

MEETING DATE: October 10, 2019

TITLE: Approval of Independence Local Water Management Plan

RES. NUMBER: 19-089

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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 October 10, 2019	

PURPOSE or ACTION REQUESTED:

Approval of the City of Independence Local Water Management Plan

PROJECT/PROGRAM LOCATION:

City of Independence

PROJECT TIMELINE:

December 31, 2018	Independence LWMP first draft submitted to MCWD
February 28, 2018	MCWD comments and denial letter sent
August 14, 2019	Independence LWMP revised draft submitted to MCWD
October 1, 2019	MCWD comments sent
October 7, 2019	Independence LWMP final draft submitted to MCWD

PROJECT/PROGRAM COST:

N/A

PAST BOARD ACTION:

December 29, 2011	MCWD approval of Independence local water management plan (11-111)
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.

Independence LWMP Summary:

The City of Independence (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 of Independence occupies approximately 4.8 square miles in the Painter Creek subwatershed of MCWD. The majority of the City (70.5 square miles) is located in the Pioneer-Sarah Creek Watershed Commission. Primary water resources within the MCWD portion of the City include SOBI Marsh, Potato Marsh, and Painter Marsh along Painter Creek. The subwatershed drains Jennings Bay of Lake Minnetonka, which is impaired for nutrients. The lower reaches of Painter Creek are also impaired for *E. coli* bacteria.

The District has identified the Painter Creek subwatershed as a priority area to focus implementation efforts in this plan cycle. Management strategies within the Painter Creek subwatershed will focus on restoring wetland and stream systems in ways that reduce nutrient loading downstream to Jennings Bay, while improving ecological integrity and corridor connectivity within the subwatershed. The MCWD has previously established a partnership with the United States Army Corps of Engineers (USACE), which identified the potential restoration of four major wetland marsh systems within this subwatershed (three of which are in Independence) under the Federal Section 206 Program.

The Independence LWMP references the 2010 USACE report and states that the City will work cooperatively with the MCWD to review land use applications that are received within these project areas and identify opportunities to incorporate restoration projects. Other implementation priorities identified by the City for this plan cycle include regulation of new development, promotion of low impact development, enforcement of the City's manure management policy, and maintenance of the stormwater system.

As a required element of the LWMP, the City has developed a MCWD-City Coordination Plan (attached) which serves as a framework to support ongoing communication and promote value-added collaboration between the City and MCWD. The Coordination Plan covers the following areas: annual meeting, land use planning, regulatory coordination, public infrastructure improvements, and education programming.

The City has not proposed to acquire implementation authority for any MCWD water resource regulation and has proposed that the District retain Local Government Unit status for the Wetland Conservation Act.

Recommendation:

Staff has verified that the LWMP meets the requirements of Minnesota Statutes §103B.235, Minnesota Rules 8410.0160, and the MCWD Watershed Management Plan and recommends approval.

Attachments:

1. Independence Map
2. Independence Coordination Plan
3. Independence LWMP (via website)

RESOLUTION

RESOLUTION NUMBER: 19-089

TITLE: **Approval of Independence 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 Independence (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 March 20, 2019, and the MCWD has fully considered the comments; and

WHEREAS, the LWMP states that the City does not choose to exercise sole regulatory authority but, instead, wishes that the MCWD continue to require permits for the use and development of land, and otherwise exercise its regulatory authority, within the meaning 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 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";

NOW, THEREFORE, BE IT RESOLVED, that the MCWD hereby approves the City of Independence Local Water Management Plan; 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 19-089 was moved by Manager _____, seconded by Manager _____.
Motion to adopt the resolution ___ ayes, ___ nays, ___ abstentions. Date: _____.

Secretary Date: _____.

then north to the Mississippi River and water from the MCWD drains to Lake Minnetonka and Minnehaha Creek then east to the Mississippi River.

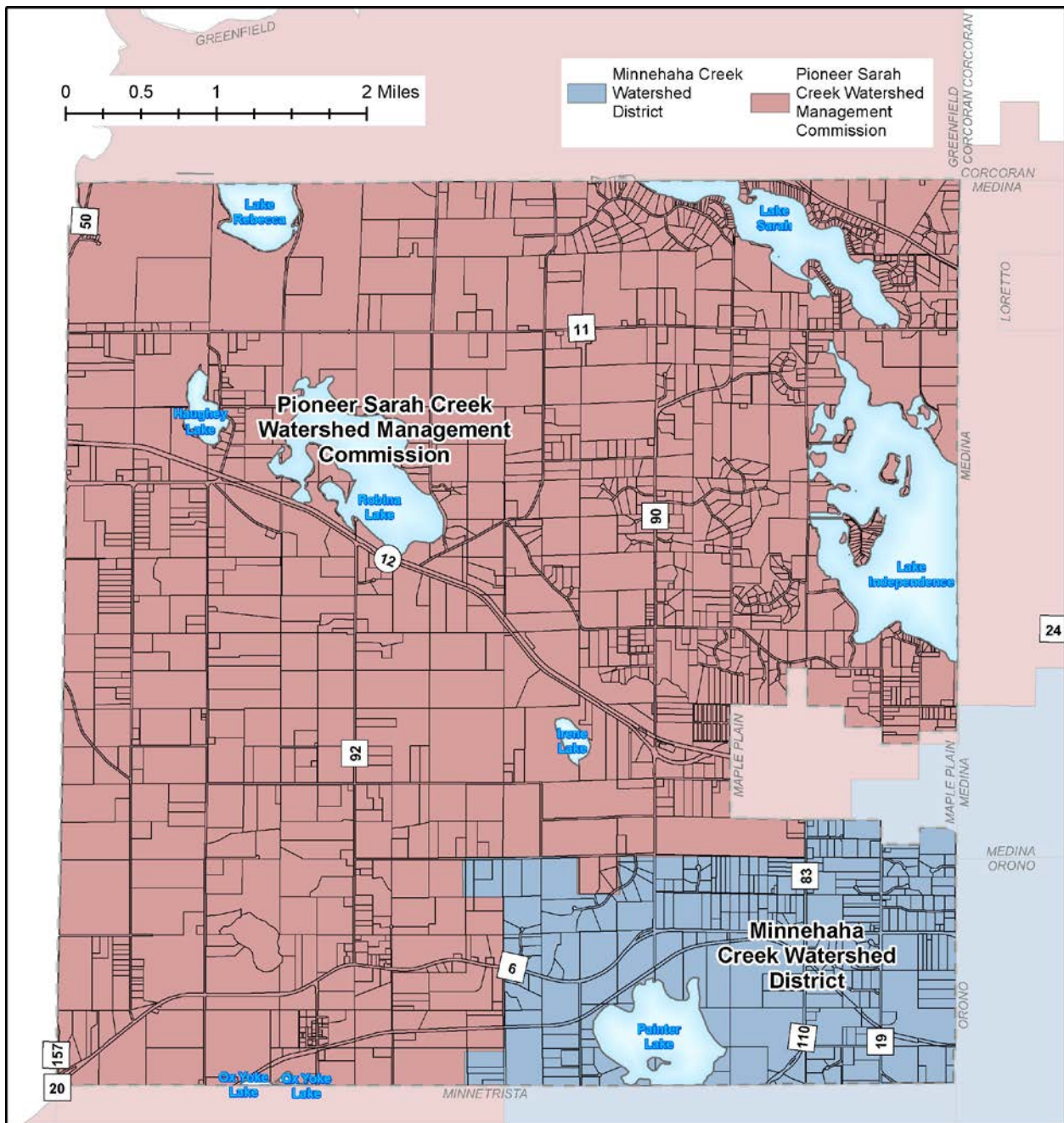


Figure 2-2. Watershed Jurisdictions

With the existing creeks and ditches in place, the drainage patterns for the City of Independence are fairly well defined. This plan divides the City into four major watersheds; they include Painter Creek, Pioneer Creek, Sarah Creek, and South Fork Crow River, as shown on Figure 2-3. Each of these four major watersheds is further divided into subwatersheds. Each subwatershed is

INDEPENDENCE – MCWD COORDINATION PLAN

Background

Minnehaha Creek Watershed District (MCWD/District) has defined its role as a regional water planning agency through its Water Management Plan. The Plan focuses on partnership with the land use community and incorporates a subwatershed focus to address areas of significant resources needs with a level of complexity that requires sustained effort and coordination across multiple partners. Within the City of Independence, the MCWD has identified the Painter Creek subwatershed as a priority area of focus for the 2018-2027 plan cycle. The Painter Creek subwatershed contains a number of large wetlands, many of which have been ditched or altered. The subwatershed also includes areas of high quality wetland and upland, including regionally significant ecological areas. The Painter Creek system delivers high phosphorus loads to Jennings Bay of Lake Minnetonka which is listed as impaired and requires the second largest load reduction within the District. Painter creek is also impaired by excess E. coli bacteria.

Purpose

The Minnehaha Creek Watershed District's (MCWD) approach to water resource planning recognizes the environmental, social and economic value created when built and natural systems work in harmony. Through its Water Management Plan the MCWD emphasizes early coordination of land use and water resources planning with Cities to integrate water resources goals with other public and private goals to add this broader value and quality of life to the community. To maintain awareness of needs and opportunities to implement projects that reflect the cooperation of other public and private partners, align investments, and secure a combined set of District, City and partner goals, the MCWD requests that cities establish a coordination plan as part of the Local Water Management Plan that the City and MCWD can implement at a staff level.

Improving coordination between land use planning at the City and watershed planning at the MCWD at the conceptual level planning phase will result in better projects that meet agency goals and are a more efficient use of public funds. Early coordination and collaboration between entities is the key to maximizing shared water resource goals and community goals for private redevelopment and public capital improvements. Through this coordination, it is the intent of the City to efficiently manage water quality concerns and maximize the asset value of the City's natural resources in the future. Commitment of MCWD resources relies on the level of City coordination at the early stages project planning as outlined in this plan.

Coordination Plan

The following coordination plan will be adjusted and expanded as deemed appropriate by the City and MCWD during implementation. The City Planner is the primary City contact and the Planning Policy Manager will be the District contact for the coordination plan.

1. Annual meeting. City and MCWD staff will meet during the first quarter of each year to review the following:
 - a. National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer Systems (MS4) reports and activity from the previous year
 - b. Draft Capital Improvement Plans (CIP) or budgeting for each organization for the upcoming year. The City will focus coordination of the Streets, Stormwater and Park

budgets with MCWD.

- c. Opportunities for early or improved coordination and review of land use change applications
- d. Regulatory coordination to identify areas of collaboration
- e. Areas for improved coordination and process improvement.
- f. Public Education plans, resources and opportunities.

2. Land Use Planning

- a. The City will continue to coordinate with MCWD to implement water resource priorities identified in the MCWD Watershed Management Plan; align local plans and capital investment to identify opportunities where local investments intersect with natural resource goals. Through on-going coordination of land use planning and changes the City and MCWD will adaptively evaluate project opportunities.
- b. Specific opportunities to improve water quality of the system have been identified through a previously established partnership between the MCWD and United States Army Corps of Engineers. These include the potential restoration of four major wetland systems that would be eligible for funding under the Federal Section 206 Program.
- c. Key Conservation areas- The City will assist MCWD in the preservation of those areas identified by MCWD by considering them in land use and zoning decisions.

3. Regulatory Coordination. The City staff will continue to route requests for land use approvals to the District in an effort to maximize water resource benefits and streamline regulatory processes. Specific areas of regulatory coordination include the following:

- a. The City will continue to rely on MCWD to maintain authority for reviewing and approving applications for compliance with MCWD's rules and enforcing those rules as necessary. The City will rely on the water resource management standards set forth by MCWD
- b. The City will require documentation of required MCWD permits in advance of issuing applicable City permits. Approved MCWD permits will be stored with other project documentation for future reference.
- c. Pre-application meetings and permit reviews will be coordinated with MCWD early in the planning process as necessary.
- d. The City will continue to collaborate with MCWD on construction site inspections and compliance.
- e. MCWD will keep the City apprised of water resource violations and expectations for compliance.
- f. The primary person responsible for regulatory coordination at the City of Independence is the City Planner and the Permitting Program Manager at MCWD
- g. The City and MCWD will include each other in the notification protocols for Illicit Discharges.

4. Public Infrastructure Improvements. The City of Independence staff will continue to route significant infrastructure improvements (streets, stormwater conveyance, and parks in particular) to the MCWD as early in the planning process as possible in order to maximize resourcing opportunities, reduce any regulatory process delays and solicit any best practice expertise/ experience.

- a. Infrastructure and land improvements that require MCWD permits will be coordinated early in the planning and design process so that the regulatory process

may be efficient and integrated water and natural resource improvements may be explored.

- b. The City will brief the MCWD on the public road improvement and CIP budgets each year at the annual meeting. The City intends to coordinate applicable projects at the concept stage of project development, partner on competitive grant programs and leverage MCWD technical resources and planning assistance.
5. Education coordination and partnership. The City and MCWD's Communication and Education Program will coordinate on information sharing and promotional materials.

DRAFT



City of
Independence

WATERSHED MANAGEMENT PLAN

October 2019



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1.0 Introduction and Executive Summary

1.1 Purpose of the Plan

The City of Independence is located in western Hennepin County. The City has an abundance of water resources, which include numerous wetlands, several large lakes, wooded areas, parks, and recreational lands. This plan provides the framework to be followed to preserve these resources as the City develops.

This plan was prepared to fulfill the legal requirements of the Metropolitan Surface Water Planning Rules (Chapter 8410). This plan also meets the policies and requirements of the Pioneer-Sarah Creek Watershed Management Commission (PSCWMC) and the Minnehaha Creek Watershed District (MCWD) and other local, state, and federal agencies.



1.2 General Approach to Planning

The general approach to water resource planning focuses on wetland protection, water quality, flood control, and stormwater pollution prevention; each are described below.

1.2.1 Wetland Protection

Stormwater runoff carries soil particles, nutrients, and contaminants, which can change the ecological balance of the receiving waterbody. Changes in the volume or rate of stormwater entering or discharging from the waterbody can also change the ecological balance. Change in the ecological balance of a wetland often results in changes in the water quality, changes in animal and fish habitat, replacement of native vegetation with invasive and tolerant plant species, and/or other impacts to the wetland's functions and values.

The State of Minnesota has published a guidance document which develops a methodology for determining the susceptibility of wetlands to degradation by stormwater input. This methodology relates wetland type



to a level of susceptibility as shown in Table 3-1. Wetlands such as bogs and fens can be easily degraded by changes in the stormwater inflows and are designated as highly susceptible. On the other hand, floodplain forests can tolerate relatively significant changes in the chemical and physical characteristics of stormwater inflow without degradation and are therefore slightly susceptible. Commonly observed shallow marshes and wet meadows dominated by cattail and reed canary grass (respectively) have a moderate susceptibility to stormwater fluctuations.

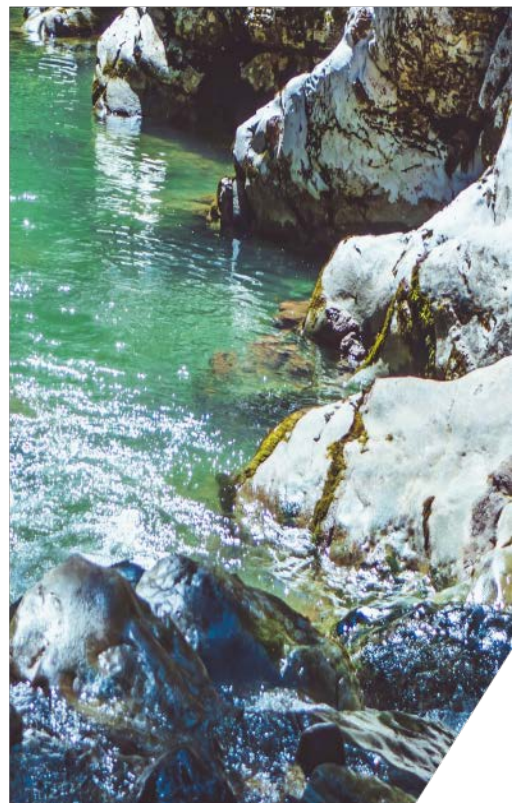
Wetland management standards were developed to determine how and when stormwater should be routed through a wetland to minimize potential impacts. These standards, shown in Table 3-2, were largely based on the state guidance document. These standards determine tolerable hydrologic change in terms of bounce (difference between the peak flood elevation and the wetland elevation), inundation period (time that flood waters temporarily stored in the wetland exceed the wetland elevation), and runout control (elevation of the outlet).

These standards provide guidance for the management of stormwater to minimize wetland impacts. It is assumed that wetland impacts will be minimized, and existing wetland functions and values will be maintained if the proposed management system and criteria meet the management standards shown in Table 3-2.

The federal Clean Water Act (CWA) as well as Minnesota's Wetland Conservation Act (WCA) regulate wetland impacts and other wetland issues. The U.S. Army Corps of Engineers administers the CWA, and the Local Government Unit (LGU) administers the WCA. The City is the LGU within Pioneer-Sarah Creek watershed, and MCWD is the LGU within its boundaries.

1.2.2 Water Quality Protection

Within the City of Independence, there are hundreds of waterbodies ranging in size from lakes to small stormwater detention basins. Nonpoint 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



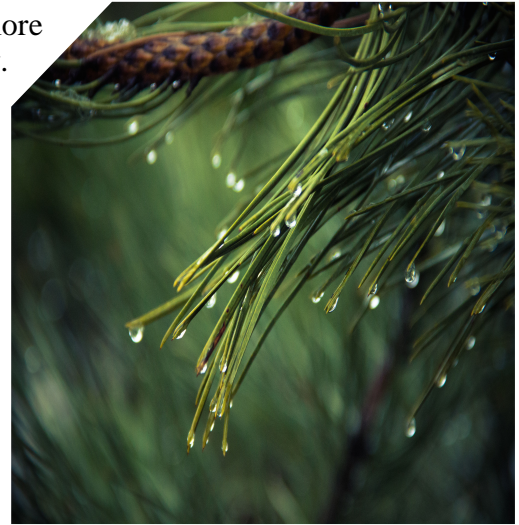
usually indicates a situation where the resource receives more nutrients, or other pollutants, than can be processed naturally. Planning for water quality protection is necessary to preserve the beneficial uses of existing waterbodies, as well as to evaluate wetland impacts as described above.

Five Total Maximum Daily Loads (TMDLs) studies have been done within the City. TMDLs mandate the maximum allowable load of a pollutant from a point source into a receiving waterbody. The Lake Independence TMDL (2007), Lake Sarah TMDL (2011), Upper Minnehaha Creek TMDL (2014), Pioneer-Sarah Creek TMDL (2017), and South Fork Crow River TMDL (2019) report impaired waters, which helps the City prioritize areas for improvement. The City works with PSCWMC and MCWD in determining water quality projects. Pollutant reduction that works towards TMDL goals are reported in annual municipal small separate storm sewer reports.

The Clean Water Act also has provisions that regulate water quality referred to as antidegradation policy, in which each state is required to adopt their own policy. Minn. Rules 7050.0250 – 7050.0335 regulates the antidegradation laws; the purpose of which is to maintain and protect existing uses and level of water quality, minimize degradation of high water quality, and maintain and protect exceptional characteristics of outstanding resource value waters. The policy is generally implemented through Minnesota Pollution Control Agency (MPCA)-issued control documents such as the National Pollutant Discharge Elimination System permits.

1.2.3 Flood Control

The flood and rate control portion of the planning consisted of estimating the 100-year flood elevation and discharge rate for each watershed. Independence has vast amounts of stormwater storage available in its wetlands and lakes. This storage was used in the development of the ultimate conditions hydrologic model for the City. The ultimate pipes were designed to take advantage of the large storage areas while maintaining the overall discharge rate leaving the City borders.



1.2.4 Stormwater Pollution Prevention Program

As required by the Clean Water Act, the City of Independence has prepared a Stormwater Pollution Prevention Program (SWPPP). The SWPPP is a requirement of the National Pollutant Discharge Elimination System (NPDES) General Permit No. MNR040000, which authorizes Municipal Separate Storm Sewer System (MS4) operators to discharge stormwater. The goal of the Stormwater Pollution Prevention Program, when implemented, is to reduce the discharge of pollutants into receiving waters to the Maximum Extent Practicable. The Stormwater Pollution Prevention Program has been established in the City ordinance in Sections 508, 509, and 725.

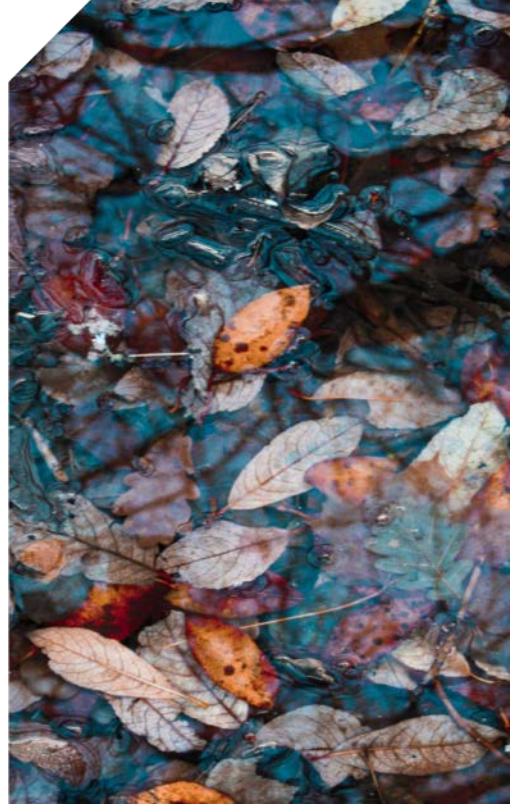
There are six minimum control measures outlined below that are required to be included in the Stormwater Pollution Prevention Program, with each using a number of different Best Management Practices (BMPs). The six minimum control measures are as follows:

1. Public Education and Outreach

Public education and outreach are a major component of the SWPPP. Through education and outreach programs the operator of a MS4 can reduce the impacts on the receiving waters. The City has an implementation plan that outlines their process to reach out to residents regarding illicit discharge and other pertinent stormwater issues.

2. Public Participation/Involvement

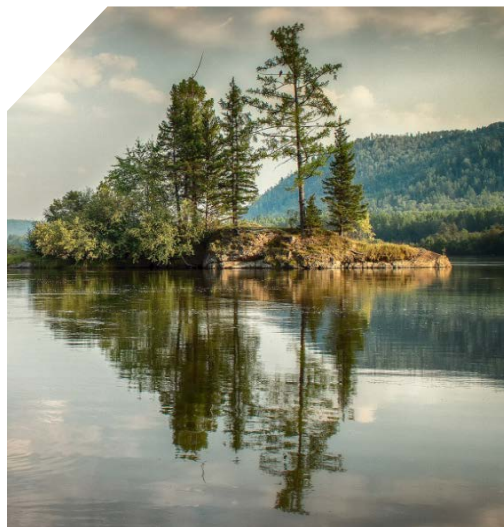
Public participation is encouraged to receive input from the public on the SWPPP. Public input may be used as a gauge to determine the effectiveness of the SWPPP and associated BMPs. Based on public input, the City of Independence may modify components of the SWPPP if deemed beneficial. A public hearing is held once per year during the City's



council meetings.

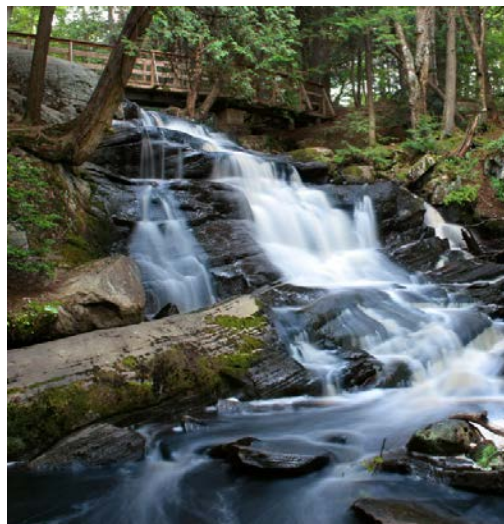
3. Illicit Discharge Detection and Elimination

City Ordinance Section 725 – Stormwater Utilities outlines the regulatory mechanism for illicit discharge. The City of Independence is required to prohibit non-stormwater discharges into the MS4. Annual inspections looking for illicit discharge indicators are conducted on all outfalls, structural BMPs, and one-fifth of stormwater ponds. If any possible illicit discharge is detected, the City implements its Emergency Response Procedure (ERP).



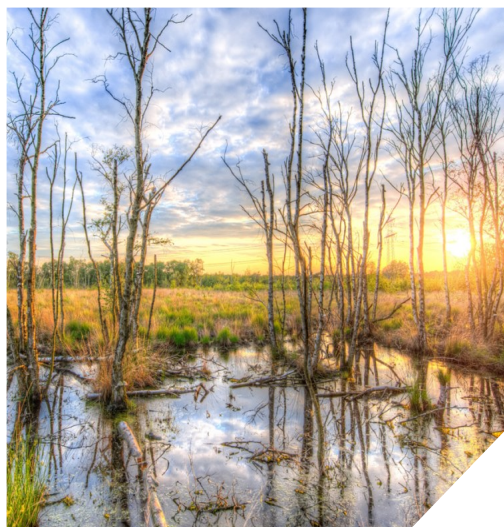
4. Construction Site Stormwater Runoff Control

All construction activities which disturb greater than one acre of land, and construction activities which disturb less than one acre but are part of a larger common plan of development or sale is regulated by City Ordinance Section 508 – Erosion and Sediment Control, which limits the amount of sediment entering downstream waters. The City conducts inspections on these developments to ensure compliance.



5. Post-Construction Stormwater Management in New Development and Redevelopment

City ordinance section 509 – Stormwater Management regulates development and redevelopment to ensure there is no increase or a net decrease, respectively, in runoff volume, total phosphorus, and total suspended solids. All projects disturbing one or more acres of land or where the volume of soil moved is 100 or more cubic yards are required to be reviewed. The



City evaluates these projects for compliance and analyzes all potential water resource related impacts before issuing a permit.

6. Pollution Prevention/Good Housekeeping

The City of Independence operates and maintains the storm sewer system in a manner so as to reduce the discharge of pollutants to the maximum extent practicable. Key components for good housekeeping are: inspecting the MS4 outfalls, stormwater ponds, all exposed stockpiles, and material handling and storage areas, as well as ensuring all field staff are trained in recognizing and responding to stormwater issues. Records of the inspections are retained, including the date of the completion of repairs and major additional protection measures.

1.3 Management Goals and Policies

As part of the planning process, goals and policies were developed for the management of resources within Independence. Goals propose the desired end, and policies provide the means to achieve the goals. Goals and policies are provided for wetlands; water quality; water quantity; erosion control; groundwater; public ditch systems; recreation, fish, and wildlife; enhancement of public participation, information, and education; floodplains; low impact development; and shorelines and streambanks. The goals and policies of this plan are presented in Section 4, and Section 5 – Plan Implementation provides more specific details on how the goals and policies will be achieved.

1.4 Plan Organization

The Plan is organized as follows:

- **Section 1** presents the Introduction and Executive Summary.
- **Section 2** presents the City's physical and resource-related information.
- **Section 3** presents the wetland, water quality, and water quantity management strategies and problem areas.
- **Section 4** presents the City's water resource goals and policies.
- **Section 5** presents the implementation strategies to accomplish the goals and policies.
- **Section 6** presents inventory data and management information for each of the four major watersheds within the City.
- **Section 7** outlines the procedures for amending this Plan.
- **Section 8** presents the required submittals for a development.
- **Section 9** presents a description of the Hydrology Model used for the plan.
- **Section 10** presents the glossary of terms.

2.0 Physical Environment Inventory

2.1 Climate

Independence and the Twin Cities area have a temperate climate, characterized by wide variations in temperature, ample rainfall, and moderate snowfall. Table 2-1 shows the historical average monthly temperature, precipitation, and snowfall data.

In an average year, the freeze-free period for the area is long enough that the stable crops of the area reach maturity without much danger from frost. The 50% probability of temperatures of 32° or lower can be expected between September 27 and May 12.

Precipitation patterns are influenced by two well-defined systems. Strong southerly winds from the Gulf of Mexico are the main source of moisture. A diffuse secondary system from the Pacific Ocean also adds to annual rain and snowfall. Precipitation occurs as rain, freezing rain, hail, and snow. Tornadoes, severe thunderstorms, and hailstorms occur occasionally and are of short duration. Measurable precipitation of 0.01-inch occurs on about 117 days per year, 6 of which have one-inch or more. Annual normal precipitation is approximately 31 inches, of which approximately two-thirds occurs during the summer months of May through September.

The annual snowfall in Independence averages approximately 54 inches. Runoff from snowmelt can occur any time during the winter. The most severe snowmelt runoff conditions usually occur in March and early April, especially when rain falls on top of the snowpack.

Table 2-1
Average Monthly Temperature, Precipitation, and Snowfall Data for
Minneapolis/St. Paul Metropolitan Area (1981-2010)

<u>Month</u>	<u>Average Temp F°</u>	<u>Precip. Inches</u>	<u>Snowfall Inches</u>
January	15.6	0.90	12.2
February	20.8	0.77	7.7
March	32.8	1.89	10.3
April	47.5	2.66	2.4
May	59.1	3.36	0.0
June	68.8	4.25	0.0
July	73.8	4.04	0.0
August	71.2	4.30	0.0
September	62.0	3.08	0.0
October	48.9	2.43	0.6
November	33.7	1.77	9.3
December	19.7	1.16	11.9
Annual Average:	46.2	Total: 30.61	Total: 54.4

Source: State Climatology Office for the Minneapolis/St. Paul Airport (1981-2010)

2.2 Precipitation Measurement Station

The State Climatology Office has a long-term precipitation station at the Minneapolis/St. Paul International Airport. This station was selected to be used as a reference for any entity conducting future water quality or quantity studies in Independence. The current thirty-year normal (1981-2010) for annual precipitation at the station is 30.61 inches.

2.3 Topography and Landforms

The topography in Independence is a result of glaciations that ended approximately 10,000 to 12,000 years ago. The topography has been influenced by two major glacial events: The Superior Lobe and the Grantsburg Lobe. These two events resulted in two general landscape units within Independence. The west central portion of the City, west of County Road 92, is part of the Corcoran Till Plain and is the best farmland in the community. The land is gently rolling with wet basins, low knolls, and ridges. Many of the soils in the area have a high seasonal water table and are unsuitable for dense residential developments utilizing conventional on-site sewage treatment systems.

The balance of the City is in the Loretto Highlands, which is a landscape with more relief containing soils with more clay content. Steep slopes, deep marshes, and poorly drained upland flats dominate the landscape. More details about area geology can be found in the Hennepin County Geologic Atlas from the Minnesota Geological Society. A topographic map of Independence is shown on Figure 2-1.

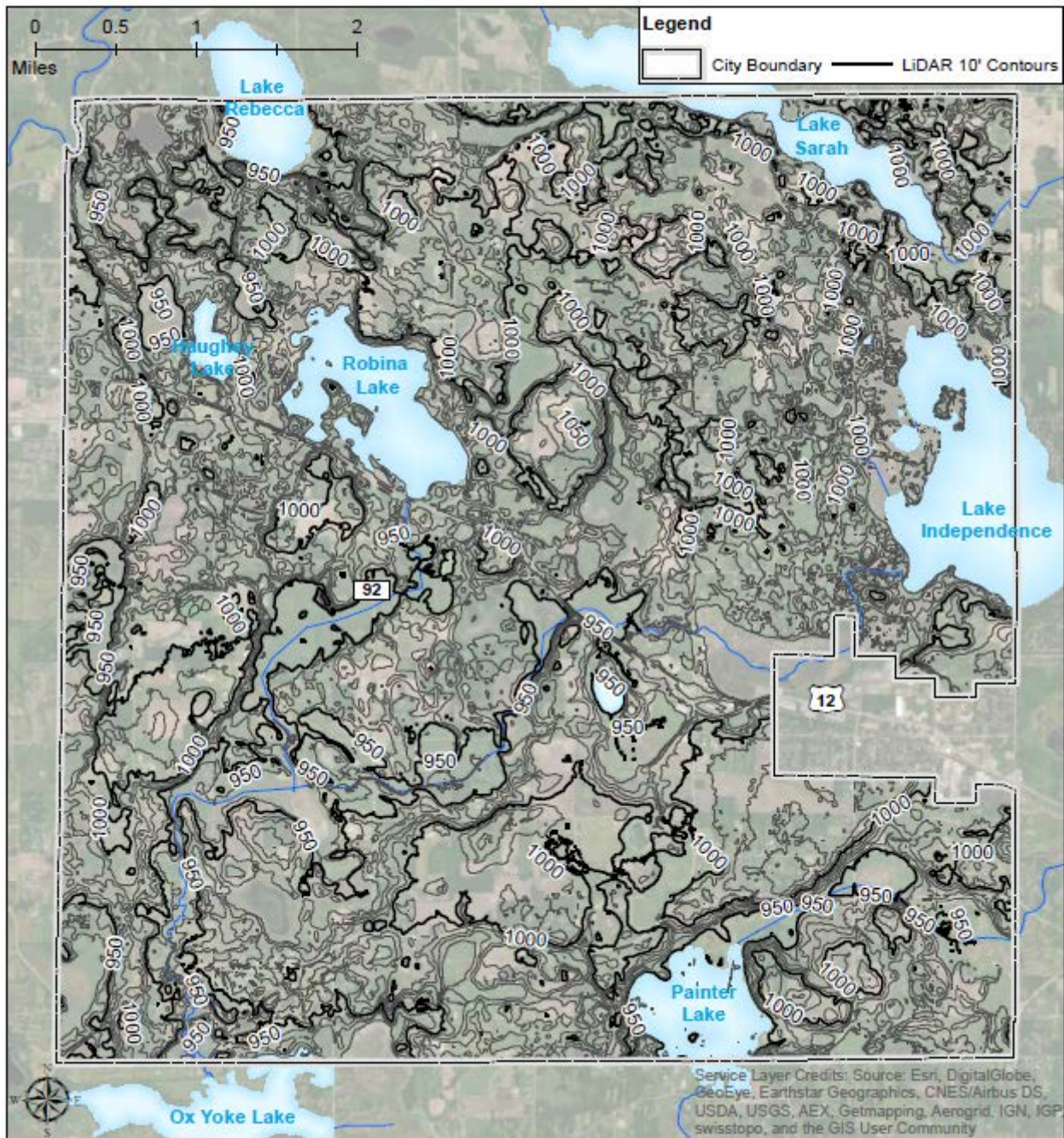


Figure 2-1. Topographic Map for the City of Independence

2.4 Watersheds and Drainage Patterns

The City of Independence is within the jurisdiction of the Pioneer-Sarah Creek Watershed Management Commission (PSCWMC) and the Minnehaha Creek Watershed District (MCWD), as shown in Figure 2-2. In general, water from the PSCWMC drains west to the Crow River

then north to the Mississippi River and water from the MCWD drains to Lake Minnetonka and Minnehaha Creek then east to the Mississippi River.

