasonably with the enjoyment of life or property.

Sound means an oscillation in pressure, stress, particle displacement, particle velocity, etc., in an elastic or partially elastic medium, or the superposition of such propagated alterations.

Sound level means a weighted sound pressure level obtained by the use of a sound level meter having characteristics, including the "A" weighting, as specified in ANSI Specifications for Sound Level Meters S1.4-1971. The reference pressure is 20 micronewtons per square meter.

Sound receiving unit means a unit of property or a building containing a person, business, activity, animal life, or property, which is affected by noise or noise pollution.

Vibration means the oscillation of a solid body or material, including, but not limited to, earth, concrete, machinery, building structures, or other similar materials. Within this article, the term vibration shall refer to those oscillations, which are disturbing, injurious, damaging or dangerous.

Cross reference(s)--Definitions generally, § 1-2.

Sec. 12-122. Source requirements.

(a) *Maximum noise levels by receiving land use districts.* No person shall operate or cause or permit to be operated any source of noise in such a manner as to create a noise level exceeding the limit set in table I for the receiving land use category specified when measured at the location identified in subsection (c) of this section. The source sound levels in any zoning district shall be the responsibility of any person who owns or operates a sound source contributing to the sound level, whether or not such sound source is in the zoning district in question.

Table I. Sound Levels by Receiving Land Use Districts

| <i>Zoning District</i> | <i>Day</i> <i>(7:00 a.m. to 10:00 p.m.)</i> | | <i>Night</i> <i>(10:00 p.m. to 7:00 a.m.)</i> | |
|------------------------|------------------------------------------------|------------|--------------------------------------------------|------------|
| | <i>L50</i> | <i>L10</i> | <i>L50</i> | <i>L10</i> |
| Residential | 60 | 65 | 50 | 55 |
| Industrial | 75 | 80 | 75 | 80 |
| Others | 65 | 70 | 65 | 70 |

(b) *Exemptions.* The levels prescribed in subsection (a) of this section do not apply to noise generated by railroads or the travel of motor vehicles on state and county highways, but such noise shall be subject to other applicable sections of this article.

(c) *Measurement of noise level.*

- (1) Except as otherwise provided in this article, the source sound level requirements of this section shall apply at the area of human activity or, if such area is ill-defined, at the property or zoning lines of the receiving unit. If a receiving unit changes its area of human activity, the source sound level requirements of this section shall apply at the new area of human activity or, if such area is ill-defined, at the property or zoning lines of the receiving unit. Measurements may be made at any location in zoning districts for evaluation purposes and to aid the enforcement of other sections of this article.
- (2) All sound levels originating in any development or property which contains one or more buildings and which is without property lines for each building shall not exceed the source requirements for the applicable zoning district measured at the area of human activity or, if this is ill-defined, at any point on a line, all of whose points are equidistant from any two buildings.

Sec. 12-123. Requirements for air circulation devices.

Any person installing or placing any air circulation device including, but not limited to, window or central air conditioning units, in any location which results in or contributes to a violation of section 12-122, shall attenuate the excessive sound level by means deemed appropriate to bring the equipment or device into compliance with this Code, including but not limited to sound barrier screening, new equipment meeting city and state noise requirements, or relocation of such units or devices.

Sec. 12-124. Hourly restrictions on certain operations.

(a) *Recreational vehicles* No person shall drive or operate any minibike, snowmobile, or other similar recreational vehicle, not licensed for travel on public highways, between the hours of 10:00 p.m. and 7:00 a.m.

(b) *Domestic power equipment.* No person may operate any domestic power implement including, but not limited to, a power lawnmower, power hedge clipper, power saw or other such implement except between the hours of 7:00 a.m. and 10:00 p.m. on weekdays and between the hours of 9:00 a.m. and 10:00 p.m. on weekends and holidays. The operation of equipment for snow removal shall be exempt from the provisions of this section when initiated within 12 hours of the completion of the most recent snowfall.

(c) *Power equipment used in construction activities.* No person shall engage in, permit, or allow construction activities involving the use of power equipment, manual tools, movement of equipment, or other activities except between the hours of 7:00 a.m. and 10:00 p.m. on weekdays and between the hours of 9:00 a.m. and 10:00 p.m. on weekends and holidays.

(d) *Garbage collection.* Except in a general industrial zoning district, no person shall collect or remove garbage or refuse except between the hours of 7:00 a.m. and 10:00 p.m. on weekdays and between the hours of 9:00 a.m. and 10:00 p.m. on weekends and holidays.

(e) *Participation in noisy parties or gatherings.* No person shall, between the hours of 11:00 p.m. and 7:00 a.m. on Sunday through Thursday and between 12:00 midnight and 7:00 a.m. on Friday and Saturday, participate in any party or gathering of people which creates noise pollution or which unreasonably disturbs the peace, quiet, or repose of another person as determined at the property line of a building, structure, rental unit, or other enclosure or area in which such party or gathering occurs. If such party or gathering is declared to be a noise pollution nuisance by a city official, all persons except the owner, renter, lessee, or other occupant shall promptly leave the premises in an orderly manner. Every owner or tenant of such premises who has knowledge of the disturbance shall make every reasonable effort to see that the disturbance is stopped.

Sec. 12-125. Prohibited noises.

(a) *Internal combustion engine, fuel-operated device or electrically powered device.* No person shall operate, permit, or allow the operation of any internal combustion engine, fuel-operated device, or electrically powered device associated with construction, home improvement, or other similar activity unless it is operated or in repair according to the manufacturer's specifications. Any internal combustion engine or fuel-operated devices, which is designed to have a muffler, shall be maintained in good working order to prevent noise pollution.

- (1) No person shall operate, permit or allow the operation of any portable air compressor or similar device which produces a sound level in excess of 81 dBA, measured at 50 feet from the compressor when the compressor is operating at its maximum related capacity. Portable air compressors with a rated capacity equal to or above 75 cubic feet per minute, which deliver air at pressures greater than 50 psig, and which are manufactured on or after July 1, 1978, shall not produce a sound level in excess of 70 dBA, measured at 50 feet from the compressor when the compressor is operating at its maximum rated capacity.
- (2) No person shall operate, permit or allow the operation of any powered, walk behind lawnmower or other similar device which produces a sound level in excess of 72 dBA, measured at 50 feet from the mower. No person shall operate, permit, or allow the operation of any powered, sit down lawnmower or other similar device, which produces a sound level in excess of 82 dBA, measured at 50 feet from the mower.

(b) *Blower, power fan or exhaust unit.* No person shall operate, permit, or allow the operation of any blower, power fan, exhaust unit or other similar device which produces noise pollution due to improper maintenance or due to operation or repair which does not conform to the manufacturer's specifications.

(c) *Cut-out, bypass or similar device.* No person shall use a cut-out, bypass, or similar device upon an internal combustion engine or its exhaust system. No person shall modify, alter, or repair any exhaust system or any internal combustion engine in any manner that amplifies or otherwise increases engine sound above that emitted by the engine as equipped according to the manufacturer's specifications.

(d) *Motor vehicles.*

- (1) No person shall operate a motor vehicle in the city in violation of the motor vehicle noise limits established by state law or the Minnesota Pollution Control Agency as set forth under Minn. Rules Chapter 7030.
- (2) No person shall operate any motor vehicle or any minibike or other similar vehicle or device in any way which results in the squealing of tires or the creation of any other noise pollution on any highway, private road, public or private parking lot, driveway, or other property in the city, except when there is reason to do so for the safe operation of the vehicle.
- (3) No person shall repair, build, rebuild, or test any motor vehicle or other internal combustion engine within the city in such a manner as to create noise pollution.

(e) *Horn, siren or other signaling device.* No person may sound or permit the sounding of any horn, siren or other signaling device on any motor vehicle within the city except in cases of imminent danger or emergency. The modification or installation of signaling devices on any motor vehicle or emergency vehicle which amplifies or otherwise increases the level of sound beyond that emitted by the signaling device installed or designed for the vehicle is prohibited. Burglar alarms, sirens, or similar devices, installed and operated for the use specified by the manufacturer, are exempt from the provisions of this subsection.

(f) *Radios, phonography, paging system, etc.* No person may use, operate, or permit to be used or operated any radio receiving set, musical instrument, phonograph, stereo or other machine or device used for the production or reproduction of sound in such a manner as to disturb the peace, quiet or comfort of a person in its vicinity. The operation of any receiving set, instrument, phonograph, stereo machine, or device between 10:00 p.m. and 7:00 a.m. shall be prima facie evidence of a violation of this section if done in such manner as to be plainly audible at:

- (1) The real property boundary of the building, structure, or residence, or other area in which it is located;
- (2) The property line of the area or premises owned, rented, leased, or used within a multiuse or apartment building; or
- (3) A distance of 50 feet from any motor vehicle in which it is located.

(g) *Loudspeakers, amplifiers, etc., for advertising.* Except as permitted by section 12-127, no person shall advertise or attract the attention of the public to any commercial establishment, business, vehicle or other area by creating noise pollution, including but not limited to crying out, sounding a horn, ringing a bell, or use or operation of any loudspeaker, sound amplifier, or other device for the production or reproduction of sound on a street or other public place. In addition, no person shall create noise pollution through the use of any such sound production or reproduction devices in any activities or proceedings of his business, including, but not limited to, the use of loudspeakers for communication.

(h) *Apartment or multiuse building.* No person may cause, allow, or permit any noise pollution in any multiuse or apartment building as determined beyond the property line of the area or premises owned, rented, leased, or used by such person.

(i) *Loading and unloading.* No person shall load or unload any motor vehicle or handle any bales, boxes, crates, or containers in such a manner as to cause noise pollution.

(j) *Schools, churches, hospitals, etc.* No person shall create or allow the creation of noise pollution on any street adjacent to any school, learning institution, religious institution, or court, or adjacent to any hospital, or home for the aged, or other similar institutions which unreasonably interferes with the working of such institution or disturbs or annoys an inhabitant in the institution, provided that conspicuous signs indicated the presence of such institutions or buildings are displayed in such streets by such institutions.

(k) *Snowmobiles.* No person shall operate a snowmobile unless it is equipped with a muffler in good working order, which will prevent noise pollution and will meet the source requirements in section 12-122. However, this shall not apply to snowmobiles which are designed and used for organized races or similar competitive events which are held with the permission of the city council and in areas designated by the city council.

(l) *Railways.* Except as otherwise required by federal law, no person driving or operating a locomotive or other powered vehicle adapted for travel on any railway in the city may ring a bell or sound a whistle upon such locomotive or vehicle, or cause the same to be rung or sounded at any time other than in cases in which the locomotive or vehicle is at or within 1,320 feet before any place where the railway crosses a traveled highway on the same level or in cases of imminent danger.

Sec. 12-126. Prohibiting vibration.

Any vibration discernible to the human sense of feeling or any vibration producing a particle velocity of more than 0.035 inches per second for five minutes or more duration (cumulative) in any one hour at the property line are prohibited. For properties abutting an "R" use district, no vibration producing a particle acceleration velocity of more than 0.035 inches per second at the property line are permitted between the hours of 7:00 p.m. and 7:00 a.m.

Sec. 12-127. Exceptions to article.

(a) *Emergency work.* Operations and acts performed exclusively for emergency work not exceeding a period of 24 hours to preserve the safety, welfare, or public health of the citizens of the city or for emergency work necessary to restore a public service or to eliminate a public hazard shall be exempt from the noise and vibration limitations under this article. Any person performing emergency work under this section shall inform the city at the time of the need to initiate such work or, if during nonbusiness hours of the city offices, then upon resumption of business hours of the city. Any person responsible for such emergency work shall take all reasonable actions to minimize the amount of noise pollution or vibration.

(b) *Exception for food/beverage vehicles.* Notwithstanding any other provisions to the contrary, food/beverage vehicles may sound a bell between 12:00 noon and 9:00 p.m. daily which produces a noise level measured at a distance of 50 feet from the source no greater than 65 decibels in all zoning districts.

Sec. 12-128. Inspections.

A city official shall inspect existing or potential noise, noise pollution, and vibration sources, and noise pollution control measures as frequently as may be necessary to ensure compliance with this article.

Sec. 12-129. Access to premises and records.

The person on the premises who is responsible for any noise pollution control measure or allowing or causing any noise, noise pollution or vibration shall, upon request of the city official, permit access to all parts of the area at any reasonable time for purposes of inspection and monitoring and shall exhibit and allow copying of any records relating to noise, noise pollution or vibration, or noise pollution control as is necessary to determine compliance with this Code. A city official shall be permitted access to any sound receiver unit affected or potentially affected by a sound source under inspection in order to determine compliance with this Code.

Sec. 12-130. Removal and correction of violations.

Any person responsible for noise, noise pollution or vibration control measures, or allowing or causing noise, noise pollution, or vibration and having received a report from the city official giving notification of one or more violations of this Code shall correct or remove each violation within the length of time set by the city official. The length of time for the correction or removal of each violation shall be stated on the inspection report. The failure to remove or correct each such violation within the time period noted on the inspection report shall constitute a separate violation of this article.

Sec. 12-131. Temporary noise permit.

(a) Permit.

- (1) *Required.* A temporary noise permit is required to create temporary noise conditions which may exceed the requirements of this article. A person making application for a permit shall include the reason for requesting the temporary noise permit, the nature of the event occurring, the time period for which the temporary noise permit is requested and the operation or procedure to be employed during the period of the temporary noise permit.
- (2) *Exception.* City-performed street and utility maintenance and construction do not require a temporary noise permit.

(b) *Fee required.* The fee for a temporary noise permit shall be set from time to time by the city and a schedule of such fees is listed in appendix A to this Code. Such fees must be submitted to the city before a permit will be issued.

(c) *Special provisions.*

- (1) *Permits for 24 hours and less.* When a temporary noise permit is issued for an event 24 hours or less in duration, the applicant must notify all immediate neighbors to the property for which the permit is issued. The notification must be in advance of the event and provide information on the date, time and type of event for which the permit was issued.
- (2) *Permits for over 24 hours.* The applicant must submit a set of address labels for all property owners within 350 feet of the boundaries of the parcel with the application when the permit request is for an event occurring more than 24 hours. The names and addresses must be officially prepared by the county auditor's office or other source approved by the city. Applications with address labels must be received in the department of inspections 14 days prior to the event to be considered for a permit. The city shall use the labels to mail notification of the requested event to the property owners. The permit will be considered for approval after any public comment is received, not less than seven days after the notification is mailed or more than ten days after receiving the completed application and labels.
- (3) *Mobile noise sources.* When a temporary noise permit application is for a mobile source of noise, the applicant shall provide information on the type of equipment, dates and times of proposed operation, and location in which the equipment or noise will be heard. Before a permit is issued, the applicant shall request an inspection with the city to have the temporary noise source measured to ensure compliance with applicable sections of this article.

(d) *Duration.* Any temporary noise permit granted by the city shall not exceed 90 days and may be renewed once for a period not to exceed 30 days upon request of the original applicant and upon approval from the city.

(e) *Criteria for issuance of permit.* A temporary noise permit to create noise which is not in compliance with this Code may be granted upon a finding that:

- (1) The activity, operation, or noise or vibration source will be of temporary duration and cannot be performed or operated in a manner that would comply with the provisions of this Code;
- (2) The costs of abatement, control or alternative activity or time sequence are unreasonably high in relation to the benefits achieved;
- (3) The measures necessary to abate or avoid potential noise, noise pollution or vibration conflict with other important values, including, but not limited to, aesthetic quality, ecological conditions or safety; or
- (4) No other reasonable alternative is available to the applicant.

In granting a temporary noise permit, the city shall prescribe any conditions, requirements or restrictions reasonably necessary to minimize adverse effects upon the community or surrounding neighborhood.

(f) *Grounds for denial of permit.* History of complaints about excessive noise in violation of this article or past permit is grounds for denial of a temporary noise permit.

Sec. 12-132. Appeal.

(a) Any person affected by any decision under this article or by any action taken in accordance with this article, including, but not limited to, an applicant for a temporary noise permit, extension of compliance date or a person objecting to the issuance of a temporary permit or the extension of a compliance date may, within ten days of the issuance of the order or action, appeal to the city manager. Appeals shall be held no sooner than ten days and not more than 30 days after a request for such appeal is filed unless good cause is shown for an extension. Requests shall be made by filing with the city manager a notice of appeal specifying the grounds and relief sought. The city manager shall forthwith set a date, time and place for the appeal and shall notify the person appealing at least ten days in advance of the appeal date.

(b) Any person affected by a decision of the city manager may appeal the decision to the city council. A notice of appeal must be filed with the city clerk within five days after the city manager's decision. Notice of the date, time, place, and nature of the matter under consideration shall be given by publication at least once in the official newspaper not less than ten days prior to the appeal.

Secs. 12-133--12-150. Reserved.

ARTICLE V. STORMWATER, SOIL EROSION, AND SEDIMENTATION**Sec. 12-151 Purpose.**

The purpose of this ordinance is to provide for the health, safety and general welfare of the residents of St. Louis Park by reducing and controlling stormwater, soil erosion and sedimentation within the City. It establishes standards and specifications for conservation practices and planning activities which enhance water quality, minimize stormwater pollution, soil erosion, and sediment in waterways, and control the volume of water runoff to receiving streams and other water resources.

Sec. 12-152. Definitions

The following words, terms and phrases, when used in this division, shall have the meanings ascribed to them in the section , except where the context clearly indicates a different meaning:

Authorized Enforcement Agency means employees or designees of the City or other governing authorities designated to enforce this ordinance.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to stormwater, receiving waters, or stormwater conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

City refers to the City of St Louis Park, any employees, agents, contractors or designee.

Clean Water Act refers to the Federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.), and any subsequent amendments thereto.

CWRMP means the Comprehensive Water Resources Management Plan on record in the City offices.

Discharge means any substance entering the stormwater system by any means.

Discharge, Illicit means any direct or indirect non-stormwater discharge to the stormwater system, except as exempted in Section 12-157 of this ordinance.

Discharge, Non-Stormwater means any discharge to the stormwater system that is not composed entirely of stormwater.

Erosion means any process that wears away the surface of the land by the action of water, wind, ice or gravity. Erosion can be accelerated by the activities of people and nature.

Erosion Control refers to methods employed to prevent erosion. Examples include soil stabilization practices, horizontal slope grading, temporary or permanent cover, and construction phasing.

Erosion Control Plan means a plan detailing erosion control during construction activity as defined in the Comprehensive Water Resources Management Plan (CWRMP), Appendix M.

Hazardous Materials means any material, including any substance, waste, or combination thereof, which because of its quantity, concentration; or, physical, chemical, or infectious characteristics, may cause or significantly contribute to a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Illicit Connections means either

- 1) Any drain or conveyance, whether on the surface or subsurface, which allows an illicit discharge to enter the stormwater system, including but not limited to any conveyances which allow any non-stormwater discharge including wastewater, process wastewater, and wash water to enter the stormwater system and any connections to the stormwater system from indoor drains and sinks, regardless of whether said drain or connection had been previously allowed, permitted, or approved by an authorized enforcement agency or;
- 2) Any drain or conveyance connected from a commercial or industrial land use to the stormwater system which has not been documented in plans, maps, or equivalent records and approved by an authorized enforcement agency.

Industrial Activity means activities subject to NPDES Industrial Permits as defined in 40 CFR, Section 122.26 (b)(14).

Land Disturbing Activity means any activity which changes the volume or peak flow discharge rate of rainfall runoff from the land surface, including the grading, digging, cutting, scraping, or excavating of soil, placement of fill materials, paving, construction, substantial removal of vegetation or any activity which bears soil or rock, or involves the diversion or piping of any natural or man-made watercourse.

NPDES means National Pollutant Discharge Elimination System as established pursuant to 33 USC § 1342(b) to regulate discharges of pollutants to waters of the United States.

NPDES Permit means a National Pollutant Discharge Elimination System Stormwater discharge permit issued by the Minnesota Pollution Control Agency (pursuant to 33 USC § 1342(b)) that regulates discharges of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.

Non-Point Source Pollution means pollution from any source other than any discernable, confined and discreet conveyances, and shall include but not be limited to pollutants from agricultural, silvicultural, mining, construction, subsurface disposal and urban runoff sources.

Permanent Stabilization Plan means a written plan to establish permanent vegetation to prevent erosion of soil. This plan may be in the form of a letter. Permanent vegetation includes sod, native grasses, trees or other acceptable forms of landscaping.

Person means any individual, association, organization, partnership, firm, corporation or other private or public entity recognized by law and acting as either the owner or as the owner's agent.

Pollutant means anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordinances, and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

Premises means any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

Sediment means solid matter carried by water, wastewater or other liquids.

Stormwater means any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation.

Stormwater Facility means anything within the stormwater system that collects, conveys or stores stormwater, including, but not limited to any inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered drainage channels, reservoirs, and other drainage structures.

Stormwater Management means the use of structural or non-structural practices that are designed to reduce stormwater runoff pollutant loads, discharge volumes, peak flow discharge rates and detrimental changes that affect water quality and habitat.

Stormwater Management Plan means a plan which describes how runoff and associated water quality impacts resulting from the development will be controlled or managed. This plan must indicate whether stormwater will be managed on-site or off-site and, if on-site, the general location and type of practices. This final plan must be signed by a licensed professional engineer (PE), who will verify that the design of all stormwater management practices meet the submittal requirements of the Comprehensive Water Resources Management Plan (CWRMP).

Stormwater Pollution Prevention Plan (SWPPP) means a document which describes the Best Management Practices and activities to be implemented by a person or business to identify sources of pollution or contamination at a site and the actions to eliminate or reduce pollutant discharges to stormwater, stormwater systems, and/or receiving waters to the maximum extent practicable.

Stormwater System means facilities by which stormwater is collected and/or conveyed, including but not limited to any roads with drainage systems, streets, gutters, curbs, inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered drainage channels, reservoirs, and other drainage structures.

Structure means anything manufactured, constructed, or erected, which is normally attached to, or positioned on land, including portable structures, earthen structures, roads, parking lots and paved storage areas.

Watercourse means a stream or body of water, or a natural or artificial channel for the passage of stormwater.

Wastewater means any water or other liquid, other than uncontaminated stormwater, discharged from a facility.

Waters of the U.S. means any water in the United States per definition as specified 33 CFR 328.a.

Wetlands as defined in Minnesota Rules 7050.0130, subpart F, means areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Sec. 12-153. Responsibility for Administration.

The City shall administer, implement, and enforce the provisions of this ordinance.

Sec. 12-154. Applicability.

This ordinance shall apply to all water entering the stormwater system generated on any developed and undeveloped lands unless explicitly exempted by an authorized enforcement agency or in this ordinance.

Sec. 12-155. Severability.

The provisions of this ordinance are hereby declared to be severable. If any provision, clause, sentence, or paragraph of this Ordinance or the application thereof to any person, establishment, or circumstances shall be held invalid, such invalidity shall not affect the other provisions or application of this Ordinance.

Sec. 12-156. Construction Site Stormwater Runoff and Erosion Control.

(a) Purpose. The purpose of this section is to regulate land disturbing activities, to preserve and enhance the natural environment by reducing sedimentation in streams, lakes, stormwater systems and other waterways, protect the quality of surface water resources, preserve and protect wildlife habitat, restore sites to reduce the negative environmental effects of land disturbing activities, provide effective practices for erosion and sedimentation control, and to comply with local, state and federal regulations.

(b) Scope. Except where an exemption applies, any person proposing a land disturbing activity within the City shall apply to the City for the approval of erosion control plan. No land shall be disturbed until the plan is approved by the City and conforms to the standards set forth herein.

(c) Erosion control plan and permit required.

1. *Review and approval.* No person may grade, fill, excavate, store, dispose of soil and earth materials, or perform any other land disturbing or land filling activity without first submitting an erosion control plan for review and approval by the City and obtaining a permit as required in this section. The erosion control permit is not a replacement for a City Conditional Use Permit as required in section 36-79 of the City Ordinance, nor is it a replacement for a watershed district permit or a state NPDES permit.