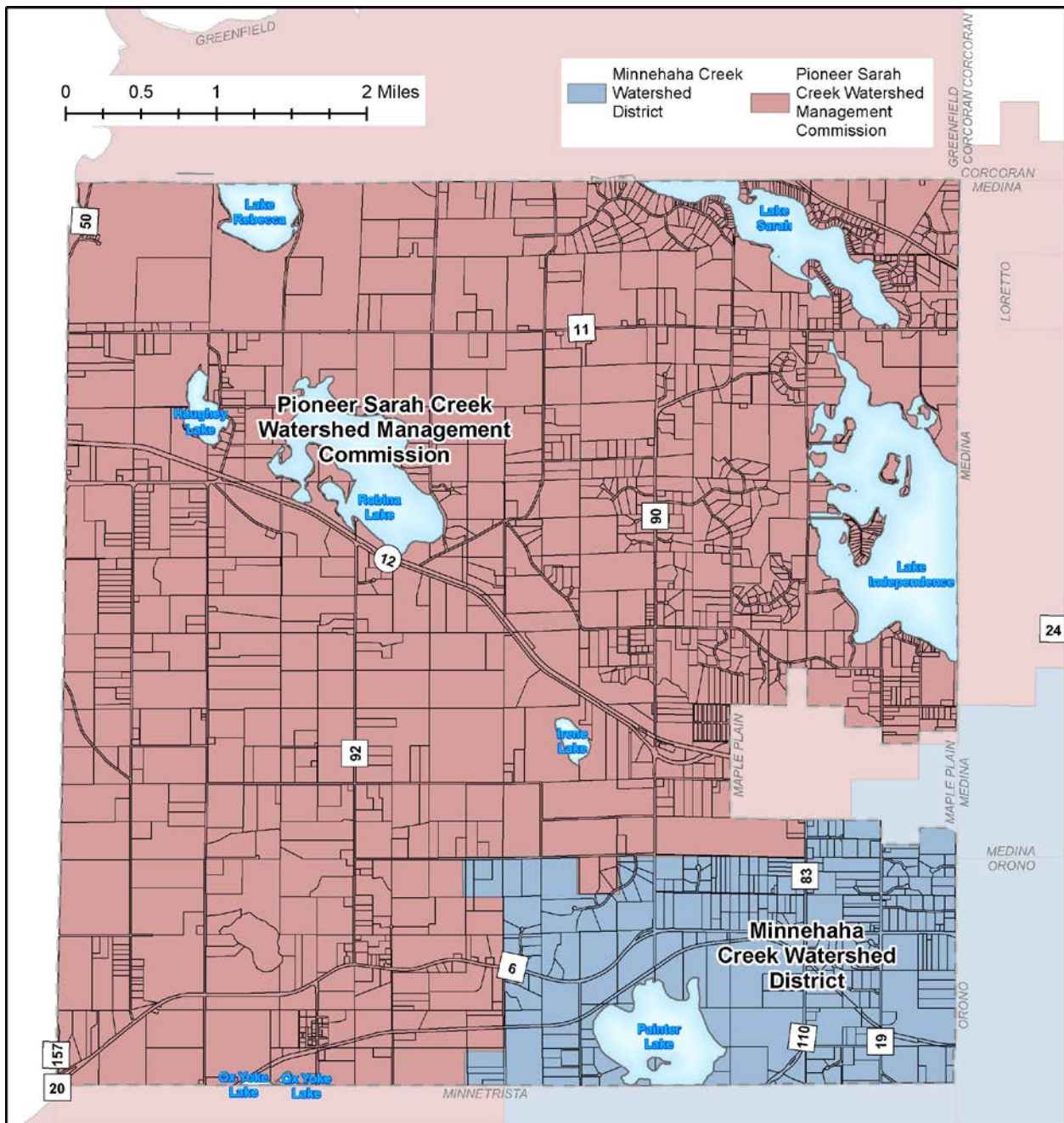


Figure 2-2. Watershed Jurisdictions

With the existing creeks and ditches in place, the drainage patterns for the City of Independence are fairly well defined. This plan divides the City into four major watersheds; they include Painter Creek, Pioneer Creek, Sarah Creek, and South Fork Crow River, as shown on Figure 2-3. Each of these four major watersheds is further divided into subwatersheds. Each subwatershed is

designated by a number that corresponds to the subwatershed and the outlet. The subwatersheds are summarized in Section 6.

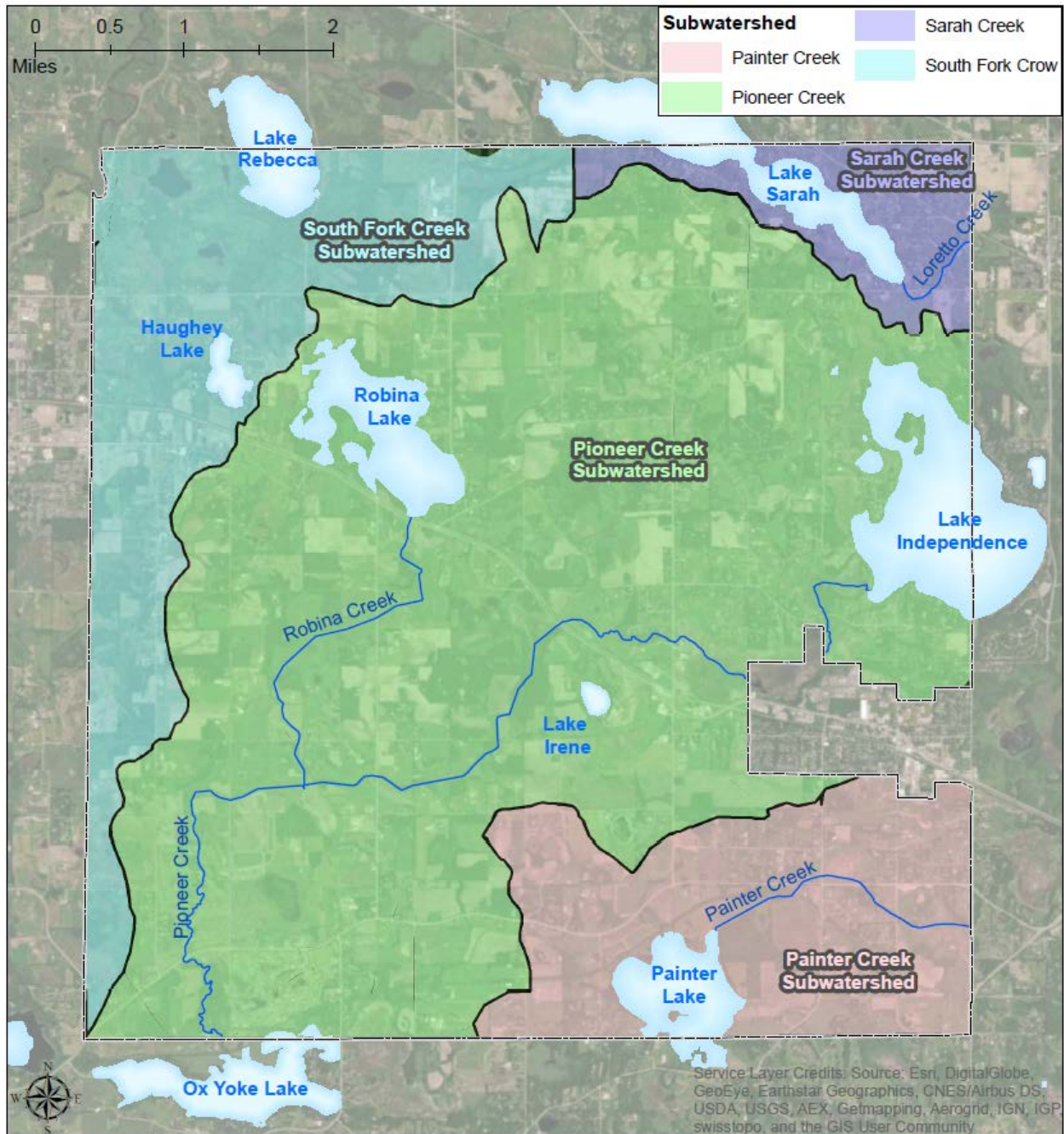


Figure 2-3. City's Four Subwatersheds

The Painter Creek Watershed is located in the southeast corner of Independence. This is the only watershed in Independence under the jurisdiction of the MCWD. The drainage area includes

parts of Independence, Medina, Orono, Maple Plain, and Minnetrista. The drainage flows from Katrina Lake in Medina to the west and south to Jennings Bay in Lake Minnetonka.

The Pioneer Creek Watershed is located in central Independence. It drains from Lake Independence to the west and south to Ox Yoke Lake in Minnetrista. The drainage area includes parts of Independence and Medina. Approximately 65% of the City drains to Pioneer Creek. Major waterbodies in the watershed include Lake Independence and Lake Robina.

The Sarah Creek Watershed is located in northeastern Independence and includes drainage from Greenfield, Corcoran, Medina, and Independence. The general flow is from east to west through Lake Sarah to the Crow River. Lake Sarah is the only major waterbody in this watershed.

The South Fork Crow River Watershed is located in western and northwestern Independence. The drainage flows from east to west to the Crow River. Major waterbodies in this watershed include Lake Rebecca and Haughey Lake.

2.5 MnDNR Protected Waters: Lakes, Wetlands, and Water Courses

The Minnesota Department of Natural Resources (MnDNR) has designated certain waters of the state as public waters (M.S. Section 103G.005, subdivision 15). MnDNR “Protected Waters and Wetlands” maps show public waters within the City. A MnDNR permit is required for work within a designated public water.

Figure 2-4 shows the protected waters, which includes lakes, wetlands, and water courses located in the City. Sections 2.5.1, 2.5.2, and 2.5.3 summarize the protected lakes, wetlands, and watercourses in Independence.

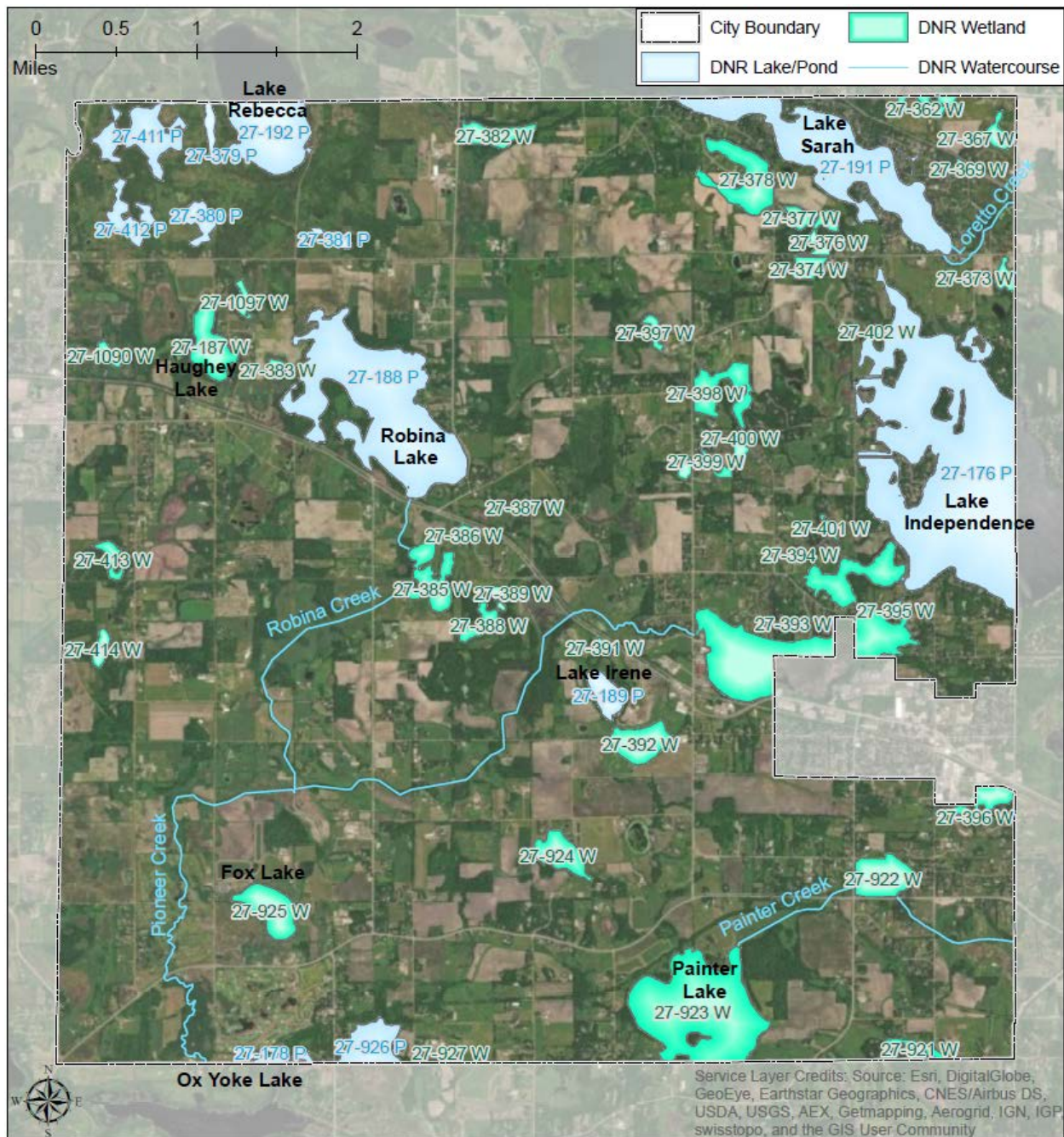


Figure 2-4. MnDNR Protected Waters

2.5.1 Protected Lakes

There are 12 protected lakes in the City of Independence. The lakes can range in size but are typically deeper than six feet. Table 2-2 lists the protected lakes within Independence. Existing water quality data is available for Lake Independence, Lake Irene, Lake Rebecca, Lake Robina, and Lake Sarah through the MPCA Environmental Access Data website.

**Table 2-2
Independence Protected Lakes**

I.D. No.	Name	Twp./Range	Section(s)	Local Government Unit	Area (acres)	DNR Shoreland Classification 1	OHW
27-176P	Lake Independence	118/23,24	7,12,13,18,19,24	PSCWMC	851	RD	956.8
27-178P	Ox Yoke lake	117,118/24	5,6,31,32	PSCWMC	325	NE	915.4
27-188P	Lake Robina	118/24	8,9,16,17	PSCWMC	395	RD	N/A
27-189P	Lake Irene	118/24	22	PSCWMC	27	RD	N/A
27-191P	Lake Sarah	118,119/24	1,2,3,34,35	PSCWMC	635	RD	979.9
27-192P	Lake Rebecca	118,119/24	5,31,32	PSCWMC	260	NE	N/A
27-379P	Unnamed	118,119/24	6/31	PSCWMC	15	NR	N/A
27-380P	Unnamed	118/24	6	PSCWMC	24	NR	N/A
27-381P	Unnamed	118/24	5	PSCWMC	9	NR	N/A
27-411P	Unnamed	118,119/24	6,31	PSCWMC	81	NR	N/A
27-412P	Unnamed	118/24	6	PSCWMC	32	NR	N/A
27-926P	Unnamed	117,118/24	4,5,32,33	PSCWMC	245	NR	N/A

¹ NE = Natural Environment, RD = Recreational Development, GD = General Development, NR = Not regulated by DNR shoreland rules.

2.5.2 Protected Wetlands

In addition to the 12 protected lakes, there are 40 other wetlands within the City of Independence that have been inventoried by the MnDNR. All of these wetlands are known as protected waters wetlands (M.S., Section 103G.005, subdivision 15), and therefore their beds along with the lakes are subject to regulatory authority of the MnDNR.

Protected waters wetlands mean all Types, 1 through 8 as defined in United States Fish and Wildlife Service Circular 39 (USDI, 1971), not included within the definition of protected waters, that are typically ten or more acres in size in unincorporated areas, or 2.5 acres in incorporated areas. Table 2-3 lists the protected waters wetlands subject to MnDNR jurisdiction.

**Table 2-3
Independence Protected Wetlands**

I.D. No.	Name	Twp./Range	Section(s)	Local Government Unit	Area (acres)	DNR Shoreland1 Classification	OHW
27-187W	Haughey Lake	118/24	7,8	PSCWMC	51	NE	953.2
27-362W	Unnamed	118,119/24	1,36	PSCWMC	17	NR	N/A
27-367W	Unnamed	118/24	1	PSCWMC	12	NR	N/A
27-368W	Unnamed	118/24	1	PSCWMC	7	NR	N/A
27-369W	Unnamed	118/24	1	PSCWMC	5	NR	N/A
27-373W	Unnamed	118/24	12	PSCWMC	11	NR	N/A
27-374W	Unnamed	118/24	2,11	PSCWMC	20	NR	N/A
27-375W	Unnamed	118/24	2	PSCWMC	3	NR	N/A
27-376W	Unnamed	118/24	2	PSCWMC	10	NR	N/A
27-377W	Unnamed	118/24	2	PSCWMC	10	NR	N/A
27-378W	Unnamed	118/24	2	PSCWMC	68	NR	N/A
27-382W	Unnamed	118/24	4	PSCWMC	30	NR	N/A
27-383W	Unnamed	118/24	8	PSCWMC	7	NR	N/A
27-385W	Unnamed	118/24	16,21	PSCWMC	47	NR	N/A
27-386W	Unnamed	118/24	16	PSCWMC	6	NR	N/A
27-387W	Unnamed	118/24	16	PSCWMC	3	NR	N/A
27-388W	Unnamed	118/24	21	PSCWMC	18	NR	N/A
27-389W	Unnamed	118/24	21	PSCWMC	5	NR	N/A
27-391W	Unnamed	118/24	22	PSCWMC	4	NR	N/A
27-392W	Unnamed	118/24	22,27	PSCWMC	43	NR	N/A
27-393W	Unnamed	118/24	23,24	PSCWMC	278	NR	N/A
27-394W	Unnamed	118/24	13,14,23,24	PSCWMC	63	NR	N/A
27-395W	Unnamed	118/24	24	PSCWMC	4	NR	N/A
27-396W	Unnamed	118/24	25	MCWD	29	NR	N/A
27-397W	Unnamed	118/24	10	PSCWMC	8	NR	N/A
27-398W	Unnamed	118/24	11,14	PSCWMC	47	NR	N/A
27-399W	Unnamed	118/24	14,15	PSCWMC	15	NR	N/A
27-400W	Unnamed	118/24	14	PSCWMC	5	NR	N/A
27-401W	Unnamed	118/24	14	PSCWMC	4	NR	N/A
27-402W	Unnamed	118/24	12	PSCWMC	3	NR	N/A
27-413W	Unnamed	118/24	18	PSCWMC	12	NR	N/A
27-414W	Unnamed	118/24	19	PSCWMC	10	NR	N/A
27-921W	Unnamed	117,118/24	1,36	MCWD	88	NR	N/A
27-922W	Unnamed	118/24	25	MCWD	52	NR	N/A
27-923W	Painter Lake	117,118/24	2,3,34,35	MCWD	292	NR	938.4
27-924W	Unnamed	118/24	27	MCWD	36	NR	N/A
27-925W	Fox Lake	118/24	29,32	PSCWMC	49	NR	N/A

I.D. No.	Name	Twp./Range	Section(s)	Local Government Unit	Area (acres)	DNR Shoreland1 Classification	OHW
27-927W	Unnamed	117,118/24	4,33	PSCWMC	7	NR	N/A
27-1090W	Unnamed	118/24	7	PSCWMC	7	NR	N/A
27-1097W	Unnamed	118/24	8	PSCWMC	10	NR	N/A

¹ NE = Natural Environment, NR = Not regulated by DNR shoreland rules.

2.5.3 Protected Watercourses

Protected waters also include all natural and altered watercourses with a total drainage area greater than two square miles. Crow River South Fork, Painter Creek, Pioneer Creek, Robina Creek, and Loretto Creek are the five protected watercourses in Independence. The five watercourses are discussed below.

2.5.3.1 Crow River South Fork

Crow River South Fork runs adjacent to the northwestern most corner of the City. This stretch of the river, section 508, reaches almost to the McLeod and Carver county border and is considered impaired for nutrients, turbidity, and fecal coliform. The [2018 South Fork Crow River Watershed TMDL](#), which is still under EPA review at the time of this publication, has more detailed information on the water quality.

2.5.3.2 Painter Creek

Painter Creek is located in the southeast corner of Independence. The creek is the outlet of Katrina Lake and flows south to Jennings Bay on Lake Minnetonka. Painter Creek is considered an impaired water, with a stretch of the stream within Independence having high amounts of *E.coli*. The [2014 Upper Minnehaha Creek Watershed TMDL](#) has more detailed information on the water quality.

2.5.3.3 Pioneer Creek

Pioneer Creek is located in central Independence. The creek is the outlet of Lake Independence and flows west to south to Ox Yoke Lake in Minnetrista. Ox Yoke Lake eventually discharges to the South Fork Crow River. Pioneer Creek is also an impaired water with high amounts of *E. coli* and deficient levels of dissolved oxygen. More information on Pioneer Creek water quality can be found in the [2017 Pioneer-Sarah Creek Subwatershed Total Maximum Daily Load](#).

2.5.3.4 Robina Creek

Robina Creek is a tributary of Pioneer Creek and is located in central Independence. The Creek is the outlet of Robina Lake and flows from north to south to Pioneer Creek. It is not considered to be impaired.

2.5.3.5 Loretto Creek

A portion of Loretto Creek is located in the northeast corner of Independence. The creek flows from east to west and discharges to Lake Sarah. Lake Sarah then discharges through Sarah Creek to the west to the South Fork Crow River. Loretto Creek is not considered to be impaired.

2.6 Other Regulated Wetlands

In addition to the MnDNR waters discussed in Section 2.5, many additional wetlands within the City are included on the National Wetland Inventory (NWI) maps but are not MnDNR waterbodies. These wetlands are shown on Figure 2-5; however, the NWI does not definitively determine the accurate boundaries of a wetland. The following three characteristics make these waterbodies exclusive from the MnDNR public waters.

- First, an individual basin may be dominated by wetland habitat (Types 1, 2, 6, and 7 [USDI, 1971] not statutorily covered by MnDNR and yet is immediately adjacent to an inventoried MnDNR basin or watercourse.
- Second, an individual isolated wetland basin may be smaller than the minimum MnDNR size (2.5 or 10 acres) as discussed previously.
- Third, an individual isolated wetland basin may be dominated by habitat types (Types 1, 2, 6, and 7) not statutorily covered by MnDNR.

Excavation, filling, grading, and/or development actions, which may adversely affect these resources, may be subject to federal permitting authority under Sections 401 and 404 of the Clean Water Act, (33 USC 125 et. seq.) and City approval under the 1991 Wetland Conservation Act (WCA), as amended. The City is the local governmental unit that administers the WCA in the PSCWMC, and MCWD administers WCA within their jurisdiction.



Figure 2-5. National Wetland Inventory (NWI)

2.7 Groundwater Resources

Two major aquifers are located within the City of Independence: the Franconia-Ironton-Galesville Aquifer and the Mt. Simon-Hinckley Aquifer. The lowest aquifer is the Mt. Simon-Hinckley. The average elevation of the aquifer is 850 feet above sea level and is characterized by Mt. Simon and Hinckley Sandstones. The Eau Claire Formation confines the aquifer from

above. Above this, the Franconia-Ironton-Galesville Aquifer is approximately 900 feet above sea level. It is composed of the Franconia Formation and Ironton and Galesville Sandstones. The St. Lawrence Formation confines this aquifer in most areas.

Groundwater quality can be affected by a variety of land use types. The identification of areas susceptible to groundwater contamination is difficult due to the character (permeability and thickness) of the surficial material, depth to the piezometric surface, precipitation amount and duration, and other components of aquifer recharge. See section 2.14 for further discussion on groundwater contamination.

A MnDNR Water Appropriation Permit is required for all users withdrawing more than 10,000 gallons of water per day or 1 million gallons per year. There are active MnDNR Water Appropriation Permits in the City of Independence. The permittees and the locations of the appropriations are shown on Figure 2-6

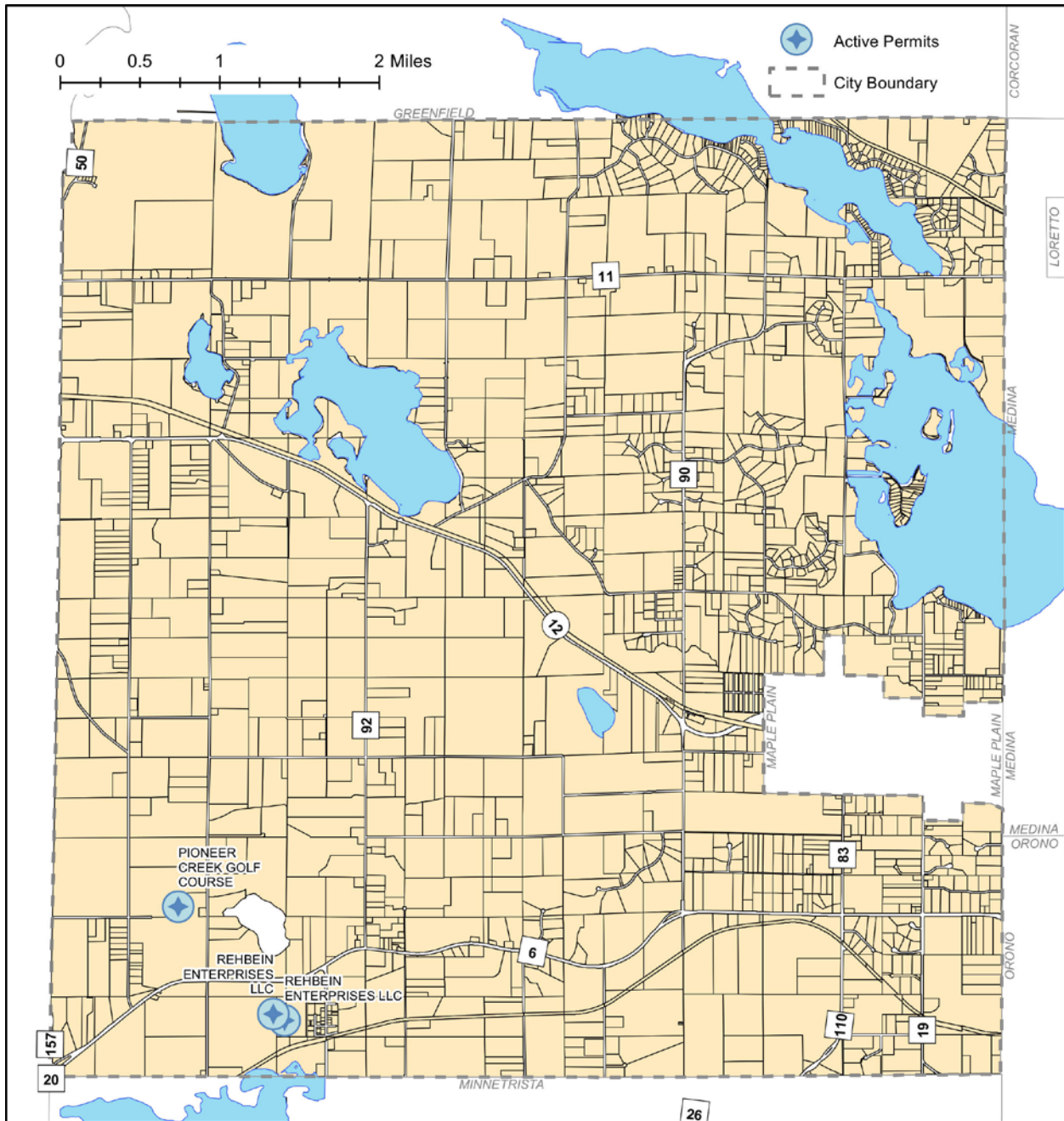


Figure 2-6. MnDNR Water Appropriation Active Permits

2.8 Soils

The United States Department of Agriculture, Soil Conservation Service published the Soil Survey of Hennepin County in 1974, and the Natural Resources Conservation Service regularly updates the Web Soil Survey website. The survey lists soils found in Hennepin County along with their general characteristics and limitations on land use and development. The Web Soil

consisting of clay loam, heavy clay, and peat. The clay soils are found on gentle to steep slopes, are well drained, and generally suited for urban development. Heavy clay is, for the most part, a subsoil condition and is also conducive for development. Peat soils located in low-lying areas have high moisture capacity and are generally poorly drained. Peat soils are a limiting factor for development.

The Lester-Peaty Muck Association, located in the southern and southwestern portions of Independence, is characterized by undulating relief with major soil conditions consisting of black loam, clay loam, and peat. The black and clay loams are suited for urban development.

The third association, Hayden-Cordova Peaty Muck, is located in the northwest part of the City and is the smallest in area of the three groups. The terrain is basically undulating to rolling. The soil conditions generally consist of brown loam, clay loam, and light clay loam. Many of the soils in this association are poorly drained, and wet areas are often intermingled closely with better-drained soils. The sporadic wetness and poor drainage of the soil must be a consideration for any development. Peat soils severely restrict development because of their wetness and location.

2.9 Native Vegetation

Independence is in the central deciduous forest region. Oak woodland and maple-basswood forests were the most common vegetation types in the area. The maple-basswood forest included a mix of elm, basswood, sugar maple, bur oak, ironwood, northern red oak, and aspen. The oak woodland was dominated by a mix of aspen, red oak, bur oak, and white oak.

The woodland that has not been cleared for crops is similar to what existed before settlement and occurs as scattered small tracts. Wooded areas are now very much in demand for home sites.

2.10 Land Use

The City of Independence is part of the Twin Cities Metropolitan area. The population growth trends for Independence and the surrounding communities are shown in the table below.

**Table 2-4
Population and Growth Trends**

Local Government	1990^a	2000^a	2010^a	2020^b	2030^b	2040^b
Independence	2,822	3,236	3,504	3,830	4,040	4,290
Greenfield	1,450	2,544	2,777	3,030	3,460	3,880
Medina	3,096	4,005	4,892	6,600	7,700	8,900
Maple Plain	2,005	2,088	1,768	1,870	2,090	2,320
Orono	7,285	7,538	7,437	8,100	8,800	9,500
Minnetrista	3,439	4,358	6,389	8,000	9,800	12,000

a. U.S. Census Bureau, 2010 Census of Population and Housing, *Population and Housing Unit Counts* PHC-3-25, Minnesota, Washington, DC, 2003.

b. Metropolitan Council. Thrive MSP 2040. January 1, 2018. www.metrocouncil.org/Data-and-Maps/Data.aspx

2.10.1 Existing Land Use

Independence has assembled a Comprehensive Plan to coordinate future development. Land use in the City is a mixture of agriculture, residential, and commercial uses. There is a large area in the northwest corner of the City, around Lake Rebecca, that is used for parks and recreation. Existing land use is discussed further in the Comprehensive Plan.

2.10.2 Future Land Use

The Comprehensive Plan identifies limited future rural residential development with the intent of protecting valued open space and rural character. The Comprehensive Plan will function to define the relationship of natural resources and land use development decisions as well as coordinate with zoning laws and other regulations to provide logical, efficient, and effective decision-making. The Comprehensive Plan is also an intergovernmental document, coordinating the City's plans with regional, county, and adjacent municipal planning activities. Much of the City is either permanent agricultural or permanent rural with small areas included within the Metropolitan Urban Service Areas (MUSA).

The 2040 future land use has minor changes, particularly near the cities of Maple Plain and Delano. Areas around Maple Plain, including a small portion with the MCWD, is planned to change from agricultural and rural residential to residential. Near Delano, on either side of Babcock Boulevard, the land use is planned to change from mostly agricultural to urban commercial.

2.11 Parks and Open Spaces

The most significant open space in Independence is the Lake Rebecca Park Reserve. The Park Reserve has an area of approximately 2,200 acres, of which approximately 1,300 acres are within Independence. The park reserve offers outdoor activities and opportunities for glimpses of wildlife. Lake Rebecca Park Reserve's gently rolling Big Woods landscape, with numerous wetland areas, provides a haven for wildlife. Facilities and amenities include a swimming beach, a boat launch, a fishing pier, picnic areas, hiking and biking trails, and horse and dog trails.

Lake Independence is also a water-based recreation lake. The Baker Park Reserve is located on the east side of the lake in Medina and offers many of the same activities as the Lake Rebecca Park Reserve.

2.12 Fish and Wildlife Habitat

The waterbodies and open spaces throughout the City provide habitat for fish and wildlife species including birds, mammals, and reptiles. Ducks and geese are present in large numbers at 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 Independence provide habitat for a variety of aquatic species including snakes, turtles, and frogs. Figure 2-8 shows the land cover types within Independence as classified by the Minnesota Land Cover Classification System (MLCCS).

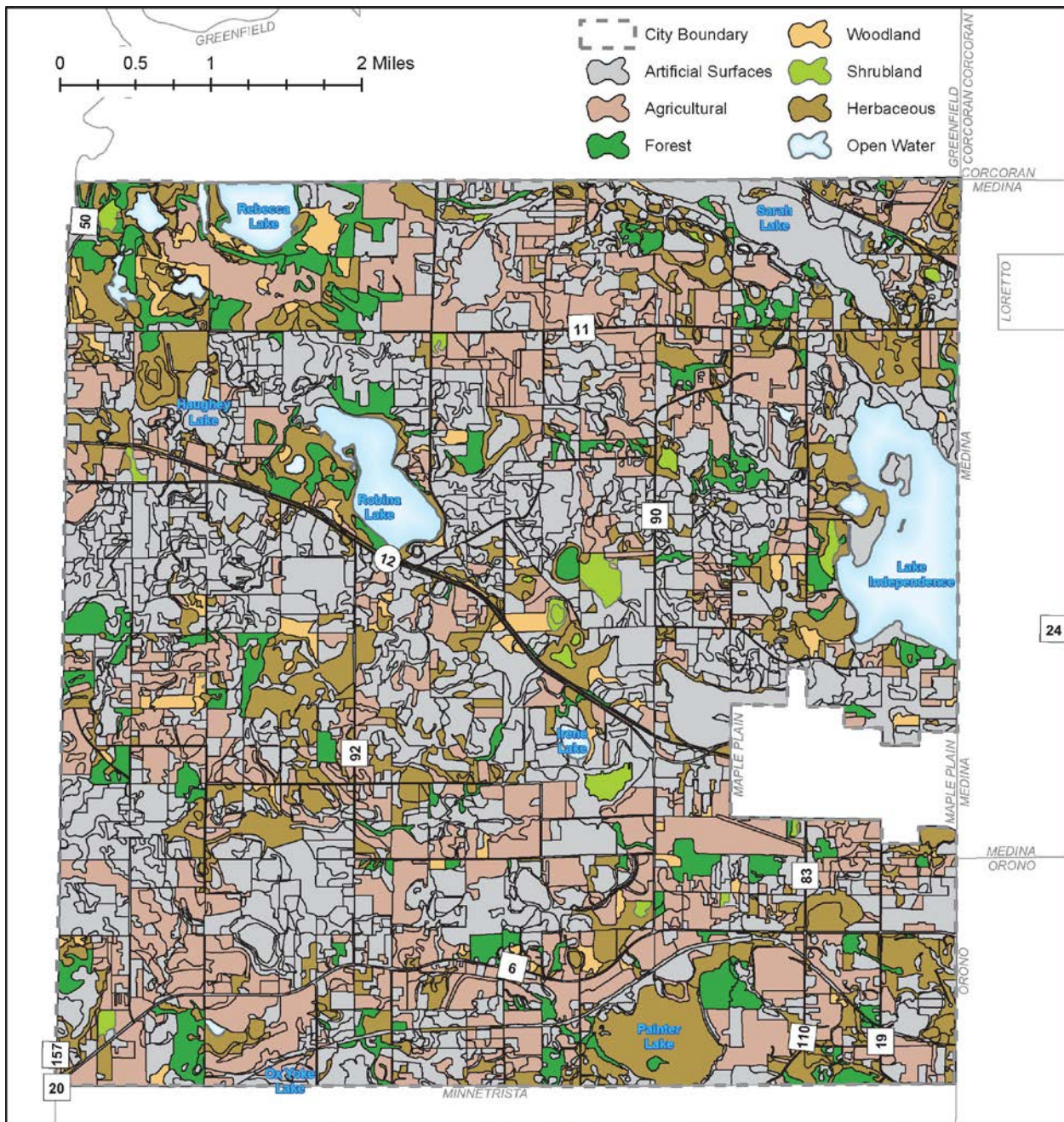


Figure 2-8. Minnesota Land Cover Classification System

2.13 Unique Features and Scenic Areas

The MnDNR Natural Heritage and Nongame Wildlife Program maintains a database of rare plant and animal species and significant natural features. Figure 2-9 includes the natural communities and regional parks within Independence. Additional information can be found in the MCWD and PSCWMC Plans.

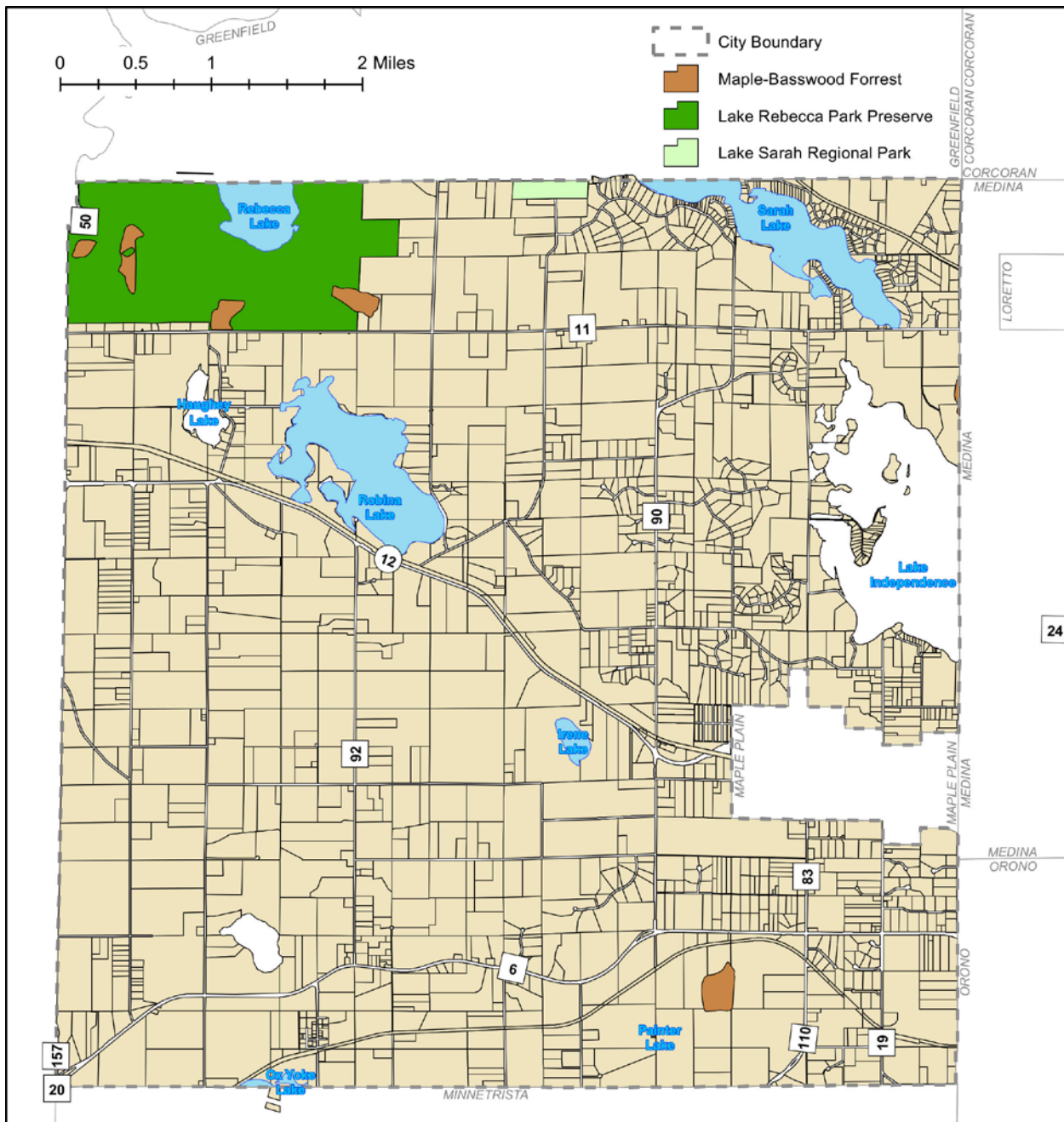


Figure 2-9. Unique Features and Scenic Areas

2.14 Pollutant Sources

The Minnesota Pollution Control Agency maintains up-to-date data on potential sources of groundwater contamination including: sanitary landfills, dumps, hazardous waste sites, registered underground and above ground storage tank sites, feedlots, abandoned wells, and permitted wastewater discharges. This information is available through the Minnesota Geospatial Information Office. The MPCA Pollutant sites are shown on Figure 2-10.