2. *General exemptions.* Land disturbing activities, which meet all the following criteria, are exempt from the requirements of this section:
 - a. The disturbed or filled area is 5,000 square feet or less in area, and;
 - b. The volume of soil or earth material stored or moved is 50 cubic yards or less, and;
 - c. No drainage way is blocked or has its stormwater-carrying capacities or characteristics modified; and
 - d. The activity does not take place within 100 feet by horizontal measurement from the top of the bank of a watercourse, the ordinary high water mark of a water body, or the ordinary high water mark of a wetland associated with a watercourse or water body. The activity does not take place within an established 100-year floodplain.
3. *Categorical exemptions.* Notwithstanding the requirements of the City Code, the following activities are exempt from the permit requirements:
 - a. Emergency activities necessary to prevent or alleviate immediate dangers to life or property.
 - b. General farming, gardening and nursery activities.
 - c. One and two family residential construction activity limited to:
 - 1) additions to the existing structure,
 - 2) landscaping and landscaping structures, and
 - 3) construction of a garage.

(d) Submission requirements for erosion control permit.

1. *Application items.* Application for an erosion control permit shall include submittal of:
 - a. Application form and fee.
 - b. Site map and grading plan.
 - c. Interim erosion and sediment control plan as defined in the City's Comprehensive Water Resources Management Plan, Appendix M.
 - d. As defined in the Comprehensive Water Resources Management Plan, Appendix M: Stormwater management plan or permanent stabilization plan as required.
 - e. Work schedule.
 - f. Cost estimate.
2. *Fees.* All applications shall be accompanied by a permit fee. Fees for permits shall be fixed and determined by the City council, adopted by resolution and uniformly enforced. Such permit fees may, from time to time, be amended by City council resolution. A copy of the resolution setting forth currently effective permit fees shall be kept on file by the City and shall be open to inspection during regular business hours.

(e) Review Procedure.

1. *Process.* City staff will review each complete application for an erosion control permit to determine its conformance with the provisions of this ordinance. Within 60 days of receiving an application, City staff shall either approve, approve with conditions, or deny an erosion control permit application.
2. *Appeal.* An appeal by an applicant of a denial of a permit under this section shall be made under the manner prescribed in section 36-31 of this Code.
3. *Site Review.* When a permit is granted, City staff shall inspect the property for erosion control compliance with city code, permit conditions and site plans prior to the onset of construction activities.

(f) Form of security. Before a permit is issued, the City may require the permittee to post security in a form acceptable to the City equal to 125 percent of the cost estimate stated in the application and agreed by the City to be the cost of the work to be done under the permit. The security may take the form of cash in United States currency or an irrevocable letter of credit issued by a financial institution and in a form acceptable to the City.

1. *Release of security.*
 - a. Any security deposited with the City to guarantee performance of the grading and erosion control work shall be released to the person holding the permit upon determination by the City that the conditions of the permit have been satisfactorily performed if no action has been taken by the City to recover all or a part of the security before that determination has been made.
 - b. Securities held to ensure the successful completion of the final plan and an interim plan shall be released to the permittee either one year after termination of the permit, or when a final plan is submitted for the unimproved site, whichever is later, if no action has been taken by the City to recover all or a part of the security filed by the permittee before that date.

(g) Suspension of permit. In enforcing the permit:

1. The City may suspend the permit and issue a stop work order and the permittee shall cease all work on the work site except for work necessary to remedy the cause of the suspension.
2. The permittee may request a reinstatement of a suspended permit upon correction of the causes for suspension and, if the conditions of the permit have been complied with in full, the City shall reinstate the permit.
3. If the permittee fails or refuses to cease work as required under subsection 6.H. [*Actions against security*] of this section, the City shall revoke the permit.
4. The City shall not reinstate a revoked permit but shall proceed to act against the security as provided in subsection 6.H. [*Actions against security*] of this section.

(h) Action against security. The City may act against the appropriate security if any of the following conditions exist:

1. The permittee stops performing the land disturbing activities or filling, and abandons the work site prior to completion of the grading plan.
2. The permittee fails to conform to the interim plan or final plan as approved, and has had its permit revoked as provided in subsection (g) *Suspension of Permit* of this section.
3. The techniques utilized under the interim or final plan fail within one year of installation or before the final plan is implemented for the site or portion of the site, whichever comes later.
4. The City determines that action by the City is necessary to prevent excessive erosion from occurring on the site, or to prevent sediment from occurring on adjacent or nearby properties.

The City shall use funds recovered from the security to reimburse the City for all direct and indirect costs incurred in doing the remedial work undertaken by the City or private contractor under contract with the City.

Sec. 12-157. Illicit Discharge and Connection

(a) Objectives. The objectives are to regulate the introduction of pollutants to the stormwater system by any user; to prohibit illicit connections and discharges to the stormwater system; and to establish authority to carry out all inspection, surveillance and monitoring procedures necessary to ensure compliance with this ordinance.

(b) Discharge Prohibitions.

1. *Prohibition of Illicit Discharges.* No person shall discharge or cause to be discharged into the stormwater system or watercourses any materials, including but not limited to pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards, other than stormwater.
 - a. The commencement, execution or continuance of discharge of pollutants to the stormwater system is prohibited except as follows: water line flushing or other potable water sources, landscape irrigation or lawn watering, diverted stream flows, ground water infiltration to storm drains, uncontaminated pumped ground water, foundation or footing drains (not including active groundwater de-watering systems), crawl space pumps, air conditioning condensation, springs, non-commercial washing of vehicles, natural riparian habitat or wet-land flows, fire fighting activities, and any other water source not containing pollutants.
 - b. Discharges specified in writing by the authorized enforcement agency as being necessary to protect public health and safety are allowed.
 - c. Dye testing is an allowable discharge, but requires a verbal notification to the authorized enforcement agency prior to the time of the test.

- d. The prohibition shall not apply to any non-stormwater discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the Federal Environmental Protection Agency, Minnesota Pollution Control Agency, or other agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for any discharge to the stormwater system.
2. *Prohibition of Illicit Connections.* The construction, use, maintenance or continued existence of such connections to the stormwater system is prohibited. This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

A person is considered to be in violation of this ordinance if the person connects a line conveying wastewater to the stormwater system, or allows such a connection to continue.

(c) Suspension of Stormwater System Access.

1. *Suspension due to Illicit Discharges in Emergency Situations.* The City may, without prior notice, suspend stormwater system discharge access to a person when such suspension is necessary to stop an actual or threatened discharge which presents or may present imminent or substantial danger to the environment, or to the health or welfare of persons, or to the stormwater system or waters of the United States. If the violator fails to comply with a suspension order issued in an emergency, the authorized enforcement agency may take such steps as deemed necessary to prevent or minimize damage to the stormwater system or waters of the United States, or to minimize danger to persons.
2. *Suspension due to the Detection of Illicit Discharge.* Any person discharging to the stormwater system in violation of this ordinance may have their stormwater system access terminated if such termination would abate or reduce an illicit discharge. The City will notify a violator of the proposed termination of its stormwater system access. The violator may petition the City for a reconsideration and hearing. A person commits an offense if the person reinstates stormwater system access to premises terminated pursuant to this Section, without the prior approval of the City.

(d) Monitoring of Discharges.

1. *Access to Facilities.*
 - a. The City shall be allowed to enter and inspect facilities and properties subject to regulation under this ordinance as often as may be necessary to determine compliance with this ordinance and for the purposes of inspection, sampling, examination and copying of records that must be kept under the conditions of an NPDES permit to discharge stormwater, and the performance of any additional duties as defined by state and federal law.

- b. The City shall have the right to set up on any permitted facility such devices as are necessary in the opinion of the authorized enforcement agency to conduct monitoring and/or sampling of the facility's stormwater discharge.
- c. The City has the right to require the discharger to install monitoring equipment as necessary. The facility's sampling and monitoring equipment shall be maintained at all times in a safe and proper operating condition by the discharger at its own expense.
- d. Any temporary or permanent obstruction to safe and easy access to the facility to be inspected and/or sampled shall be promptly removed by the owner or operator at the written or oral request of the City and shall not be replaced. The costs of clearing such access shall be borne by the owner of operator.
- e. Unreasonable delays in allowing the City access to a permitted facility is a violation of a stormwater discharge permit and of this ordinance. A person who is the operator of a facility with a NPDES permit to discharge stormwater associated with industrial activity commits an offense if the person denies the City reasonable access to the permitted facility for the purpose of conducting any activity authorized or required by this ordinance.

(e) Requirement To Prevent, Control, And Reduce Stormwater Pollutants By The Use Of Best Management Practices.

- 1. *Owner Responsibility.* The owner or operator of any property shall provide, at owner/operator's expense, reasonable protection from accidental discharge of prohibited materials or other wastes into the municipal stormwater system or watercourses through the use of structural and non-structural Best Management Practices (BMPs). Further, any person responsible for a property or premise, which is, or may be, the source of an illicit discharge, may be required to implement, at said person's expense, additional structural and non-structural BMPs to prevent the further discharge of pollutants to the stormwater system. These BMPs are listed in the Stormwater Pollution Prevention Plan (SWPPP) and the Minnesota Pollution Control Agency's current BMPs, and are necessary for compliance with requirements of the NPDES permit and Appendix J of the City's Comprehensive Water Resources Management Plan.

(f) Water Course Protection.

- 1. *Owner Responsibility.* Every owner of a property through which a watercourse passes, or such person's lessee, shall keep and maintain that part of the watercourse within their property free of trash, debris, excessive vegetation, and other obstacles that would pollute, contaminate, or significantly impact the flow of water through the watercourse. All owners or lessees shall maintain existing privately owned structures within or adjacent to a watercourse, so that such structures will not become a hazard to the use, function, or physical integrity of the watercourse.

(g) Notification of Spills.

1. Notwithstanding other requirements of law, as soon as any person responsible for a facility, vehicle or operation, or responsible for emergency response for a facility or operation has knowledge of any known or suspected release of materials of any amount, which are resulting or may result in illicit discharges or pollutants discharging into the stormwater system or water of the United States, said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of hazardous materials said person shall immediately notify the City and other emergency response agencies of the occurrence via emergency dispatch services.

In the event of a release of non-hazardous materials, said person shall notify the City in person or by phone no later than the next business day.

If the discharge of prohibited materials emanates from a commercial or industrial establishment or vehicle, the owner or operator of such establishment or vehicle shall also retain a written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

Sec. 12-158. Post construction stormwater runoff.

(a) Objectives. The objectives of this Section are to establish minimum stormwater management requirements and controls to protect and safeguard the general health, safety, and welfare of the public residing in watersheds within this jurisdiction. This section seeks to meet that purpose through the following objectives:

1. Reduce stormwater runoff rates and volumes, soil erosion and non-point source pollution, wherever possible, through stormwater management controls and to ensure that these management controls are properly maintained and pose no threat to public safety;
2. Control stormwater runoff in any development to reduce flooding, silt deposits, stream bank erosion and maintain the integrity of stream channels;
3. Control non-point source pollution caused by stormwater runoff from development; and
4. Control the total annual volume of surface water runoff, which flows from any specific site following development.

(b) Applicability. The rules of applicability are as set forth in Sec. 12-156. [*Construction Site Stormwater Runoff and Erosion Control*] of this ordinance, with some exceptions. A stormwater management plan is not required for construction or redevelopment of a single or double family home. A stormwater management plan is not required for residential construction on less than two (2) acres with a density of two (2) units or less per acre. However, a permanent stabilization plan is required for projects that meet these exceptions.

(c) Stormwater Management Plan.

1. *Stormwater Management Plan Required for All New Developments and Redevelopments.* No application for development or redevelopment will be approved unless it includes a stormwater management plan detailing in concept

how runoff and associated water quality impacts resulting from the development will be controlled or managed. This plan must indicate whether stormwater will be managed on-site or off-site and, if on-site, the general location and type of practices.

The stormwater management plan(s) shall be referred for comment to interested agencies, and any comments must be addressed in a final stormwater management plan. This final plan must be signed by a licensed professional engineer (PE), who will verify that the design of all stormwater management practices meet the submittal requirements of the Comprehensive Water Resources Management Plan.

2. *Maintenance of Existing Stormwater Facilities.* Any stormwater facility in existence prior to adoption of this ordinance shall be maintained by the owner of the stormwater facility and in a manner to conform to design standards for that facility. Any redevelopment of the stormwater facility shall require that the facility meet current stormwater design standards as set forth in this ordinance.

The thresholds for maintenance are triggered once sediment deposition reaches a point greater than is allowed under the design standard criteria, or such deposition begins to have a substantial effect on the water quality or holding capacity of the pond.