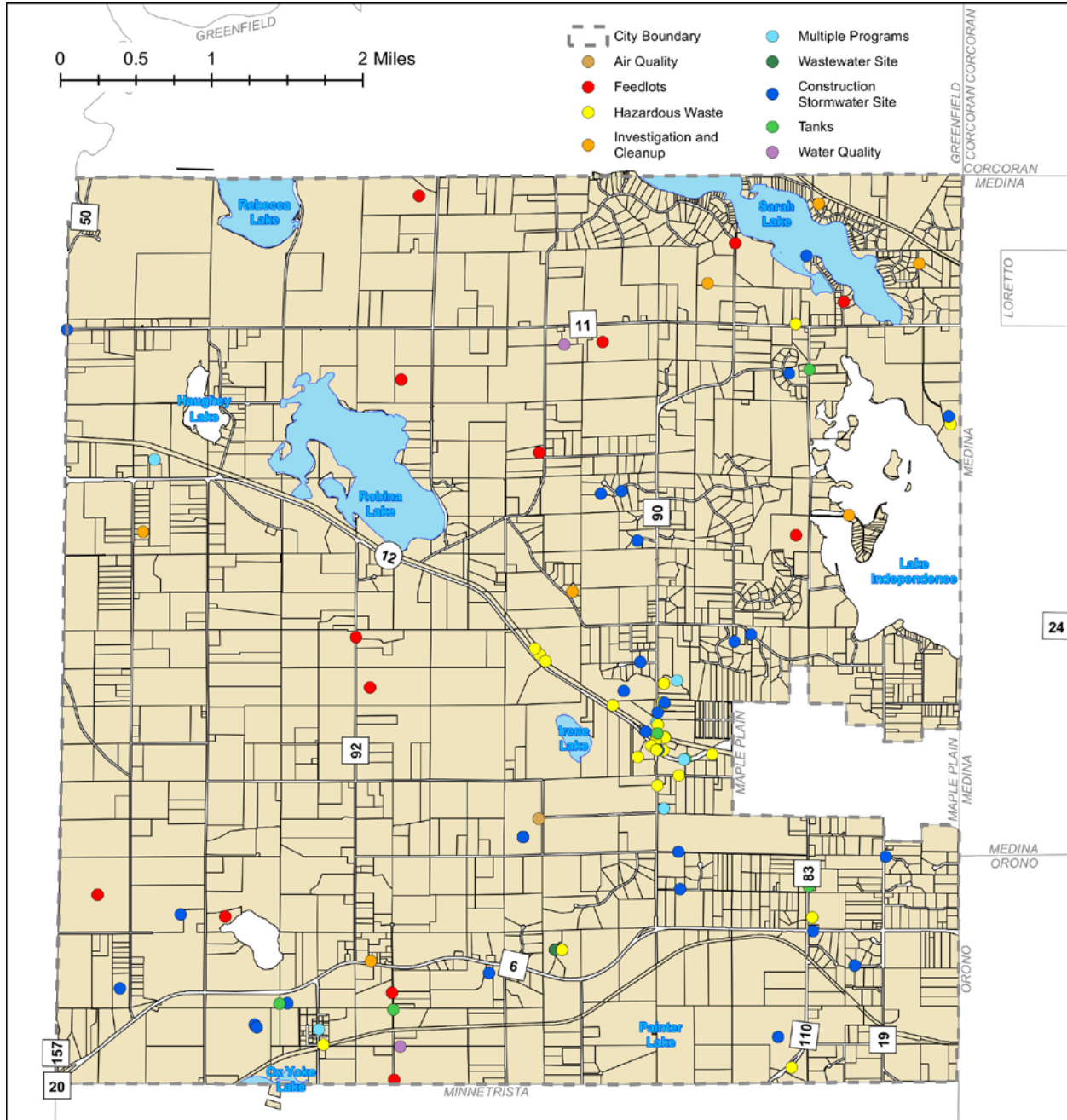


Figure 2-10. MPCA Pollutant Sites

The County Atlas-Regional Assessment Program exists to develop County Geologic Atlases and Hydrogeologic Assessments. It is a joint program of the MnDNR-Division of Waters and the Minnesota Geological Survey. The County Atlas-Regional Assessment Program prepares map-based reports of counties and multicounty regions to convey geologic and hydrogeologic information and interpretations to governmental units at all levels, but particularly to local

governments. This information and these interpretations contribute to sound planning and management of the state's land and water resources.

The program created a "Sensitivity of Ground Water Systems to Pollution" map for Hennepin County in 1989. Susceptibility of the water table was rated based on the depth of the water table and the vertical conductivity of geologic materials. Rating groundwater susceptibility can be based on the ability of geologic material to 1) absorb and hold contaminants; 2) transform contaminants into benign substances; 3) dilute contaminants to levels below some standard; and 4) control the rate that contaminated water flows to or through aquifers. High susceptibility does not indicate that water quality has been or will become degraded; low susceptibility does not guarantee that groundwater will remain pristine. Rather, it indicates the areas at a greater risk of contamination due to high soil permeability and shallow groundwater.

A majority of the water table in Independence has a low susceptibility to pollution, but the areas near Pioneer, Painter, and Robina Creeks and the South Fork Crow River have a medium to very high susceptibility.

The City of Independence does not have a municipal water supply system; therefore, the City has no need for a Well Head Protection Plan.

2.15 Water Resources Related Agreements

The City is a member of the Pioneer-Sarah Creek Watershed Commission. The Pioneer-Sarah Creek Watershed Commission is an involved partner in the City's water resources matters. The watershed commission covers an area of about 70.5 square miles and member cities include Greenfield, Independence, Loretto, Maple Plain, Medina, and Minnetrista.

The commission has adopted an education and outreach plan that targets the following audiences:

- All property owners
- Lakeshore property owners
- Government: elected and appointed officials, staff, board, and commission members
- Educators and students
- Agriculture and animal operators

In addition, the commission has adopted Rules and Standards for which all projects must adhere to. The rules and standards are applicable to stormwater management, erosion and sediment control, floodplain alteration, and wetland alteration.

The commission has enacted a permit program. In general, all projects that disturb one acre or more of land must apply for and obtain a permit.

A copy of the Joint Powers Agreement is included in Appendix A.

2.16 Comprehensive Plan

The City is preparing the 2040 Comprehensive Plan concurrent with the preparation of this plan. Required plan elements are Land Use, Transportation, Water Resources, Parks & Trails, Housing, and Plan implementation.

2.17 City Owned Land

The City owns or pays taxes on 18 parcels, including City Hall, a museum, and three parks. The remaining parcels are either street easements or vacant land, most of which are predominantly wetland. Sixteen of the parcels are within Pioneer-Sarah Creek Watershed, and the other two are in Minnehaha Creek WD.

**Table 2-5
City Owned Land**

PID	Size (Acres)	Watershed	Use
0111824340006	0.65	PSCWMC	Vacant Land
0111824420014	1.65	PSCWMC	Vacant Land
0311824120013	5.00	PSCWMC	Tamarack Park
1311824240011	1.68	PSCWMC	Vacant Land
2211824140003	50.17	PSCWMC	Pioneer Creek Park
2311824310019	1.34	PSCWMC	Vacant Land
2311824320010	20.07	PSCWMC	City Hall/Public Works
2311824330008	0.06	PSCWMC	Town Hall Museum
2311824330014	0.37	PSCWMC	Street Easement
2511824230009	0.73	PSCWMC	Street Easement
2511824230017	0.16	PSCWMC	Street Easement
2511824230018	1.28	PSCWMC	Street Easement
3211824420046	0.34	PSCWMC	Lyndale Park
3211824420052	0.80	PSCWMC	Vacant Land
3411824410008	0.13	MWCD	Vacant Land
3411824410009	0.13	MWCD	Vacant Land
3611824240010	0.44	PSCWMC	Street Easement
3611824240011	1.66	PSCWMC	Street Easement

3.0 Management Strategies and Problem Areas

This section presents the process and information used to develop the management plan strategies for wetlands, water quality, and water quantity. Section 3.4 discusses the known problem areas within the City.

3.1 Wetland Protection

This section describes the process that was used to develop a wetland management strategy. The objective of this process is to provide no net loss of wetland functions and values. Impacts to wetlands include not only direct impacts such as filling and drainage, but also indirect impacts from stormwater inputs. This process is based largely on the state guidance document “Stormwater and Wetlands: Planning and Evaluation Guidelines for Addressing Potential Impacts of Urban Stormwater and Snowmelt Runoff on Wetlands” (State of Minnesota, Stormwater Advisory Group, June 1997).

3.1.1 Wetland Susceptibility to Stormwater Input

Stormwater runoff carries soil particles, nutrients, and contaminants, which can change the ecological balance of the receiving water body. Changes in the volume or rate of stormwater entering or discharging from the water body can also change the ecological balance. Change in the ecological balance of a wetland often results in changes in the water quality, changes in animal and fish habitat, replacement of native vegetation with invasive and tolerant plant species, and/or other impacts to the wetland’s functions and values.

The state guidance document developed a methodology for determining the susceptibility of wetlands to degradation by stormwater input. This methodology relates wetland type to a level of susceptibility as shown in Table 3-1. Wetlands such as bogs and fens can be easily degraded by changes in the stormwater inflows and are designated as highly susceptible. On the other hand, floodplain forests can tolerate relatively significant changes in the chemical and physical characteristics of stormwater inflow without degradation and are therefore slightly susceptible. Commonly observed shallow marshes and wet meadows dominated by cattail and reed canary grass (respectively) have a moderate susceptibility to stormwater fluctuations.

3.1.2 Wetland Management Standards

Wetland management standards were developed to determine how and when stormwater should be routed through a wetland to minimize potential impacts. These standards, shown in Table 3-2, were largely based on the state guidance document. These standards determine tolerable hydrologic change in terms of bounce (difference between the peak flood elevation and the wetland elevation), inundation period (time that floodwaters temporarily stored in the wetland exceed the wetland elevation), and runout control (elevation of the outlet).

These standards provide guidance for the management of stormwater to minimize wetland impacts. It is assumed that wetland impacts will be minimized and existing wetland functions

and values will be maintained if the proposed management system and criteria meet the management standards shown in Table 3-1. Specific requirements designed to implement the City’s wetland management strategies and buffer widths are outlined in Section 5.1.

**Table 3-1
Susceptibility of Wetlands to Degradation by Stormwater Impacts**

Exceptionally Susceptible Wetland	Highly Susceptible Wetland Types:²	Moderately Susceptible Wetland	Least Susceptible Wetland Types:⁴
Sedge Meadows	Shrub-carrs ^a	Floodplain Forests ^a	Gravel Pits
Open Bogs	Alder Thickets ^b	Fresh (Wet) Meadows ^b	Cultivated Hydric Soils
Coniferous Bogs	Fresh (Wet) Meadows ^{c,e}	Shallow Marshes ^c	Dredged Material/Fill Material Disposal Sites
Calcareous Fens	Shallow Marshes ^{d,c}	Deep Marshes ^c	
Low Prairies	Deep Marshes ^{d,c}		
Lowland Hardwood Swamps			
Seasonally Flooded Basins			

1. Special consideration must be given to avoid altering these wetland types. Inundation must be avoided. Water chemistry changes due to alteration by stormwater impacts can also cause adverse impacts. Note: All scientific and natural areas and pristine wetland should be considered in this category regardless of wetland type.
2. a., b., c. Can tolerate inundation from 6 inches to 12 inches for short periods of time. May be completely dry in drought or late summer conditions. d. Can tolerate +12 inches inundation, but adversely impacted by sediment and/or nutrient loading and prolonged high water levels. e. Some exceptions.
3. a. Can tolerate annual inundation of 1 to 6 feet or more, possibly more than once/year. b. Fresh meadows that are dominated by reed canary grass. c. Shallow marshes dominated by reed canary grass, cattail, giant reed, or purple loosestrife.
4. These wetlands are usually so degraded that input of urban stormwater may not have adverse impacts.

Notes: There will always be exceptions of the general categories listed above. Use best professional judgment. Appendix A of the State Guidance Document contains a more complete description of wetland characteristics under each category. Pristine wetlands are those that show little disturbance from human activity.

Source: “Planning and Evaluation Guideline for Addressing Potential Impacts of Urban Stormwater and Snowmelt Runoff on Wetlands” State of Minnesota, Stormwater Advisory Group, June 1997.

**Table 3-2
Wetland Management Standards
According to Management Class**

Standard	Management Class			
	Preserve	Manage 1	Manage 2	Manage 3
Bounce (10-year)	Existing	Existing plus 0.5 foot	Existing plus 1 foot	No limit
Inundation Period ² (1 & 2-year)	Existing	Existing plus 1 day	Existing plus 2 days	Existing plus 7 days
Inundation Period ² (10-year)	Existing	Existing plus 7 days	Existing plus 14 days	Existing plus 21 days
Runout Control ¹	No change, maintain existing hydrology	No change, maintain existing hydrology	0 to 1 feet above existing outlet	0 to 4 feet above existing runout
Stormwater Treatment	Upstream sediment and nutrient pretreatment required to maintain background loading rates	Upstream sediment and nutrient pretreatment required to maintain background loading rates	Remove sediment from new inflows	Remove sediment from new inflows
Pioneer-Sarah Creek Buffer Width ³	Average 25 feet Minimum 10 feet	Average 25 feet Minimum 10 feet	Average 25 feet Minimum 10 feet	Average 25 feet Minimum 10 feet
Minnehaha Creek Buffer Width	Base 75 feet Minimum 67 feet	Base 40 feet Minimum 34 feet	Base 30 feet Minimum 24 feet	Base 20 feet Minimum 16 feet

¹ If currently landlocked, new outlet should be above delineated wetland elevation.

² Inundation period is defined as the proposed peak storage divided by the average discharge (S/Q).

³ Buffers are unmowed, naturalized strips of vegetation around the wetland perimeter. Buffers shall be provided during development or redevelopment. Buffer averaging is allowed provided that a minimum buffer width of 10 feet is provided

3.1.3 Wetland Management Classification

A wetland functions and values assessment will be required for all waters proposed to receive new stormwater discharges from private development or City initiated projects unless a management class has already been designated for the receiving water. Areas within the MCWD may already have an assigned classification through their Functional Assessment of Wetlands (FAW) that was completed in 2003 on all wetlands greater than one-quarter acre in size. The FAW can be viewed online by clicking on the wetlands layer on the MCWD maps website. If a wetland does not have a classification, then the latest version of the “Minnesota Routine Assessment Method for Evaluating Wetland Functions” shall be used to assess receiving waters. The City may require, not only the water body directly receiving the discharge, but all downstream waterbodies to be assessed. The assessment shall be completed by qualified wetland personnel who specialize in such work. Developers will be responsible for submitting the assessment for private projects. The assessments will be subjected to review and approval by the City’s water resource staff.

The function and value assessment will be used to assign the wetlands into one of four categories – Preserve, Manage 1, 2, or 3. The flowchart shown on Figure 3-1 will be used with the function and value assessment to assign the wetlands into one of the four categories. The City’s water resource staff will be responsible for assigning the wetlands into categories.

3.2 Water Quality

Within the four major watersheds of the City of Independence, there are hundreds of waterbodies ranging in size from lakes to small stormwater detention basins. Nonpoint pollution associated with stormwater runoff creates adverse impacts; the degree of impact depends on the water body'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. Planning for water quality protection is necessary to preserve the beneficial uses of existing waterbodies, as well as to evaluate wetland impacts as described in Section 3.1. Improved water quality will be achieved with new development and redevelopment projects by the load reduction achieved by abstracting 1.1 inches of stormwater runoff from the net new impervious or no net increase in total phosphorus or total suspended solids, whichever is lower.

Water quality protection will also be achieved through implementation of the City's Stormwater Pollution Prevention Program (SWPPP) as discussed in Section 1.2.4.

3.3 Water Quantity

The flood and rate control portion of the planning consisted of estimating the 100-year flood elevation and discharge rate for each watershed. This section discusses the flood insurance study and the City's flood and rate control process.

3.3.1 Flood Insurance Study

A Flood Insurance Study (FIS) of the City of Independence was completed in November 2016 by the Federal Emergency Management Agency (FEMA). The FIS maps indicate the boundaries for 100-year levels. The study determined flood elevations for Lake Independence, Lake Robina, Lake Sarah, South Fork Crow River, Robina Creek, Pioneer Creek, and Painter Creek. The 100-year flood elevations reported were used in the plan.

3.3.2 Flood Protection Level

Storm drainage systems are typically designed to pass a flood of a designated magnitude called the design flood. The design flood generally balances the cost of flood damages with the cost of the storm drainage system to achieve an overall minimum public cost. Watersheds in Independence are classified as requiring protection for either the 1 or 10 percent chance flood, based on expected flood damages. Storm drainage systems that serve as the outlet for areas where flood damage is likely to occur must safely pass the critical-duration 1 percent chance flood. Storm drainage systems for areas where no significant flood damage or disruption of infrastructure is likely to occur must safely pass the critical-duration 10 percent chance flood.

3.3.3 Hydrologic Model

Simulating the stormwater system using a hydrologic model is important in determining the adequacy of the existing system and to provide guidance in designing systems to handle surface runoff for ultimate development conditions. A hydrologic model simulates the rainfall-runoff process so that runoff rates and volumes from design storms can be estimated for different stormwater configurations and land use conditions.

As rain falls on the watershed, several different processes move the water from the ground surface to one of three ultimate destinations. Initially water is stored in depressions and on the surface of the ground, and begins to infiltrate into the soil. As rainfall continues, the storage capacity of these depressions is exceeded, and the excess water begins to runoff into gutters, swales, ditches, and storm sewers. In Independence, these conveyance paths lead to county and public ditches or creeks or to one of the many lakes, ponds, and wetlands in the City.

The amount of rain and the time over which the rain occurs influences the amount of runoff and the rate at which the runoff travels from the watershed. In addition to the rainfall conditions, the physical characteristics of the watershed also determine the volume of water that leaves the watershed as runoff, and the resulting flood levels in the ponds, wetlands, and lakes in the watershed.

The storm drainage system for Independence was analyzed for the 1 percent chance flood for existing and proposed (ultimate development) conditions. The 1 percent chance flood is used to design storm drainage systems that serve as the outlet for areas where significant flood damage is likely to occur.

The drainage divides within the PSCWMC were determined using:

- Four USGS Maps: Delano – 1981, Mound – 1993, Rockford – 1981, Watertown – 1993
- Field Surveyed pipes and water levels
- LiDAR data

The drainage divides within the MCWD were obtained from the MCWD Comprehensive Water Resources Management Plan.

HydroCAD was used as the hydrologic model to simulate flow through the storm drainage systems in Independence. This computer model creates a hydrograph for each watershed. The model then routes these hydrographs through storage areas (such as wetlands, lakes, and detention ponds) and conveyance systems (storm sewers and ditches) and combines them with hydrographs from other subwatersheds. The hydrologic model estimates both the peak rate of runoff and the volume of runoff. The peak rate of runoff is the primary factor in determining storm sewer sizes. The volume of runoff is the primary factor in the design and evaluation of stormwater storage areas and in the assessment of hydrologic impacts to wetlands. A more detailed discussion about the HydroCAD Model is given in Section 9.0.

3.3.4 Rate Control and Flood Storage

Independence has vast amounts of stormwater storage available in its wetlands and lakes. This storage was used in the development of the ultimate conditions hydrologic model for the City. The storage areas were estimated from the USGS topographic maps and the elevations were based on field surveys of existing water levels and pipe inverts.

The ultimate pipes were designed to take advantage of the large storage areas while maintaining the overall discharge rate leaving the City borders.

3.3.5 Flood Control

Flood control has been directed primarily at the management of flood levels, which include the protection of structures and the safety of the residents of the City.

3.3.5.1 Flood Protection Standards

It is common practice in stormwater management to provide a safety factor against flooding. This factor of safety is typically represented as a vertical separation distance between the peak flood elevation and the flood damage elevation. This vertical separation is called the “freeboard.” Section 5.2.4 presents the freeboard values that will be used for the City.

3.3.5.2 Flood Control System

The flood control system in Independence consists of the wetlands, ponds, and lakes for storage of runoff; the roadways, storm sewers, ditches and streams for conveyance of water from the watershed; and the management of the water in the system. Normal levels, flood levels, flood storage, peak discharges, and proposed storm sewer pipe sizes for each watershed are tabulated in the tables in Section 6.

3.4 Problem Areas

An assessment of the known problem areas and concerns is presented in this section.

3.4.1 Lake and Stream Water Quality Concerns

The water quality of six lakes and streams within the City have been identified as a concern, including Lake Independence, Lake Rebecca, Lake Irene, Lake Sarah, Crow River South Fork, and Pioneer Creek. A summary of these impaired waters is shown on Table 3-3.

Multiple TMDL studies have been assigned Wasteload allocations (WLA) for several of the impaired waters. WLAs have been given for Total Phosphorus (TP) for Lake Independence and Lake Sarah; *E. coli* for Painter Creek, Pioneer Creek, and Crow River; and Total Suspended Solids for Crow River. Additionally, the City has two more WLAs for waterbodies outside of the municipal boundaries as their watersheds are within City limits. These include TP WLAs for Jennings Bay and Rice Lake.

**Table 3-3
Impaired Waters**

Reach	Lake or River ID	Year ID	Affected Use	Pollutant or Stressor	TMDL Target Completion Date	Year TMDL Plan Approved
Crow River, South Fork	07010205-508	2002	Aquatic Life	Fish Bioassessments	2027	n/a
		2004	Aquatic Life	Turbidity	2017	n/a
		2006	Aquatic Recreation	Fecal Coliform	2017	n/a
		2016	Aquatic Life	Aquatic macroinvertebrate bioassessments	2027	n/a
		2016	Aquatic Life	Nutrient/Eutrophication Biological Indicators	2027	n/a
Lake Independence	27-0176-00	2002	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators	n/a	2007
Lake Irene	27-0189-00	2016	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators	2027	n/a
Lake Rebecca	27-0192-00	2008	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators	2017	Delisted 2018
Lake Sarah (West Bay)	27-0191-01	2006	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators	2012	2011
Lake Sarah (East Bay)	27-0191-02	2006	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators	2012	2011
Pioneer Creek	07010205-653	2016	Aquatic Life	Dissolved Oxygen	2027	n/a
		2016	Aquatic Recreation	Escherichia coli	n/a	2017
Pioneer Creek	07010205-654	2016	Aquatic Life	Aquatic macroinvertebrate bioassessments	2027	n/a
		2016	Aquatic Life	Fishes bioassessments	2027	n/a

Note: Information obtained from the proposed 2018 Impaired Waters List

3.4.1.1 Lake Independence TMDL

Lake Independence is 851 acres in size and is classified as a Class 2 recreational water. The primary uses include swimming, fishing, and boating. The contributing watershed is 7,631 acres and is predominately agricultural and residential uses. There are several single-family hobby farms located within the watershed.

The TMDL was approved in 2007. In 2007, the average phosphorous concentration was 47 ug/L, which exceeds the state standard of 40 ug/L for deep, recreational waters. Lake Independence phosphorus data has been collected by the Three Rivers Park District throughout the growing season since 1995 and can be found on the MPCA Environmental Data Access System. The average total phosphorus concentration for each year between 1995-2017 is shown on the graph in Figure 3-2.

The total load, as reported in the 2007 TMDL report, from all sources is 2,381 pounds per year. A map of the Lake Independence subwatershed used in the TMDL is shown in Figure 3-3. While the phosphorus standard is 40 ug/L, the TMDL states the desire to achieve a water quality goal of 36 ug/L. Achieving the desired water quality will require a phosphorous reduction of 1,081 pounds per year.

Approximately 18% of the 1,081 pounds per year load comes from internal loading, which is 209 pounds per year. The communities within the watershed (Independence, Medina, and Loretto) have agreed to work together to eliminate the 209 pounds per year of internal loading. Additionally, the TMDL allocates phosphorous load reductions to each municipality in the watershed, as follows:

Independence	-535 lbs/yr
Medina	-284 lbs/yr
Loretto	-53 lbs/yr

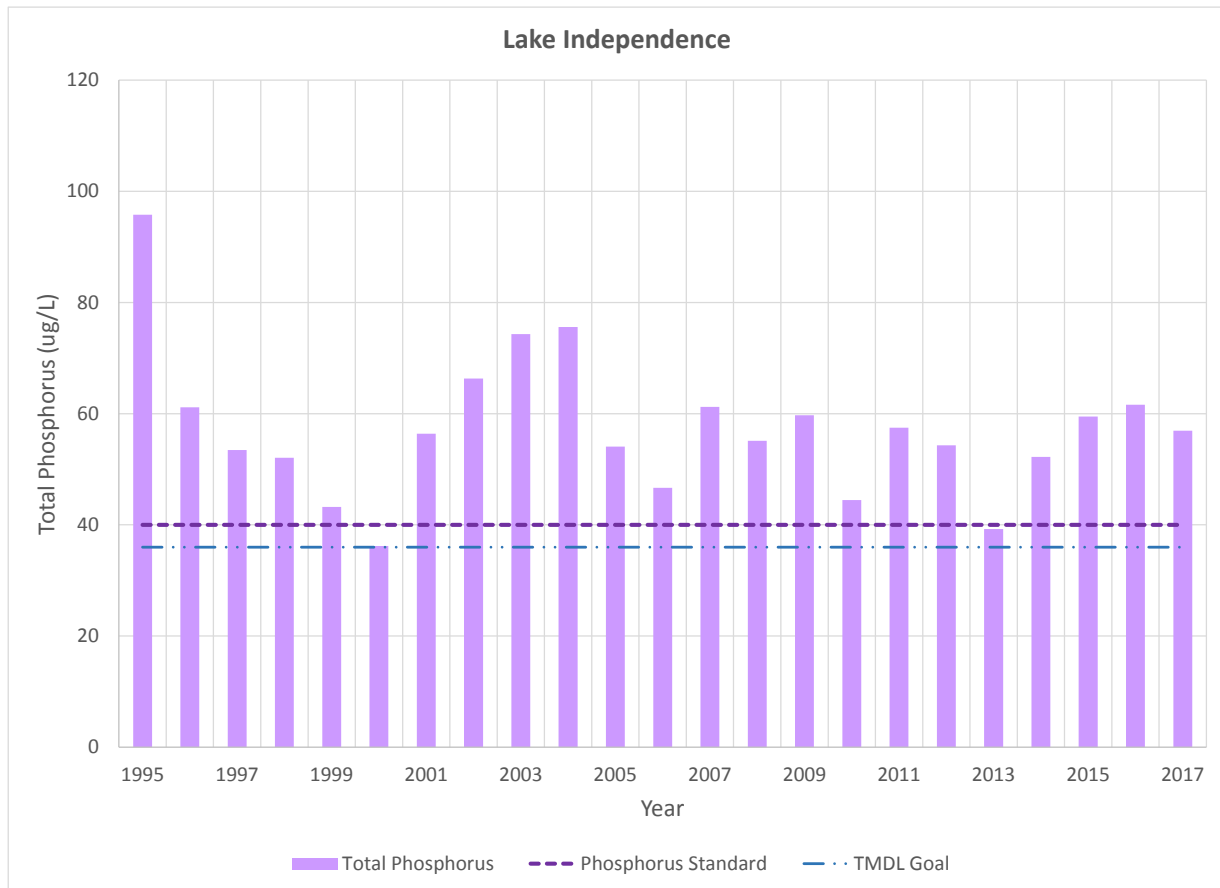


Figure 3-2. Total phosphorus in Lake Independence. Results shown are average values. Detailed results can be obtained through the MPCA Environmental Data Access System.

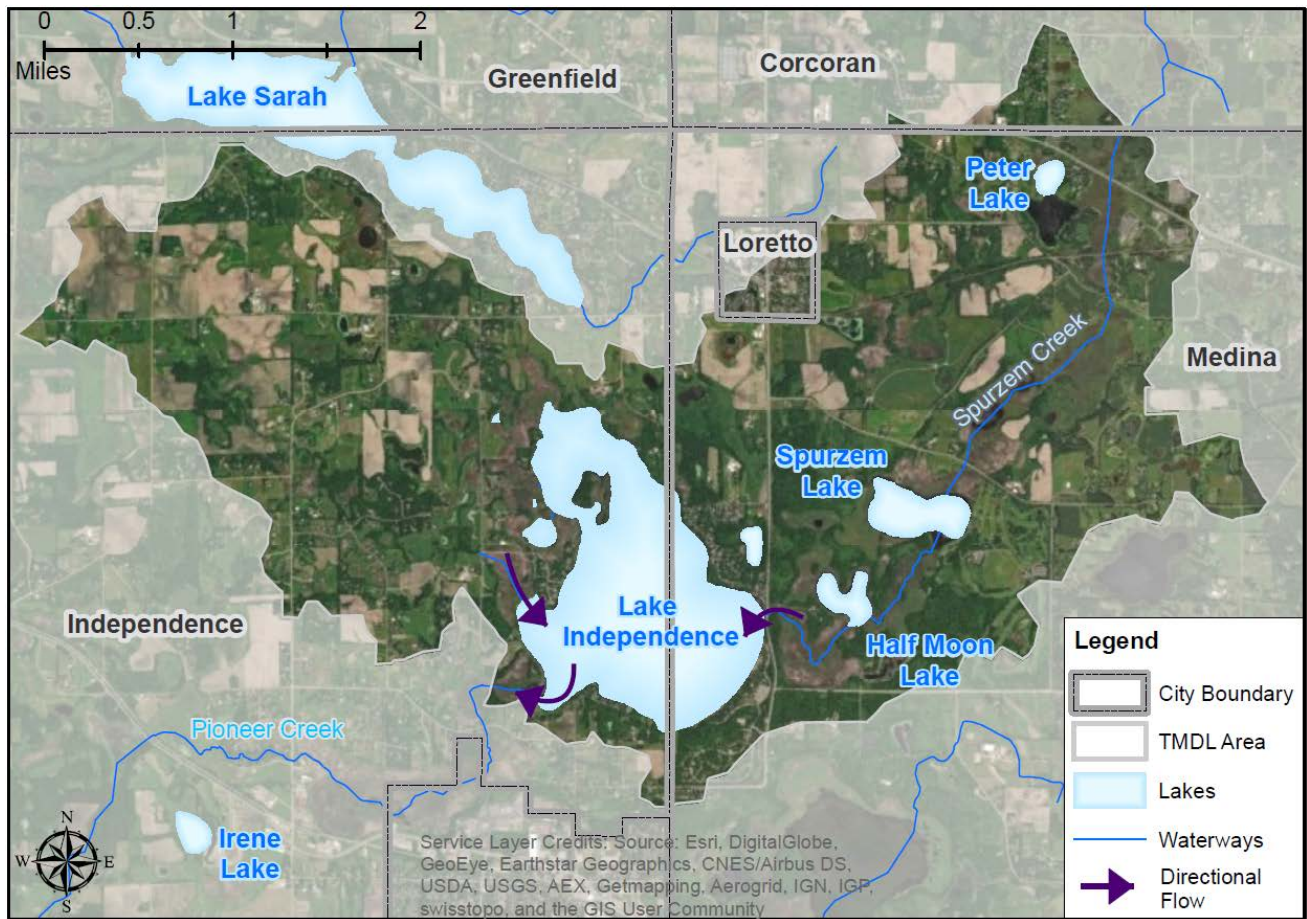


Figure 3-3. Lake Independence TMDL Study Area

Corrective Actions:

In order to achieve the desired load reductions, it will be necessary for the City of Independence to implement structural and non-structural BMPs. The City has already implemented several BMPs, as shown in Tables 3-4 and 3-5:

**Table 3-4
Lake Independence TMDL Structural BMPs**

Project	Year
Filter strip/buffer	2009
Filter strip/buffer	2009
Filter strip/buffer	2009
Rain Garden	2014
Wet Detention Pond	2015
Wet Detention Pond	2015

**Table 3-5
Lake Independence TMDL Non-structural BMPs**

Project	Year Implemented
BMP improvement	2009
BMP improvement	2009
Rooftop disconnection	2009
Increased implementation of illicit discharge detection and elimination ordinance	2009
Updated ordinance	2012
Erosion repairs	2014
Supplemental Public Education Outreach	2014
Supplemental Public Education Outreach	2014
BMP improvement	2014
Increased implementation of illicit discharge detection and elimination ordinance	2014
BMP improvement	2014
Increased implementation of illicit discharge detection and elimination ordinance	2015
Increased publications	2015

The City of Independence has achieved a load reduction of 91.2 lbs of phosphorous to date. The load reduction is a good start, and the City must continue to implement additional structural and non-structural BMPs in order to achieve the ultimate goal reduction of 535 lbs per year.

3.4.1.2 Lake Sarah TMDL

Lake Sarah is classified as a Class 2B recreational water, and the primary uses include swimming, fishing, and boating. Lake Sarah is 553 acres in size and the contributing watershed is 4,454 acres and is predominately agricultural and residential uses. Only a small portion of the contributing watershed is within the City of Independence and primarily consists of residential development along the south side of the lake.

The TMDL was approved in 2011. In 2011, the average phosphorous concentration was 101 ug/L, which exceeds the state standard of 40 ug/L for deep, recreational waters. Lake Sarah phosphorus data has been collected by the Three Rivers Park District throughout the growing season since 2006 and can be found on the MPCA Environmental Data Access System. The average total phosphorus concentration for each year between 2006-2017 is shown on the graph in Figure 3-3.