3. *Inspection of Stormwater Facilities.* Inspection programs may be established on a reasonable basis, including but not limited to an inspection at least once every five years or more often if deemed necessary to ensure proper functioning of the stormwater management facility. Inspections are the responsibility of the owner of the stormwater facility and must be completed by a licensed professional engineer (PE) hired for that purpose. Inspection results must be completed and submitted to the City of St Louis Park every five years beginning five years from the completion of development or from the date of this ordinance for a pre-existing stormwater facility.

Inspections may include, but are not limited to: reviewing maintenance and repair records; sampling discharges, surface water, groundwater, and material or water in drainage control facilities; and evaluating the condition of drainage control facilities and other stormwater treatment practices.

All new and existing stormwater management facilities must undergo, at a minimum, an inspection every five years to document maintenance and repair needs and ensure compliance with the requirements of this ordinance and accomplishment of its purposes. This maintenance may include: removal of silt, litter and other debris from all catch basins, inlets and drainage pipes; grass cutting and vegetation removal; and necessary replacement of landscape vegetation. Any maintenance needs found must be addressed in a timely manner, as determined by the City of St. Louis Park. The inspection and maintenance requirement may be increased as deemed necessary to ensure proper functioning of the stormwater management facility.

(d) Maintenance Covenants. Maintenance of all stormwater management facilities shall be ensured through the creation of a formal maintenance covenant that must be approved by the City of St. Louis Park and recorded at the Hennepin County Records Office prior to final plan approval. As part of the covenant, a schedule shall be developed for when and how often maintenance will occur to ensure proper function of the stormwater management facility. The covenant shall also include plans for periodic inspections to ensure proper performance of the facility between scheduled cleanouts.

The owner/operator shall show in the maintenance covenant how it will utilize Best Management Practices (BMPs) to prevent discharge of pollutants into the stormwater system. These BMPs are listed in the City's Stormwater Pollution Prevention Plan (SWPPP) and the current Minnesota

Pollution Control Agency BMP standards, and are necessary for compliance with requirements of the NPDES permit and Appendix J of the City's Comprehensive Water Resources Management Plan. The threshold for maintenance is triggered once sediment deposition reaches a point greater than is allowed under the design standard criteria, or such deposition begins to have a substantial effect on the water quality or holding capacity of the pond.

(e) Right-of-Entry for Inspection. When any new drainage control facility is installed on private property, or when any new connection is made between private property and a public stormwater system, the property owner shall grant to the City of St. Louis Park the right to enter the property at reasonable times and in a reasonable manner for the purpose of inspection. This includes the right to enter a property when the City has a reasonable basis to believe that a violation of this ordinance is occurring or has occurred, and to enter when necessary for abatement of a public nuisance or correction of a violation of this ordinance.

(f) Records of Installation and Maintenance Activities. Parties responsible for the operation and maintenance of a stormwater management facility shall make records of the installation and of all maintenance and repairs, and shall retain the records for at least ten years. These records shall be made available to the City during inspection of the facility and at other reasonable times upon request.

Reference Appendix "T" of the Comprehensive Surface Water Management Plan, entitled *Stormwater Management Guidelines for New Development or Redevelopment within the City of St. Louis Park*.

Sec. 12-159. Wetland Protection.

All land disturbing activities, which impact or may impact a wetland, must be in conformance with the City's Wetland Management Plan, which is Appendix "B" of the City's Comprehensive Surface Water Management Plan, as adopted by Council Resolution.

Sec. 12-160. Enforcement.

(a) Violation. Any action, failure to act or land use practice that would impair water quality if allowed to continue, shall constitute a public nuisance and be treated as a misdemeanor under this Code.

(b) Notice of Violation. Whenever the City finds that a person has violated any section of this Code or failed to meet a requirement of this Ordinance, the City shall order compliance by written Notice of Violation to the responsible person. Such notice may require:

1. Monitoring, analyses and reporting;
2. Elimination of illicit discharges or connections;
3. Abatement of pollution and hazards;
4. Restoration of affected property;
5. Remediation of issue;
6. Payment of a fine to cover administrative and remediation costs;
7. Implementation of source control or treatment BMPs; and
8. Other actions as deemed necessary by the City.

If abatement of a violation and/or restoration of affected property is required, the notice shall set forth a deadline within which such remediation or restoration must be completed. The notice shall further advise that, should the violator fail to remediate or restore within the established deadline, the work will be done by the City or other local governmental unit or a contractor and the expense thereof shall be charged to the violator.

(c) Failure to maintain practices. If a responsible party fails or refuses to meet the requirements of the maintenance covenant, the City of St. Louis Park, after reasonable notice, may correct a violation of the design standards or maintenance needs by performing all necessary work to place the facility in proper working condition. In the event that the stormwater management facility becomes a danger to public safety or public health, the City of St. Louis Park shall notify the party responsible for maintenance of the stormwater management facility in writing. Upon receipt of that notice, the responsible person shall have 30 days to effect maintenance and repair of the facility in an approved manner. After proper notice, the City of St. Louis Park may assess the owner(s) of the facility for the cost of repair work and any penalties; and the cost of the work shall be a lien on the property, or prorated against the beneficial users of the property, and may be placed on the tax bill and collected as ordinary taxes by the county.

Sec. 12-161. Appeal of Notice of Violation.

Any person receiving a Notice of Violation may appeal the determination of the City. The notice of appeal must be received within 5 days from the date of the Notice of Violation. Hearing on the appeal before the appropriate authority or designee shall take place within 30 days from the date of receipt of the notice of appeal. The decision of the City or the local government unit or designee shall be final.

Sec. 12-162. Enforcement Measures After Appeal.

If the violation has not been corrected pursuant to the requirements set forth in the Notice of Violation, or, in the event of an appeal, within 5 days of the decision of the City or local government unit upholding the decision of the authorized enforcement agency, then representatives of the authorized enforcement agency shall enter upon the subject private property and are authorized to take any and all measures necessary to abate the violation and/or restore the property. It shall be unlawful for any person, owner, agent or person in possession of any premises to refuse to allow the government agency or designated contractor to enter upon the premises for the purposes set forth above.

Sec. 12-163. Cost of Abatement of the Violation.

Within 30 days after abatement of the violation, the owner of the property will be notified of the cost of abatement, including administrative costs. The property owner must file any objection to the amount of the assessment in writing with the City within 30 days. If the amount due is not paid within a timely manner as determined by the decision of the City or by the expiration of the time in which to file an appeal, the costs shall become a special assessment against the property and shall constitute a lien on the property for the amount of the assessment. Any person violating any of the provisions of this article shall become liable to the City by reason of such violation.

Sec. 12-164. Injunctive Relief.

It shall be unlawful for any person to violate any provision or fail to comply with any of the requirements of this Ordinance. If a person has violated or continues to violate the provisions of this Ordinance, the authorized enforcement agency may petition for a preliminary or permanent injunction restraining the person from activities which would create further violations or compelling the person to perform abatement or remediation of the violation.

Sec. 12-165. Compensatory Action.

In lieu of enforcement proceedings, penalties, and remedies authorized by this Ordinance, the authorized enforcement agency may impose upon a violator alternative compensatory actions, such as storm drain stenciling, attendance at compliance workshops, creek cleanup, and similar programs.

Sec. 12-166. Violations Deemed A Public Nuisance.

In addition to the enforcement processes and penalties provided, any condition caused or permitted to exist in violation of any of the provisions of this Ordinance is a threat to public health, safety, and welfare, and is declared and deemed a nuisance, and may be summarily abated or restored at the violator's expense, and/or a civil action to abate, enjoin, or otherwise compel the cessation of such nuisance may be taken.

Sec. 12-167. Criminal Prosecution.

Any person that has violated or continues to violate this ordinance shall be liable to criminal prosecution to the fullest extent of the law.

The authorized enforcement agency may recover all attorney's fees court costs and other expenses associated with enforcement of this ordinance, including sampling and monitoring expenses.

Sec. 12-168. Remedies Not Exclusive.

The remedies listed in this ordinance are not exclusive of any other remedies available under any applicable federal, state or local law and it is within the discretion of the authorized enforcement agency to seek cumulative remedies.

(Ordinance No. 2264-04, 3-30-04)

Surface Water Management Plan Appendix M1 - Erosion and Sediment Control Plans Guidelines

Outlined below are the city's guidelines for erosion and sediment control plans.

Regulated activities: All projects disturbing 5,000 square feet or excavating, filling or stockpiling 50 cubic yards of material within the city.

Projects meeting minimum threshold must be compliant with the guidelines outlined in this document, the National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General (CSW) and Municipal Separate Storm Sewer System permits (MS4), Minnehaha Creek Watershed District (MCWD), Bassett Creek Watershed Management Commission (BCWMC) or any other regulatory agency having jurisdiction within the city. All plans will be required to adhere to the most stringent requirements applicable.

Exceptions: Emergency activity necessary to protect life or prevent physical harm to a person or property, provided erosion control measures, including necessary remedial action, are implemented as soon as possible.

Erosion and sediment control site plan requirements: Site plan design must be adequate to prevent erosion and the transport of sediment and other pollutants from permitted site to the satisfaction of the city engineer. At a minimum, the site plan must include the following items before the packet is considered complete and review can begin.

1. Plans and specification shall conform to the provision of the city and all other applicable regulatory entities.
2. Provide schedule for overall project construction, phasing and erosion and sediment control plan implementation, maintenance and final stabilization.
3. Show site location including surrounding roads, steep slopes, other significant geographic features, buildings and other significant structures.
4. Show existing and final grades/contours and the direction of flow for all pre- and post-construction runoff from the site. Include areas of grubbing, clearing, tree removal, grading, excavation, fill and other disturbance; areas of soil or earth material storage; quantities of soil or earth material to be removed, placed, stored or otherwise moved on site; and delineated limits of disturbance.
5. Show site property lines.
6. Identity, locate and graphically represent all existing and planned underground utilities concentrated within the project area, where safe, practical and feasible.
7. Identify and show all receiving waterbodies and/or stormwater conveyance systems to which the site discharges. Specify impaired or special management waters status of each receiving waterbody or conveyance system and any existing or proposed wetland buffers on site.

8. Locate all trees and vegetation intended for removal or to be retained. Incorporate installation of protective fencing to exclude all fill and equipment from the drip line or critical root zone, whichever is greater, of all vegetation to be retained.
9. Show all onsite buildings and structures, existing and proposed stormwater management facilities, including, but not limited to: infiltration basins, biofiltration basins, stormwater ponds, porous pavers, underground storage and swales
10. Locate all proposed runoff control, erosion prevention, sediment control and temporary and permanent soil stabilization BMPs, including but not limited to: inlet protection, perimeter control, temporary and permanent soil stabilization, concrete wash areas, slope breaks, energy dissipation, rock construction entrance and silt curtains.
11. When silt fence is used, it must conform to Standard Specifications for Construction, Minnesota Department of Transportation, 2018 or as amended.
12. Show areas where compaction is to be prevented and/or mitigated. These areas shall be protected from construction vehicle traffic where practical and feasible. These areas include but are not limited to: filtration and infiltration stormwater facilities and areas that are proposed to be permanently landscaped as green space.
13. Location of all onsite, existing and proposed stormwater management facilities, including, but not limited to: infiltration basins, biofiltration basins, stormwater ponds, porous pavers, underground storage and swales.
14. Location of any wetland buffers on site (existing or to be established).
15. Provide site inspection plan to include the following:
 - a. Maintain inspection and maintenance records on site with the erosion control plan and made available at the city's request within 24 hours.
 - i. City performs inspections twice a week and within 24 hours after a 2.5-inch rainfall event.
 - b. Date and time of inspection.
 - c. Name of person conducting inspections.
 - d. Findings of inspection, including recommendations for corrective actions and corrective actions taken, including dates, times and party completing maintenance activities.
 - e. Date and amount of rainfall events greater than 0.5 inches within 24 hours.
16. Provide the credentials and contact information of a qualified/ adequately trained erosion control supervisor who will be responsible for implementing the erosion and sediment control plan and/or SWPPP.
17. Identify Best Management Practices (BMPs) to minimize erosion.
18. All exposed soils shall be stabilized within seven days of inactivity.
19. Slopes along surface waters require soil stabilization within 72 hours.
20. Slopes greater than 3:1 require a category three erosion control blanket.
21. Identify BMPs to minimize sedimentary and other pollutant discharges.