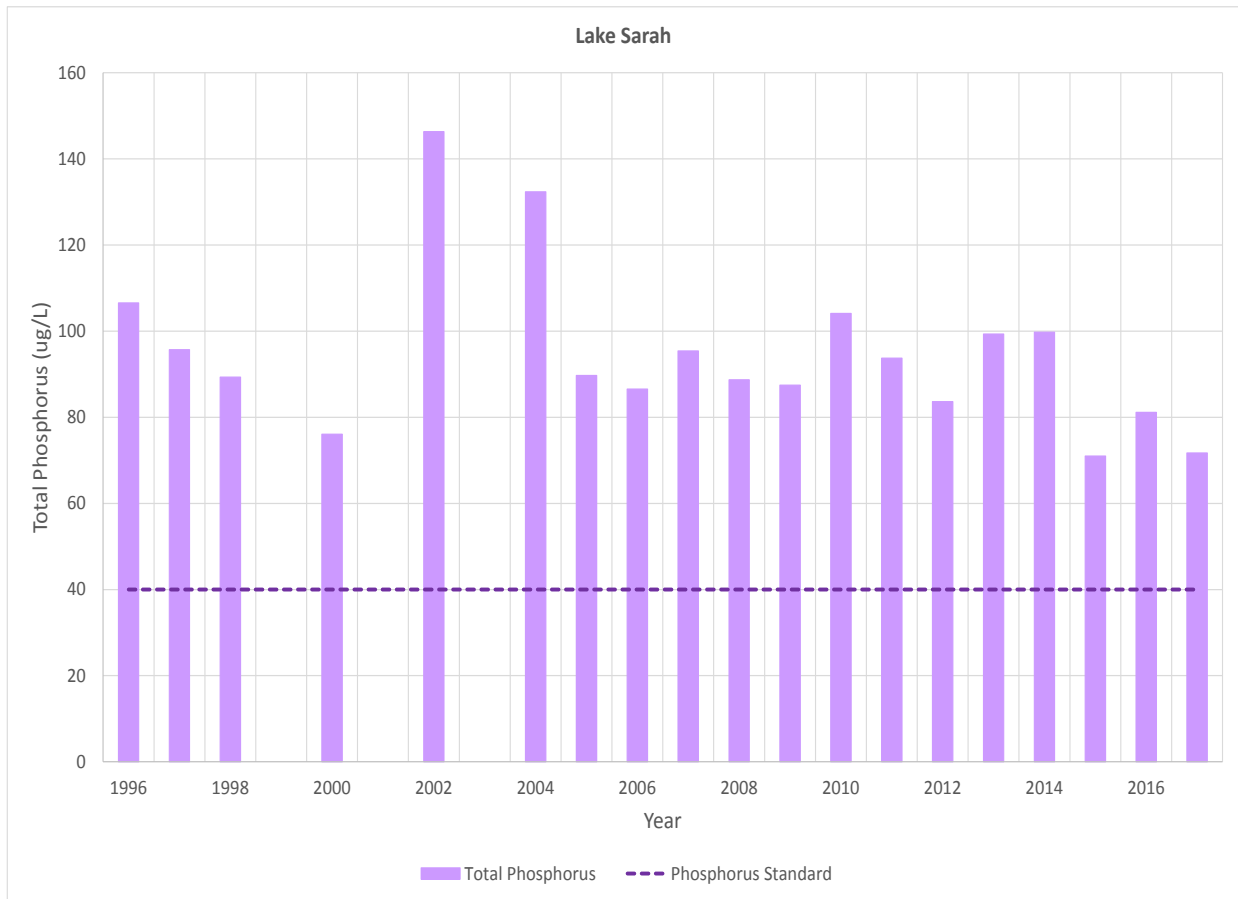


Figure 3-4. Total phosphorus for Lake Sarah. Results shown are average values. Detailed results can be obtained through the MPCA Environmental Data Access System.

The total load, as reported in the 2011 TMDL report, from all landscape/watershed sources was 2,108 pounds per year. A map of the Lake Sarah subwatershed used in the TMDL report is shown in Figure 3-5. Additionally, an internal load of 2,763 pounds per year is estimated. The internal loading is likely due to curlyleaf pondweed. The Lake Sarah watershed contributes 38% of the total annual phosphorous load to the lake, and the internal loading accounts for 59% of the phosphorous loading to the lake.

In order to achieve the desired water quality, the internal loading will have to be controlled to background levels, and the watershed load will have to be reduced to a total phosphorous load of 1,238 pounds per year.

The TMDL Implementation plan allocates phosphorous load reductions to each municipality in the watershed, as follows:

Independence	-143 lbs/yr
Corcoran	-109 lbs/yr
Medina	-249 lbs/yr
Loretto	-37 lbs/yr

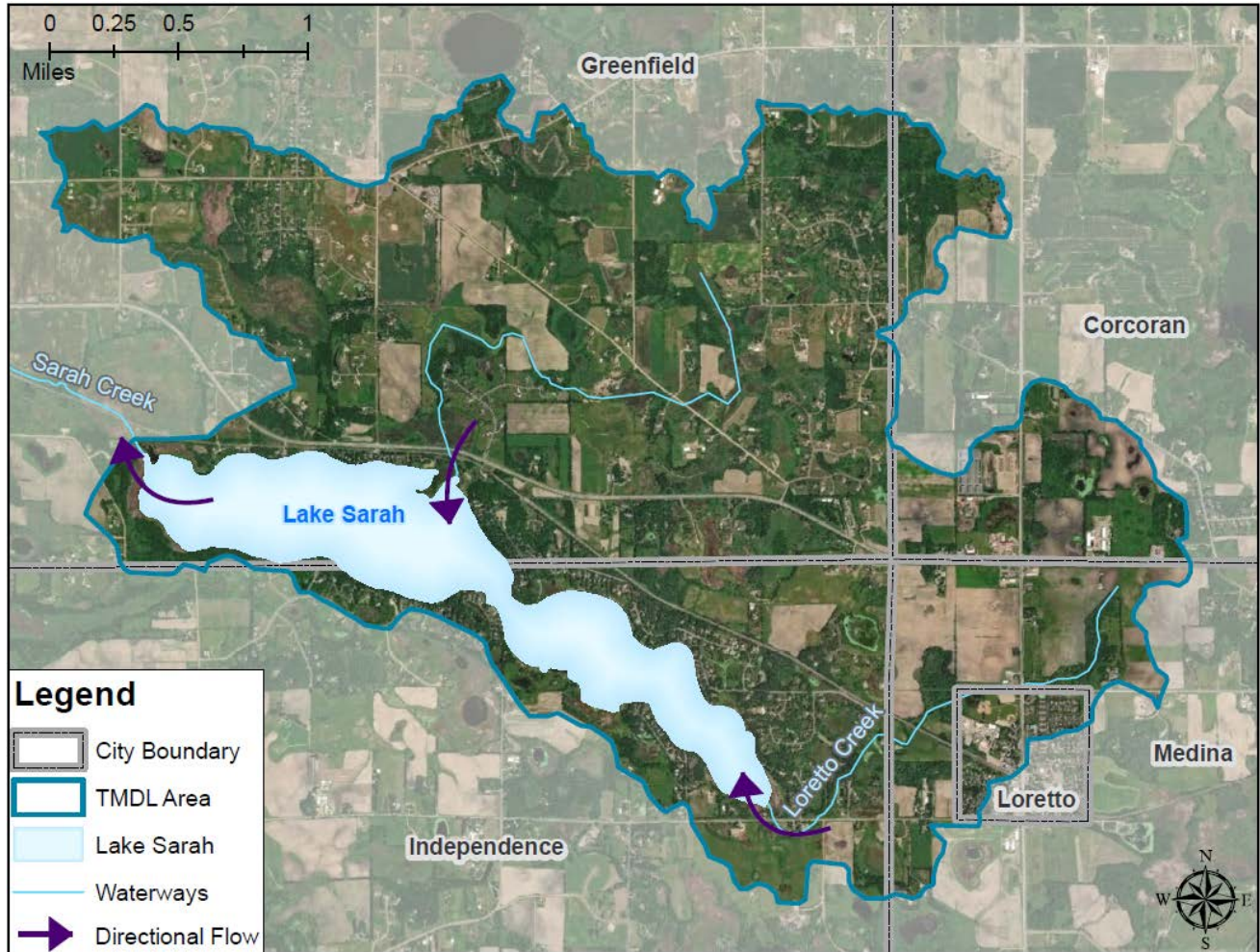


Figure 3-5. Lake Sarah TMDL Study Area

Corrective Actions:

In order to achieve the desired load reductions, it will be necessary for the City of Independence to implement structural and non-structural BMPs. Curlyleaf pondweed treatments have been applied over the past several years, which will target the internal loading source. Curlyleaf pondweed treatments were applied in 2015, 2016, 2017, and 2018. In accordance with the Lake Sarah Nutrient TMDL Implementation Plan, a load reduction of 3,222 pounds per year is targeted by curlyleaf pondweed management. Several rain gardens, hydraulic restorations, and one sediment pond was identified in the Lake Sarah and Lake Independence Stormwater Retrofit Analysis prepared in 2014 by the Anoka Conservation District as further discussed in Section 5.

3.4.1.3 Pioneer Creek TMDL

The Pioneer-Sarah Creek TMDL was approved in 2017. While Lake Sarah and Lake Independence are included in this subwatershed, they were not a part of this TMDL since they were already covered in their own TMDL reports, which are mentioned in the previous sections. A map of the TMDL area is shown in Figure 3-5. Pioneer Creek is impaired for *E. coli*, which is a bacterium that may be considered harmful in high enough concentrations. However, there is a small section of Pioneer Creek within the City of Independence that is not considered impaired for *E. coli*. The impaired reach (593) extends from Lake Independence for 7.1 miles to just after the creek turns sharply south. This reach has a direct watershed area of 9,178 acres, and a total watershed area, which includes areas upstream, of 17,573 acres. The majority of the surrounding land use is agricultural or undeveloped.

The Pioneer Creek is classified as a 2B surface water. The numeric standard for *E. coli* for Class 2B for *E. coli* is:

Not to exceed 126 organisms per 100 milliliters (cfu/100mL) as a geometric mean of not less than five samples representative of conditions within any given calendar month, nor shall more than 10% of all samples taken during any calendar month individually exceed 1,260 cfu/100mL. The standard applies only between April 1 and October 31.

The monthly *E. coli* samples taken in the 593 reach of Pioneer Creek between 2009 and 2011 are shown in Table 3-6. During this time, Pioneer Creek was above the geomean standard of 126 cfu/mL for five of the seven applicable months.

**Table 3-6
Pioneer Creek *E.coli* Summary**

May			June			July			August			September			October		
n	Geo	%n > 1,260	n	Geo	%n > 1,260	n	Geo	%n > 1,260	n	Geo	%n > 1,260	n	Geo	%n > 1,260	n	Geo	%n > 1,260
13	135	0	45	75	0	41	127	7	49	247	6	13	258	23	5	161	0

Notes: Red values mean the monthly geomean values are greater than 126 cfu/100mL standard.

n = number of samples

Geo = Geometric mean in cfu/100mL

%n > 1,260 = percent of samples greater than 1,260 cfu/100mL

The WLA given in the 2017 TMDL is based on the flow regime of the creek. Independence's WLA is shown in Table 3-7.

**Table 3-7
City of Independence's Pioneer Creek *E. Coli* Wasteload Allocation**

	Flow Regime (billions of organisms/day)				
	Very High	High	Mid	Low	Very Low
Independence MS4	1.23	0.41	0.23	0.05	0.02
Total Load TMDL) ¹	240.91	113.82	44.27	10.02	4.67
Total Reduction ²	62%	0%	19%	51%	26%

¹WLA, LA, MOS, and Unallocated load; ²Reduction from all existing load

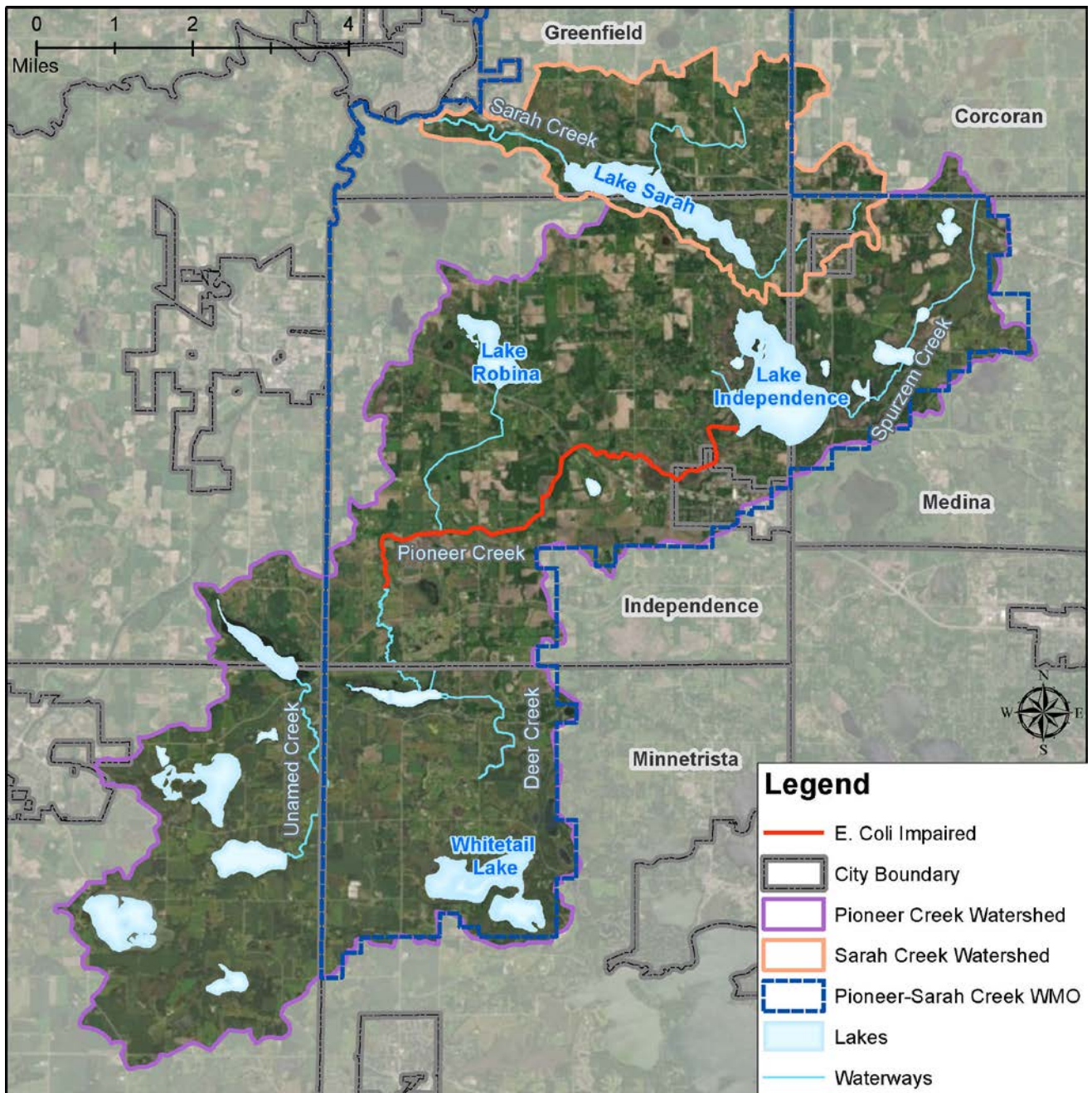


Figure 3-6. Pioneer-Sarah Creek TMDL study area

3.4.1.4 Lake Rebecca

Lake Rebecca was identified as impaired for nutrients in 2008. Average total phosphorus concentrations in 2007 were over 100 ug/L, which is well over the 40 ug/L standard for deep, recreation lakes.

Two alum treatments were applied, one in the fall of 2010 and one in the spring of 2011. Since that time, the total phosphorus has dropped below the standard. Lake Rebecca phosphorus data has been collected by the Three Rivers Park District throughout the growing season since 1994 and can be found on the MPCA Environmental Data Access System. The average total phosphorus concentration for each year between 1994-2017 is shown on the graph in Figure 3-7. The proposed 2018 impaired waters list plans to delist Lake Rebecca, so it will no longer be considered an impaired water.

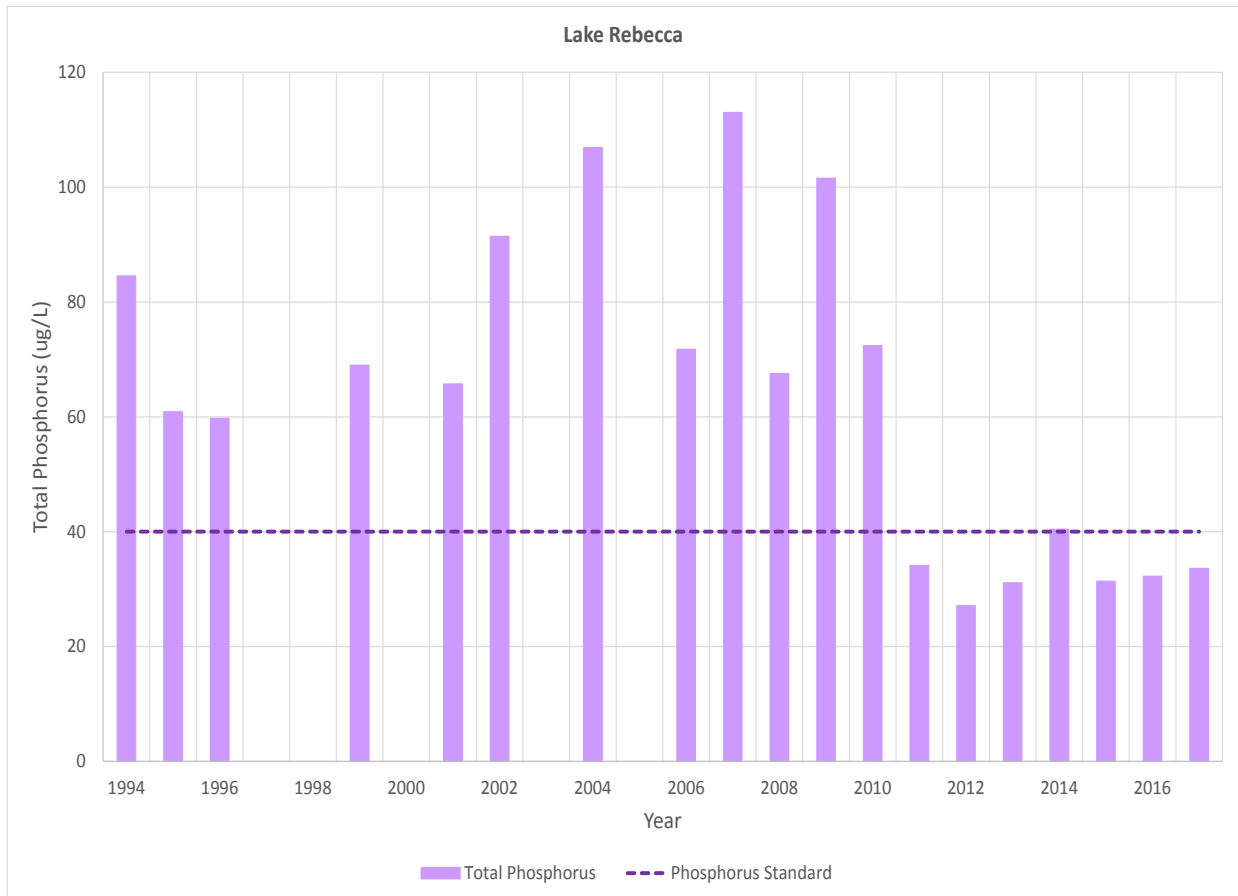


Figure 3-7. Total phosphorus for Lake Rebecca. Results shown are average values. Detailed results can be obtained through the MPCA Environmental Data Access System.

3.4.1.5 Lake Irene

Lake Irene was added to the 2016 proposed impaired waters list for nutrient impairment. There are only two years of data for the total phosphorus for Lake Irene, which can be viewed in Figure 3-8. The phosphorus standards for Lake Irene is 60 ug/L instead of the 40 ug/L due to it being a shallow lake. The average phosphorus concentrations were 179 ug/L and 136 ug/L for 2010 and 2011, respectively. Lake Irene has more than double the standard concentration for phosphorus. There is no TMDL specifically for this lake, but Lake Irene is included in the Pioneer-Sarah Creek subwatershed TMDL area.

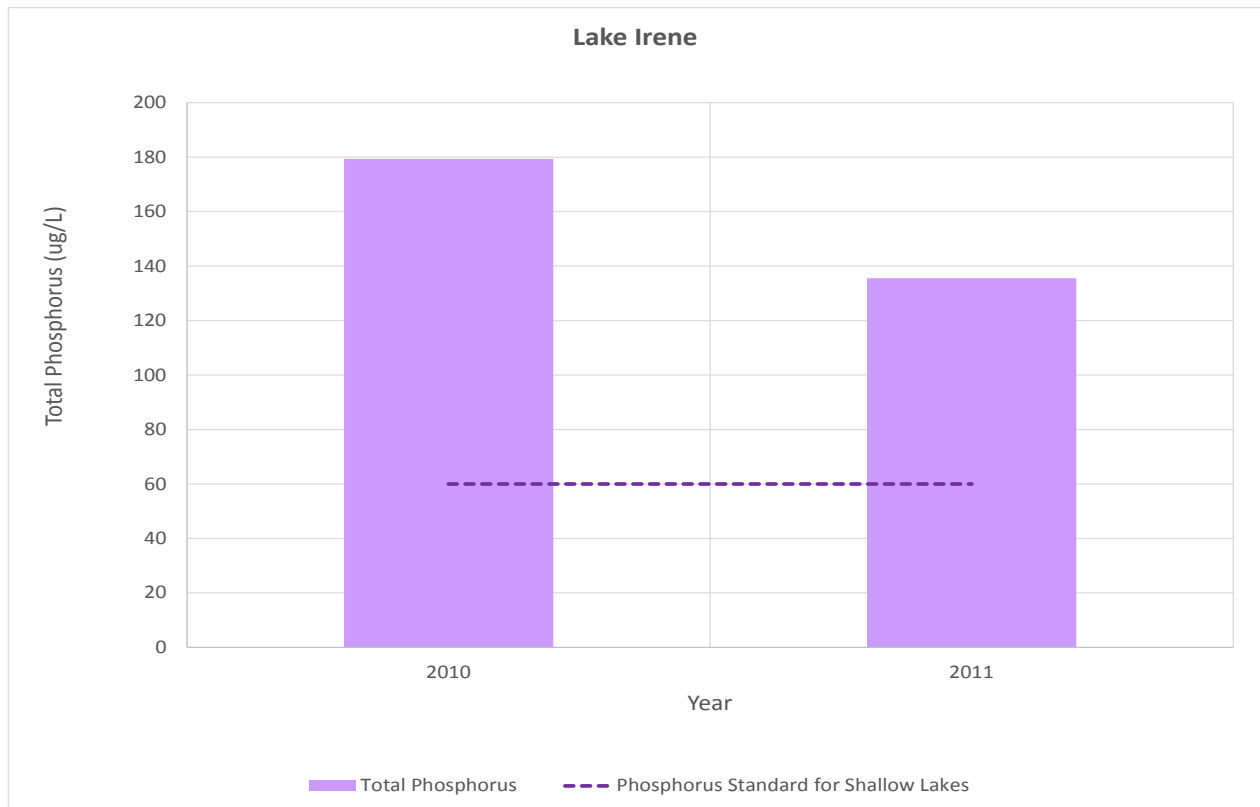


Figure 3-8. Total phosphorus for Lake Irene. Results shown are average values. Detailed results can be obtained through the MPCA Environmental Data Access System.

3.4.1.6 Crow River, South Fork TMDL

The South Fork Crow River is listed as impaired for multiple pollutants and stressors, including turbidity or total suspended solids (TSS), nutrients, and fecal coliform (see Table 3-3). The reach bordering the northwest boundary of Independence is part of section 508, which extends 31 miles from just north of Independence to almost the Carver and McLeod county border.

The South Fork Crow River TMDL Report was completed in October 2018 and is still being reviewed by the EPA at the time of this publication. TSS and *E. coli* data from the TMDL report is summarized Figure 3-9 and Table 3-8. For the TSS, five sections within the 508 reach were sampled

for varying timeframes between 2006-2013. Between the five sections sampled, 10 to 50 percent of the samples were over the 65 mg/L TSS standard. The *E. coli* data shows the geomean frequently surpassed the standard of 126 cfu/100mL.

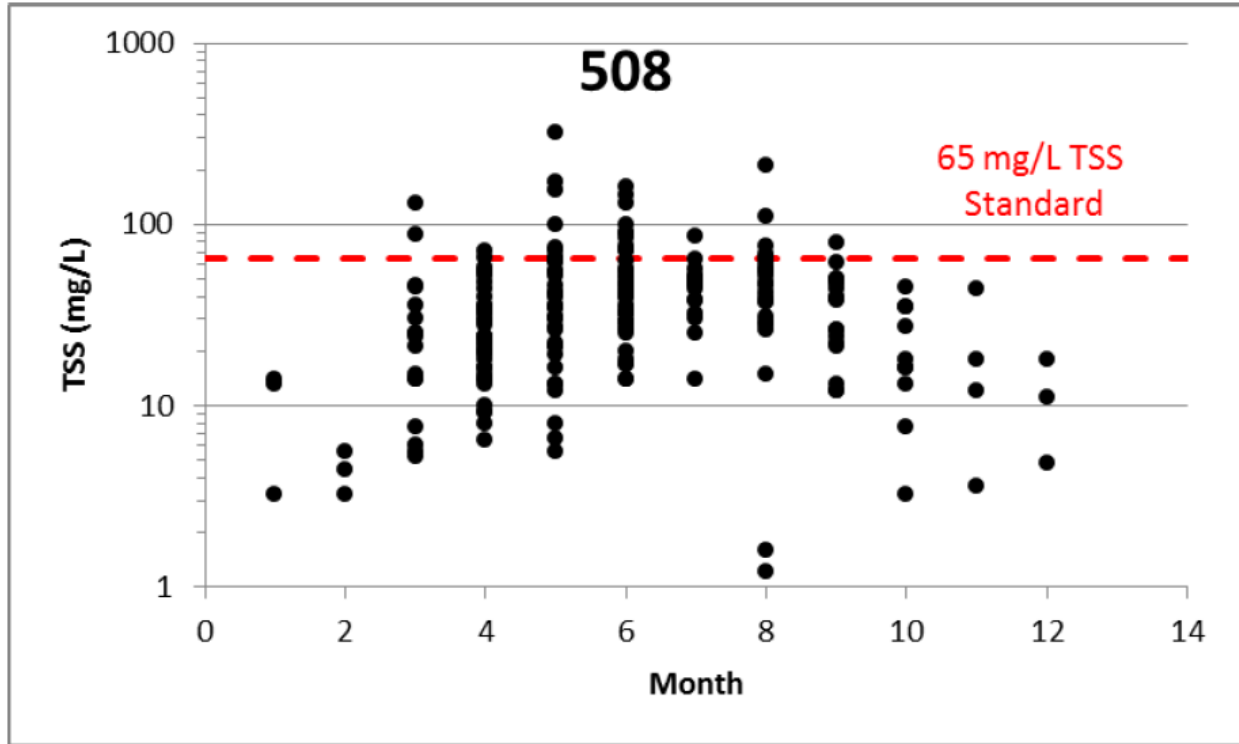


Figure 3-9. TSS seasonal variation of the Crow River South Fork, section 508. Red dashed line indicates the South River Nutrient Region 65 mg/L TSS standard. Graph taken from Figure 3-6 in the [South Fork Crow River TMDL](#) report.

Table 3-8
South Fork Crow River (508) *E. coli* Summary

Data Years	All months (April – October)		
	n	Geo	%n > 1,260
2001-2013	63	90	5
2003-2013	97	172	8
2010-2013	43	290	16

Notes: Data from South Fork Crow River TMDL. Red values mean the monthly geomean values are greater than 126 cfu/100mL standard.

n = number of samples

Geo = Geometric mean in cfu/100mL

%n > 1,260 = percent of samples greater than 1,260 cfu/100mL

The TMDL report as assigned Wasteload Allocations (WLA) for TSS and *E. coli* for the South Fork Crow River. The TSS WLA was given to the surrounding MS4s categorically. The other MS4s include Corcoran, Loretto, Maple Plain, Medina, and Minnetrista. The WLA for all the MS4s

combined is shown in Table 3-9. The *E. coli* WLA is for the City of Independence and is based on the flow regime of the river. Independence's *E. coli* WLA is shown in Table 3-10.

**Table 3-9
South Fork Crow River MS4 Total Suspended Solids Wasteload Allocation**

	Flow Regime (tons/day)				
	Very High	High	Mid	Low	Very Low
MS4 Communities	10.2	4.0	1.2	0.3	<0.1
Total Load (TMDL)	444.5	128.1	38.7	11.4	3.3
Estimated Reduction	49%	9%	0%	0%	0%

**Table 3-10
City of Independence's South Fork Crow River *E. coli* Wasteload Allocation**

	Flow Regime (billions of organisms/day)				
	Very High	High	Mid	Low	Very Low
Independence MS4	256.61	70.27	20.33	6.02	--
Total Load (TMDL) ¹	8,407.58	2,302.23	666.13	197.16	56.89
Total Reduction ²	32%	33%	47%	36%	--

¹WLA, LA, MOS, and Unallocated load; ²Reduction from all existing loads of entire watershed

The South Fork Crow River TMDL also gave Independence a Total Phosphorus reduction requirement for Rice Lake. Rice Lake is west of Independence and lies on the border of Franklin Township in Wright County and Watertown Township in Carver County. Approximately 53% of its watershed is located within the City of Independence. The TP WLA for the City is 138.7 lb/yr, which is a reduction of 616.8 lb/yr or 82%. A map of the TMDL study area within the City of Independence is shown in Figure 3-10.

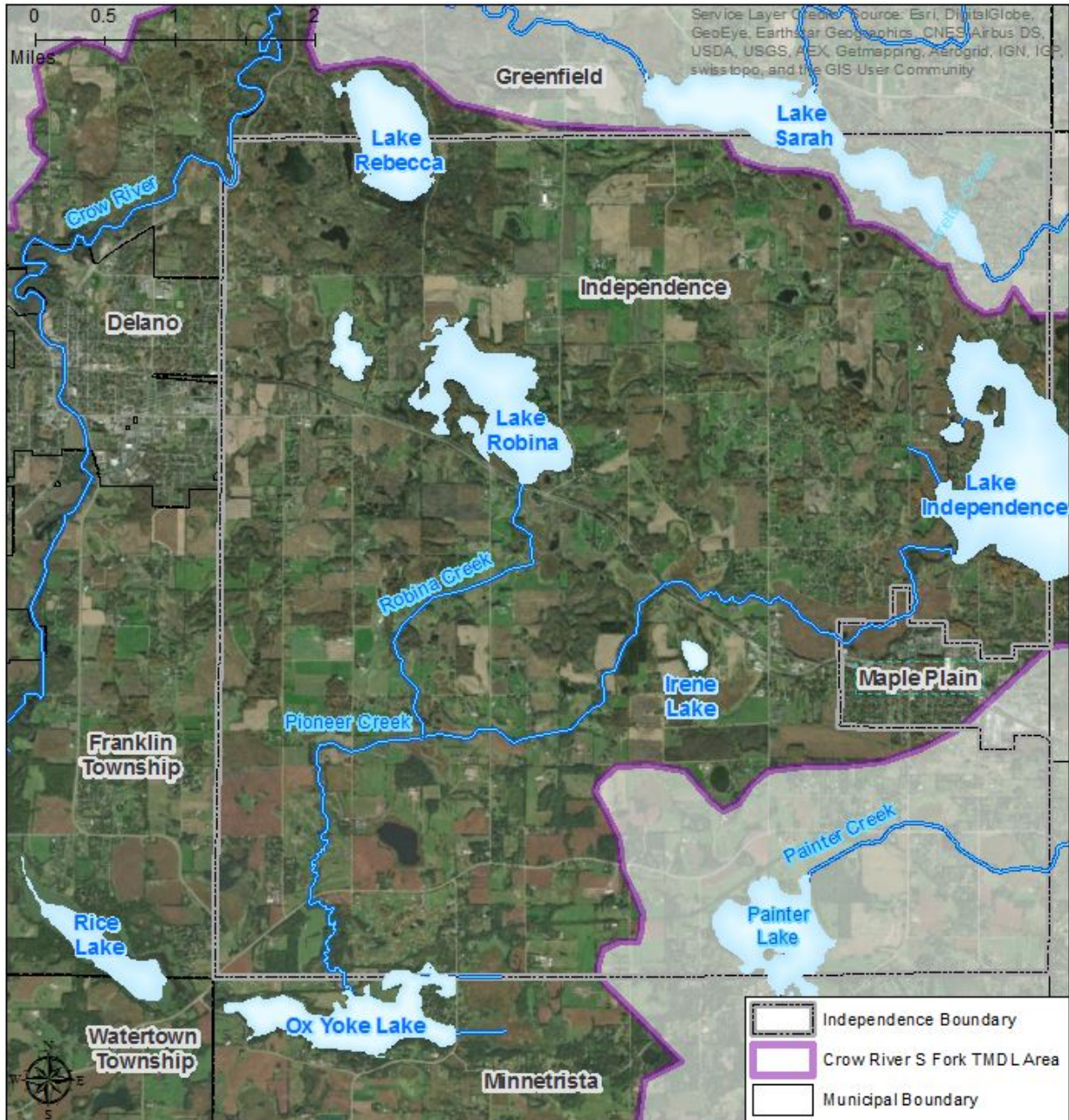


Figure 3-10. South Fork Crow River TMDL study area within the City of Independence

3.4.1.7 Upper Minnehaha Creek Watershed TMDL

The 2014 Upper Minnehaha Creek TMDL included Painter Creek, which traverses from Katrina Lake to Painter Lake and continues on into Jennings Bay of Lake Minnetonka. The segment of Painter Creek within the boundaries of Independence is not listed as an impaired water until it reaches Painter Lake. This reach of Painter Creek is impaired for *E. coli*; the WLA for *E. coli* is shown in Table 3-11.

Table 3-11
City of Independence's Painter Creek *E. coli* Wasteload Allocation

	Flow Regime (billions of organisms/day)				
	Very High	High	Mid	Low	Very Low
Independence MS4	11.8	5.92	7.85	1.04	0.012
Total Load (TMDL) ¹	279.4	132.1	83.6	14.8	0.16
Total Reduction ²	0%	0%	0%	31%	37%

¹WLA, LA, MOS, and Unallocated load; ²Reduction from all existing loads of entire watershed

The TMDL study also included Jennings Bay in Minnetrista, which is considered impaired for nutrients. MCWD's [Painter Creek Subwatershed Plan](#) states Painter Creek contributes between one-third to one-half of Jennings Bay's total annual phosphorus load. The TMDL assigned the City of Independence a Jennings Bay TP WLA of 189 lb/yr, which is 617 lb/yr load reduction or 77%. Figure 3-11 shows the Upper Minnehaha Creek TMDL study area within the City of Independence.

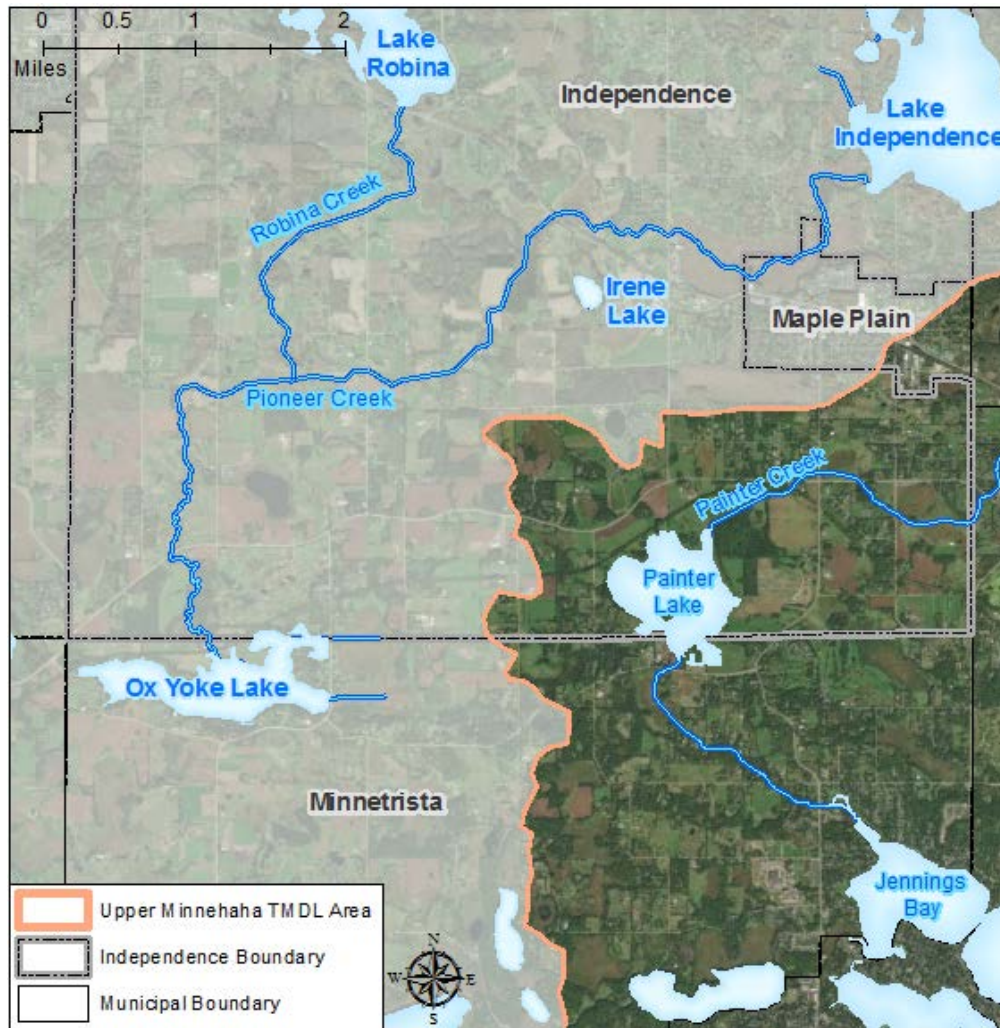


Figure 3-11. Upper Minnehaha Creek Watershed TMDL study area within the City of Independence

Corrective Action:

The City will utilize the 2007 MCWD Painter Creek Subwatershed Plan and the 2010 Feasibility Report and Environment Assessment: Painter Creek Section 206 to consider potential projects to help meet the TMDL requirements.

The City will work cooperatively with the MCWD on proposed district projects and will implement the strategies outlined in Section 5.2.5.3. MCWD has identified two potential regional ponds within Independence. The regional ponds will help reduce the phosphorus loading and peak flows to Painter Creek. The potential regional pond locations are shown on Figure 3-12.

There are potential wetland restoration areas within Independence. Wetland restoration may help reduce the phosphorus loading and peak flows to Painter Creek. Three potential wetland restoration areas are shown on Figure 5-2. These wetland restorations are proposed projects by the MCWD. The City will cooperate with the MCWD during the implementation stage of these projects.

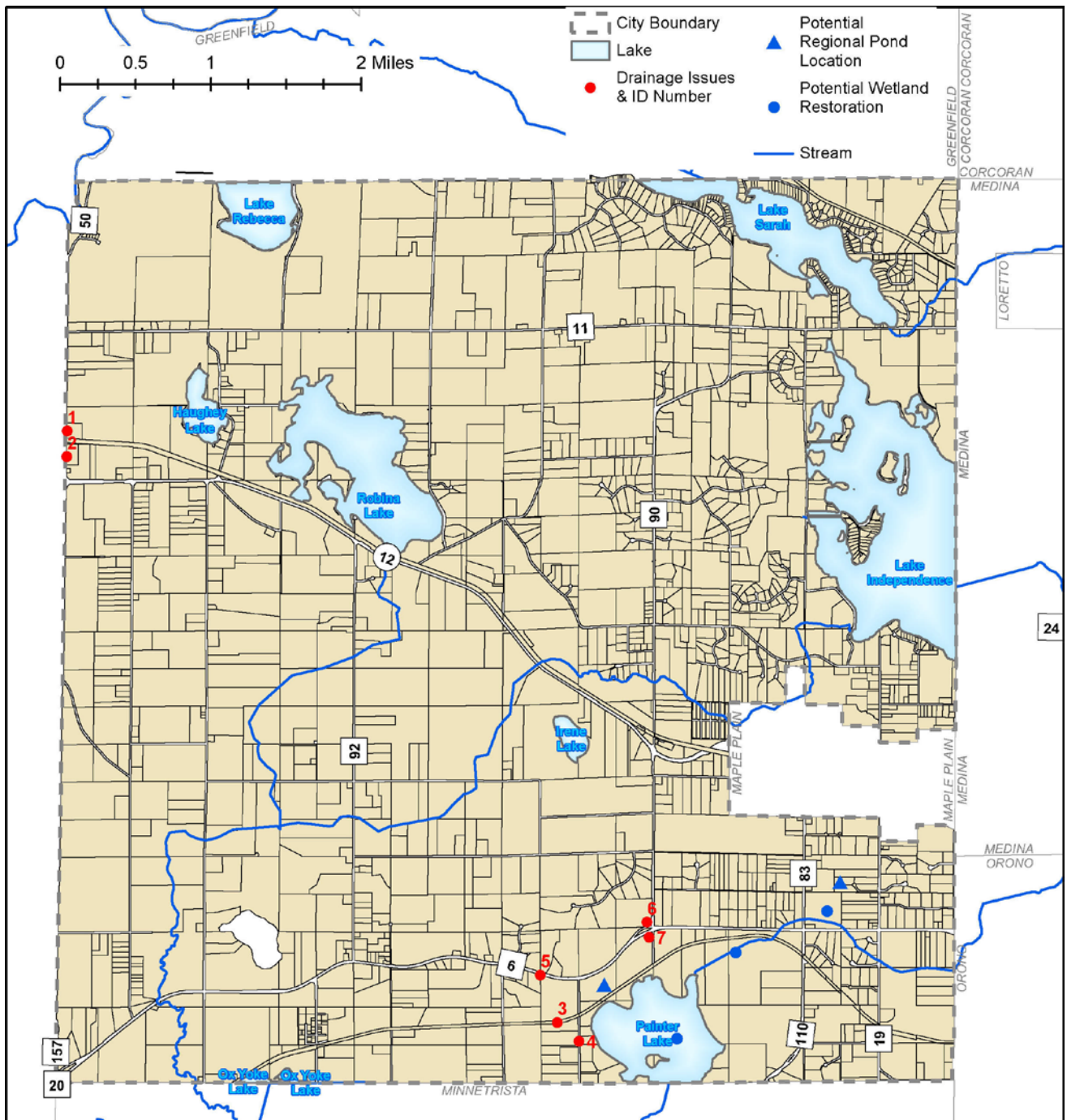


Figure 3-12. Drainage Issues and Concerns

3.4.2 Flooding, Stormwater Rate Control, and Water Quantity Concerns

3.4.2.1 High Lake Levels

The high-water elevations of Lake Independence, Lake Sarah, and Lake Haughey were identified as a concern in the second-generation water management plan. A contributing factor to the high-water levels is from increased rates and volumes of stormwater runoff as a result of an increase in impervious surface area due to development.

Corrective Actions:

A Lake Independence outlet project was completed in 2013 and has successfully lowered the lake level to an acceptable elevation. The outlet project consisted of rebuilding the weir that controls the lake elevation at Independence Road and dredging the outlet channel from weir to Pagenkopf Road.

The City shall implement the water quantity policies and standards outlined within this plan through development plan review in an effort to address flooding and increased flow rate and volume concerns within the City.

3.4.2.2 Culvert Crossing Concerns

Rates and volumes of stormwater runoff associated with the culverts north and south of the railroad at County Line Road between the Cities of Delano and Independence has been identified as a concern. The location of these culverts is shown on Figure 3-12 as issues 1 and 2.

There are two locations within the City that are predicted to overtop during a 100-year storm event. The two locations are one private driveway off of Ingerson Road and the low spot south of County Road 6 on Ingerson Road. These two locations are shown on Figure 3-12 as issues 3 and 4.

MCWD has identified three culvert crossings within the City that have higher velocities than desired which may result in erosion at the outlet. The crossings are on County Road 6. The locations are shown on Figure 3-12 as issues 5, 6, and 7.

Corrective Actions:

The City will cooperate with the City of Delano and the PSCWMC to study the rate and volume control issue associated with the railroad culverts at County Line Road. The City completed a preliminary drainage study of the Urban Commercial Area and presented the results in the second-generation water management plan.

As the results show, by requiring restrictions of the outlets from subwatersheds 2 and 3, the hydrologic conditions of the watersheds in Delano will not only be maintained, but will be improved. The XP-SWMM results are included in Appendix D of the second-generation water management plan.

A detailed drainage review will be required prior to approval of any preliminary plats within the Urban Commercial area.

The flooding issues were discussed with City Staff, and they were not identified as a threat to life or property; therefore, they were not examined any further. If projects occur in these areas, the flood potential will be reviewed at that time.

There are some slight to moderate erosion issues at the outlet of the Ingerson Road culvert. The City also reviewed the culvert crossings on County Road 6. These crossings have minor to no erosion issues. It is assumed that these crossings will be inspected on a routine basis by the City and the County as part of their MS4 permit requirements, and maintenance will be performed at such time that it is warranted.

3.4.3 Impacts of Stormwater Quality on Fish and Wildlife Resources

Impacts to fish and wildlife resources have been identified, including decreased floristic diversity and impacted wildlife habitat, as a result of stormwater.

Corrective Actions:

The City shall implement the water quality standards outlined within this plan through development plan review in an effort to address water quality impacts on fish and wildlife resources.

3.4.4 Impacts of Soil Erosion on Water Quality and Water Quantity

Construction site erosion has been identified as a concern.

Erosion along the banks of Lake Independence, Pioneer Creek, and Lake Sarah has been identified as a concern.

Erosion caused by commercial, hobby farm, and agricultural/farming activities has been identified as a concern.

Corrective Actions:

The City shall implement the standards outlined within this plan through development plan review to address erosion issues within the City.

The City shall develop erosion and sedimentation ordinances that conform to this plan's policies and standards.

The City will be responsible for enforcement of these ordinances.

The City shall create developer's guidelines based on the goals, policies, and standards outlined in this plan.

3.4.5 Groundwater Susceptibility

As discussed in Section 2.14, the MnDNR and the Minnesota Geological Survey have developed a map that identifies the susceptibility of the water table to pollution. There are a number of areas in the City that have been identified as highly or very highly susceptible to aquifer impacts.

Corrective Action:

The City shall implement the groundwater policies and standards outlined within this plan through development plan review in an effort to protect existing groundwater quality. Given the proposed low-density development planned for Independence, the potential for groundwater impacts is considered low.

4.0 Goals and Policies

This section presents the goals and policies developed for the management of water resources within Independence. Goals and policies are provided for wetlands, water quality, water quantity, erosion control, groundwater, public ditch system, recreation, fish and wildlife management, enhancement of public participation, information and education, floodplains, abstraction/filtration, shorelines and streambanks. Goals propose the desired end and policies provide the means to achieve the goals. Section 5.0 provides more specific detail on how the goals and policies will be implemented.

4.1 Wetlands

Goal: Preserve, create, and restore wetland resources, and maximize the benefits and functionality of wetlands to the City.

Policy 1:

Act as the Local Government Unit responsible for administration of the Wetland Conservation Act within the boundaries of the Pioneer-Sarah Creek Watershed Management Organization.

Policy 2:

The Minnehaha Creek Watershed District will act as the Local Government Unit responsible for administration of the Wetland Conservation Act within their District boundaries.

Policy 3:

Manage wetlands consistent with this plan and state and federal wetland regulations.

Policy 4:

Encourage restoration of degraded wetlands in Key Conservation Areas to improve vegetative diversity and ecological integrity, with priority given to wetlands where restoration could improve management classification to at least a Manage 1. Restore other wetlands as opportunities arise.

Policy 5:

Regulate wetland impacts commensurate with the quality of the wetland as determined by the management classifications identified in the function and value assessment.

Policy 6:

Encourage establishment and maintenance of buffer areas around wetlands, lakes, and streambanks.

Policy 7:

Require submittal of a functions and values assessment for all proposed wetland impacts requiring a permit, unless a management class has already been designated for the impacted wetland; mitigation of all fill in Preserve category wetlands; and specifying by management classification stormwater discharge pretreatment, buffer, inundation period, and other wetland standards.

Policy 8:

Maintain a current inventory of wetland location, size, function and value, and management classification.

4.2 Water Quality

Goal 1: Preserve, maintain, and improve aesthetic, physical, chemical, and biological composition of surface waters and groundwater within the City.

Goal 2: Reduce *E. coli* within the Painter Creek Watershed, Pioneer Creek Watershed, and South Fork Crow River Watershed to meet the TMDL wasteload allocations.

Goal 3: Reduce phosphorus in the Lake Independence Watershed, Lake Sarah Watershed, Painter Creek Watershed, and Rice Lake watersheds to meet the TMDL wasteload allocations.

Goal 4: Reduce the total suspended solids in the South Fork Crow River Watershed to meet the TMDL wasteload allocations.

Policy 1:

Manage stormwater consistent with the water quality standards outlined in this plan. In all cases, stormwater will be managed to meet or exceed MCWD and WMC standards. The MCWD will continue to implement and permit their rules within their District boundaries.

Policy 2:

The City will continue to educate Independence residents about household BMPs to protect the City's water resources.

Policy 3:

Maintain, operate, and clean structural BMPs such as sedimentation and detention structures as needed to preserve the initial intended performance.

Policy 4:

The City shall review the progress and policies related to TMDLs as they become available.

Policy 5:

The City will amend this surface water management plan to incorporate completed TMDL studies.

Policy 6:

The City will use the findings of the TMDL studies to guide development review.

Policy 7:

The City will provide the MCWD and WMC annual reports regarding TMDL implementation progress.

Policy 8:

Promote the general application of BMP's across the City.

Policy 9:

All individual developments shall be designed so as to preserve and enhance existing topography, waterbodies, natural vegetation, permanent wetlands, wildlife areas and other natural amenities.

Policy 10:

The City's natural drainage network of wetlands and streams shall be maintained and protected to provide a natural stormwater system for runoff storage, filtration and maximum groundwater recharge.

4.3 Water Quantity

Goal 1: Maintain or reduce existing flows from drainage within the City to decrease the negative effects of stormwater runoff and bounce from existing and proposed development as well as provide low flow augmentation to surface waters.

Goal 2: Reduce volume of stormwater runoff from new development and redevelopment and maintain or reduce existing water volumes discharged in the Painter Creek Watershed.

Policy 1:

The City will promote preservation of the retention capacities of the lakes, streams, wetlands and ditches of the present drainage system in order to control rates of runoff and potential flooding.

Policy 2:

The City will encourage infiltration of precipitation and runoff where feasible and practical.

Policy 3:

Detention facility design will include access for maintenance of the outlet structure and to the facility in general.

Policy 4:

Provide a positive overflow from all stormwater ponds and wetlands for landlocked basins. Outlets will be installed under the 100-year flood elevation only if there is a demonstrated threat to public structures or safety.

Policy 5:

Require low floors of new structures to be built to have 2 feet of freeboard protection for the critical duration 1 percent chance flood. Low floors of new structures adjacent to landlocked basins shall be elevated a minimum of 2 feet above the elevation of two consecutive 1 percent chance storms and low openings shall be 1 foot above the 10-day snowmelt as outlined in this plan.

Policy 6:

Review development and redevelopment proposals for consistency with this plan.

Policy 7:

Correct existing flooding problems within available funding constraints by upgrading the storm drainage system or implementing flood protection improvements.

Policy 8:

Trunk storm drainage systems that serve as the outlet for areas where flooding of structures or where significant flood damage is likely to occur will typically be designed to meet freeboard protection standards for the critical duration 1 percent chance flood. The design shall be based on a hydrograph method for appropriate rainfall and snowmelt events. The design shall be based on proposed ultimate land use. The design shall consider potential flood, wetland, and water quality impacts to upstream and downstream areas.

Policy 9:

Trunk storm drainage systems for areas where no significant flood damage or disruption of infrastructure is to occur shall be designed to safely convey the critical duration 10 percent chance flood. The design shall be based on proposed ultimate land use. The design shall consider potential flood, wetland, and water quality impacts to upstream and downstream areas.

Policy 10:

Manage the rate and volume of runoff in general accordance with the stormwater management criteria presented in this plan.

Policy 11:

Provide emergency overflows for storm drainage systems where possible.

Policy 12:

Maintain, clean, and replace storm drainage systems as needed to preserve the initial design capacity.

Policy 13:

Promote regional stormwater retention systems for stormwater rate control when it is reasonable and practical to do so. The City supports on-site retention systems when regional systems are not reasonable and practical.

Policy 14:

Encourage the development and maintenance of depressional storage within the City.

Policy 15:

Encourage abstraction of the first one inch of rainfall on new permitted development and redevelopment.

Policy 16:

Development shall not decrease the runoff time for a 100-year event of the critical duration for a subwatershed.

4.4 Erosion Control

Goal: Control temporary sources of sediment resulting from land disturbance and identify, minimize and correct the effects of sedimentation from erosion-prone and sediment source areas.

Policy 1:

Require development and redevelopment to implement construction site erosion and sediment control practices consistent with the City's Sediment and Erosion Control Ordinance, the NPDES General Construction Permit, the Minnesota Stormwater Manual and the MCWD Rule B: Erosion Control. The MCWD will continue to implement and permit their rules within their District boundaries.

Policy 2:

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

Policy 3:

The City will encourage the preservation of natural vegetation.

Policy 4:

Evaluate the need to provide erosion control or energy dissipation measures at culverts with high velocities to prevent erosion and downstream sediment transport.

Policy 5:

Work cooperatively with adjacent property owners to prevent erosion and sediment transport and stabilize streambanks as necessary.

Policy 6:

Diversion, retention, and treatment of wastes from feed lots and stables shall be required to conform to Minnesota Pollution Control Agency's regulations for agricultural waters.

4.5 Groundwater

Goal: Protect and maintain existing groundwater flow, promote groundwater recharge and improve groundwater quality and aquifer protection.

Policy 1:

Cooperate with the Minnesota Department of Health to ensure that abandoned wells are properly sealed.

Policy 2:

Encourage pretreatment of stormwater discharge to wetlands or infiltration areas in the areas of high aquifer sensitivity.

Policy 3:

Encourage the use of low impact development techniques that minimize new impervious surfaces and provides for increased infiltration.

Policy 4:

Encourage groundwater infiltration and recharge where feasible and practical.

Policy 5:

Require developers to identify existing drain tile lines on property proposed for development.

Policy 6:

Encourage abstraction of the first one inch of rainfall on new permitted development and redevelopment in Type A and B soils.

Policy 7:

Require an additional level of analysis and review of permitted development and redevelopment where there is a potential to adversely impact groundwater connected to a surface water feature.

4.6 Public Ditch System

Goal: Maintain public ditch systems within the City as required under statutory jurisdiction.

Policy 1:

The City shall maintain public water management structures between waters and wetlands, and regional detention basins.

Policy 2:

Except for Painter Creek, the public ditch systems within the City shall be managed by Hennepin County, which is the public ditch authority. Painter Creek will be managed by the Minnehaha Creek Watershed District.

4.7 Recreation, Fish, and Wildlife Management

Goal 1: To protect and enhance fish and wildlife habitat areas, significant open spaces, and natural areas.

Goal 2: Promote the recreational use, where appropriate, of surface waters within the City by providing recreation opportunities for residents by promoting the use and enjoyment of water resources with the intent of increasing the livability and quality of life within the City.

Policy 1:

The City shall encourage fish and wildlife habitat protection and enhancement opportunities as part of surface water management practices.

Policy 2:

The City will work with and support to the maximum extent practical the efforts of the MCWD and WMC in promoting public enjoyment and protecting fish, wildlife, and recreational resource values in the City.

4.8 Enhancement of Public Participation, Information, and Education

Goal 1: Educate and inform the public on pertinent water resource management issues, and increase public participation in water management activities.

Goal 2: Solicit input from the general public with the intent that policies, projects, and programs will address local community values and goals, as well as protect historic and cultural values regarding water resources; strive to manage expectations; and base decisions on an educated public.

Policy 1:

Implement the Stormwater Pollution Prevention Program adopted May 2006, amended July 2008 to include TMDL requirements.

Policy 2:

Develop and distribute targeted written material to stakeholder groups (e.g., residents, agricultural property owners, developers) explaining the need for natural resource conservation and low impact development approaches to reduce phosphorus and other

pollutant loading and providing strategies that each stakeholder group can employ to assist in meeting the City's goals.

4.9 Floodplains

Goal: Reduce the severity and frequency of flooding and high water by preserving and increasing the existing water storage capacity below 100-year flood elevations on all waterbodies within the City.

Policy 1:

Manage activities within the floodplain in accordance with the City's ordinance and state and federal regulations.

Policy 2:

The City shall discourage encroachment into the floodplain/fringe that will reduce storage capacity unless the storage volume is mitigated.

Policy 3:

The City shall prohibit encroachment into the floodway.

4.10 Low Impact Development

Goal: Promote low impact development strategies where feasible for the purpose of improving water quality, increasing groundwater recharge, and decreasing runoff volumes throughout the City.

Policy 1:

Encourage abstraction of the first 1.1 inches of rainfall on new permitted development and redevelopment.

Policy 2:

Promote reforestation and revegetation with native plants to increase infiltration.

Policy 3:

Encourage the use of low impact development techniques that minimize new impervious surface and provides for increased infiltration.

Policy 4:

Enforce buffer requirements outlined in this plan.

4.11 Shorelines and Streambanks

Goal: Preserves the natural appearance of shoreline areas and minimize degradation of surface water quality, which can result from dredging operations.

Policy 1:

Manage activities within the shoreland districts in accordance with the City ordinance and state and federal regulations.

Policy 2:

Promote native vegetation over structural stabilization in City policies, regulations, and programs.

Policy 3:

Work cooperatively with adjacent property owners to prevent erosion and sediment transport and stabilize streambanks as necessary.

5.0 Plan Implementation

To uphold the goals and policies of this Plan, the City will review all proposed developments and improvements. Approvals for BMPs relating to water quality, wetland protection, erosion and sediment control, and water quantity will be required for all developments, land disturbances, and other applications that require permitting by City Ordinance.

The City has established the following regulatory controls and criteria relating to its policies. These controls and criteria apply to the management of: wetlands, water quantity and quality, floodplains, shorelands, recreation, open space and wildlife, groundwater, soil erosion and sedimentation control, education, and municipal operations. While these controls and criteria relate to one of the policy areas, it should be noted that they are interrelated and may serve multiple purposes.

The criteria, as a minimum, establish the degree of performance necessary to achieve improvements in water quantity and quality management. These criteria are not intended to dictate or preempt the design process, but rather provide a guide to proper development. Section 8 outlines the development submittals required for the City to complete the engineering review for proposed developments.

5.1 Wetlands

As discussed in Section 3.0, the City's strategy for managing wetlands will be guided by designating wetlands into management classes.

5.1.1 Wetland Alterations

Wetland alteration will continue to be permitted and enforced through state and federal agencies. These regulatory programs are well established, and agency personnel are trained to make qualitative judgments regarding wetland values. The City will continue to administer the Wetland Conservation Act within the boundaries of the Pioneer-Sarah Creek Watershed Management Organization. The Minnehaha Creek Watershed District will administer the Wetland Conservation Act within their District boundary.

5.1.2 Field Delineation

Any proposed development will require a field delineation by a qualified individual using accepted methodology. The functions and values of identified wetlands shall also be analyzed according to Section 3.1.3. The City's water resources staff will use the information described in Section 3.1.3 to determine the wetland's management class.

5.1.3 Wetland Excavation

Wetland excavation shall be in accordance with the requirements of the Wetland Conservation Act and all other local, state and federal agencies.

5.1.4 Wetland Fill

Any filling shall not cause the total natural flood storage capacity of the wetland to fall below the projected volume that the wetland would hold following a 24-hour duration, 1 percent (100-year) frequency rainfall over the fully developed drainage area.

Fill material shall not be placed below the Ordinary High Water (OHW) level of state public waters and public waters wetlands without obtaining appropriate permits from the Army Corps of Engineers, Minnesota Department of Natural Resources, and the City as required. Fill material may only be placed within the wetland limit if there are not conflicts with floodplain management policies and, if federal, state, and City permits as may be required are obtained.

5.1.5 Stormwater Runoff

Stormwater runoff into wetlands shall conform to the requirements listed in Table 3-2.

5.1.6 Sequencing Procedures

When a proposed wetland alteration(s) involves excavation, filling, or stormwater runoff, the City will determine the applicability of the 1991 Minnesota Wetland Conservation Act, as amended. Project proposers must follow the sequencing procedures described in Minnesota Rules, Chapter 8420 – Wetland Conservation.

5.1.7 Wetland Buffers

Wetland buffers are unmowed areas adjacent to wetlands, lakes, and streams that contain non-invasive vegetation, preferably dense native vegetation. Buffers filter pollutants before they can enter the water body, reduce erosion, protect vegetation diversity and wildlife habitat, and minimize human impacts to the water body. Buffers are required around all wetlands, lakes, and streams for all new development, with the width dependent on the watershed. The Minnehaha Creek Watershed District (MCWD) and Pioneer-Sarah Creek Watershed Management Commission (PSCWMC) each have their own requirements.

MWCD determines the buffer width by the management class of the wetland, which is further described in Section 3.1.3. Table 5-1 outlines the buffer width requirements based on the wetland management class. The base buffer width can be reduced by beneficial slope or soil conditions as stated in their Buffer Width section of their [Wetland Protection Rule](#).

**Table 5-1
Minnehaha Creek Watershed District Buffer Requirements**

Management Class	Base Buffer Width	Minimum Applied Buffer Width
Manage 3	20 feet	16 feet
Manage 2	30 feet	24 feet
Manage 1	40 feet	34 feet
Preserve	75 feet	67 feet

PSCWMC requires all buffers to be an average of 25 feet wide and a minimum of 10 feet wide. [Appendix C Rules and Standards](#) of their Third Generation Watershed Management Plan provides more details on the buffer requirements.

5.1.7.1 Buffer Easements

A conservation easement (preferred), or functional equivalent such as a drainage and utility easement or outlot, is encouraged on the wetland and buffer.

5.1.7.2 Use of Existing Vegetation as the Buffer

The existing vegetation is acceptable for a buffer and must not be disturbed if:

1. It is continuous, dense perennials (can be trees and shrubs with 60% canopy cover), and
2. <30% invasive plant species, and
3. Not disturbed or mowed within the last 5 years, and
4. Topography does not channelize runoff.

5.1.7.3 Creation of New Buffers

If the required buffer is non-existing or will be disturbed during grading activities, a Buffer Establishment Plan must be provided. At a minimum, the Buffer Establishment Plan must consist of:

1. The area of buffer to be created must be clearly depicted on the plans with a hatch or shading, and
2. The proposed native seed mix must be clearly labeled on the plans, and

3. The seeding rate for the proposed seed mix must be specified, and
4. Weed free mulch must be specified

5.1.7.4 Buffer Monuments

Buffers shall be adequately marked with signage at maximum 200 foot spacing. Signs should be erected before occupation of new developments. Signs can be waived where the City deems they would serve no practical purpose.

5.1.7.5 Buffer Requirements for Mitigation Wetlands

Mitigation wetlands must have equal or better functions and values than the wetlands they replace. Buffers are required around mitigation wetlands. The buffer width must be the larger of the buffer required for:

1. the impacted wetland being replaced, or
2. if mitigation is an expansion of an existing wetland with higher classifications then meet that wetland's buffer requirement.

5.1.7.6 Buffer Maintenance

The functionality and aesthetic qualities of the buffer depend on maintenance. The following summarizes the buffer maintenance requirements:

- During the first two full growing seasons, the applicant must replant any vegetation that does not survive.
- After the first two full growing seasons, the buffer must be reseeded if the buffer changes at any time through human intervention and activities.
- The City may require an escrow for buffer establishment and maintenance.
- A legally binding and enforceable maintenance plan clarifying responsible parties is required for all buffer areas.

5.1.7.7 Wetland Setbacks

As stated in City Code Section 530 – Zoning: District Provisions, all buildings and structures must be 10 feet from the outside edge of the wetland buffer. This requirement applies to areas in both PSCWMC and MCWD.

5.2 Water Quantity and Quality Management

The following prescribe the design criteria for water quality and quantity assessment.

5.2.1 General Hydrology

Hydrologic analysis of stormwater runoff for the planning and design of flows in storm sewers, ditches, streams and channels to lakes, detention basins, and wetlands shall be made using generally accepted hydrograph methods.

Determination of total runoff volume should follow the USDA-SCS curve number method which incorporates land use and hydrologic soil groups. Specific step-by-step process can be found in the Soil Conservation Service (SCS) publication National Engineering Handbook: Chapter 4, SCS Hydrology (1972), and Hydrology Guide for Minnesota (1992). Peak runoff rates should be determined through the use of the SCS method incorporating “time of concentration” for both pre and post development conditions.

The developed runoff hydrograph should then be routed through the drainage area, that is, mathematically the peaks and volumes are followed as they move in a wave progressively downstream.

“Design Storms” or storm volumes for hydrologic analyses shall be based upon Atlas 14, Volume 8 or most recent updated, as published by NOAA with Durations of 30 minutes to 24 hours and Return Periods from 1 to 100 years.

The rational method may be used to determine peak runoff rates for primary systems. Construction of a hydrograph should be undertaken which characterizes the movement of surface water as a function of time and precipitation.

5.2.2 Rainfall

Usually the standard 24-hour SCS rainfall distribution will be used to calculate the peak discharge rates and levels from developments. The following minimum rainfall and snowmelt values shall be used in calculations for the City of Independence:

<u>Event</u>	<u>Rainfall (inches)</u>
1 year, 24 hour	2.48
2 year, 24 hour	2.86
10 year, 24 hour	4.24
25 year, 24 hour	5.29
50 year, 24 hour	6.20
100 year, 24 hour	7.20
100 year, 2 day	7.61
100 year, 4 day	8.39
100 year, 10 day snowmelt	7.2 inches of runoff

5.2.3 Curve Numbers

Table 8-1 in Section 8 lists the minimum allowable Curve Numbers (CN) which shall be used for design. Hydrologic soil groups shall be determined based upon the Soil Survey for Hennepin County, Minnesota as published by the United States Department of Agriculture Soil Conservation Service in Cooperation with Minnesota Agricultural Experiment Station.

5.2.4 Flood Protection

Consistent with state and federal regulations, Independence requires that the level of flood protection along all ditches, detention basins, lakes, streams and wetlands be established based upon the 1 percent (100-year frequency) flood. Land use within floodplains shall be regulated in accordance with City ordinance and state floodplain zoning regulations.

The following freeboard values are required for the City of Independence:

- Landlocked Basins (no outlet) 2.0 feet (Established high water, see 5.2.5.9)
- Non-Landlocked Basins 2.0 feet (100-year frequency)

5.2.5 Stormwater Basin Design

It is the policy of the City of Independence to require development to control urban stormwater quantity and quality through a management approach of detention and filtration/infiltration basins. Detention and filtration/infiltration basins, whether on-site or regional in nature, shall be designed to incorporate all requirements of the National Pollution Discharge Elimination System Application for General Stormwater Permits for Construction Activity (MN R100001) and the following:

5.2.5.1 Infiltration Required

A stormwater runoff volume equal to 1.1 inches from the new impervious surface must be infiltrated or abstracted, unless infeasible due to site conditions. Infiltration techniques will not be allowed in stormwater hotspots. Potential stormwater hotspots are defined as a land use or activity that produces higher concentrations of trace metals, hydrocarbons, or pollutants not normally found in stormwater. Examples include fueling stations, vehicle service or washing areas, vehicle fleet storage areas, and facilities that generate or store hazardous materials. Infiltration basins shall be constructed and designed in accordance with the Minnesota Stormwater Manual, with the following additional requirements:

1. Construction of an approved pre-treatment system shall be required prior to discharging to the infiltration basin. Pre-treatment is defined as any Best Management Practice that (a) removes settleable or particulate matter and (b) removes oil and grease to a level that they do not interfere with infiltration performance.
2. Exit velocities from the pre-treatment system shall be less than 3 feet per second for the 100-year storm event and flows shall be evenly distributed across the width of the outlet.

3. Infiltration rates must be determined by double-ring infiltrometer test(s) conducted to the requirements of ASTM standard D3385 at or near the proposed bottom elevation of the infiltration BMP. The test results shall be provided to the City in a geotechnical report and shall be certified by qualified geotechnical professional.
4. The bottom of the infiltration practice must be at least three feet from the seasonal high ground water table.
5. Infiltration practices shall not have standing water longer than 48 hours following each storm event.

5.2.5.2 Infiltration Prohibited or Infeasible

Where infiltration basins are infeasible due to site conditions, biofiltration must be provided for that part of the abstraction volume that is not abstracted by other BMPs. Where biofiltration is infeasible, at a minimum filtration through a medium that incorporated organic material, iron filings, or other material to reduce soluble phosphorous must be provided.

5.2.5.3 Phosphorus Loading Reduction

Facilities shall be designed to reduce phosphorus loading at down gradient site boundaries such that there is no net increase in Total Phosphorous (TP) or Total Suspended Solids (TSS) as a result of development.

These standards can be achieved through the use of ponding, Low Impact Development techniques, reduction in impervious surfaces, or other Best Management Practices deemed reasonable by the City. The City will consider a variance or flexibility to this standard if impacts to other natural resources are demonstrated. Independence will consider the implementation of this standard on regional/drainage area basis if this standard is deemed impractical on a site-by-site basis.

As required by the Minnehaha Creek Watershed District Independence is required to reduce phosphorus loads in its discharge to Painter Creek. Independence's phosphorus reduction strategy consists of the following components:

- Pasture Management
- Implementation of Post Construction Stormwater Management
- Street Sweeping
- Painter Creek Stormwater Improvement Projects

5.2.5.4 Street Sweeping

The City of Independence has a total of 8.25 miles of street within the Painter Creek Subwatershed. The City will sweep these streets once per year after snowmelt. This will remove organic debris and sediment prior to reaching waterbodies and further reduce phosphorus

loadings.

5.2.5.5 Painter Creek Stormwater Improvement Projects

The MCWD has identified 7 potential stormwater improvement projects within the Painter Creek Watershed. The City will work cooperatively with the MCWD to identify project partners and other funding sources during the feasibility study stage of these projects. The City may contribute financially toward these projects to meet their phosphorus load reduction obligations for Painter Creek.

5.2.5.6 Emergency Spillway

An emergency spillway (emergency outlet) adequate to control the critical one percent frequency/duration rainfall event (usually 100-year, 24-hour) shall be provided.

5.2.5.7 Basin Side Slopes

Basin side slopes above the normal water level should be no steeper than 4:1 and preferably flatter. Provide a basin shelf with a minimum width of 10 feet and a slope of 10:1 starting at the normal water level. Side slopes below the basin shelf shall be no steeper than 3:1 and preferably flatter.

5.2.5.8 Length to Width Ratio

To prevent short-circuiting, the distance between major inlets and the normal outlet shall be maximized.

5.2.5.9 Flood Storage

To protect downstream channels and structures the following flood control criteria are required for basin design:

1. A flood pool (“live storage”) volume above the normal elevation shall be adequate so that the peak discharge rates from the 2-year, 10-year, and 100-year frequency, critical duration storms (usually the 24-hour) are no greater than predevelopment basin watershed conditions.
2. Dead storage volume may not be utilized as live storage.

5.2.5.10 Skimming Structures

Skimming structures shall be utilized to remove floating debris for a 2-year storm event for each basin. Skimming structures shall be shown on the plans.

5.2.5.11 For Areas without Formal Outlets (i.e. Landlocked Areas)

Landlocked depressions that presently do not have a defined outlet and do not typically overflow may only be allowed a positive outlet provided downstream impacts are addressed and the plan is approved by the City. Where a positive outlet is not constructed the following shall apply:

The minimum building elevation (low floor) shall be set two (2) feet above the level resulting from two concurrent 100-year rainfall events. The starting elevation of the pond/water body prior to the runoff event shall be established by one of the following:

1. Existing Ordinary High-Water level established by the Minnesota Department of Natural Resources;
2. Local observation well records, as approved by the City; or
3. Mottled soil.

All areas below the established high-water level shall be contained within a drainage and utility easement.

Landlocked areas shall also be analyzed for the 100 year 10 day snowmelt event. The analysis shall consider a minimum of 7.2 inches of runoff. The minimum building opening shall be set a minimum of 1 foot above the 100 year 10 day snowmelt elevation.

Outletting landlocked areas below the 100-year flood elevations is only permitted in cases of demonstrated threat to public structures or safety.

5.2.5.12 Stormwater Discharge

Discharge must be made to a receiving stream, a ditch, another pond or an approved discharge route as shown in this Water Management Plan. All outlet structures shall have outlet erosion control devices.

5.2.5.13 Storm Sewer

- A. Storm sewer sizing shall be based upon the 10 year storm event. Inlet capacities and roadway spread at each inlet shall be determined. Storm sewer inlets shall be spaced to ensure that not more than half the travel lane is inundated during the 10 year storm event. Manning's equation shall be utilized to determine the flow in the street at each catchbasin for verification of actual spread. Additionally, grate inlet capacities shall be verified at the maximum allowable depth of flow (low point) to verify that the proposed grates will pass the 10 year flows. When appropriate, by-pass flows shall be considered in calculations.
- B. Storm sewer systems shall also meet the following requirements:
 1. Maintain a minimum velocity of 3 fps for 10-year storm event.
 2. Maintain a minimum cover of 2 feet from top of pipe to top of casting or flow line elevation.

3. Maintain a minimum of 3 feet of final cover over corrugated high-density polyethylene (HDPE) pipe.
4. Maintain a minimum of 1.5 feet of final cover over RCP in areas not used for vehicle traffic.
5. Storm sewer inverts, which outlet to detention basins, shall be placed at the normal level of the basin. Storm sewers may be submerged a maximum of half the pipe diameter below the basin normal level if approved by the City Engineer.

5.2.5.14 Stormwater Facility Easements

The City will require that all stormwater facilities be within a drainage and utility easement or outlot.

5.2.6 Lake Sarah and Lake Independence Phosphorus Total Maximum Daily Load (TMDL)

Lake Independence is an 851-acre lake located in the Pioneer-Sarah Creek Watershed on the east side of the City of Independence. Lake Independence and its surrounding drainage area contains portions of three municipalities; Independence, Medina, and Loretto. As with many lakes in the Twin Cities metropolitan area, Lake Independence is used heavily for recreation and is prized for its aesthetic value by homeowners. Over the past several decades, the lake has experienced degraded water quality that has reduced the lake's recreational and aesthetic value. In 2002, the lake was added to the Minnesota 303(d) impaired waters list for impaired aquatic recreation as a result of mean summer phosphorus values that exceeded the 40-ppb phosphorus standard for Class 2 recreation waters. A total maximum daily load (TMDL) study for Lake Independence was approved on February 23, 2007. The requirements of the study are incorporated into the Water Management Plan by reference.