22. All down gradient slopes will have adequate sediment and pollutant controls that will not allow sediment or other pollutants to overtop or to undermine the BMPs.
23. Dewatering activities are regulated by the city, the Minnesota Department of Natural Resources and the Metropolitan Council Environmental Services (see the city's dewatering webpage for permitting information).

<https://www.stlouispark.org/government/departments-divisions/engineering/engineering-permits/dewatering-permit>
24. All dewatering activities require an individual site plan to be submitted to the city engineer and must include, at a minimum, sampling protocol for selected pollutants, identification and protection plan for downstream receiving waters, adequate treatment process to reduce pollutants and to protect downstream receiving waters.
25. Plans shall provide that stockpiles of soil or other materials subject to erosion by wind or water shall be covered, vegetated and install effective sediment controls at the base of stockpiles on the downgradient perimeter in accordance with the amount of time the material will be on site and the manner of its proposed use.
26. Provide BMP maintenance timelines and practices per NPDES CSW and MS4 permit guidelines:
 - a. Guidelines for maintenance of sediment control BMPs (24 hours).
 - b. Implementation of erosion control BMPs (no greater than seven days).
 - c. Stabilize ditches and outfalls with adequate BMPs (24 hours).
27. Define the management practices of solid and hazardous wastes per NPDES CSW and MS4 permit guidelines
 - a. Storage, handling and disposal of construction products, materials and wastes: The permittee(s) shall comply with the following to minimize the exposure to stormwater of any of the products, materials or wastes. Products or wastes which are either not a source of contamination to stormwater or are designed to be exposed to stormwater are not held to this requirement:
 - i. Building products that have the potential to leach pollutants must be under cover (e.g., plastic sheeting or temporary roofs) to prevent the discharge of pollutants or be protected by a similarly effective means designed to minimize contact with stormwater.
 - ii. Pesticides, herbicides, insecticides, fertilizers, treatment chemicals and landscape materials must be under cover (e.g., plastic sheeting or temporary roofs) to prevent the discharge of pollutants or be protected by similarly effective means designed to minimize contact with stormwater.
 - iii. Hazardous materials and toxic waste, including oil, diesel fuel, gasoline, hydraulic fluids, paint solvents, petroleum-based products, wood preservatives, additives, curing compounds and acids, must be properly stored in sealed containers to prevent spills, leaks or other discharge. Restricted access storage areas must be provided to prevent vandalism. Storage and disposal of hazardous waste or materials must be in compliance with Minn. R. ch. 7045 including secondary containment as applicable.

- iv. Solid waste must be stored, collected and disposed of properly in compliance with Minn. R. ch. 7035.e. Portable toilets must be positioned so that they are secure and will not be tipped or knocked over. Sanitary waste must be disposed of properly in accordance with Minn. R. ch. 7041.
 - b. Fueling and maintenance of equipment or vehicles; spill prevention and response: The permittee(s) will take reasonable steps to prevent the discharge of spilled or leaked chemicals, including fuel, from any area where chemicals or fuel will be loaded or unloaded, including the use of drip pans or absorbents, unless infeasible. The permittee(s) must conduct fueling in a contained area unless infeasible. The permittee(s) must ensure adequate supplies are available at all times to clean up discharged materials and that an appropriate disposal method is available for recovered spilled materials. The permittee(s) must report and clean up spills immediately as required by Minn. Stat. § 115.061, using dry clean up measures where possible.
 - c. Vehicle and equipment washing: No vehicle washing or engine degreasing is allowed on site.
 - d. Concrete and other washouts waste: The permittee(s) must provide effective containment for all liquid and solid wastes generated by washout operations (concrete, stucco, paint, form release oils, curing compounds and other construction materials) related to the construction activity. The liquid and solid washout wastes must not contact the ground, and the containment must be designed so that it does not result in runoff from the washout operations or areas. Liquid and solid wastes must be disposed of properly and in compliance with Minnesota Pollution Control Agency (MPCA) rules. A sign must be installed adjacent to each washout facility that requires site personnel to utilize the proper facilities for disposal of concrete and other washout wastes.
- 28. Provide design calculations for the use of temporary sediment basins for sites greater than five acres.
- 29. Plan must implement construction phasing, maintain vegetative buffer strips, horizontal slope grading and minimize the need for disturbance.
- 30. Projects adjacent to special or impaired waters must preserve a 50-foot natural buffer or, if a buffer is infeasible on the site, provide redundant (double) perimeter sediment controls when a surface water is located within 50 feet of the project's earth disturbances and stormwater flows to the surface water. Install perimeter sediment controls at least five feet apart, unless limited by lack of available space. Natural buffers are not required adjacent to road ditches, judicial ditches, county ditches, stormwater conveyance channels, storm drain inlets and sediment basins. If preserving the buffer is infeasible, the reasons why must be documented in the SWPPP. Sheet piling is a redundant perimeter control if installed in a manner that retains all stormwater.
- 31. Additional site plan design may be required to meet Total Maximum Daily Load (TMDL) requirements.
 - 32. Review of erosion and sediment control plan cannot begin until all of these aforementioned criteria have been met.
- 33. Provide soils engineering and geology report. The city engineer may request of the following information:
 - a. Data and information obtained from the requested site investigation.

- b. Description of the types, composition, permeability, stability, erodibility and distribution of existing soils on site.
 - c. Description of site geology.
 - d. Conclusions and revisions, if any, to the proposed land-disturbing activity at the site or erosion control plan, including revisions of plans and specifications.
34. Plans shall provide that all fabric fences used for erosion and sedimentation control and all other temporary controls will not be removed until the city has determined that the site has been permanently re-stabilized and will be removed within 30 days thereafter.

Construction activity requirements: During the construction process, the owner and contractor must maintain site-wide compliance as defined within their SWPPP, NPDES CSW and MS4 permits and local watershed standards.

1. All plans will be required to adhere to the most stringent requirements of the aforementioned organizations.
2. All erosion and sedimentation controls proposed for compliance with this rule shall be in place before any land-disturbing activity commences.

Final stabilization plan: The plan to establish permanent perennial vegetative cover to prevent erosion of the soil must include the following:

1. Final soil stabilization and or landscaping plan.
2. Specific vegetation species and locations within the project.
3. Performance standard and schedule for desired vegetative cover.
4. Permanent stabilization of all areas subject to land disturbance, retention of native topsoil on site wherever practical and feasible and specify at least six inches of topsoil or organic matter be spread and incorporated into the underlying soil during final site treatment wherever topsoil has been removed.
5. Soil amendments and usage of fertilizers.
6. Plans must state that all fabric fences used for erosion and sedimentation control and all other temporary controls will not be removed until the city has determined that the site has been permanently re-stabilized and will be removed within 30 days thereafter.
7. Long-term vegetation maintenance practices.

Project closeout: The following outlines the city's project certification and permit closeout procedures to ensure the project has been completed in conformance with the plans and specifications developed for projects.

1. Permittee shall provide the city engineer with an as-built grading plan as defined in the city's erosion and sediment control plan requirements and design guidelines (section 02050 standard specifications).
2. The city will withhold all securities until the certified as-built grading plan has been approved by the city engineer.

Material testing and quantity verification requirements: Permittees and contractors are required to work closely with city to ensure that the installation, application, location and quantity of the selected erosion and sediment control BMP are in conformance with the approved plans and specifications for the project. The city reserves the right to refuse any work that is not in conformance with the approved plans and specifications for the project or is deemed to be inadequate due to existing conditions.

Surface Water Management Plan Appendix M2 – Stormwater Management Requirements

Outlined below are the City of St. Louis Park’s guidelines for stormwater management.

Stormwater management requirements: The stormwater management plan must detail how runoff and associated water quality impacts resulting from the project will be managed. This plan must indicate whether stormwater will be managed on-site or off-site and the general location and type of practices. Stormwater management plans must be compliant with National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General (CSW) and Municipal Separate Storm Sewer System permits (MS4), Minnehaha Creek Watershed District, Bassett Creek Watershed Management Commission (BCWMC) or any other regulatory agency having jurisdiction within the city, and the erosion and sediment control guidelines.

All plans will be required to adhere to the most stringent requirements applicable. Permittees are encouraged to use the Minnesota Stormwater Manual (MPCA, 2018) for additional guidance.

Regulated activities: A stormwater management plan is required for all new development and redevelopment projects which result in site disturbance that is one acre or greater or any project that proposes 10,000 square feet of new impervious surface.

Exemption: Construction of single-family homes is exempt from this requirement but is encouraged to comply with it.

Stormwater management plan requirements: A plan must be submitted to the city which describes how runoff and associated water quality impacts resulting from the development will be controlled or managed. This plan must indicate whether stormwater will be managed on-site or off-site and, if on-site, the general location and type of practices. This final plan must be signed by a licensed professional engineer (PE), who will verify that the design of all stormwater management practices meets the submittal requirements of the city’s Environment and Public Health code.

1. Phosphorus control

- a. New development projects subject to this rule must result in no net increase in phosphorus loading from existing conditions, on an annual average basis.
- b. Redevelopment projects subject to this rule must result in a net new reduction in phosphorus loading from existing conditions, on an annual average basis.
- c. **Within BCWMC Jurisdiction:** If an applicant is unable to achieve the performance goal because site restrictions make it infeasible or it is prohibited by the MPCA, then the applicant must implement the flexible treatment options, as shown in the [BCWMC Design Sequence Flow Chart in Appendix A](#). Using the flow chart, applicants are taken through a step-by-step approach to document site restrictions and how they have attempted to meet the 1.1 inches performance goal. If the performance goal is shown to be infeasible, a 0.55-inch performance and a 75 percent annual total phosphorus removal goal is explored, followed by a maximum extent practicable volume reduction and a 60 percent annual total phosphorus removal goal, and then a final option to meet the 1.1 inches volume reduction goal at an off-site location

2. Total suspended solids
 - a. New development projects subject to this rule must result in no net increase in total suspended solids loading from existing conditions, on an annual average basis.
3. Redevelopment projects subject to this rule must result in a net reduction in total suspended solids loading from existing conditions, on an annual average basis. The stormwater management system must be design so that the water quality volume will discharge through the soil surface or filter media in 48 hours or less. Additional flows that cannot be infiltrated or filtered in 48 hours should be routed to bypass the system through a stabilized discharge point.
4. Rate control:
 - a. For all projects subjected to this rule, the site design will provide on-site facilities for post-construction conditions to ensure that discharge rates from the 6-inch 24-hour rainfall event is no greater than the existing discharge rates from a 4.2-inch 24-hour rainfall event.
 - b. **Within BCWMC Jurisdiction:** Proposed, nonlinear projects containing one or more acres of new and/or fully reconstructed impervious surfaces must manage stormwater runoff such that peak flow rates leaving the site are equal to or less than the existing rate leaving the site for the 2-, 10-, and 100-year events based on Atlas 14 precipitation amounts and using a nested 24-hour rainfall distribution. See Table 1 below applicable Atlas 14 rainfall depths for the city.

Table 1: Atlas 14 Rainfall Depths for City of St. Louis Park, MN

| Storm Event | Depth, inches |
|------------------------------------------|---------------|
| 50% annual probability (2-year) 24-hour | 2.9 |
| 10% annual probability (10-year) 24-hour | 4.3 |
| 1% annual probability (100-year) 24-hour | 7.4 |

5. Volume control: For all projects subjected to this rule, the stormwater management plan must provide for the abstraction of the first one inch of rainfall from the site's impervious surface.
 - a. New development projects subject to this rule will result in no net increase of stormwater discharge volume, on an annual average basis, unless prohibited by the stormwater management limitations.
 - b. Redevelopment projects subject to this rule will result in a net reduction of stormwater discharge volume, on an annual average basis, unless prohibited by the stormwater management limitations.