The current estimated phosphorus load to Lake Independence based upon field monitoring and computer model results is 2,381 pounds per year assuming normal annual precipitation. To reach the goal of 36 ppb for in-lake phosphorus concentration, the model predicts that the annual phosphorus load to the lake would need to be reduced to 1,300 lbs/year. This translates to a total reduction of 1,081 lbs/year, or a 45% reduction from the current total annual phosphorus load estimate of 2,381 lbs/year.

5.2.6.1 TMDL Implementation Plan

In 2014, the Anoka Conservation District prepared a Stormwater Retrofit Analysis for Lake Sarah and Lake Independence. A primary goal of the analysis was to identify projects in the City of Independence to improve water quality in Lake Sarah and Lake Independence such that waste load reduction goals as identified in the TMDL implementation plans can be achieved. The analysis identified several projects with merit. The City should continue to seek landowner

support for the identified projects as well as funding. The project name listed in Table 5-2 corresponds to the location as depicted in Figure 5-1.

**Table 5-2
Lake Sarah and Lake Independence Stormwater Retrofit Potential Projects for
Independence**

Project Type	Project Name	TP Decrease (lbs/yr)	Cost-Benefit (\$/lb TP)
Filter Strip	FS89	1.25	\$433
	FS93	34.27	\$48
	FS94	10.95	\$121
Gully Stabilization	GS45	2.1	\$1,019
	GS46	15.6	\$279
Hydrologic Restoration	HR13	2.49	\$727
	HR14	0.86	\$2,047
	HR29	5.98	\$771
	HR31	3.77	\$978
	HR33	9.19	\$825
	HR38	2.56	\$2,680
	HR44	0.6	\$4,761
	HR65	6.25	\$1,226
	HR67 &HR 68	15.32	\$232
	HR79	5.87	\$1,194
Iron Enhanced Sand Filter	HR95	9.64	\$317
	IESF113	105.34	\$275
	IESF114	72.66	\$480
Lakeshore Restoration	IESF115	145.34	\$318
	LR51	4.37	\$638
	LR52	0.42	\$1,137
	LR53	4.8	\$428
	LR58	2.15	\$717
	LR59	12.52	\$445
	LR60	4.26	\$611
	LR62	2.07	\$740
New Pond	LR99	1.05	\$1,398
	LR100	2.58	\$566
Rain Garden	NP47	4.49	\$1,152
	RG11	1.11	\$1,196
	RG69	0.54	\$1,533
	RG72	0.71	\$1,166
	RG74	0.62	\$1,335
Regional Pond	RG111	0.13	\$1,175
	RP108	89.09	\$1,325
	RP109	72.02	\$1,639
Sediment Basin	RP110	108.62	\$1,014
	SB2	1.5	\$1,065

	SB3	2.21	\$715
	SB63	1.15	\$1,310
Seasonal Ponding	SP77	2.85	\$365
Wetland Restoration	WR1	8.39	\$549
	WR4	22.09	\$325
	WR5	4.71	\$915
	WR6	5.11	\$726
	WR12	25.64	\$381
	WR18	39.54	\$707
	WR22	2.24	\$1,857
	WR24	3.41	\$876
	WR75	9.34	\$392
	WR76	4.63	\$796
	WR82	15.65	\$667
	WR83	5.57	\$1,335
	WR86	4.07	\$740
	WR91	18.29	\$791
WR97	2.53	\$1,338	
	WR105	32.13	\$845

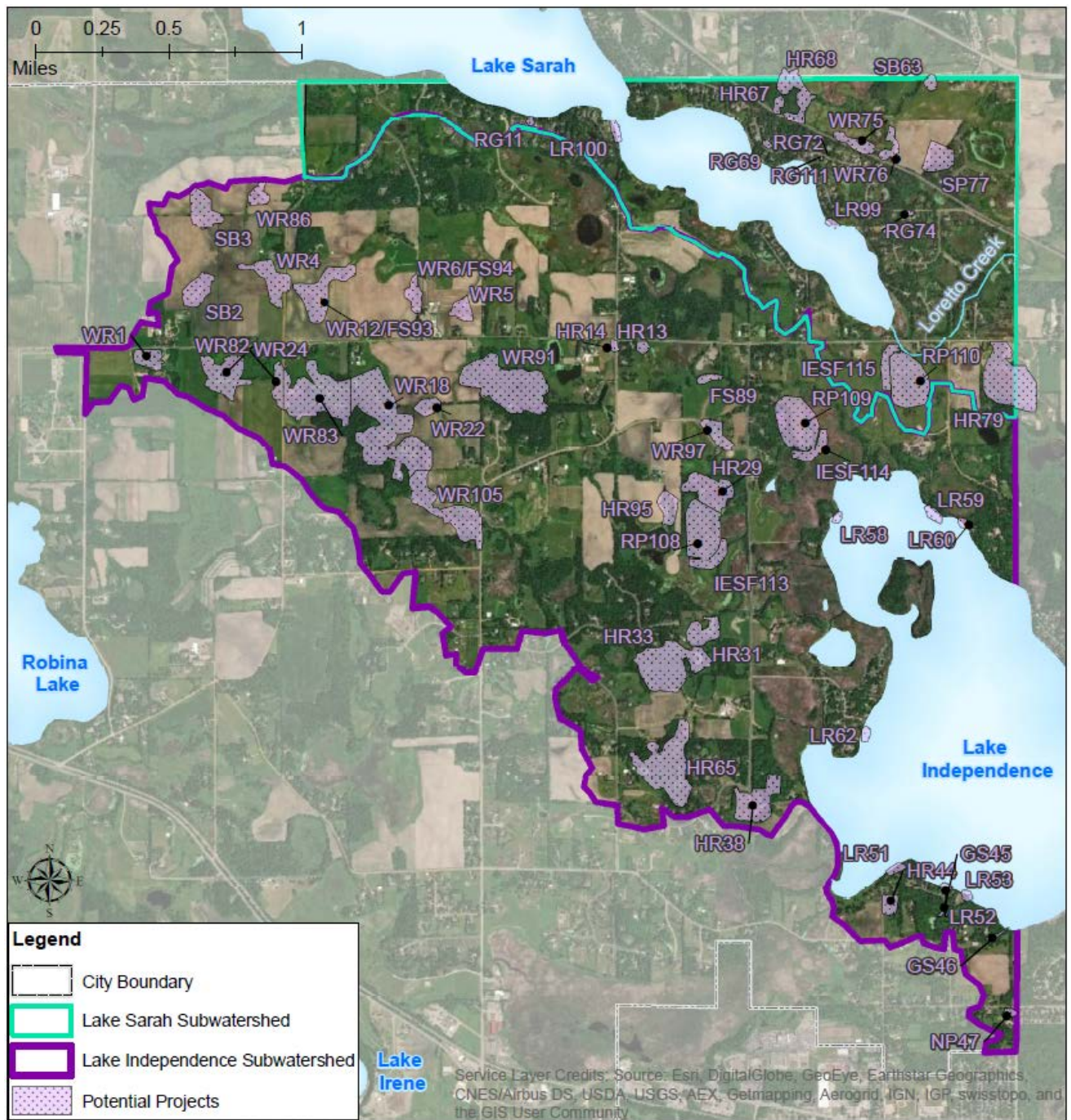


Figure 5-1. Potential Stormwater Projects

5.2.6.2 Adaptive Management

The City recognizes that there is much uncertainty in the physical and social processes that result in achieving the desired water quality. As such, the City embraces an adaptive management strategy in which the City continues to learn from past and present practices and implements an iterative decision-making process. In this practice, the City will evaluate results from past actions to inform on future actions based on the results observed. Adaptive management techniques apply not only to the scientific methods applied, but also to the social techniques.

For example, the physical practice known as bio-retention basins or rain gardens are a relatively new practice. The City will monitor the rain gardens that have been installed during this plan period to inform future decisions on whether or not the rain garden produced the desired water quality benefits.

On the social side, the City will continue to adapt to its experiences and outcomes. For example, the City has learned that implementation of agricultural BMPs may be challenging. The City therefore will continue to explore new ways to educate its residents and agricultural producers about the water quality benefits of certain actions. Through adaptive management strategies, the City will over time seek landowner understanding and support for water quality improvement and promote good stewardship of the land.

5.2.7 Restoration Strategies for Pioneer Creek

The [Pioneer-Sarah Creek Subwatershed Watershed Restoration and Protection Strategy Report \(WRAPS\)](#) provides some strategies to restore waterbodies that have deficiencies. Table 5-3 lists the suggested goals for the City of Independence pulled from the WRAPS to help decrease *E. coli* concentrations, increase dissolved oxygen, restore eroded channels, and reestablish healthy wetlands. The table establishes which suggestions are the primary or secondary role for the City.

**Table 5-3
City of Independence Strategies and Actions Proposed for Pioneer-Sarah Creek
Subwatershed**

Strategies	Strategy Type	Current Strategy Adoption Level	Interim 10-year Milestone	Suggested Goal
<i>E. coli</i> Improve riparian vegetation	Achieve minimum of 50' buffer as necessary to comply with law, enforce buffers on 100% of affected streams and ditches	Unknown	Complete 5,000' not currently in wetland or regional park	5,000'
DO ² Improve quality of upstream lakes	Achieve phosphorus load reduction goals for Lake Independence to reduce algae and oxygen demand loads to Pioneer Creek	Ongoing	See Lake Independence strategies	Complete
In-channel restorations	Channel restorations, where possible, through development of low-flow channel to decrease width and increase velocity, meandering, riffles, and aeration throughout Unnamed and Deer Creek ³	Unknown	Complete 2,500' not currently in wetland	2,500'
Wetland restorations	Improve hydrology and water quality flow-through wetland system to decrease sediment oxygen demand and improve overall water quality	Unknown	Perform monitoring, 1-2 BMPs	3-5 wetland outlet BMPs
Improve fertilizer and manure application management, eliminate livestock traffic through waterways	Promote/educate hobby and production livestock owners on appropriate livestock and manure management practices (rotational grazing, manure storage, land application based on soil conditions and soil and manure nutrient testing, precautions to take if spreading in sensitive areas, etc.) and eliminating livestock traffic through water ways, as per University of Minnesota guidelines, MDA guidelines, and Minnesota rules. In particular, see MDA's MN Ag Water Quality Certification Program	As needed	Hold workshops as needed, work with willing landowners as opportunities arise	As needed
	Implement non-production animal operation siting and management ordinance as per 2015 approved watershed plan	PSCWMC has developed guidance for cities	Cities adopt ordinance	Ongoing
Address failing septic systems	Identify and upgrade 100% of SSTS systems in shoreland areas	None	Upgrade 50% of failing SSTS	100%
Improve riparian vegetation	Evaluate compliance with state stream buffer requirements of all DNR streams and public ditches	In progress	Complete	Complete

Strategies	Strategy Type	Current Strategy Adoption Level	Interim 10-year Milestone	Suggested Goal
	Achieve minimum of 50' buffer as necessary to comply with law, enforce buffers on 100% of affected streams and ditches	Unknown	Complete – Buffers in place on public waters by July 2017, on public ditches by Dec. 2018	100%
Improve urban/suburban stormwater management	Implement updated Commission standards for runoff volume and rate control for new development projects throughout watershed	New standards in 2005 as part of PSCWMC's 3 rd gen plan	Ongoing	Ongoing
Implement/review policies and rules	Ongoing review of policies and procedures to meet WLA goals	Ongoing	Ongoing	Ongoing
Road Salt Management	Promote and adopt strategies in the TCMA Chloride Management Plan (website)	Ongoing	Ongoing	Ongoing

¹Table pulled from the Pioneer-Sarah WRAPS Tables 3.2 and 3.5, Blue – primary role of City, Gray – secondary role of City

²DO allocations were not developed as part of this TMDL since sources were primarily natural background

³Deer Creek flows from Ox Yoke Lake, and Unnamed Creek flows from Rice Lake

5.2.8 Protection Strategies for Lake Rebecca

Since Lake Rebecca is being removed from the impaired waters list, strategies should be in place to protect the Lake from converting back into an impaired water. The Pioneer-Sarah Creek WRAPS specifies a protection strategy shown in Table 5-4.

**Table 5-4
Pioneer-Sarah Creek Subwatershed Protection Strategy**

Strategies	Strategy Type	Current Strategy Adoption Level	Interim 10-year Milestone	Suggested Goal
Continue to reduce watershed pollutant loadings	Work with Shriners Horse Farm and City of Independence to continue improvements in horse farm operations to minimize off-site export of phosphorus, bacteria, and other pollutants to tributary that discharges to Lake Rebecca	Improvements made in manure management in 2009, livestock grazing densities continue to be above recommended levels	Ongoing	Ongoing

From Table 3.4 in the Pioneer-Sarah Creek Subwatershed WRAPS; Blue – Primary/lead role for City

5.3 Water Quality Monitoring Program

The City will continue to cooperate with the MCWD and WMC with regards to water quality monitoring, modeling, and planning to protect priority resources. The PSCWMC has developed the following water quality goals for streams within Independence

**Table 5-5
Water Quality Goals**

Stream	Total Nitrogen (g/m³)	Total Suspended Solids (g/m³)	Total Phosphorus (mg/m³)
Pioneer Creek	3	25	500
Robina Creek	3	25	500

Goals are flow-weighted annual average concentrations.

5.4 Floodplains and Shoreland Management

Various levels of government are involved in regulation of surface water, wetlands and floodplain. As previously discussed, the MnDNR has inventoried and classified waterbodies and wetlands in the State of Minnesota. The “protected waters and wetlands” program identifies waterbodies and wetlands that require DNR permits for activities like draining, filling, dredging, and diverting of water. The MnDNR *Shoreland Management Program* has also established a classification system for lakes greater than 10 acres in size and rivers with a drainage area two square miles or greater. Floodplain and shoreland areas are governed by the City’s floodplain and shoreland ordinance, which regulate activities adjacent to waterbodies classified by the Minnesota DNR. A plan review is required for development or redevelopment if any part of the development is within or affects a 100-year floodplain.

5.5 Recreation, Open Space and Wildlife Management

Through development review the City shall encourage protection and/or preservation of wetlands and uplands that provide habitat for fish and wildlife.

5.6 Groundwater Management

The City of Independence contains natural characteristics which result in low to very high sensitivity for groundwater contamination. This Plan contains policies and criteria which will guide land use development to protect existing groundwater quality.

5.6.1 Well Abandonment

The City will continue to, in cooperation with Hennepin County, educate residents regarding the land use control practices and proper well abandonment procedures in accordance with Minnesota Rules, Section 4725.2700.

5.6.2 Individual Sewage Treatment Systems

A principal risk of direct contamination of groundwater comes from sewage from individual sewage treatment systems. Independence will insure protection of local groundwater through implementation of its ordinances regarding private on-site sewer systems. Wetlands, floodplain and shoreland areas also serve as important areas of groundwater recharge. Strategies to protect these areas were described in the previous sections.

5.7 Soil Erosion and Sediment Control

The control of erosion and sedimentation remains important to maintaining water quality in the City. Of paramount importance to the maintenance of water quality in the City is the proper enforcement of erosion and sediment controls. Enforcement will involve indirect and direct approaches.

5.7.1 Indirect Approach

The indirect approach includes incentives within the ordinance such as the requirement for a performance bond equal to or greater than the estimated cost of the work to be performed and civil penalties.

5.7.2 Direct Approach

The direct approach involves the inspection and enforcement of the sediment control elements in this Plan to ensure compliance with the principles and standards. The inspection and enforcement will be undertaken by the City or its representative.

5.7.3 Conservation Principles

For applicable urban land disturbance activities, the developer shall prepare and implement an erosion and sediment control plan. The Plan shall include the necessary erosion and sediment control practices, implementation schedule and other necessary items to conform to the General Stormwater Permit for Construction Activity (MN R100001) and City ordinance.

5.8 Low Impact Development

A majority of the City of Independence's proposed zoning is Rural Residential. The nature of this land use will likely reduce impacts of stormwater, as development occurs, given that much of Independence is currently farmed.

Low impact development techniques that Independence will focus on as outlined in this plan include:

- Wetland Buffers – Section 5.1.7
- Infiltration Basins – Section 5.2.5.1
- Recreation, Open Space and Wildlife Management – Section 5.5
- Land Conservation – Section 5.9

5.9 Manure Management Policy

The City has determined that it is in the best interest of the residents of Independence to protect the valuable water resources of our region. Management of surface water runoff relating to the storage and land application of manure generated by commercial riding stables has been identified as an important measure to protect water quality. The City has found that the consistent application of standards relating to manure management is important and warrants the establishment of this manure management policy.

In order to ensure that best management practices are being followed, Independence has identified a need for all commercial riding stables to prepare and maintain a manure management plan and adhere to established manure management standards. The required plan will provide detailed information pertaining to the management of manure generated from commercial riding stables.

5.9.1 Manure Management Best Practices

The City has developed the following best management practices that shall be used in the preparation of the manure management plan:

- a. Animal unit density should be based on the buildable, upland acres of a property. Existing and proposed building areas, parking areas as well as wetlands, steep slopes and other natural impediments should be subtracted from the total acreage.
- b. Each animal unit shall have 1/3 of an acre of grazable pasture. If the grazable pasture area restricts the number of animal units, the lesser number should be used to determine the maximum number of animal units permitted.
 - i. The applicant shall manage the pasture areas by rotating their use during the growing months. A minimum of 70 percent vegetative cover shall be maintained on the pasture areas during the growing season. The City shall determine the 70% coverage by using a dimensional transect method.
- c. Manure management shall be addressed using one of the following methods:

- i. Contain manure on-site and remove manure from the property by taking off-site.
 - ii. Contain manure on-site and compost by using an approved compost system.
 - iii. Contain manure on-site and land apply manure.
- d. Land application of manure shall consider the following best practices:
 - i. Time of year – manure shall not be land applied to frozen ground.
 - ii. Setbacks from wetlands, steep slopes, drainage ditches/creeks/other water resources – a minimum of a twenty-five (25) foot setback (buffer) shall be maintained for all land applications.
 - iii. Shoreland Overlay – no land application of manure shall be permitted in the shoreland overlay zoning district.
 - iv. Manure Containment - detailed plans for the manure containment area, including the type of surface and or structure to be used for manure storage. Manure containment areas shall be impervious and located in an area which avoids direct run-off into wetlands, drainage swales and other similar water resource areas.
 - v. Soil Testing – the City will review the plan and may require that prior to land application of manure, the soil will be tested to determine the existing level of nutrients. The City will review the site and determine the best locations for testing. Test samples should be taken at a rate of three samples for each twenty acres. The soil test samples taken shall be analyzed using the University of Minnesota recommended maximum nutrient levels for in-situ phosphorous concentration (the phosphorous uptake from the vegetation). Based on the findings of the analysis and at the discretion of the City, the applicant may not be permitted to land apply the manure until such time as the phosphorus levels decrease.

5.9.2 Site Plan Requirements

The manure management plan shall address and provide information relating to the following:

- a. Site Plan – Provide a scaled site plan indicating the location of the manure containment area, existing natural resources (wetlands, drainage swales, wooded areas, etc.), two-foot contours, pasture areas, and existing and proposed structures.
- b. Manure Containment - Detailed plans for the manure containment area, including the type of surface and or structure to be used for manure storage.

- c. Buffer Areas – Indicate on the plan the twenty-five-foot buffer setback from wetlands and drainage swales.

5.10 Stormwater System Maintenance Plan

The Stormwater System Maintenance Plan has been developed to assure that the system of stormwater retention/treatment basins and stormwater conveyance systems are adequately inspected and maintained to assure that they meet their design functions. Outlined below are the inspection and maintenance activities the City intends to implement:

1. All City stormwater retention, infiltration, and treatment basins and outlets will be inspected, in accordance with BMP 6b-3 of the SWPPP, to determine if the basin's retention and treatment characteristics are adequate.
2. Portions of the City's storm sewer system will be inspected on a rotating basis in accordance with BMP 6b-7 of the SWPPP.
3. Urban streets will be swept once annually in all areas and twice annually in priority areas. Priority areas are those that drain directly to high public use waterbodies and/or high-quality wetlands without pretreatment of stormwater runoff.
4. All public sump catchbasins, sump manholes, skimmer structures and other settling or filter devices will be cleaned and inspected every year.
5. Some of the stormwater maintenance in the newer subdivisions is the financial obligation of the Homeowner Associations. The City intends to assemble applicable Developer Agreement's and create an inventory which lists the responsible party for maintenance for all known stormwater management facilities.
6. Deferred Maintenance. At this time, there is not a significant amount of deferred maintenance. Each year, the inspection reports are provided to the Public Works department and necessary maintenance is completed. Further, since most of the wet sedimentation basins are relatively new (less than 20 years old) they have not yet accumulated with sediment. As the system continues to age, it will be necessary to dedicate funding to ensure the proper maintenance and function of the stormwater system.

The City is currently evaluating and will further refine the maintenance plan in accordance with the SWPPP. This item is specifically outlined in BMP Nos. 6a-1 to 6b-7.

5.11 Land Conservation

Key Conservation Areas, including high-value wetlands and uplands. The conservation of these areas will improve the characteristics of the aquatic ecosystem and the water quality within the

watershed as well as areas downstream. Strategies to protect the ecological and hydrological values of these areas may include land use regulation; acquisition and management; and property owner education regarding land management strategies to maintain ecological integrity.

5.12 Stormwater Pollution Prevention Program

In addition to design guidelines and strategies previously presented the City will implement its SWPPP. Implementation of the SWPPP will assist in maintaining or improving existing water quality through implementation of public and employee education and participation programs, illicit discharge and detection programs and improved municipal operations.

5.13 Program Financing

5.13.1 Capital Improvements Program and Stormwater Maintenance

Capital Improvement Plan recommendations are prepared by staff each year and then provided to the City Council for review and/or approval. When possible, the City incorporates water quality improvements into major transportation infrastructure projects, such as road reconstructions. The City's current Capital Improvement Plan can be found at: <https://www.ci.independence.mn.us/government/2040-comprehensive-plan>.

Several water quality capital improvement projects have been identified by the City of Independence and PSCWMC. Table 5-6 provides an estimate of expenses and funding sources to implement the strategies outlined in this plan. The table also identifies potential funding sources.

**Table 5-6
Capital Improvement Program**

Year	Project	Project Name	Total Cost	Priority	Cost Per lb.	Potential Funding Source(s)
2019	2017 IN-4	Wetland Restoration 18	\$559,205	Medium	\$707/lb	PSC, Independence, County Grant, NRCS, EQUIP
2020	IN-8	Sediment sampling in Lake Sarah	\$12,000			PSC, Independence, Greenfield
2020	2017 IN-1	JB Gully Stabilization	\$75,000	High	\$300/lb	PSC, Ind, County, MPCA, Lake Assn
2020	2017 IN-2	Hydrologic restoration 95 Koch property	\$61,205	High	\$317-\$481/lb	PSC, Independence, County Grant, NRCS, EQUIP
2020	2017 IN-5	Wetland Restoration 91	\$529,205	Low	\$1,447/lb	PSC, Independence, County Grant, NRCS, EQUIP
2020	2017 IN-6	Wetland Restoration 105	\$543,205	Medium	\$845/lb	PSC, Independence, County Grant, NRCS, EQUIP
2020	2017 IN-7	Seasonal Pond 77	\$10,420	High	\$366/lb	PSC, Independence, County Grant
2023	2018 IN-03	Lake Independence Alum Treatment	\$1,390,468			PSC

Note: PSC = Pioneer-Sarah WMC

5.13.2 Funding Sources

The City currently has a Tax District established for Pioneer-Sarah Creek Watershed area. The district was established by Ordinance 2003-04. A copy of the Ordinance is included as Appendix B of this plan. Over 85 percent of Independence is within the Pioneer-Sarah Creek Watershed; therefore, this district will fund a majority of the proposed stormwater improvements and maintenance activities. At this time, the City does not plan to establish any other Tax Districts or stormwater utility fees. Routine maintenance items such as culvert repair and street sweeping, which are performed by the City's public works department has been and will remain part of the general fund budget.

The City will actively pursue grant opportunities to fund proposed projects. Some of the grant programs the City will track are as follows:

1. Clean Water Revolving Fund

The Clean Water Revolving Fund (CWRP) is a low interest loan program that is administered by the Public Facilities Authority (PFA). To be eligible, the City must first apply for placement on the Project Priority List (PPL) and then on the Intended Use Plan (IUP). This involves preparation of a preliminary plan siting the needs and benefits of the project(s) in a feasibility report. The project(s) are then rated and ranked based on points assigned through the rating process. Following the ranking process to get the project onto the PPL, a letter from the City is required to move the project(s) forward to the IUP. Generally, only the higher-ranking projects are funded through this process

Over the past two annual funding cycles, federal law has required that a portion of the CWRP financing be reserved for green infrastructure. This program, titled "Green Project Reserve" includes loan forgiveness for qualifying projects. These projects would include those projects that provide for a definable environmental benefit and/or reduced maintenance activities or costs.

2. Clean Water Fund

The 2008 amendment to the state constitution increased the sales tax rate by three-eighths of one percent, and, approximately 33% of that is dedicated to the Clean Water Fund (CWF). Local Government Units (LGUs) are eligible to apply for competitive grants from the Board of Soil and Water Resources (BWSR) and receive up to 75% of project costs in grant dollars for eligible projects. BWSR has created several programs to disperse the Clean Water Funds appropriated. Cities are only eligible to apply for the BWSR Shoreland Improvement Grants and BWSR Restoration Technical Assistance Grants. The City will need to work cooperatively with the Watershed Organizations when making application for the BWSR grants.

3. Clean Water Partnership / Section 319 Grants

Clean Water Partnership / Section 319 grants are eligible to projects that address nonpoint-source pollution. Eligible implementation projects are those that are identified by a comprehensive assessment and planning process in the watershed or around the water body of concern. The projects must be categorized as either protection or restoration. Protection projects focus on protecting a water body that is currently meeting state water quality standards for a particular pollutant.

5.13.3 Levy Limit Constraints

Current State Statutes do not provide for levy limits therefore levy limit constraints will not be an issue in regards to financing stormwater activities.

5.13.4 Effect on Other City Funds and Households

As previously discussed, the City has an established Taxing District that covers the Pioneer-Sarah Creek Watershed area. The City also already has established budget items that are financed through the general fund for routine maintenance items. It is anticipated that the City will continue to levy \$65,000 - \$80,000 per year to the Pioneer-Sarah Creek Watershed Taxing District. These funds will be used for annual expenses and capital projects. With these funds and others as identified on Table 5-6 the City does not anticipate that this program will have a significant impact on other City Funds in the next 5 years.

The City of Independence has approximately 1,300 households. Over the next 5 years the City will spend approximately \$85,000 per year on the activities outlined in Table 5-6. In the next 5 years, it is anticipated that this program will cost each household within the City approximately \$65 per year.

5.13.5 Coordination with Other Agency Capital Improvements

In 2010, the USACE and MCWD generated the *Feasibility Report and Environmental Assessment: Painter Creek Section 206* report. Restoration of four wetlands in a chain that composes Painter Creek were included, and three of those wetlands are within the City of Independence: SOBI Marsh, Potato Marsh, and Painter Marsh.

**Table 5-7
Painter Creek Subwatershed Project Costs¹**

Wetland	Swale/Scrapes/Level Spreader	Weir & Scrapes/Swale
SOBI Marsh	\$242,460	
Potato Marsh	--	\$870, 073
Painter Marsh	--	\$2,804,760

¹Estimated based on October 2008 price levels

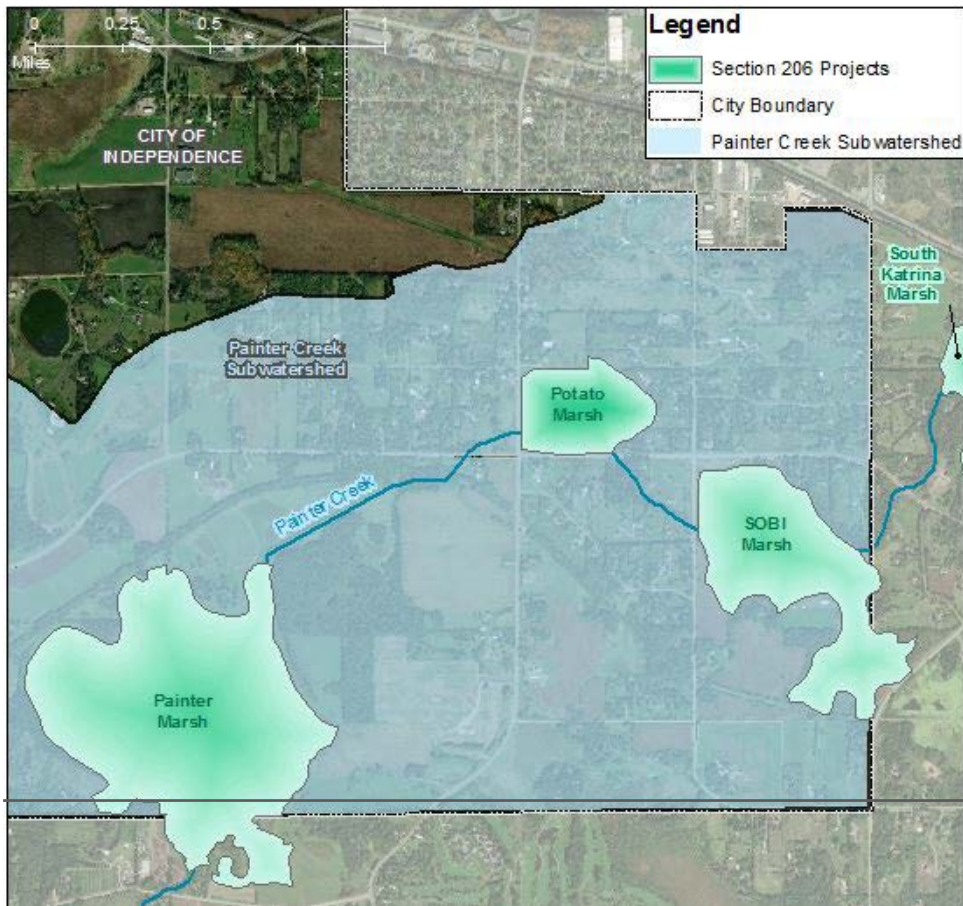


Figure 5-2. Painter Creek Subwatershed Section 206 Projects

If any land use applications are received within these project areas, the City will work cooperatively with the MCWD to identify opportunities to incorporate restoration projects identified in the Feasibility Report.

5.14 Coordination with Other Agencies

The City of Independence coordinates with its two watersheds: Pioneer-Sarah Creek Watershed Management Commission (PSCWMC) and Minnehaha Creek Watershed District (MCWD). Permitting within the two watersheds is regulated slightly differently. MCWD has a mapping program on their website that will show which watershed a particular address is located in. Permitting requirements for each watershed can be found on their websites. The City has its own permitting requirements as outlined in the City Ordinance. Some projects may require review by both the City and watershed.

Within the Pioneer-Sarah Creek watershed, the City reviews site plans for stormwater management and erosion control. The City also administers WCA permitting. The City Planner informs PSCWMC of all permitting reviews.

MCWD implements regulatory authority for the portions of the City within MCWD's jurisdiction. Site plans, erosion control, and WCA applications are reviewed by MCWD. The watershed coordinates with the City Planner for MCWD applications. More detailed information on the Independence – MCWD Coordination Plan can be found in Appendix E. No changes are proposed to the existing regulatory authority that is established in the City of Independence with the MCWD.

5.15 Ordinance Updates

The City will need to revise and expand their existing ordinances to enforce the goals and policies of this plan. The Ordinance will be needed to enforce rate control, volume control, and water quality provisions through the techniques outlined in this plan.

6.0 Watershed Data Tables

As discussed, the City of Independence has been divided into four watersheds. South Fork Crow River, Sarah Creek, Pioneer Creek and Painter Creek. This section contains data tables that present pertinent information to each subwatershed. The tables are as follows:

Table 6-1: South Fork Crow River and Sarah Creek Watershed Data

Table 6-2: Pioneer Creek Watershed Data

Table 6-3: Painter Creek Watershed Data

Figure 6-1: Existing Land Use Subwatershed Map

Figure 6-2: Future Land Use Subwatershed Map

Table Abbreviations

OC = Open Channel

CMP = Corrugated Metal Pipe

RCP = Reinforced Concrete Pipe

INA = Information Not Available

NA = Not Applicable

**TABLE 6-1
EXISTING WATERSHED DATA
SOUTH FORK CROW RIVER AND SARAH CREEK**

SUBWATERSHED ID NUMBER	SUBWATERSHED AREA (acres)	DOWNSTREAM SUBWATERSHED	OUTLET DATA				WATER ELEV. (feet)	OVERFLOW ELEV. (feet)	MnDNR NUMBER	OHWL (feet)	100-YEAR STORM EVENT SUMMARY					REMARKS
			ELEV. (feet)	SIZE (inches)	TYPE	LENGTH (feet)					NORMAL ELEV. (feet)	FLOOD ELEV. (feet)	STORAGE (ac-ft)	PEAK DISCHARGE (cfs)	VOLUME DISCHARGE (ac-ft)	
SOUTH FORK CROW RIVER																
CR-1	1,538.6	CR-2	920.6	36	CMP	13	920.4	920.4	192P, 381P, 382W	NA	920.6	921.9	354	8	321	
CR-2	993.5	CROW RIVER	908.0	36	CMP	INA	INA	INA	379P, 380P, 412P, 411W, 1097W	NA	908.0	911.2	227	29	673	OUTLET DATA IS ASSUMED. FIELD VERIFICATION IS NECESSARY
CR-3	294.6	NA	932.6	36	RCP	65	933.1	939.2	1090W	NA	932.6	936.3	19	50	250	
CR-4	115.3	NA	952.5	15	CMP	78	NA	956.6	NA	NA	952.5	956.4	18	6	44	
CR-5	85.4	NA	931.0	24	CMP	32	NA	934.4	NA	NA	931.0	934.2	17	18	82	
CR-6	274.0	NA	940.5	50 X 70	CUSTOM CMP ARCH	28	941.4	948.2	414W	NA	940.5	942.9	44	31	240	
CR-7	612.0	NA	920.1	36	RCP	140	922.8	932.7	NA	NA	920.1	923.8	396	38	967	
CR-8	179.3	CR-5	941.0	NA	OC	NA	INA	NA	413W	NA	940.0	942.5	18	25	57	OUTLET DATA IS ASSUMED. FIELD VERIFICATION IS NECESSARY.
CR-9	441.1	CR-3	951.0	NA	OC	NA	INA	NA	187W	953.2	950.0	951.6	94	6	113	OUTLET DATA IS ASSUMED. FIELD VERIFICATION IS NECESSARY.
SARAH CREEK																
SC-1	123	SC-5	INA	30	RCP	100	INA	INA	NA	NA	INA	INA	22	35	54	INFORMATION IS FROM THE CITY OF MEDINA LOCAL SURFACE WATER MANAGEMENT PLAN.
SC-2	13	SC-5	INA	18	RCP	100	INA	INA	NA	NA	INA	INA	2	12	6	INFORMATION IS FROM THE CITY OF MEDINA LOCAL SURFACE WATER MANAGEMENT PLAN.
SC-3	667	SC-5	INA	30	RCP	100	INA	INA	NA	NA	INA	INA	12	39	189	INFORMATION IS FROM THE CITY OF MEDINA LOCAL SURFACE WATER MANAGEMENT PLAN.
SC-4	30	SC-5	INA	15	RCP	100	INA	INA	NA	NA	INA	INA	2	9	13	INFORMATION IS FROM THE CITY OF MEDINA LOCAL SURFACE WATER MANAGEMENT PLAN.
SC-5	4,404	NA	973.8	48	RCP	95	974.7	985.4	191P, 362W, 367W, 368W, 369W, 373W	979.9	973.8	977.9	980	88	1678	OUTLET MODELED IS UNDER COUNTY ROAD 92

TABLE 6-2
EXISTING WATERSHED DATA
PIONEER CREEK

SUBWATERSHED ID NUMBER	SUBWATERSHED AREA (acres)	DOWNSTREAM SUBWATERSHED	OUTLET DATA				WATER ELEV. (feet)	OVERFLOW ELEV. (feet)	MnDNR NUMBER	OHWL (feet)	100-YEAR STORM EVENT SUMMARY					REMARKS
			ELEV. (feet)	SIZE (inches)	TYPE	LENGTH (feet)					NORMAL ELEV. (feet)	FLOOD ELEV. (feet)	STORAGE (ac-ft)	PEAK DISCHARGE (cfs)	VOLUME DISCHARGE (ac-ft)	
PIONEER CREEK																
PIC-1	5,960.9	PIC-2	953.8	6' X 25'	CONCRETE BOX	36	956.4	962.1	176P, 401W, 402W	956.8	956.3	960.0	3,258	136	2891	REPORTED FLOOD ELEVATION IS BASED ON THE FLOOD INSURANCE RATE MAP. CONTROL WEIR ELEV = 956.3
PIC-2	273.3	PIC-9	953.9	17 X 122	CONCRETE ARCH	68	955.5	964.6	394W	NA	953.9	958.0	167	135	2945	REPORTED FLOOD ELEVATION IS BASED ON THE FLOOD INSURANCE RATE MAP.
PIC-3	802.8	PIC-13	943.9	7.2' x 6'	CONC. BOX	85	945.1	971.6	NA	NA	943.94	949.0	274	212	5417	REPORTED FLOOD ELEVATION IS BASED ON THE FLOOD INSURANCE RATE MAP. CULVERT MODELED IS UNDER THE RAILROAD TRACKS.
			943.9	5' x 10'	CONC. BOX	70	945.1	960.3								
PIC-4	667.5	PIC-6	970.2	36	CMP	61	970.2	975.6	378W	NA	970.2	974.1	79	38	287	
PIC-5	671.8	PIC-7	973.3	48	RCP	82	973.9	983.7	397W	NA	973.3	977.7	73	87	384	
PIC-6	213.5	PIC-1	963.9	48	CMP	120	963.7	982.4	374W, 375W, 376W, 377W	NA	963.9	967.3	40	48	388	
PIC-7	563.6	PIC-1	954.5	36	CMP	71	956.9	961.1	398W	NA	954.5	961.4	176	92	1038	
PIC-8	253.4	PIC-1	958.9	24	CMP	62	NA	963.7	399W, 400W	NA	958.9	964.3	26	38	112	
PIC-9	1,308.0	PIC-3	951.8	7' X 10'	CONCRETE BOX	49	955.9	965.5	393W, 395W	NA	951.8	957.9	417	175	4522	REPORTED FLOOD ELEVATION IS BASED ON THE FLOOD INSURANCE RATE MAP.
PIC-10	706.0	PIC-3	948.1	36	CMP	71	948.6	958.4	189P, 391W, 392W	NA	948.1	950.7	134	25	246	CULVERT MODELED IS UNDER HIGHWAY 12.
PIC-11	1,641.1	PIC-12	954.1	4.5' X 4.5'	CONC. BOX	63	955.0	966.7	188P, 383W	NA	954.1	956.0	564	17	97	REPORTED FLOOD ELEVATION IS BASED ON THE FLOOD INSURANCE RATE MAP. CULVERT MODELED IS UNDER HIGHWAY 12.
			953.9	48	CMP	78	954.5	966.0								
PIC-12	1,988.4	PIC-14	936.6	60	CMP	50	937.8	942.3	385W, 386W, 387W	NA	936.6	944.0	177	226	1315	REPORTED FLOOD ELEVATION IS BASED ON THE FLOOD INSURANCE RATE MAP.
PIC-13	553.7	PIC-18	938.9	77 X 122	CONCRETE ARCH	53	940.0	951.0	388W, 389W	NA	938.9	944.0	58	241	6195	REPORTED FLOOD ELEVATION IS BASED ON THE FLOOD INSURANCE RATE MAP.
PIC-14	872.5	PIC-15	931.2	77 X 122	CONCRETE ARCH	63	932.8	940.3	925W	NA	931.2	939.0	594	480	11689	REPORTED FLOOD ELEVATION IS BASED ON THE FLOOD INSURANCE RATE MAP.
PIC-15	502.4	PIC-19	929.8	77 X 122	CONC. ARCH	40	931.0	939.5	NA	NA	929.75	935.8	172	528	12863	REPORTED FLOOD ELEVATION IS BASED ON THE FLOOD INSURANCE RATE MAP.
			930.0	77 X 122	CONC. ARCH	40										
PIC-16	152.3	NA	931.6	24	CMP	60	932.7	944.9	NA	NA	931.6	943.2	8	39	166	
PIC-17	385.7	PIC-21	945.0	36	CMP	INA	INA	INA	NA	NA	945.0	954.2	32	82	136	OUTLET DATA IS ASSUMED. FIELD VERIFICATION IS NECESSARY.
PIC-18	518.1	PIC-14	934.9	6.8' X 7.7'	CONC. BOX	32	936.7	945.4	NA	NA	934.9	9400.3	92	354	9395	REPORTED FLOOD ELEVATION IS BASED ON THE FLOOD INSURANCE RATE MAP.
			934.9	6.8' X 7.7'	CONC. BOX	32										
PIC-19	227.7	PIC-20	925.5	97 X 154	CONCRETE ARCH	113	927.0	940.4	NA	NA	925.5	932.4	192	563	13737	REPORTED FLOOD ELEVATION IS BASED ON THE FLOOD INSURANCE RATE MAP.
PIC-20	351.6	NA	918.6	25' WIDE	BRIDGE	14	919.7	925.9	NA	NA	918.6	927.0	23	665	16653	REPORTED FLOOD ELEVATION IS BASED ON THE FLOOD INSURANCE RATE MAP.
PIC-21	68.3	NA	930.3	36	CMP	58	929.7	940.0	NA	NA	930.3	938.3	9	87	159	

**TABLE 6-3
EXISTING WATERSHED DATA
PAINTER CREEK**

SUBWATERSHED ID NUMBER	SUBWATERSHED AREA (acres)	DOWNSTREAM SUBWATERSHED	OUTLET DATA				WATER ELEV. (feet)	OVERFLOW ELEV. (feet)	MnDNR NUMBER	OHWL (feet)	100-YEAR STORM EVENT SUMMARY				REMARKS
			ELEV. (feet)	SIZE (inches)	TYPE	LENGTH (feet)					NORMAL ELEV. (feet)	FLOOD ELEV. (feet)	STORAGE (ac-ft)	PEAK DISCHARGE (cfs)	
PAINTER CREEK															
PaC-1	449.0	PaC-2	NA	NA	OC	NA	INA	NA	NA	NA	988.0	989.2	INA	41	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY. PEAK DISCHARGE AND FLOOD ELEVATION ARE FROM A 10-DAY SNOWMELT.
PaC-2	261.0	PaC-3	971.5	48	ROUND	55	INA	977.3	NA	NA	971.5	975.1	INA	46	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY (NODE PC-2 FN1). FLOOD ELEVATION IS FROM A 10-DAY SNOWMELT.
PaC-3	151.0	PaC-8	NA	NA	OC	NA	INA	NA	NA	NA	970.6	972.9	INA	66	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY (NODE PC-3 FN1).
PaC-4	758.0	PaC-8	NA	NA	OC	NA	INA	NA	NA	NA	960.5	962.9	INA	142	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY. FLOOD ELEVATION IS FROM A 10-DAY SNOWMELT.
PaC-5	157.0	PaC-8	NA	NA	OC	NA	INA	NA	NA	NA	965.0	966.2	INA	45	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY.
PaC-6	197.0	PaC-7	981.7	15	ROUND	60	INA	983.9	396W	NA	977.8	982.3	INA	3.7	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY. PEAK DISCHARGE AND FLOOD ELEVATION ARE FROM A 10-DAY SNOWMELT.
			977.8	10	ROUND	64									
PaC-7	155.0	PaC-8	NA	NA	OC	NA	INA	NA	NA	NA	977.0	980.3	INA	162	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY.
PaC-8	1,068.0	PaC-9	959.2	23 X 36	ARCH	48	INA	964.0	NA	NA	959.2	962.9	INA	27	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY (NODE PC-8 FN4). PEAK DISCHARGE AND FLOOD ELEVATION ARE FROM A 10-DAY SNOWMELT.
PaC-9	583.0	PaC-10	NA	NA	OC	NA	INA	NA	NA	NA	956.5	962.4	INA	28	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY (NODE PC-9 FN5). PEAK DISCHARGE AND FLOOD ELEVATION ARE FROM A 10-DAY SNOWMELT.
PaC-10	64.0	PaC-11	955.1	40 X 65	ARCH	150	INA	968.5	NA	NA	955.1	958.8	INA	86	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY (NODE PC-10 FN1).
			955.1	40 X 65	ARCH	150									
PaC-11	706.0	PaC-12	945.4	48 X 48	BOX	46	INA	953.5	NA	NA	945.4	951.5	INA	257	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY (NODE PC-11).
PaC-12	56.0	PaC-13	944.3	54 X 88	ARCH	128	INA	952.6	NA	NA	944.3	949.1	INA	270	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY (NODE PC-12 FN6).
PaC-13	338.0	PaC-14	941.0	62 X 102	ARCH	78	INA	948.9	922W	NA	941.0	947.9	INA	276	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY.
PaC-14	100.0	PaC-15	940.3	62 X 102	ARCH	120	INA	954.2	NA	NA	940.3	947.4	INA	283	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY (NODE PC-14 FN3).
PaC-15	51.0	PaC-21	940.9	120	ROUND	100	INA	965.0	NA	NA	940.9	947.0	INA	284	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY (NODE PC-15 FN1).
			947.7	72	ROUND	71									
PaC-16	578.0	PaC-21	953.9	27	ROUND	55	INA	961.3	921W	NA	953.9	959.5	INA	30	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY.
PaC-17	284.0	PaC-21	989.6	72 X 72	BOX	39	INA	997.8	NA	NA	989.6	991	INA	91.5	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY (NODE PC-17).
PaC-18	344.0	PaC-19	975.8	24	ROUND	150	INA	995.9	924W	NA	975.8	992.7	INA	56.2	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY.
PaC-19	106.0	PaC-20	960.6	72	ROUND	78	INA	975.7	NA	NA	957.3	962.5	INA	196.7	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY.
			957.3	72	ROUND	84									
PaC-20	357.0	PaC-21	942.7	42	ROUND	58	INA	944.6	NA	NA	938.9	945.5	INA	173.4	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY (NODE PC-20).
			938.9	36	ROUND	58									
PaC-21	1,176.0	PaC-22	935.3	96 X 96	BOX	46	INA	948.2	923W	938.4	935.3	943.1	INA	286.7	INFORMATION IS FROM THE MCWD H/H AND POLLUTANT LOADING STUDY (NODE PC-21 FN1). PEAK DISCHARGE AND FLOOD ELEVATION ARE FROM A 10-DAY SNOWMELT.

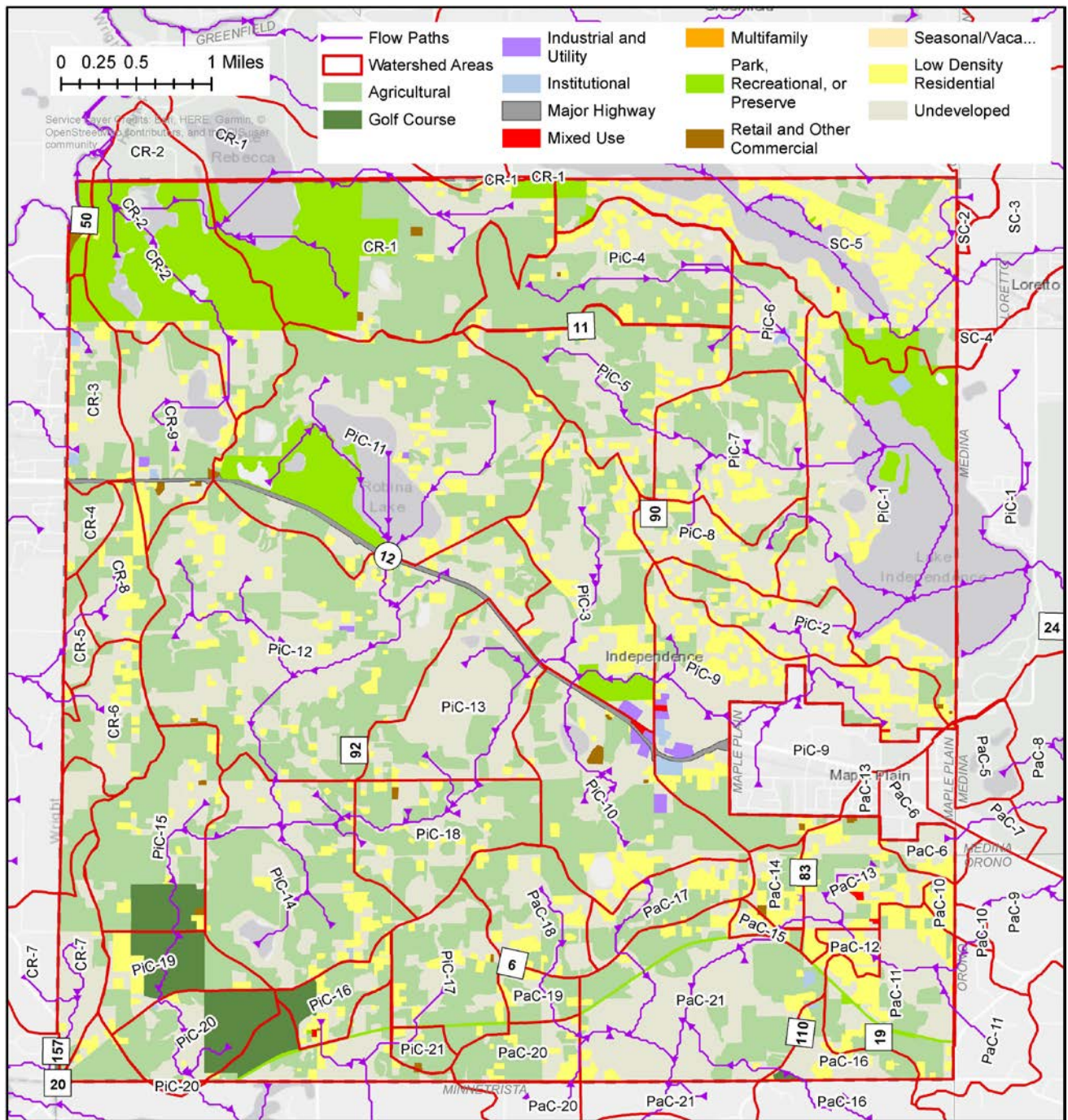


Figure 6-1. Existing Land Use Watershed Map

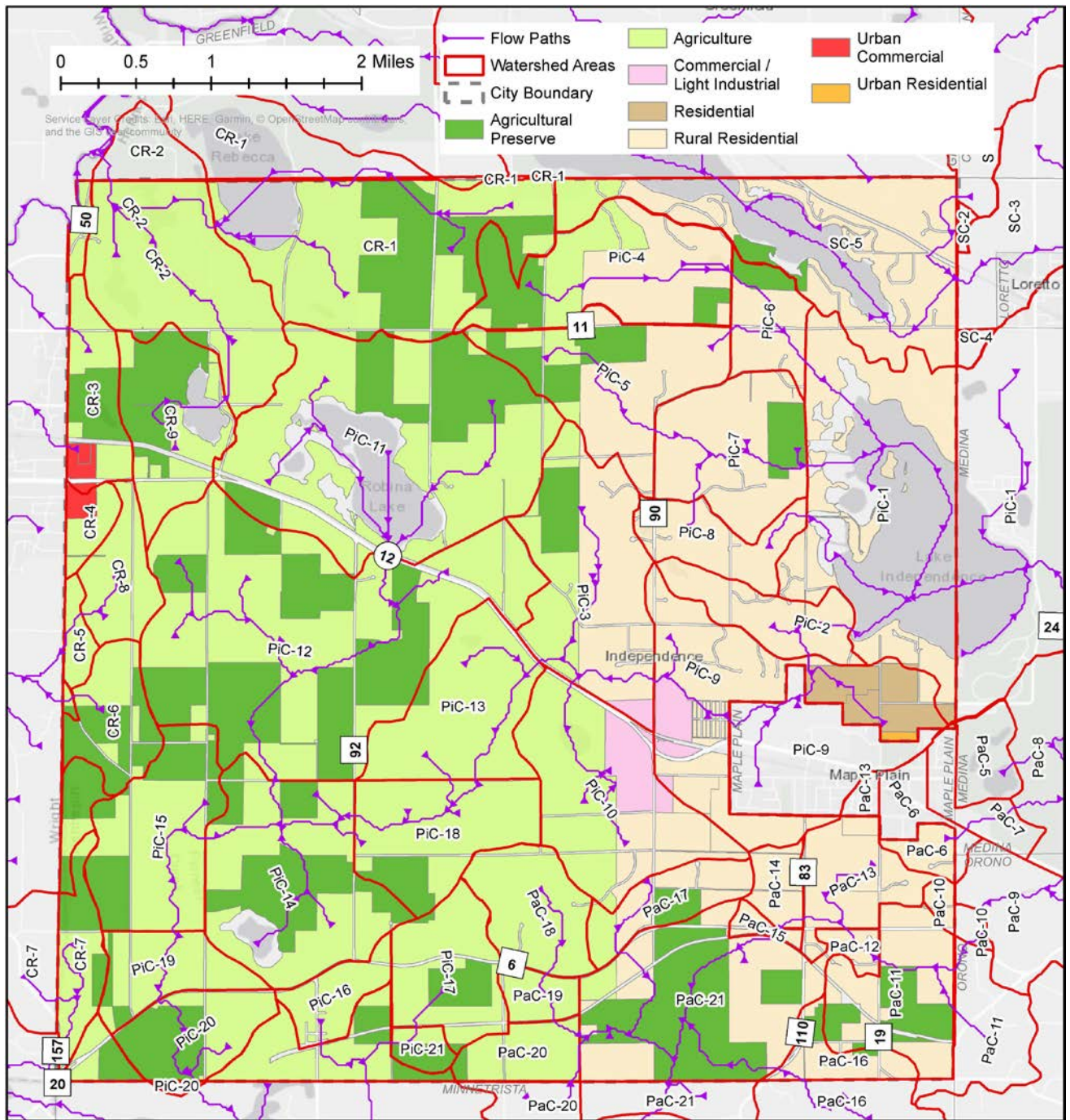


Figure 6-2. Future Land Use Watershed Map

7.0 Plan Amendments

This plan will be reviewed at five to ten-year intervals to determine whether updates are required to meet changing legal or physical conditions. Amendments may be either minor or major.

Minor amendments are amendments that do not change the goals, policies, management strategies, and management processes. Minor amendments include, but are not limited to the following:

- Updates to the storm drainage system based on construction or to correct errors or omissions.
- Changes to watershed divides provided they do not affect major watershed divides.
- Minor amendments as defined by Minn. Rules 8410.0020, Subp. 10 which reads as follows:
“. . . items such as recodification of the plan, revision of a procedure meant to streamline administration of the plan, clarification of the intent of a policy, the inclusion of additional data not requiring interpretation, or any other action that will not adversely affect a local unit of government or diminish a water management organizations' ability to achieve the plan's goals or implementation program.”

Minor amendments will be submitted to the affected WD or WMC as required by respective WD or WMC policy.

Major amendments will include:

- Modifications to the watershed divides or storm drainage system that change the projected rates and volume of flow.
- Modifications to the goals and policies.
- Major amendments, when required, will involve the same steps as approval of the original document.

The citizens of Independence, City Staff, the City Council, or any of the review authorities having jurisdiction may submit amendment requests. The amendment request will be evaluated by City staff and a recommendation will be made to the City Council. If the Council deems the amendment necessary, it will direct City staff and/or the City attorney to draft an amendment.

According to State Statute 103B.235, Subd. 5, Amendments, to the extent and in the manner required by the MCWD and PSCWMC, all major amendments to the SWMP shall be submitted to the MCWD and PSCWMC for review and approval in accordance with the provisions of State Statute 103B.235, subdivisions 3 and 3a for the review of plans. All major plan updates and amendments will be submitted to the MCWD, PSCWMC, and the Metropolitan Council simultaneously. All minor amendments will be reviewed and approved by the City Council.

Amendments will also be required within two years of the adoption of a watershed plan by a Watershed District or Watershed Management Organization, consistent with Minn. Statute 103B.235 and Minn. Rules 8410-0160.

Upon approval of the local water management plan by the Watersheds, the City shall adopt and implement its plan within 120 days and shall amend its official controls within 180 days.

8.0 Development Submittal Requirements

8.1 Purpose and Intent

This section of the plan is intended to provide Developer's Engineers with a standardized format for submittal of drainage plans and calculations and wetland delineation and mitigation reports to the City for review. A standardized format will provide the following:

- Reduce preparation time for submittals by providing direct guidelines for Developer's Engineers to follow.
- Reduce review time required by the City by ensuring that a complete and comprehensive drainage plan and calculations are submitted.
- Ensure that the City will receive the best possible protection of its resources, which could be adversely affected by inadequate stormwater management planning.

8.2 General Requirements – Grading, Drainage, and Erosion Control Plan

Grading, Drainage, and Erosion Control Plans shall be provided by the Developer in accordance with the City Code. Several items critical to the review of the drainage system must be adequately depicted on the plan by the Developer's Engineer. The following key elements must be depicted on the plan:

8.2.1 Topography

Existing and proposed contours at a minimum of 2-foot intervals. A 1-foot contour interval or proposed spot elevations shall be used where conditions dictate. The determination of contour interval shall be made based upon clarity and readability of the plans.

8.2.2 Stormwater Basins

Basin locations as depicted by the proposed contours. Normal level and 100 year flood water levels shall be depicted on the plan for each basin. Detention basins are required at each outfall point from the proposed plat. Perimeter berm elevation and width shall be clearly labeled on plan sheets.

Permanent detention basins may be utilized as construction detention basins, provided they are cleaned after permanent erosion control measures are established. Design features of the detention ponds shall be as described in this Plan.

8.2.3 Erosion Control Features

Locations of silt fence, bale barriers, wood fiber blanket, rock construction entrances, storm drain inlet protection, outlet projection, riprap, temporary seeding, permanent seeding, sod, mulch, or other erosion control features proposed to be implemented for the project.

8.2.4 Wetland Delineation

Show the field delineated boundaries of all public waters and wetlands.

8.2.5 Storm Sewer Facilities

Storm sewer facilities, when utilized, shall be adequately depicted on the drawings. At a minimum, the following must be shown on the plan:

1. Storm sewer pipe size, length, grade and type of material between each structure.
2. Catchbasin and manhole structural data including size, flow line or rim elevations and invert elevations. A typical section depicting each different type of catchbasin or manhole used shall be shown on the drawing. Type of casting utilized shall be referenced for each catchbasin or manhole.
3. A typical curb section for urban design streets shall be shown on the drawing.
4. If ditch sections are used, a typical section shall be shown on the drawing depicting bottom width and side slopes of the ditch.
5. Details of skimming structures proposed.

8.2.6 Maintenance Access Routes and Easements

Suitable access routes must be provided to all outlet structures, emergency overflows, and constructed stormwater basins and devices. Maintenance Access Routes shall adhere to the following standards:

1. Shall be clearly depicted on the plans
2. Minimum 10' in width
3. Cross slope of 10:1 or less
4. Longitudinal slope of 10% or less
5. Shall be within a drainage and utility easement, minimum 20' wide

8.3 Storm Drainage System Submittal Requirements

The stormwater drainage report shall be comprised of the following sections to provide the City Engineer with adequate base information for which to review the report. The following data must be included in the report:

Title Page. The title page shall list the project name, project location, date prepared, and preparer's name, title, and company.

Table of Contents. The table of contents must provide a description of the major categories of the report and also list each hydrograph and reservoir report presented in the report.

Summary. The summary must provide descriptions of items critical to the review of the entire report. Assumptions and results of the calculations shall be included in the summary:

- A. Pre-Development Site Conditions (Existing)
 - 1. Total site area
 - 2. Delineation of sub-drainage areas, as appropriate.
 - 3. For each drainage area, or sub-drainage area, provide the following information:
 - a. Area in acres.
 - b. Curve number (with justification per City approved CN's)
 - c. Time of Concentration (with justification)
 - d. Runoff rate and runoff volume
- B. Post-Development Site Conditions (Proposed)
 - 1. Total site area
 - 2. Delineation of sub-drainage areas, as appropriate.
 - 3. For each drainage area, or sub-drainage area, provide the following information:
 - a. Area in acres
 - b. Curve number (with justification)
 - c. Time of Concentration (with justification)
 - d. Runoff rate and runoff volume
- C. Comparison of pre-development to post-development runoff rates and volumes.
- D. Total of existing and new impervious area
- E. Calculations to determine the Water Quality Volume (1.1" over the new impervious surface)
- F. Calculations to determine that the Water Quality Volume will be infiltrated in 48 hours or less
- G. Geotechnical and Double Ring Infiltrometer test results certified by a Geotechnical Engineer
- H. If infiltration is infeasible, it must be documented in the report with references to supporting data
- I. Summary of nutrient removal on site.
- J. A discussion of the storm sewer system, if applicable, to include a summary of flows to each catchbasin and the depth of water over each catchbasin during the 10 year event.

Drainage maps: Drainage maps depicting pre-development and post-development conditions. The maps may be 22"x34" plans, but shall also be provided on 11"x17" reductions. The plans

shall delineate drainage area and sub-drainage area boundaries. All areas shall be labeled and referenced to those presented in the report.

Computer Printouts: Drainage maps of all hydrograph and reservoir files shall be included at the back of the report for reference.

8.4 Wetland Delineation and Replacement

8.4.1 Wetland Delineation

When a regulated use or activity is proposed on a property which is within a wetland or wetland buffer area, a wetland delineation and report is required. The applicant shall provide a wetland report prepared by a qualified Wetland Specialist. The wetland report shall include the following:

1. Vicinity map;
2. A copy of a National Wetland Inventory Map identifying the wetlands on or adjacent to the site;
3. A site map setting forth all of the following:
 - a. Surveyed wetland boundaries based upon delineation;
 - b. Site boundary property lines and roads;
 - c. Internal property lines, rights-of-way, easements, etc.;
 - d. Existing physical features of the site including buildings, fences, and other structures, roads, parking lots, utilities, waterbodies, etc.;
 - e. Contours at the smallest readily available intervals, preferably at 2-foot intervals;
 - f. Hydrologic mapping showing patterns of surface water movement and know subsurface water movement into, through, and out of the site area.
 - g. Location of all test holes and vegetation sample sites, numbered to correspond with flagging in the field and field data sheets.
4. A report which discusses the following:
 - a. Location information (legal description, parcel number and address);
 - b. Delineation. The wetland boundaries on the site established by the delineation shall be staked and flagged in the field. If the wetland extends outside the site, the delineation report shall discuss all wetland areas within 150 feet of the site, but need only delineate those wetland boundaries within the site;
 - c. General site conditions including topography, acreage, and surface areas of all wetlands identified;
 - d. Hydrological analysis, including topography, of existing surface and known significant sub-surface flows into and out of the subject wetland(s);
 - e. Analysis of functional values of existing wetlands, including vegetative, faunal, and hydrologic conditions;

8.4.2 Wetland Replacement

When wetland impacts cannot be avoided, the applicant shall prepare a Wetland Replacement Plan. The Wetland Replacement Plan components shall conform to the requirements of Minnesota Rules 8420.0530.

8.4.3 Wetland Functions and Values Assessment

A wetland functions and values assessment shall be provided in accordance with Section 3.1.3.

8.5 Wetland Review

The applicant must submit copies of all required information including the preliminary plat to the appropriate Watershed Organization for review and approval. The two Watershed Organizations within the City include Minnehaha Creek Watershed District and the Pioneer-Sarah Watershed Management Organization.

**Table 8-1
City of Independence Minimum Runoff Curve Numbers**

Cover Description	Curve numbers for hydrologic soil group			
	A	B	C	D
Cover type and hydrologic condition				
<i>Fully developed urban areas (vegetation established)</i>				
Open space (lawns, parks, golf courses, cemeteries, etc.)				
Grass Cover > 75%	39	61	74	80
Grass Cover < 75%	49	65	77	82
Impervious areas:				
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	98	98	98	98
Streets and roads:				
Paved; curbs and storm sewers (excluding right-of-way)	98	98	98	98
Paved; open ditches (including right-of-way)	83	89	92	93
Gravel (including right-of-way)	76	85	89	91
Dirt (including right-of-way)	72	82	87	89
Water Surface:	100	100	100	100
Urban Districts:				
Commercial and business	NA ¹	92	94	95
Industrial	NA ¹	88	91	93
Residential districts by average lot size:				
1/8 acre or less (town houses)	NA ¹	85	90	92
1/4 acre	NA ¹	75	83	87
1/3 acre	NA ¹	72	81	86
1/2 acre	NA ¹	70	80	85
1 acre	59	68	79	84
2 acres and greater	55	65	77	82
Developing Urban Areas				
Newly graded areas (pervious areas only, no vegetation)	77	86	91	94
Undeveloped areas				
Agricultural land (all current uses)	55	65	77	82
Pasture, grassland, or range – continuous forage for grazing	49	65	77	82
Meadow – continuous grass, protected from grazing and generally mowed for hay	30	58	71	78
Brush – brush-weed-grass mixture with brush the major element	35	56	70	77
Woods – grass combination (orchard or tree farm)	43	65	76	82
Woods	36	60	73	79

¹Use of Type A soil is not allowed for this hydrologic condition.

9.0 Hydrologic/Hydraulic Models

9.1 General Overview

The need for stormwater modeling has increased as new construction changes the usage of the surrounding land. For example, replacing a stand of trees with a parking lot has a dramatic effect on runoff, greatly increasing its total volume and the rate of runoff. The potential for erosion and flooding is increased in areas downstream of construction. To prevent such damage, the runoff must be predicted before construction so that suitable steps can be taken to handle the runoff in a safe and effective manner.

HydroCAD, a hydrologic computer modeling program, was used for this management plan. Hydraulic evaluations of pipes, ditches, and other structures were performed using standard engineering procedures and are not discussed. The Flood Insurance Study for Pioneer and Robina Creeks was adopted by this plan and was not restudied.

To determine the critical flood levels for each subwatershed, runoff volumes from pervious and impervious areas were determined for storms with durations varying between one and four days and a snowmelt runoff event with a duration of ten days.

9.2 Hydrologic Model (HydroCAD)

Stormwater modeling and drainage design techniques can be divided into two basic groups:

- 1) Steady-state (constant flow) methods, such as the Rational Method as applied to storm sewer pipe networks.
- 2) Hydrograph generation and routing procedures designed to simulate the time varying nature of actual runoff.

Although HydroCAD can be used for steady-state designs, it is designed primarily as a hydrograph generation and routing program. It is based primarily on hydrology techniques developed by the Soil Conservation Service (SCS) combined with standard hydraulics calculations. For any given storm, these techniques are used to generate hydrographs throughout a watershed.

9.2.1 Runoff Volumes

The volume and rate of runoff from a subwatershed are affected by the runoff curve number (CN). The soil group classification and antecedent soil moisture condition have an effect on the CN.

The soil group classification used for this study is Group B. Soil Group B contains shallow, sandy loams. The antecedent soil moisture condition (AMC) is a measure of how much rain falls five days before a 24-hour storm. For this study, AMC II was used. The total 5-day antecedent rainfall, for AMC II, is 0.5-1.1” during the dormant season and 1.4 – 2.1” during the growing

season. From this information a CN, which indicates the percentage of runoff from a subwatershed, can be determined. For this study, the CN's range from 50-100. With the CN and the rainfall distribution and duration information, the runoff from each subwatershed can be determined using the SCS TR-20 method.

9.2.2 Rainfall Distribution and Duration

Design storm characteristics must be determined for the model. This requires determining both the amount of precipitation and the intensity distribution of the precipitation. NOAA Atlas 14, Volume 8 as published by the National Weather Service are used to determine the amount of precipitation.

9.2.3 Flood Elevations

After the hydrographs are created for each subwatershed, they are routed through storage areas (wetlands, lakes, detention ponds, etc.) and conveyance systems (storm sewers and ditches) and combined with other hydrographs at junctions with other subwatersheds. Specific characteristics of the water body and its outlet are input into the elevation-flood storage-discharge relationship used in the routing through each water body.

The storm duration that is critical for a watershed is dependent on the watershed size and slope, the volume of storage available in the system, and the outlet capacity. The critical duration is determined by routing several different duration storms of a given frequency and determining which duration produces the greatest peak discharge or flood elevation. A small watershed with little available storage will have a critical storm of shorter duration than a large watershed with abundant storage.

The elevations reported in this plan have been derived using limited topographic information and shall not be used for the purpose of establishing flood protection standards of new or existing structures. As development/building applications are submitted, the applicants will be required to further investigate the drainage patterns in accordance with Section 8.0 to more accurately determine flood elevations.

10.0 Glossary

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

10 Percent Chance Flood: The flood event that has an annual probability of being equaled or exceeded in any given year of 10 percent. This flood is the result of the critical duration 10 percent chance storm falling on the watershed. This is also commonly called the “10-year” flood.

100-Year Storms: Rainstorms of varying duration (e.g. 2-, 6-, 24-hour) and intensities (inches per hour) expected to recur on the average of once every one hundred years (1% frequency probability).

Abstraction: Retention on site through infiltration, evapotranspiration, or capture and reuse.

Acre-Foot: A measurement of water volume that is equal to 1 foot of water covering an area of 1 acre.

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 affect water quality adversely.

Aquifer: Saturated permeable geologic unit(s) that can transmit significant quantities of water under ordinary hydraulic gradients.

Bedrock Aquifer: One or more saturated geologic units composed of sedimentary, metamorphic, or igneous rock that can transmit significant quantities of water under ordinary hydraulic gradients.

Best Management Practices (BMPs): Practices that can be used to control urban nonpoint source pollution.

BMP Fingerprinting: A series of techniques used to manage stormwater to minimize impacts to wetlands, forest, and sensitive stream reaches. Techniques include bypassing flow around a wetland and discharge of stormwater to a pretreatment pond around or adjacent to the wetland.

Bounce: The vertical elevation difference between the peak flood elevation and the wetland elevation.

Buffer: An upland area adjacent to a wetland, lake, or stream that is covered with natural vegetation that experiences little to no human impact such as mowing. The buffer begins at the delineated wetland edge or top of bank of a stream.

County Ditch: An open channel to conduct the flow of water. (Minnesota Statutes, section 103E.005, Subd. 8).

Design Storm: A rainfall event of specific return frequency and duration (e.g., a storm with a 2-year frequency of occurrence and 24-hour duration) that is used to calculate the runoff volume and peak discharge rate.

Detention: The temporary storage of storm runoff used to control the peak discharge rates, and which provides gravity settling of pollutants.

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

Detention Time: The amount of time a parcel of water actually is present. Theoretical detention time for a runoff event is the average time parcels of water reside in the basin over the period of release.

Ditch Repair: To restore all or part of a drainage system, as nearly as practicable, to the same condition as when originally constructed and subsequently improved.

- Resloping of ditches, leveling and reseeding of waste banks, if necessary, to prevent further deterioration;
- Realignment of original construction, if necessary, and to restore the effectiveness of the system or prevent the drainage of a wetland;
- Routine operations that may be required to remove obstructions and maintain the efficiency of the drainage system;
- Restoration or enhancement of wetlands; and
- Wetland replacement under Minnesota Statutes, section 103G.222.

Erosion: Wearing away of the lands or structures by running water, glaciers, wind, and waves.

Eutrophication: The natural or artificial process of nutrient enrichment whereby a water body becomes filled with aquatic plants and low in oxygen content.

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

Feedlot: An area where livestock are fattened for market.

Flood Fringe: The portion of the floodplain outside of the floodway.

Flood Profile: A graph of a longitudinal plot of water surface elevations of a flood event along a reach of a stream or river.

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

Floodway: The channel of a watercourse and those portions of the adjoining floodplain which are reasonably required to carry and discharge the 100-year flood.

Freeboard: A factor of safety above a certain flood level. This typically is defined as the vertical separation (feet) between the design flood level (e.g., 1 percent chance flood elevation) and the lowest floor of a structure or the top of an embankment. Freeboard compensates for the many unknown factors (e.g., waves, ice, debris, etc.) that may increase flood levels beyond the calculated level.

Geology: The science which treats the origin, history, and structure of the earth, as recorded in the rocks; together with the forces and processes now operating to modify rocks.

Glacial Drift: Material which was deposited by glaciers.

Greenway: A linear open space established along either a natural corridor such as a riverfront, stream, valley, or ridgeline, or overland along a railroad right-of-way converted to recreational use, a canal, scenic road or bicycle passage. An open space connector linking parks, nature

reserves, cultural features, or historic sites with each other and with populated areas. Locally certain strip or linear parks designated as parkway or greenbelt.

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

Hydric Soils: Soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part.

Hydrograph: A graph showing variation in the water depth or discharge in a stream or channel, over time, at a specified point of interest.

Hydrology: The applied science concerned with the waters of the earth in all its states – their occurrences, distribution, and circulation through the unending hydrologic cycle of: precipitation; consequent runoff, stream flow, infiltration, and storage; eventual evaporation; and reprecipitation.

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

Infiltration: The entrance of water into the soil or other porous material through the interstices or pores of a soil or other porous medium.

Inundation Period: Time that flood waters temporarily stored in the wetland exceed the wetland elevation. Difference between the peak flood elevation and the wetland elevation.

Invert Elevation: The vertical elevation of a pipe or orifice in a pond which defines the water 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.

Landlocked Lake or Basin: Area which has an outlet that is significantly higher than the normal water level of the lake, pond, or wetland.