- c. **Within BCWMC Jurisdiction:**
- i. **New development:** Proposed new, nonlinear developments that create more than one acre of new impervious surface on sites without restrictions shall capture and retain onsite 1.1 inches of runoff from the new impervious surfaces. If the performance goal is not feasible and/or is not allowed for a proposed project, then the applicant must implement the flexible treatment options, as shown in the [BCWMC Design Sequence Flow Chart in Appendix A](#). Site restrictions include those factors listed in the BCWMC flexible treatment options, which include, but are not limited to MPCA's prohibited site conditions.
 - ii. **Redevelopment:** Nonlinear redevelopment projects on sites without restrictions that create one or more acres of new and/or fully reconstructed impervious surfaces shall capture and retain onsite 1.1 inches of runoff from the new and/or fully reconstructed impervious surfaces. If the performance goal is not feasible and/or is not allowed for a proposed project, then the applicant must implement the flexible treatment options, as shown in the [BCWMC Design Sequence Flow Chart in Appendix A](#). Site restrictions include those factors listed in the BCWMC flexible treatment options, which include, but are not limited to MPCA's prohibited site conditions.
 1. Mill and overlay and other resurfacing activities are not considered fully reconstructed impervious surfaces. Trails and sidewalks are exempt from BCWMC water quality performance standards. Buffers should be provide for trails and sidewalks where possible.
 - iii. **Linear Project:** Linear projects on sites without restrictions that create one or more acres of net new impervious surfaces shall capture and retain onsite 1.1 inches of runoff from the net new impervious surfaces. If the performance goal is not feasible and/or is not allowed for a proposed project, then the applicant must implement the flexible treatment options, as shown in the BCWMC Design Sequence Flow Chart in Appendix A. Site restrictions include those factors listed in the BCWMC flexible treatment options, which include, but are not limited to MPCA's prohibited site conditions.
 1. Mill and overlay and other resurfacing activities are not considered fully reconstructed impervious surfaces.
 2. Net new impervious surface calculations will be based on the street surface from back of curb to back of curb; trails/sidewalks (as noted above) and driveways are not included in the net new impervious surface calculations.
6. Complete at least one soil boring, test pit or infiltrometer test in the location of the infiltration practice for determining infiltration rates. Field measured infiltration rates must be divided by two as a safety factor or soil boring results with the infiltration rate chart in the Minnesota Stormwater Manual (MPCA, 2018) at the start of the project to determine design infiltration rates. When soil borings indicate type A soils, field measurements should be performed to verify the rate is not above 8.0 inches per hour. Infiltration is prohibited if the field measured infiltration rate is above 8.0 inches per hour.

7. Complete MPCA's contamination screening checklist or self-conducted assessment to determine the suitability for infiltration. Permittees must retain the checklist or assessment with the SWPPP. For more information and to access the MPCA's contamination screening checklist, see the Minnesota Stormwater Manual (MPCA, 2018) at the start of design of the project.
 - b. Existing drainage, including pre-developed drainage areas, land use and the direction of flow for each area and travel path used to determine the time of concentration.
 - c. Final drainage, including post-developed drainage areas, land use and the direction of flow for each area and travel path used to determine the time of concentration.
 - d. Off-site catchment areas draining to the site. Provide two-foot contours. Show land use and the direction of flow for each area and travel path used to determine the time of concentration.
 - e. Existing public and private utilities.
 - f. All receiving waters, including wetlands
 - g. Property limits, labeled streets, lot and block information if platted, and street address if unplatted.
 - h. Building pads, type of house to be built, garage floor elevation, lowest floor elevation and lowest opening elevation are shown.
 - i. Driveway slope, from garage to the gutter.
 - j. Lowest opening elevation: minimum 2 feet above 100-year high water level (HWL) and minimum one foot above emergency overflow elevation.
 - k. Pipe size, length, grade and material.
 - l. Top of castings and all inverts of catch basins and manholes
 - m. Labeled storm drain structures
8. Overflow design to be considered for events greater than storm sewer system design event.
9. Infiltration/filtration
 - a. Refer to the Minnesota Stormwater Manual (MPCA, 2018) at the start of design of the project for specific infiltration/filtration practices.
 - b. Infiltration systems will meet volume control standards set by the city.
 - c. Filtration systems will achieve approximately 80 percent removal of total suspended solids.
 - d. During construction of infiltration or filtration systems, rigorous erosion prevention and sediment controls (e.g. diversion berms) should be used to keep sediment and runoff completely away from the infiltration or filtration area.
 - i. The area must be staked off and marked so that heavy construction equipment will not compact the soil in the proposed infiltration or filtration area.
 - e. Infiltration or filtration systems should not be excavated to final grade until the contributing drainage area has been constructed and fully stabilized.
 - ii. Pretreatment practices are required for filtration and infiltration basins.

10. Calculations or computer model results that demonstrate the design adequacy of the infiltration or filtration system.

Stormwater management design requirements: The following must be included in the stormwater management plan and design:

1. Provide proposed drainage plan and hydraulic calculations dated and signed by a licensed professional.
2. Locate and describe existing vegetation, areas not to be disturbed, on-site soil characteristics and groundwater elevations
3. Drainage Area Maps
 - a. Clearly draw and label two-foot contours
 - i. Existing contours are dashed and proposed are solid.
 - ii. Where applicable, extend existing 2-foot contour lines a minimum 100 feet beyond the site boundary or more to accurately depict the drainage patterns.
 - b. Existing drainage, including pre-developed drainage areas, land use and the direction of flow for each area and travel path used to determine the time of concentration must be mapped.
 - c. Final drainage, including post-developed drainage areas, land use and the direction of flow for each area and travel path used to determine the time of concentration must be mapped
 - d. Show existing public and private utilities.
 - e. Show all receiving waters, including wetlands
 - f. Show Property limits, labeled streets, lot and block information if platted, and street address if un-platted
 - g. Show building pads, type of house to be built, garage floor elevation, lowest floor elevation and lowest opening elevation are shown. Show lowest opening elevation: minimum 2 feet above 100-year high water level (HWL) and minimum one foot above emergency overflow elevation.
 - h. Show driveway slope, runoff from garage to the gutter.
 - i. Show pipe size, length, grade and material.
 - j. Detail top of castings and all inverts of catch basins and manholes
 - k. Label existing and proposed storm drain structures
 - l. Delineate infiltration or filtration areas.
 - m. Provide adequate maintenance access (typically 12 feet wide)
4. Scaled drawing of infiltration or filtration BMP, with typical detail and typical cross section. Outline area which runoff is directed to the BMP. As part of the drawing set submittal, provide (in table form) the following information.
 - a. A long-term inspection and maintenance plan for all permanent stormwater treatment practices
 - b. Existing and proposed drainage easements shown and labeled.

- c. All existing and proposed lot corner elevations shown to the nearest tenth of a foot.
 - d. Control/spot elevations for drainage ways provided.
5. A way to visually verify that the system is as designed must be provided.
 6. Appropriate on-site testing is required and must be development and redevelopment projects consistent with the recommendations in the Minnesota Stormwater Manual (MPCA, 2018) at the start of design of the project. Testing shall be conducted to verify soil types, infiltration capacity characteristics, and to ensure a minimum of three feet of separation from the seasonally saturated soils (or from bedrock) and the bottom of the proposed infiltration system.

Buffer Requirements within BCWMC Jurisdiction

1. Width

- a. Wetland Buffer Width Requirements must meet the average minimum buffer widths according to the Minnesota Rapid Assessment Method (MnRAM) classification and as follows:
 - i. An average of 75 feet and a minimum of 50 feet from the edge of wetlands classified as Preserve.
 - ii. An average of 50 feet and a minimum of 30 feet from the edge of wetlands classified as Manage 1.
 - iii. An average of 25 feet and a minimum of 15 feet from the edge of wetlands classified as Manage 2 or Manage 3.

A plan showing the delineated boundary of the wetland, proposed buffer area, and MnRAM classification for the wetland must be submitted for city review. Maintenance of the buffer area must be included in the maintenance agreement developed between the city and the applicant.

- b. Stream Buffer Width Requirements: Adjacent to priority streams stream buffer width must be 10 feet or 25 percent of the distance between the ordinary high water level (i.e., the top of the bank of the channel) and the nearest existing structure, whichever is less.

A plan showing the ordinary high water level of the stream (i.e., the top of the bank of the channel), nearest adjacent structure, and proposed buffer area must be submitted for city review. Maintenance of the buffer area must be included in the maintenance agreement developed between the city and the applicant.

2. Design

- a. Buffer required for all proposed projects shall be limited to property owned or managed by the applicant (i.e. to the extent of a drainage and utility easement owned by a city on a city stormwater project or to the property boundary on a commercial, institutional, or residential project).
- b. Buffer areas must be left native if not disturbed as part of the project and where acceptable natural vegetation exists. A buffer has acceptable natural vegetation if it:
 - i. Has a continuous, dense layer of perennial grasses that have been uncultivated or unbroken for at least five consecutive years, or

- ii. Has an overstory of trees or shrubs with at least 80 percent canopy closure that have been uncultivated or unbroken for at least five consecutive years, or
 - iii. Contains a mixture of the plant communities described above that have been uncultivated or unbroken for at least five consecutive years.
 - c. Buffer areas must be planted with native plants if disturbed as part of the project (plantings must be comprised of at least 75% native species).
 - d. Soil in the buffer areas disturbed as part of the project shall be amended, as necessary, to ensure that the soil has an organic content of not less than 10 percent and not more than 35 percent.
 - e. Buffers must be kept free of all structures and features, including fences and play equipment.
 - f. Buffers shall not be used for storage of household and personal items, lawn equipment, furniture, firewood, parts, yard waste, and the like.
 - g. A conservation easement or equivalent to the city for the buffer area is recommended to ensure appropriate maintenance of the buffer.
 - h. Buffer vegetation must not be cultivated, cropped, pastured, mowed, fertilized, subject to the placement of mulch or yard waste, or otherwise disturbed, except for periodic cutting or burning that promotes the health of the buffer, actions to address disease or invasive species, mowing for purposes of public safety, temporary disturbance for placement or repair of buried utilities, or other actions to maintain or improve buffer quality and performance.
 - i. The edge of the buffer must be indicated by permanent, free-standing markers at the buffer's upland edge. A marker will be placed along each lot line, with additional markers at an interval of no more than 200 feet or where needed to indicate the contour of the buffer area.
- 3. Maintenance: The affected property owner or homeowner association that is responsible for the maintenance must:
 - a. Maintain and repair damage to buffer areas from such activities as mowing, cutting, grading or other prohibited activities, unless mowing is approved by city staff as a buffer management BCWMC Buffer Requirements. Permission must be obtained from the city before implementing buffer management strategies, which may include mowing, burning, and the use of herbicides.
 - b. Be responsible for maintaining only the permitted vegetation in the buffer area and must remove all noxious weeds and invasive, non-native species such as European buckthorn.
 - c. Ensure that all soil surfaces in the buffer area are planted with the permitted vegetation and that there is no open soil surface that may result in erosion.
- 4. Exemptions: Exempted areas from buffer requirements must be properly designed, maintained, and constructed to prevent erodible conditions. These areas are:
 - a. Public recreational facilities adjacent to the feature (e.g. trails, stairways, and docks) up to 20 feet in width will be allowed, with that width being added to the required buffer width.

- b. Minimally improved areas within the buffer for private access to the feature will be allowed (e.g. wood chip trails, stairways, and docks).

A perpendicular access to the feature is allowed up to 20 feet in width or 20 percent of the lot width, whichever is more restrictive.

Stormwater management limitations

1. Permittee will fully attempt to comply with the appropriate performance goals described above. Options considered and presented will examine the merits of relocating project elements to address varying soil conditions and other constraints across the site. If full compliance is not possible due to any of the factors listed below, the permittee must document the reasons why in the SWPPP.
2. Volume reduction techniques considered will include infiltration, reuse and rainwater harvesting, and canopy interception and evapotranspiration and or other commonly accepted techniques included in the Minnesota Stormwater Manual (MPCA, 2018) at the start of design of the project. Higher priority will be given to BMPs that include volume reduction. Secondary preference is to employ filtration techniques, followed by rate control BMPs. Factors to be considered for each alternative will include following restricted and prohibited site conditions.

Restricted infiltration areas

1. Poor soils (infiltration rates that are too low or too high, above 8.0 inches per hour, or problematic urban soils).
2. Within 1,000 feet up-gradient, or 100 feet down-gradient of active karst features.
3. Zoning, setbacks or other land use requirements.

Prohibited infiltration areas

1. Constructing infiltration systems within a drinking water supply management area (DWSMA) is prohibited if the system will be located:
 - a. In an Emergency Response Area (ERA) within a DWSMA classified as having high or very high vulnerability as defined by the Minnesota Department of Health.
 - b. In an ERA within a DWSMA classified as moderate vulnerability unless a regulated MS4 permittee performed or approved a higher level of engineering review sufficient to provide a functioning treatment system and to prevent adverse impacts to groundwater.
 - c. Outside of an ERA within a DWSMA classified as having high or very high vulnerability, unless a regulated MS4 permittee performed or approved a higher level of engineering review sufficient to provide a functioning treatment system and to prevent adverse impacts to groundwater.
2. Where industrial facilities are not authorized to infiltrate industrial stormwater under an NPDES/SDS, CSW, MS4 and industrial stormwater permits issued by the MPCA.
3. Where vehicle fueling, and maintenance occur.

4. With less than three feet of separation distance from the bottom of the infiltration system to the elevation of the seasonally saturated soils or the top of bedrock.
5. Where high levels of contaminants in soil or groundwater will be mobilized by the infiltrating stormwater. Prohibited areas or other land use requirements.

Mitigation provisions: In the case that infiltration practices cannot be implemented on site, steps must be taken to mitigate stormwater runoff volume, rate and pollutant reduction. This may include off-site or regional treatment for additional volume retention, additional pollutant or reduction. The city engineer and all permitting agencies must approve all mitigation projects and document who is responsible for the long-term maintenance of the facility.

1. Mitigation projects must involve the creation of new structural stormwater BMPs, the retrofit of an existing structural stormwater BMPs, or the use of a properly designed regional structural stormwater BMP.
2. Routine maintenance of structural stormwater BMPs already required by this permit cannot be used to meet mitigation requirements of this part.
3. Mitigation projects shall be completed within two years after the start of the original construction activity.
4. The city's engineering department will determine and document who will be responsible for long-term maintenance on all mitigation projects of this part.
5. If a regional project has been identified, the City of St. Louis Park may consider a cash payment from the owner and/or operator of a construction activity for mitigation purposes in lieu of the owner or operator of that construction activity meeting the conditions for post-construction stormwater management. Upon receipt of a cash payment in lieu of onsite treatment, a project must be implemented with the designated funds. Mitigation projects must be completed within two years upon the start of construction of the project.
6. Mitigation projects are selected in the following order of preference:
 - a. Locations that yield benefits to the same receiving water that receives runoff from the project.
 - b. Locations within the same watershed area as the original project.
 - c. Locations in the next adjacent upstream watershed.
 - d. An alternate location within the City of St. Louis Park.
5. **Within BCWMC jurisdiction:** If the infiltration practices and/or performance goal is not feasible and/or is not allowed for a proposed project, then the applicant must implement the flexible treatment options, as shown in the [BCWMC Design Sequence Flow Chart in Appendix A](#).

Maintenance: All stormwater management structures and facilities must be designed for maintenance access and properly maintained in perpetuity to ensure they continue to function as designed. Permit permittees must provide a maintenance plan that identifies and protects the design, capacity and functionality of on-site and off-site stormwater management facilities; specifies the methods, schedule and responsible parties for maintenance; provides for the maintenance in perpetuity of the facility; and contains at a minimum the requirements in the City of St. Louis Park's standard maintenance declaration. The plan will be recorded on the deed in a form acceptable to the district. A public entity assuming the maintenance obligation may do so by filing with the district a document signed by an official with authority.

Alternative volume reduction and treatment practices: Green infrastructure techniques and practices (including, but not limited to, infiltration, evapotranspiration, reuse/harvesting, conservation design, urban forestry, green roofs), will be given preference as design options consistent with zoning, subdivision and planned unit development requirements. Alternative practices must follow requirements and recommendations in the Minnesota Stormwater Manual (MPCA, 2018) at the start of project design.

Shoreland Protection: All new and redevelopment projects are required to comply with the MnDNR's model shoreland management requirements.

Floodplain Requirements: All new and redevelopment projects **with the BCWMC jurisdiction** that will have floodplain affects must comply with BCWMC Floodplain Policy.

St. Louis Park: Minnehaha Creek Watershed District Coordination Plan

Purpose

On January 11, 2018, the Minnehaha Creek Watershed District (“MCWD” or “the District”) adopted its fourth-generation watershed management plan (Plan). The MCWD Plan sets forth the District’s vision, priorities, and organizational philosophy, which centers on recognizing the natural environment as an integral component of vibrant communities to create a sense of place, provide vital connections, and enhance social and economic value. This philosophy stems from the District’s balanced urban ecology policy, which states that successful, sustainable communities are built on a foundation of integrated land use and water planning through early coordination with partners. To ensure that early and consistent coordination becomes second nature to both MCWD and its partners, the District, through its authority under Minnesota Statutes 103B and 103D and Minnesota Rules 8410, requires all municipalities to develop and implement a coordination plan.

Background

The MCWD has identified the Minnehaha Creek corridor, of which the city of St. Louis Park (“the city” or “St. Louis Park”) is a part, as a priority area of focus for the 2018–2027 plan cycle. Minnehaha Creek is an iconic resource that connects St. Louis Park to surrounding communities and a system of urban parks, lakes, and open spaces. Since the area’s urbanization in the 1950s, the Minnehaha Creek system has been ditched, riparian wetlands have been filled, and the creek corridor has been fragmented by development. As a result, runoff volumes and pollutant loads have increased, infiltration and base flow have decreased, the ecological integrity of the system has been negatively impacted, and the community asset value of this resource has been overlooked. As a result, Minnehaha Creek and downstream Lake Hiawatha are on the State of Minnesota’s Impaired Waters List. The management strategies that the MCWD has identified focus on stormwater management to reduce runoff volume and pollutant loading, stream restoration to improve habitat and water quality, and creek corridor restoration to improve the ecological integrity of the system and integrate the corridor into the community.

Since 2010, the city and MCWD have proactively coordinated public and private development to manage regional stormwater and expand and connect the riparian Minnehaha Creek Greenway to the St. Louis Park community. Through the early coordination of land use planning and innovative public and private partnerships, the effort, to date, has resulted in hundreds of acres of regional stormwater management, two miles of restored stream, over ten acres of wetland restoration, public access to over 50 acres of previously inaccessible green space, and two miles of new trail networks. Building on these shared endeavors, MCWD will continue to focus within the area of St. Louis Park—part of the Minnehaha Creek Greenway—to continue the corridor restoration and stormwater management effort while achieving the community’s goals of St. Louis Park.

Coordination Plan

This coordination plan is intended to serve as a framework for the city and MCWD to reinforce a collaborative relationship and promote the integration of land use and water planning to maximize outcomes. The plan aims to identify known partnership opportunities and provide a framework for the

identification and effective coordination of future opportunities by defining clear expectations and roles. The coordination plan may be adjusted and expanded throughout the plan cycle as the city and MCWD deem appropriate. The primary contacts responsible for implementation of the coordination plan are the St. Louis Park water resources manager and the District's policy planning manager.

Annual Meeting

The city and MCWD staff members will meet during the first quarter of each year to discuss the following:

- St. Louis Park surface water management plan (SWMP) implementation and progress
- Land use planning efforts by the city (e.g., small area plans, rezoning studies, and resiliency plans)
- A capital improvement program (CIP) for each organization, including stormwater, roads and utilities, and parks
- Regulatory coordination and significant development and redevelopment activity
- Areas for improved coordination and process improvement

This meeting will be initiated by the city and include representatives from the following departments:

- St. Louis Park: Engineering and Community Development
- MCWD: Policy Planning, Project Planning, and Permitting

Partnership Opportunities

There are several known partnership opportunities that the city and MCWD will continue to coordinate, and these opportunities are summarized below:

1. Southwest Light Rail Transit (SWLRT) Trail, Meadowbrook Road Connection

St. Louis Park, MCWD, and other public and private partners have implemented a series of initiatives to expand the public realm along Minnehaha Creek known as the Minnehaha Creek Greenway. These improvements aim to restore and enhance the creek ecology, water quality, and the riparian corridor while connecting the community to newly accessible open space and connecting pedestrian trails to transit. The SWLRT project provides for a key connection across Minnehaha Creek at Meadowbrook Road. The city and MCWD have coordinated the SWLRT plan review to ensure that the project accommodates a critical trail connection under the newly proposed bridges over Minnehaha Creek to the Cedar Regional Trail.

SWLRT construction is anticipated to begin in 2019. It is expected that St. Louis Park and MCWD will collaborate on the design and construction of the new trail connection and the associated riparian corridor improvements with the timing of the SWLRT bridge construction in the area of the trail crossing.

Lead staff: MCWD project planning manager and St. Louis Park senior engineering project manager

2. Oxford-Louisiana Drainage Area Improvements

The MCWD and city are working together to explore opportunities to reduce stormwater volume and nutrient loading to Minnehaha Creek in the area of the future Louisiana Station (SWLRT). This includes a shared exploration of regionally treating stormwater and improving the ecological function in the Louisiana and Oxford roadway corridors. This effort requires an ongoing coordination between MCWD, the city, and private development partners to determine opportunities for regional stormwater management.

Lead staff: MCWD project planning manager and St. Louis Park senior engineering project manager

3. Louisiana Avenue Improvements

Reconstruction of Louisiana Avenue between Oxford Street and Excelsior Boulevard includes the cycle track and a widening of the sidewalk along the road, which will connect the Louisiana SWLRT Station to the Minnehaha Creek Greenway trail system. Additionally, the project calls for a new bridge over Minnehaha Creek, which will increase the vertical clearance under the bridge for Minnehaha Creek Greenway trail users and avoid an at-grade crossing. This effort requires ongoing coordination between MCWD and the city to determine opportunities to enhance the Minnehaha Creek Greenway for trail users.

Lead staff: MCWD project planning manager and St. Louis Park senior engineering project manager

4. Target Knollwood Planning

The MCWD and Target Corporation executed a memorandum of understanding to examine floodplain restoration, stormwater management opportunities, and creek corridor enhancement at various Target Corporation sites in the Twin Cities. In St. Louis Park, this shared effort will focus on floodplain restoration and stormwater management to address localized flooding and runoff in the Minnehaha Creek Greenway at Target's Knollwood location. MCWD and the St. Louis Park staff will coordinate with the Target Corporation and advise on opportunities to advance shared goals for the site. This effort will require an ongoing coordination between Target, MCWD, and the city to determine opportunities for road realignment, floodplain restoration, and stormwater management at the Knollwood Target site.

Lead staff: MCWD project planning manager and St. Louis Park senior engineering project manager

5. Twin Lakes Subwatershed Improvements

MCWD has acquired \$490,000 of capital to invest in the Twin Lakes subwatershed through an agreement established with LifeTime Inc. Per the agreement, funds are to be utilized for nutrient removal within the minor subwatershed (or downstream resources if no viable options are found). Nutrient removal must, at a minimum, achieve 7.2 pounds of total annual phosphorus reduction and 28,734 cubic feet of abstraction. St. Louis Park and MCWD staff have committed to coordinating any planned development and municipal capital investments within the subwatershed to identify opportunities to meet these goals.

Lead staff: MCWD permitting program manager and St. Louis Park water resources manager

CIP Planning and Coordination

The city maintains a 10-year CIP on municipal projects, including stormwater infrastructure rehabilitation, maintenance, and management. Every year, all aspects of the CIP are evaluated for relevance, priority, and budgetary considerations and adjusted accordingly. The process generally begins in April, with a review of the CIP by division leads in the engineering, parks and recreation, and public works departments as well as the city manager. This process takes approximately six weeks and concludes with a presentation to and approval by the city council. During the process, division leads and their community liaisons, reach out to their partners to discuss the status of existing opportunities and to identify new ones. This adaptive process allows the city to adjust the CIP for new opportunities and move others to different positions as St. Louis Park and its partners change their priorities.

The city understands that the process of aligning investments begins at the concept stage of project development and recognizes that the MCWD may offer technical, planning, and financial assistance to initiatives that align well with MCWD goals. Below are opportunities to align investments as presented in the SWMP CIP. Specifics about MCWD's involvement in each opportunity are difficult to convey. As a result, each opportunity will be discussed in detail during the annual meeting, and MCWD's involvement will be divulged.

1. Rainwater Rewards Program (2019–2026): This program provides financial and technical assistance in the form of grants to residents for implementing projects that protect and restore stormwater by capturing pollutants in rainwater runoff, increase the watershed's ability to store water, preserve and restore native plant and wildlife communities, and protect and preserve groundwater quality and quantity. For grant applicants within MCWD, St. Louis Park will coordinate with the District to determine whether there are opportunities to enhance each applicant's request and offer additional assistance.
2. Louisiana Station Area Project (2019): This project provides flood storage and mitigation in areas along and adjacent to Louisiana Avenue and Oxford Street and in areas along Minnehaha Creek to help facilitate redevelopment of the proposed SWLRT Louisiana and Wooddale stations. St. Louis Park will work with the District to identify funding opportunities and ways to collaborate on project designs, permitting, and floodplains and wetlands mitigation.
3. Edgewood Business Park Project (2019): This project will identify and assess flood-prone areas in the city that were not included in the Federal Emergency Management Flood Insurance Rate Map study. The project will provide additional floodplain storage and or flood proofing of buildings within the Edgewood Business Park area. The city will work with the District to identify funding opportunities and ways to collaborate on hydrology and hydraulics model development and project design analysis.
4. Aquila Park Water Quality Improvement Project (2020): This project uses an existing public space, Aquila Park, for stormwater treatment and volume control through infiltration. The basis for this project is the removal of suspended solids and phosphorous from stormwater runoff to meet the waste load allocation for St. Louis Park, assessed as part of the Lake Hiawatha Total Maximum Daily Load (TMDL) study. St. Louis Park will work with the District on stormwater and water quality modeling, site information, project design analysis and permitting, and potential funding opportunities.

5. Minnehaha Creek Equalizer Pipe Projects (2021): This project consists of installing a one-direction equalizer pipe in the Minnehaha Creek meander between Hillsboro Avenue and 31st Street. This meander of Minnehaha Creek was cut off before the 1930s when a rail line was constructed. The rail line was removed in the 1960s, and a sanitary sewer was installed along the same alignment. During periods of high water along Minnehaha Creek, the area becomes inundated, and water overtops the existing berm and is trapped with no exit. The water becomes stagnant and produces algae and odors that affect wildlife and adjacent residents. St. Louis Park will work with the District on the hydrologic and hydraulic modeling of Minnehaha Creek to locate site information, project design analysis and permitting, and potential funding opportunities.
6. Louisiana Oaks and South Oak Water Quality Project (2021): This project uses an existing lift station at South Oak Pond to pump water to a proposed filtration system for water quality treatment (removal of phosphorus and suspended solids) before the water is discharged to Minnehaha Creek. The basis for this project is the removal of suspended solids and phosphorous from stormwater runoff to meet the waste load allocation for St. Louis Park, assessed as part of the Lake Hiawatha TMDL study. The city will work with the District on the stormwater and water quality modeling, site information, project design analysis and permitting, and potential funding opportunities.
7. Ainsworth Park Water Quality Improvement Project (2022): This project uses an existing public space, Ainsworth Park, for stormwater treatment and volume control through infiltration. The basis for this project is the removal of suspended solids and phosphorous from stormwater runoff to meet the waste load allocation for St. Louis Park, assessed as part of the Lake Hiawatha TMDL study. The city will work with the District on the stormwater and water quality modeling, site information, project design analysis and permitting, and potential funding opportunities.
8. Keystone Park Water Quality Improvement Project (2025): This project uses an existing public space, Keystone Park, for stormwater treatment and volume control through infiltration. The basis for this project is the removal of suspended solids and phosphorous from stormwater runoff to meet the waste load allocation for St. Louis Park, assessed as part of the Lake Hiawatha TMDL study. The city will work with the District on the stormwater and water quality modeling, storm sewer surcharge assessments, site information and investigation for potential infiltration, project design analysis and permitting, and potential funding opportunities.
9. Lake Street Water Quality Improvement Project (2026): This project uses existing public space along Lake Street and Brunswick Avenue for stormwater treatment and volume control through infiltration. The basis for this project is the removal of suspended solids and phosphorous from stormwater runoff to meet the waste load allocation of St. Louis Park, assessed as part of the Lake Hiawatha TMDL study. The city will work with the District on the stormwater and water quality modeling, storm sewer surcharge assessments, gather site information and investigation for potential infiltration, project design analysis and permitting, and potential funding opportunities.

Operation and Maintenance

St. Louis Park and MCWD coordinate on the operations and maintenance of shared capital investments throughout the city. They expect, as more projects are constructed, collaboration on operations and maintenance activities will increase.

1. Twin Lakes Park: St. Louis Park and MCWD, in partnership with the City of Minneapolis and Hennepin County, constructed water quality basins in Twin Lakes Park pursuant to the 1994 Clean Water Partnership Agreement. MCWD and St. Louis Park coordinate the operation and maintenance of these facilities according to a 2010 maintenance agreement.
2. Minnehaha Preserve: St. Louis Park and MCWD coordinated the design, construction, and maintenance of a set of integrated improvements for the Reach 20 restoration, now named the Minnehaha Preserve. Improvements include stream channel restoration, stormwater facilities, educational pavilion, wayfinding and educational signage, trails, bridges, and the boardwalk. St. Louis Park and MCWD share the operation and maintenance of this city park according to the terms of the project agreement and the second agreement.

Lead staff: MCWD project and land management technician and St. Louis Park water resources manager

Regulatory Coordination

To streamline the regulatory process and identify opportunities to maximize the integration of water resource features into projects, the city's engineering and community development departments will route requests for significant land use approvals to MCWD during the concept plan phase or soon after. Regulatory coordination will be done as follows. :

1. The city will host and facilitate pre-application meetings and permit reviews with MCWD early in the planning process
2. St. Louis Park will support MCWD in construction site and compliance inspections and associated corrective actions
3. MCWD will apprise the city of water resource violations and expectations for compliance.
4. St. Louis Park will require documentation of the required MCWD permits in advance of issuing applicable city permits. The approved MCWD permits will be stored with other project documentation for future reference.
5. St. Louis Park road, infrastructure, facilities, and land improvements will be coordinated as part of the annual meeting and early in the CIP process so that the regulatory process may be efficient and the integrated water and natural resource improvements may be explored.

Lead staff: MCWD permitting program manager and St. Louis Park water resources manager

Public Outreach and Education

St. Louis Park will implement the education and outreach initiatives outlined in its Stormwater Pollution Prevention Program. St. Louis Park and MCWD collaborate on public outreach, educational activities, and workshops annually. Current initiatives include Resilient Yard Workshops, Winter Maintenance Training, and volunteer coordination opportunities. Ongoing collaborations will include programing throughout the Minnehaha Creek Greenway, specifically within the Minnehaha Preserve, as we leverage the value of the education pavilion and community connections that this expanded trail system and park space will provide.

Lead staff: MCWD communications and education manager and St. Louis Park water resources manager

Reporting and Data Sharing

Additionally, St. Louis Park will:

- Transmit the annual National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System (MS4) report to the MCWD
- Notify the MCWD of:
 - Updates to road and infrastructure implementation programs
 - Updates to park and recreation plans
 - Rainwater Reward grant applications
 - Creation and completion of small area plans and other focused development or redevelopment planning within the District
 - Significant changes to the city's MS4 program or infrastructure

DRAFT

Bassett Creek Watershed Management Commission

This coordination plan framework (“Framework”) ensures coordination and holistic planning between the City of St. Louis Park (“the city”) and Bassett Creek Watershed Management Commission (BCWMC). The Framework defines the roles and responsibilities of each entity, annual and regulatory coordination activities, and organizational contacts.

2. Coordination Plan Framework

2.1 Annual Meeting

The city and BCWMC staff members will meet during the first quarter of each year to discuss the following:

- Prior year-end summary: completed projects, challenges and opportunities encountered, and lessons learned
- Drafting annual National Pollutant Discharge Elimination System (NPDES) and Municipal Separate Storm Sewer System (MS4) permit reports
- Education and outreach activities for the current year
- Capital improvement program and projects (CIPs) for the current fiscal year and a three-year outlook

This meeting, which will be initiated and hosted by the city’s Water Resources Manager each year, will be facilitated in a manner necessary to ensure that this partnership is always looking for ways to leverage the value of St. Louis Park’s natural resources to enhance community connections and the built environment.

ANNUAL MEETING REQUIRED COORDINATION

- Conduct a Doodle poll or an equivalent means to set the annual meeting date
- Solicit agenda topics related to the areas highlighted
- Draft and transmit the meeting agenda
- Host and facilitate the meeting
- Send meeting summary and action items list to participants five business days after the meeting

| Table 1. Required Participants for the Annual Meeting | |
|-------------------------------------------------------|-----------------------------------------------|
| City of St. Louis Park | Bassett Creek Watershed Management Commission |
| ✓ Water Resources Manager | ✓ Administrator |
| ✓ Senior Engineering Project Manager | ✓ Commission Engineer or Consultant |

2.2 Regulatory Coordination

To streamline the regulatory process and identify opportunities to maximize integration of water resources features into projects, the city’s Engineering, and Planning departments will route requests for land use approvals, including but not limited to infrastructure and park improvements, to WMOs at the concept plan phase or soon thereafter. Specific areas of regulatory coordination include the following:

- Permitting
- Private development and redevelopment
- Public development and redevelopment

Table 2. Required Participants for Regulatory Coordination

| City of St. Louis Park | Bassett Creek Watershed Management Commission |
|--------------------------------------|-----------------------------------------------|
| ✓ Water Resources Manager | ✓ Administrator |
| ✓ Senior Engineering Project Manager | ✓ Commission Engineer or Consultant |

2.2.1 Permitting

The following outlines the general permitting process and coordination for the City of St. Louis Park and B CWMC.

1. Early Coordination

- Pre-application discussions and permit reviews will be coordinated with BCWMC.

2. Within BCWMC Jurisdiction

- Administer BCMWC standards through the city’s permitting program.
- Notify BCWMC of application(s) in its jurisdiction within three business days of receipt.

2.2.2 Private development and redevelopment

The city will share known upcoming projects at the annual meeting. The city will inform permit applicants of the potential need for MCWD permits and criteria within BCWMC jurisdiction.

2.2.3 Public development and redevelopment

Because of our strong working relationship with BCWMC, the City is continually seeking opportunities for coordination, which occurs through informal conversations as opportunities arise. Any future efforts, including small area plans, rezoning studies, resiliency plans, or other planning activity, will be shared at the annual meeting.

2.2.4 Electronic connections

The city will maintain a link BCWMC website to its website with a map of the watershed in the City of St. Louis Park.

2.3 Public Outreach and Education

The city will implement the education and outreach initiative outlined in the city’s Storm Water Pollution Prevention Program (see City of St. Louis Park SWPPP, Appendix B) and will continue to provide stormwater programming information and educational materials to the public through its annual newsletter, city mailings, website, and social media outlets. The city will also help to generate and promote WMO educational workshops and events to private homeowners and developers and will coordinate with BCWMC on other educational efforts where possible to avoid duplicative efforts.

| Table 3. Required Participants for Public Outreach and Education | |
|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| City of St. Louis Park | Bassett Creek Watershed Management Commission |
| <ul style="list-style-type: none"> ✓ Water Resources Manager ✓ Volunteer Coordinator ✓ Web Coordinator | <ul style="list-style-type: none"> ✓ Administrator ✓ Commission Engineer or Consultant |

2.4 Aligning Planning and Investments

The city understands that the process of aligning investments begins at the concept stage of project development and recognizes that, in addition to a future competitive grant program, BCWMC may offer technical resources and planning to assist the city in aligning public and private investments. Below are opportunities to align investments as presented in the city’s surface water management plan capital improvement program (CIP).

| Table 4. Required Participants for Aligning Planning and Investments | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| City of St. Louis Park | Bassett Creek Watershed Management Commission |
| <ul style="list-style-type: none"> ✓ Water Resources Manager ✓ Senior Engineering Project Manager ✓ Planning/Zoning Supervisor | <ul style="list-style-type: none"> ✓ Administrator ✓ Commission Engineer or Consultant |

2.4.1 Opportunities for BCWMC

Provide Opportunities for Volunteering: Continue annual partnerships with schools and community volunteer programs for participation in cleaning up trash and debris from parks and areas adjacent to creeks, lakes, and ponds.

Lake and Stream Monitoring: Continue partnership with the Metropolitan Council, and BCWMC on annual monitoring of lakes and streams through the citizen-assisted monitoring program and staff or consultants.

2.4.2 Bassett Creek Watershed Management Commission Project Opportunities

Only a small portion of the city is within the BCWMC watershed boundaries, as such there has not been opportunities to partner together. The Otten Pond Rehabilitation Project (2022) project have been identified for future collaboration effort.