Lateral Ditch: Any open channel or storm sewer drainage construction by branch or extension, or a system of branches and extensions, or a drain that connects or provides an outlet to property with an established drainage system (Minnesota Statutes, section 103E.005, subdivision 15). Lateral includes only those facilities which are connected to the Anoka County Ditch system as identified in the Anoka County Public Ditch Inventory dated January 1992.

Level of Protection: The amount of secondary stormwater runoff capacity required to avoid flood damage and provide for public safety.

Level of Service: The amount of primary stormwater runoff capacity required to avoid unusual hardship or significant interference with normal public activities (transportation, sanitary, or utilities).

Management Strategy: The specific physical, legal or administrative actions recommended or implemented based upon the established criteria and will achieve the policies and goals.

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 to make 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 to 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.

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

Nonpoint Source Pollution: Pollution from any source other than any discernible, confined and discrete conveyances, including but not limited to surface runoff from agricultural, silvicultural, mining, construction, subsurface disposal and urban activities.

Normal Level: For basins, that water elevation maintained by a natural or man-made outlet.

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

On-Site Detention: A method of temporarily storing stormwater runoff at a development site in the form of wet or dry basins. While the primary objective is water quality control, significant reduction in outflow conveyor overloading is accomplished for high intensity, short duration storm events. This method is employed on developments when the regional detention basin approach is not available, usually due to site location of either facility.

Ordinary High Water (OHW) Level: The boundary of public waters and wetlands, and shall be an elevation delineating the highest water level which has been maintained for a sufficient period of time to leave evidence upon the landscape, commonly that point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. For watercourses, the ordinary high-water level is the elevation of the top of the bank of the channel. For reservoirs and flowages, the ordinary high-water level is the operating elevation of the normal summer pool.

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

Percolation: Movement of water through soil layers of material.

Permeability: A characteristic of soil that enables water to move downward through the profile. Measured in inches per hour.

Policies: The plans or course of action to be followed in achieving the goals.

Post-Disturbance Condition: The state of a site following crop or development establishment in which source and/or structural control measures have been implemented resulting in erosion and sedimentation control achieving soil loss limits.

Precipitation: The total measurable supply of water 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 in a day, month, or year, and designated as daily, monthly, or annual precipitation.

Primary Capacity: The volume and/or rate of stormwater runoff defined as that level of service provided by the primary system.

Primary System: The primary system conveys runoff from the more frequent events such as the 2 to 10-year events. In general, the system is composed of swales, ditches, gutters, and storm sewers.

Public Waters: Any waters as defined in Minnesota Statutes, section 105.37, subdivisions 14 and 15.

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 could typically constitute a reach.

Recharge: Replenishment of the 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, which 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 Detention Basin: A natural pond or wetland area, often modified by man, in which a minimum and permanent water level is maintained. During periods of stormwater runoff of various durations, the basin receives additional water, stores it temporarily, and releases it at a controlled rate(s). In addition to runoff flow equalization in reducing existing flooding problems, the basin serves pollutants from existing as well as planned development.

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

Retention Facility: A permanent natural or manmade structure that provides for the storage of stormwater runoff by means of a permanent pool of water.

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

Runoff: That portion of the precipitation which is not absorbed by the 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.

Secondary Capacity: The volume and/or rate of stormwater runoff in excess of the primary capacity and defined as that level of protection provided by the secondary system.

Secondary System: The system is composed of all the pathways that runoff takes when the capacity of the primary system is exceeded and in general is composed of streets, swales, ditches, storm sewers, detention basins, creeks, streams and rivers.

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 ordinances on a river or stream, whichever is greater.

Soil Association: A group of soils geographically associated in a characteristic repeating pattern defined and delineated as a single map unit.

Source Control: The application of erosion techniques including but not limited to: mulching, seeding, sodding, and greenbelts.

Stormwater Runoff: The flow on the surface of the ground, resulting from precipitation in the form of rainfall or snowmelt.

Structural Control: The application of construction erosion techniques including but not limited to: sediment basins, silt fences, debris dams, dikes, terracing, riprap and diversions.

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

Time of Concentration: The time required for surface runoff from the most remote part of a drainage basin to reach the basin outlet.

Transpiration: The process by which plants dissipate water into the atmosphere from leaves and other surfaces.

Universal Soil Loss Equation: A method developed by the Agricultural Research Service, USDA, and used by Soil and Water Conservation Districts to estimate the average annual soil erosion based on rainfall, soil erodibility, slope of the land, length of slope, vegetative cover, and erosion control practices.

Waterbodies: Natural and man-made depressions and stormwater conveyance and storage facilities including wetlands, lakes, ponds, streams and rivers.

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

Wetland: Transitional land between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. Wetlands must have a predominance of hydric soils, be inundated or saturated with water at a frequency and duration to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions, and under normal circumstances, supports a prevalence of hydrophytic vegetation.

Wetland Bank: System of identifying wetlands restored or created for replacement credit, providing for, and facilitating and tracking the exchange of wetland banking credits for projects that require replacement plans or wetland mitigation.

Worst-case Soil Loss Condition: The state of a site which is denuded and rough grade contours could create the greatest potential soil loss (e.g., a site in which all of the vegetative cover is removed, the existing or interim grades are not stabilized and could result in significant soil loss).

Appendix A

Joint Powers Agreement

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1 AMENDED AND RESTATED
2 JOINT POWERS AGREEMENT ESTABLISHING
3 THE PIONEER-SARAH CREEK WATERSHED MANAGEMENT COMMISSION
4

5 RECITALS

6 WHEREAS, on July 29, 1993, pursuant to statutory authority, the Cities of Corcoran,
7 Greenfield, Independence, Loretto, Maple Plain, Medina and Minnetrista, the Town of Watertown,
8 and the Hennepin Conservation District adopted a "Joint Powers Agreement to Protect and Manage the
9 Pioneer-Sarah Creek Watersheds" (the "Joint Powers Agreement"); and

10 WHEREAS, in 2000 the City of Corcoran withdrew from the Agreement; and

11 WHEREAS, in 2001 the Town of Watertown withdrew from the Agreement; and

12 WHEREAS, the Cities of Greenfield, Independence, Loretto, Maple Plain, Medina and
13 Minnetrista wish to amend and restate the Agreement's terms in this document.

14 NOW, THEREFORE, pursuant to the authority conferred upon the parties by Minn. Stat §§
15 471.59 and 103B.201, et seq., the parties to this Agreement do mutually agree as follows:

16 SECTION ONE
17 DEFINITIONS
18

19 For purposes of this Agreement, each of the following terms, when used herein with an initial
20 capital letter, will have the meaning ascribed to it as follows:

21 "Agreement" means the Joint Powers Agreement, as amended and restated in this document.

22 "Board" means the Board of Commissioners of the Commission.

23 "BWSR" means the Minnesota Board of Water and Soil Resources.

24 "Commissioner" means an individual appointed by a governmental unit to serve on the Board.

25 The term Commissioner shall include both the representative and alternate representative appointed to
26 serve on the Board.

27 "Pioneer-Sarah Creek Watershed" or "Watershed" means the area within the mapped area
28 delineated on the map filed with BWSR, as may be amended. A complete legal description defining
29 the boundary of the Pioneer-Sarah Creek Watershed is attached hereto and made apart hereof.

1 "Governmental Unit" means any signatory city or township,

2 "Member" means a governmental unit that enters into this Agreement.

3 "Watershed Management Organization ("WMO") means the organization created by this
4 Agreement, the full name of which is "Pioneer-Sarah Creek Watershed Management Commission." The
5 Commission shall be a public agency of its respective governmental units.

6 SECTION TWO
7 ESTABLISHMENT
8

9 The parties create and establish the Pioneer-Sarah Creek Watershed Management Commission.
10 The Commission membership shall include the Cities of Greenfield, Independence, Loretto, Maple Plain,
11 Medina and Minnetrista. In addition to other powers identified in this Agreement, the Commission shall
12 have all of the authority for a joint powers watershed management organization identified in Minn. Stat. §
13 103B.211.

14 SECTION THREE
15 PURPOSE STATEMENT
16

17 The purpose of this Agreement is to establish an organization within the Pioneer-Sarah Creek
18 Watershed to (a) protect, preserve, and use natural surface and groundwater storage and retention systems,
19 (b) minimize public capital expenditures needed to correct flooding and water quality problems, (c) identify
20 and plan for means to effectively protect and improve surface and groundwater quality, (d) establish more
21 uniform local policies and official controls for surface and groundwater management, (e) prevent erosion of
22 soil into surface water systems, (f) promote groundwater recharge, (g) protect and enhance fish and wildlife
23 habitat and water recreational facilities, and (h) secure the other benefits associated with the proper
24 management of surface and ground water, as identified in Minn. Stat. § 103B,201, including but not limited
25 to aesthetic values when owned by the public or constituting public resources, as defined in Minn. Stat. Ch.
26 116B.

27 The Commission's Members agree to (a) provide a forum for exchanging information in the
28 management of land use and land use techniques and control, (b) provide a forum for resolution of
29 intergovernmental disputes relating to management and protection of the Pioneer-Sarah Creek Watershed;

1 and (c) cooperate on a united basis on behalf of all units of government within the Pioneer-
2 Sarah Creek Watershed with all other levels of government for the purpose of facilitating natural
3 resource protection and management in the Watershed.

4 SECTION FOUR
5 BOARD OF COMMISSIONERS
6

7 4.1. Appointment. The governing body of the Commission shall be its Board. Each
8 Member shall be entitled to appoint one representative to serve on the Board and one alternate who
9 may sit when the representative is not in attendance, and said representative or alternative
10 representative shall be called a "Commissioner." It is expected that each Member ensure that its
11 Commissioner will attend each meeting of the Board.

12 4.2. Term. Each Member shall determine the term length for its Commissioner's
13 appointment to the Board. The representatives to the Commission shall serve at the pleasure of the
14 governing body of the Member appointing such representative to the Commission. The Commission
15 and its Members shall fill all Board vacancies pursuant to Minn. Stat. § 103B.227, subd. 1 and 2, as
16 may be amended from time to time.

17 4.3. Compensation. Commissioners shall serve without compensation from the
18 Commission, but this shall not prevent a Member from providing compensation to its Commissioner
19 for serving on the Board.

20 4.4. Officers. No later than the first meeting in February of each year, the Commission
21 shall elect from its membership a chairperson, a vice-chairperson, a treasurer and a secretary and such
22 other officers as it deems necessary to reasonably carry out the purposes of this Agreement. No
23 Commissioner may be elected to more than one office. All officers shall hold office for terms of one
24 year and until their successors have been elected by the Commission. An officer may be reelected to
25 the same office for unlimited terms. A vacancy in an office shall be filled from the Board membership
26 by election for the remainder of the unexpired term of such office. The officers' duties include the
27 following:

28 A. Chairperson. The Chairperson shall preside at all Board meetings and shall have
29 all the same privileges of discussion, making motions and voting, as do other

1 Commissioners. The Chairperson may delegate certain responsibilities to the
2 Executive Secretary as necessary to carry out the duties of the office.

3
4 B. Vice-Chairperson. The Vice-Chairperson shall, in the absence or disability of
5 the Chairperson, perform the duties and exercise the powers of the Chairperson.
6

7 C. Treasurer. The Treasurer shall have the custody of the funds and securities of the
8 Commission and shall keep full and accurate accounts of receipts and
9 disbursements in books belonging to the Commission and shall deposit all
10 monies and other valuable effects in the name and to the credit of the
11 Commission in such depository as may be designated by the Commission.
12 He/she shall disburse funds of the Commission as approved by the Commission
13 and shall render to the Commission at regular meetings, or as the Board may
14 request, an account of all his/her transactions as Treasurer and of the financial
15 condition of the Commission. The Treasurer may delegate certain duties to the
16 Executive Secretary as necessary to carry out the duties of the office.
17

18 D. Secretary. The Secretary shall attend all Board meetings, shall act as clerk of such
19 meetings, and shall record all votes and the minutes of all proceedings. He/she
20 shall give notice of all Board meetings. The Secretary may delegate certain
21 duties to the Executive Secretary as necessary to carry out the duties of the
22 office.
23

24 4.5. Executive Secretary. The Commission may appoint an Executive Secretary to coordinate
25 activities of the Commission, accept delegated duties by the Commission officers, and accept business
26 duties not assigned to officers. All notices to the Commission shall be delivered or served at the office
27 of the Executive Secretary.

28 4.6. Quorum and Voting. A majority of all Commissioners with voting privileges shall
29 constitute a quorum. Once a quorum is present, a majority vote is required for approval on an action,
30 unless as provided otherwise in this Agreement.

31 4.7. Meetings. The Board shall schedule meetings at least quarterly (every three months) on a
32 uniform day and place selected by the Commission. Written notice of the location and time of all
33 Commission meetings shall be sent to all Commission representatives and alternate representatives
34 and to the Clerk of each Member. Special meetings may be held at the call of the Chairperson or by
35 any three Commissioners by giving not less than 72 hours written notice of the time, place and
36 purpose of such meeting.
37

SECTION FIVE
COMMISSION POWERS AND DUTIES

1
2
3
4 5.1. Watershed Management Plan. The Commission shall develop a watershed management
5 plan including a capital improvement program in conformance with Minn. Stat. § 103B.231. The
6 Commission shall adopt the plan within 120 days after BWSR's approval of the plan. After adoption, the
7 Commission shall implement the watershed management plan and enforce the regulations set out in the plan.
8 A copy of the adopted plan shall be filed with the clerk of each Member governmental unit.

9 5.2. Local Water Management Plans. The Commission shall review Members' local water
10 management plans as required by Minn, Stat. § 103B.235, subd. 3.

11 5.3. Review Services.

12 A. Where the Commission is authorized or requested to review and make
13 recommendations on any matter, the Commission may charge a reasonable fee for such review services.
14 The Commission's standard fee schedule, as amended from time to time, will be a part of the
15 Commission's Rules.

16 B. The Commission may charge an additional fee when it determines that a
17 particular project will require extraordinary and substantial review services. Before undertaking such
18 review services, the Commission shall provide the party to be charged the additional fee with written
19 notice of the services to be performed and the additional fee therefor. Unless said party objects within
20 5 business days of receipt of such written notice to the amount of the additional fee to be charged,
21 such review services shall be performed and the party shall be responsible for the cost thereof. If said
22 party objects to the proposed additional fee for such services within 5 business days and the party and
23 the Commission are unable to agree on a reasonable alternative amount for review services, such
24 extraordinary and substantial review services shall not be undertaken by the Commission.

25 The Members recognize that from time to time the Commission provides review services
26 regarding a violation under the Minnesota Wetland Conservation Act, and that there currently is no statutory
27 mechanism in place that allows the Commission to recover its costs from the wetland violator

1 for these review services. Therefore, when the Commission provides review services regarding a violation
2 under the Minnesota Wetland Conservation Act, the Commission may seek reimbursement for these
3 services from the Member where the subject property is located.

4 C. Upon request of any Member, the Commission shall review and evaluate any
5 dispute between the Member and other unit(s) of government regarding land use and natural resource
6 protection and management.

7 5.4 Public Participation.

8 A. Technical Advisory Committee. A Technical Advisory Committee ("TAC") to
9 the Commission is hereby created. TAC members and one or more alternate members shall be appointed by
10 the governing body of each Member. TAC members may be, but need not be, Commissioners. TAC
11 members shall serve at the pleasure of the governing body of each Member that appoints them and are
12 not required to meet statutory qualifications for Commissioners. TAC members will undertake
13 projects/tasks as requested or assigned to the TAC by the Commission and may participate in meetings
14 of the Commission pertaining to those assigned projects/tasks.

15 B. Citizen Advisory Committee. If a need is determined by the Commission, the
16 Commission will establish a Citizen Advisory Committee to the Commission, particularly to review and
17 comment on specific projects undertaken by the Commission pursuant to the Watershed Management
18 Plan.

19 5.5. Rules. The Commission shall adopt rules for (a) conducting its business, including but
20 not limited to additional duties of the Commission's officers, (b) the scope of responsibilities of the
21 Technical Advisory Committee and the Citizen Advisory Committee, if one is established, and (c)
22 preparing the annual work plan.

23 5.6. Contracts. The Commission may make such contracts, and enter into any such
24 agreements, as it deems necessary to make effective any power granted to it by this Agreement. No
25 Commissioner shall receive a direct financial benefit from any contract made by the Commission. Every
26 contract for the purchase or sale of merchandise, materials or equipment by the Commission shall be let
27 in

1 accordance with the Uniform Municipal Contracting Law (Minn. Stat. § 47L345) and the Joint Exercise of
2 Powers statute (Minn. Stat. § 47L59). In accordance with Minn. Stat. § 471.59, subd. 3, contracts let and
3 purchases made under this Agreement shall conform to the statutory requirements applicable to the
4 Member cities with a population over 2,500.

5 5.7. Employment. The Commission may contract for services, may use staff of other
6 governmental agencies, may use staff of the Members and may employ such other persons as it deems
7 necessary. Where staff services of a Member are utilized, such services shall not reduce the financial
8 contribution of such Member to the Commission's operating fund unless utilization of staff service is
9 substantial and the Commission so authorizes.

10 5.8. Public/Private Organizations. The Commission may cooperate or contract with the State
11 of Minnesota or any subdivision thereof or federal agency or private or public organization to
12 accomplish the purposes for which it is organized.

13 5.9. Annual Financial, Activity and Audit Reports; Newsletter. The Commission shall submit
14 to its Members and BWSR a financial report, an activity report and an audit report for the preceding
15 fiscal year, in compliance with state law. The Commission shall publish and distribute an annual
16 newsletter in compliance with state law. The Commission shall transmit to the clerk of each Member
17 copies of the reports/newsletter in a format ready for publication. Each Member shall
18 publish/distribute the reports/newsletter as it deems necessary. All of the Commission's books, reports
19 and records shall be available for and open to examination by any Member at all reasonable times.

20 5.10. Gifts, Grant, Loans. The Commission may, within the scope of this Agreement, accept
21 gifts, apply for and use grants or loans of money or other property from the United States, the State of
22 Minnesota, a unit of government or other governmental unit or organization, or any person or entity for the
23 purposes described herein; may enter into any reasonable agreement required in connection therewith;
24 may comply with any laws or regulations applicable thereto; and may hold, use and dispose of such
25 money or property in accordance with the terms of the gift, grant, loan or agreement relating thereto.

1 5.11. Boundary Change in the Pioneer-Sarah Creek Watershed.

2 A. Enlargement. Proceedings for the enlargement of the Pioneer-Sarah Creek
3 Watershed shall be initiated by a request from affected Member(s) to the Commission, or as mandated by
4 law. Such request should include a map and legal description of the affected area. In reviewing such a
5 request, the Commission should consider, among other things, (a) whether the affected area is
6 contiguous to the existing Pioneer-Sarah Creek Watershed, (b) whether the affected area can be feasibly
7 administered by the Commission; and (c) the reasons why it would be conducive to the public health and
8 welfare to add the area to the existing Pioneer-Sarah Creek Watershed. Upon deliberation, if it appears to
9 the Commission that the enlargement of the Watershed as requested would be for the public welfare and
10 public interest and the purpose of resource management would be served, or that in fact the enlargement
11 is mandated by law, the Commission shall by its findings and order enlarge the Pioneer-Sarah Creek
12 Watershed and file a copy of said findings and order with the appropriate governmental offices.

13 B. Transfer of Territory. Proceedings to transfer territory that is within the
14 Pioneer-Sarah Creek Watershed to the jurisdiction of another watershed management organization or a
15 watershed district shall be initiated by a request from affected Member(s) to the Commission, or as
16 mandated by law. Such request should include a map and legal description of the affected area. Upon
17 deliberation, if it appears to the Commission that the transfer of territory as requested would be for the
18 public welfare and public interest and the purpose of resource management would be served, the
19 Commission shall by its findings and order change the Pioneer-Sarah Creek Watershed boundaries
20 accordingly and file a copy of said findings and order with the appropriate governmental offices.

21 5.12. Subdistricts. The Commission may define and designate drainage subdistricts within the
22 Watershed and shall have authority to separate the Watershed into such different subdistricts and to
23 allocate capital improvement costs to a subdistrict area if that subdistrict is the only area that materially
24 benefits from the capital improvement.

25 5.13. Monitor Water Quality. In connection with its water management plan, the Commission
26 will establish a comprehensive water quality-monitoring plan for lakes and streams within the Watershed.

1 The Commission will also establish goals for judging the adequacy of its water quality protection
2 programs.

3 5.14 Ratification. The Commission may, and where required by this Agreement shall, refer
4 matters to the governing bodies of the Members for ratification. Within 60 days, the governing bodies of
5 the Members shall take action upon any matter referred for ratification.

6 5.15. Statutory Powers. The Commission may exercise all other powers necessary and
7 incidental to the implementation of the purposes and powers set forth herein and as outlined and authorized
8 by Minn. Stat. §§ 103B.201, et seq,

9 SECTION SIX
10 FINANCIAL MATTERS

11
12 6.1. Depositories/Disbursements. The Commission may collect and receive money and
13 services subject to the provisions of this Agreement from the parties and from any other sources approved
14 by the Commission and it may incur expenses and make expenditures and disbursements necessary
15 and incidental to the effectuation of the purposes of this Agreement. The Board shall designate a
16 national, state, or private bank or banks as a depository of Commission funds, Funds may be expended
17 by the Commission in accordance with procedures established herein. Orders, checks and drafts shall
18 be signed by two officers.

19 6.2. General Administration. Each voting Member agrees to contribute each year to a general
20 fund to be used for general administration purposes including, but not limited to, salaries, rent, supplies,
21 development on an overall plan, insurance, bonds, and to purchase and maintain devices to measure
22 hydrological and water quality data. The funds may also be used for normal maintenance of facilities
23 and capital improvements. The annual contribution by each voting Member shall be based on its share
24 of the taxable market value of all real property within the Watershed.

25 6.3. Budget Approval and Appeal Process. On or before July 1 of each year, the Board shall
26 adopt a budget for the following calendar year for the purpose of providing funds to conduct the
27 Commission's business in accordance with its annual work plan, Budget approval shall require a

1 majority vote of all Commissioners eligible to vote. At least 45 days before each Member governmental
2 unit must certify its levy to Hennepin County, the Commission shall certify the budget to the clerk of each
3 Member governmental unit together with a statement of the proportion of the budget to be provided by
4 each Member. The schedule of payments by the Members shall be determined by the Board in such a
5 manner as to provide for an orderly collection of the funds needed.

6 The governing body of each Member agrees to review the budget, and the Board shall upon notice
7 from any Member received prior to August 15, hear objections to the budget, and may amend the budget
8 (except the fee due cannot be increased), and then give notice to the Members of any and all
9 modifications or amendments.

10 SECTION SEVEN
11 CAPITAL IMPROVEMENT PROGRAM
12

13 7.1. Assessments. If a capital improvement ordered by the Commission may result in payment
14 from any Member, or if a capital improvement ordered by the Commission may result in a levy by a
15 Member against privately or publicly owned land within the Watershed, said capital improvement
16 shall follow the statutory procedure outlined in Minn. Stat. Ch, 429, except as herein modified.

17 7.2. Preliminary Reports/Public Hearings. For those improvements initiated by the
18 Commission or so designated in the Commission's watershed management plan to be constructed by the
19 Board, the Board shall secure from its engineers or some other competent person a preliminary report
20 advising it whether the proposed improvement is feasible and as to whether it shall best be made as
21 proposed or in connection with some other improvement and the estimated cost of the improvement as
22 recommended.

23 The Board shall then hold a public hearing on the proposed improvement after mailed notice to the
24 clerk of each Member governmental unit within the Watershed. The Commission shall not be required to
25 mail or publish notice except by said notice to the clerk, Said notice shall be mailed not less than 45
26 days before the hearing, shall state the time and place of the hearing, the general nature of the
27 improvement, the estimated total cost and the estimated cost to each Member governmental unit. The

1 Board may adjourn said hearing to obtain further information, may continue said hearing pending
2 action of the Member governmental units or may take such other action as it deems necessary to carry out
3 the purpose of this Commission.

4 A resolution setting forth the order for a capital improvement project shall require a favorable vote
5 by (a) at least two-thirds of all Commissioners eligible to vote, and (b) all Commissioners representing
6 Members who will directly benefit from the project. In all cases other than to order a capital improvement
7 project, a majority vote of all Commissioners eligible to vote shall be sufficient to adopt an action. The
8 order shall describe the improvement, shall allocate in percentages the cost between the Member
9 governmental units, shall designate the engineers to prepare plans and specifications, and shall designate
10 the Member who will contract for the improvement.

11 After the Board has ordered the improvement or if the hearing is continued while the Member
12 governmental units act on said proposal, it shall forward said preliminary report to all Member
13 governmental units with an estimated time schedule for the construction of said improvement. The Board
14 shall allow an adequate amount of time, and in no event less than 45 days, for each Member
15 governmental unit to conduct hearings, in accordance with the provisions of the aforesaid Chapter 429 or
16 the charter requirements of any Member city, or to ascertain the method of financing which said Member
17 governmental unit will utilize to pay its proportionate share of the costs of the improvement. Each Member
18 governmental unit shall ascertain within a period of 90 days the method it shall use to pay its proportionate
19 share of the costs.

20 If the Commission proposes to use Hennepin County's bonding authority as set forth in Minn. Stat.
21 § 103B.251, or if the Commission proposes to certify all or any part of a capital improvement to Hennepin
22 County for payment, then and in that event all proceedings shall be carried out in accordance with the
23 provisions set forth in said Section 103B,251.

24 The Board shall not order and no engineer shall prepare plans and specifications before the Board
25 has adopted a resolution ordering the improvement. The Board may direct one of its Members to prepare
26 plans and specifications and order the advertising for bids upon receipt of notice from each Member

1 governmental unit who will be assessed that it has completed its hearing or determined its method of
2 payment or upon expiration of 90 days after the mailing of the preliminary report to the Members.

3 7.3. Appeals/Arbitration. Any Member governmental unit being aggrieved by the Board's
4 determination as to the cost allocation of said capital improvement shall have 30 days after the Commission
5 resolution ordering the improvement to appeal said determination. Said appeal shall be in writing and shall
6 be addressed to the Board asking for arbitration, The determination of the Member's appeal shall be
7 referred to a Board of Arbitration. The Board of Arbitration shall consist of three persons; one to be
8 appointed by the Board of Commissioners, one to be appointed by the appealing Member governmental
9 unit, and the third to be appointed by the two so selected. In the event the two persons so selected do no
10 appoint the third person within 15 days after their appointment, then the Chief Judge of the Hennepin
11 County District Court shall have jurisdiction to appoint, upon application of either or both of the two earlier
12 selected, the third person to the Board of Arbitration. The third person selected shall not be a resident of
13 any Member governmental unit and if appointed by the Chief Judge said person shall be a person
14 knowledgeable in the subject matter. The arbitrators' expenses and fees, together with the other expenses,
15 not including attorney fees, incurred in the conduct of the arbitration shall be divided equally between the
16 Commission and the appealing Member, Arbitration shall be conducted in accordance with the Uniform
17 Arbitration Act, Minn, Stat. Ch. 572,

18 7.4. Contracts for Capital Improvements. All contracts which are to be let as a result of the
19 Board ordering a capital improvement, and for which two or more Member governmental units shall be
20 responsible for the costs, shall be let in accordance with the provisions of Minn. Stat, § 429.041. The
21 bidding and contracting of said work shall be let by any one of the Member governmental units, as ordered
22 by the Board, after compliance with the statutory requirements. Contracts and bidding procedures shall
23 comply with the legal requirements applicable to statutory cities.

24 The Commission shall not have the authority to contract in its own name for any improvement
25 work for which a special assessment will be levied against any private or public property under the
26 provisions of Chapter 429 or under the provisions of any Member city charter. These contracts shall be

1 awarded by action of the governing body of a Member and shall be in the name of a Member
2 governmental unit. This section does not preclude the Commission from proceeding under Minn. Stat. §
3 103B.251.

4 7.5. Contracts with Other Governmental Bodies. The Commission may exercise the powers
5 set forth in Section 7.4 but said contracts for a capital improvement shall require a majority vote of all
6 Commissioners eligible to vote.

7 7.6. Supervision. All improvement contracts shall be supervised by the entity awarding the
8 contract. The Commission staff shall also be authorized to observe and review the work in progress and the
9 Members agree to cooperate with the Commission staff in accomplishing its purposes. Representatives of
10 the WMO shall have the right to enter upon the place or places where the improvement work is in
11 progress for the purpose of making reasonable tests and inspections, The Commission staff shall report and
12 advise and recommend to the Board on the progress of the work,

13 7.7. Land Acquisition. The Commission shall not have the power of eminent domain and shall
14 not own any interest in real property. All interests in lands shall be held in the name of the Member wherein
15 said lands are located.

16 7.8. Capital Improvement Fund. The Commission shall establish an improvement fund or
17 funding mechanism for each capital improvement project. The Commission may fund all or part of the cost
18 of a capital improvement contained in the capital improvement program of the plan in accordance with
19 Minn. Stat. § 103B.251, The Commission and Hennepin County may establish a maintenance fund to be
20 used for normal and routine maintenance of an improvement constructed in whole or in part with money
21 provided by Hennepin County pursuant to Minn, Stat, § 103B.251. The levy and collection of an ad
22 valorem tax levy for an improvement, payment of bonds, or maintenance shall be by Hennepin County
23 based upon a tax levy resolution adopted by a majority vote of all eligible Members of the Board and
24 remitted to the County on or before the date prescribed by law each year. If it is determined to levy for
25 maintenance, the Commission shall be required to follow the hearing process established by Minn. Stat.

1 Ch. 103D. Mailed notice shall also be sent to the clerk of each Member governmental unit at least 30
2 days before the hearing.

3 7.9. Capital Improvement Cost Allocation.

4 A. All costs of improvements designated in the Board's adopted watershed
5 management plan for construction by the Board, which the Board determines will benefit only one
6 Member, shall be paid for entirely by that Member.

7 B. All costs of improvements designated in the Board's adopted watershed
8 management plan for construction by the Board, which the Board determines benefit more than one
9 Member, shall be apportioned by the Board by the following bases:

- 10 (1) A negotiated amount to be arrived at by the Members who have
11 lands in the subdistrict responsible for the capital improvement; or
12
- 13 (2) On the basis of each Member's share of the taxable market value of
14 all real property within the Watershed; or
15
- 16 (3) Capital costs allocated under option (2) above may be varied by the
17 Commission by a favorable vote by (a) at least two-thirds of all
18 Commissioners eligible to vote and (b) all Commissioners
19 representing Members who will directly benefit from the project, if
20 (i) any Member community receives a direct benefit from the
21 capital improvement which benefit can be defined as a lateral as
22 well as a trunk benefit, or (ii) the capital improvement provides a
23 direct benefit to one or more Members which benefit is so
24 disproportionate as to require in a sense of fairness a modification
25 in the formula.
26

27 C. If the project is constructed and financed pursuant to Minnesota Statutes
28 103B.251, the Members understand and agree that said costs will be levied on all taxable property in
29 the watershed as set forth in the statute.

30 SECTION EIGHT
31 WITHDRAWAL FROM AGREEMENT
32

33 Withdrawal of any Member may be accomplished by filing written notice with the
34 Commission and the other Members 60 days before the effective date of withdrawal. No Member may
35 withdraw from this Agreement until the withdrawing Member has met its full financial obligations for
36 the year of withdrawal and prior years.

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SECTION NINE
DISSOLUTION OF COMMISSION

9.1. This Agreement may be terminated upon 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 Hennepin County and BWSR at least 90 days before the date of dissolution.

9.2. In addition to the manner provided in Section 9.1 for termination, any Member may petition the Commission's Board to dissolve the Commission. Upon 90 days notice in writing to the clerk of each member governmental unit and to Hennepin County and BWSR, the Board shall hold a hearing and upon a majority vote of all Commissioners eligible to vote, 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 governing bodies 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.

9.3. Winding Up. Upon dissolution, all personal property of the Commission shall be sold and the proceeds thereof, together with monies on hand after payment of all obligations, shall be distributed to the Members. Such distribution of Commission assets shall be made in approximate proportion to the total contributions to the Commission for such costs made by each Member, All payments due and owing for operating costs under Section 6.2, or other unfilled financial obligations, shall continue to be the lawful obligation of the Members. In no event may this Agreement be terminated until all of the planning and plan implementation provisions of the Act, which are required of a watershed management organization, have been completed.

SECTION TEN
MISCELLANEOUS PROVISIONS

10.1. Special Assessments. 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. The Commission shall have the power to require any Member to contribute the costs allocated or assessed according to the other provisions of this agreement.

1 10.2. Member's Construction Projects that Will Affect Pioneer-Sarah Creek. Each Member
2 agrees that it will not directly or indirectly collect or divert any additional surface water to or from Pioneer-
3 Sarah Creek or its tributaries without approval from the Commission. Such approval may be granted
4 by the Commission for a Member to proceed with the construction or reconstruction of improvements
5 within the individual corporate Member's boundaries and at said Member's sole cost upon a finding (a)
6 that there is an adequate outlet, (b) that said construction is in conformance with the overall plan, and
7 (c) that the construction will not adversely affect other Members.

8 10.3. Member Vote Suspension for Failure to Contribute. Any Member who is more than 60
9 days in default in contributing its proportionate share to the general fund shall have the vote of its Board
10 representative suspended pending the payment of its proportionate share. Any Member who is more
11 than 60 days in default in contributing its proportionate share of the cost of any improvement to the
12 contracting Member shall upon request of the contracting Member have the vote of its Board
13 representative suspended, pending the payment of its proportionate share, Any Member whose Board
14 representative vote is under suspension shall not be considered as an eligible Member as such
15 membership affects the number of votes required to proceed on any matter under consideration by the
16 Board.

17 10.4. Amendment. The Commission may recommend changes and amendments to this
18 Agreement to the Members. Amendments shall be acted upon by the Members within 90 days of referral.
19 Amendments shall be evidenced by appropriate resolutions of the Members filed with the Commission and
20 shall, if no effective date is contained in the amendment, become effective as of the date all such
21 filings have been completed.

22 10.5. Termination of Prior Agreement. By executing this document, the parties hereby agree to
23 terminate the prior joint powers agreement, adopted July 29, 1993.

24 10.6. Counterparts. This Agreement and any amendment may be executed in several
25 counterparts and all so executed shall constitute one Agreement or amendment, binding on all of the parties
26 hereto notwithstanding that all of the parties are not signatory to the original or the same counterpart.

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- 10.7. Effective Date. This Agreement shall be in full force and effect when all governmental units delineated in Section 2 have executed this Agreement. All Members need not sign the same copy.
- 10.8. Duration. This Agreement shall have an unlimited duration.
- 10.9. Statutory References. All statutory references include all future amendments.

Dated: 8/17/04

CITY OF GREENFIELD
 By: Thomas G. Swann
 Its Mayor
 Attest: Christa Okerman
 Its City Clerk

Dated: 2-24-04

CITY OF INDEPENDENCE
 By: Lewis D. John
 Its Mayor
 Attest: Ron Hunsel
 Its City Clerk

Dated: 3/9/2004

CITY OF LORETTO
 By: Kent C. Torce
 Its Mayor
 Attest: Kelly Bruninell
 Its City Clerk

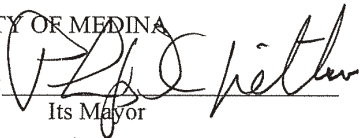
Dated: 3/23/04

CITY OF MAPLE PLAIN
 By: Jack Vigoren
 Its Mayor
 Attest: Debbie Hudson
 Its City Clerk

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Dated: 3-16-04


CITY OF MEDINA

By: 
Its Mayor

Attest: 
Its City Clerk

Dated: 3/15/04

CITY OF MINNETRISTA

By: 
Its Mayor

Attest: 
Its City Clerk

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Appendix B
Ordinance No. 2003-04

CITY OF
Independence
HENNEPIN COUNTY

CITY OF INDEPENDENCE

ORDINANCE NO. 2003-04

AN ORDINANCE ADDING SECTION 720 TO THE
INDEPENDENCE CITY CODE; ESTABLISHING PIONEER-
SARAH CREEK WATERSHED TAX DISTRICT

THE CITY OF INDEPENDENCE DOES ORDAIN:

Section 1. Chapter VII of the Independence City Code is amended by adding a section to read as follows:

Section 702 – Pioneer-Sarah Creek Watershed Tax District Established

720.01 Tax District. Subdivision 1. Purpose. A tax district is established for purposes of paying the costs of planning for water management as required by law, for paying capital costs of the water management facilities described in a capital improvement program, and for paying for normal and routine maintenance of such facilities.

Subd. 2. District Territory. The tax district is established in that portion of the City of Independence located within the Pioneer-Sarah Creek watershed. The territory or area is more particularly described in a schedule on file with the City Administrator.

Subd. 3. Levy. The tax shall be levied annually on all taxable property in the district at a rate equal to 0.02418 percent of the market value of such taxable property.

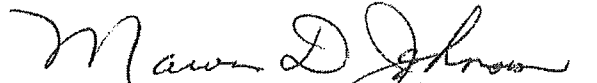
Subd. 4. Proceeds. The proceeds of the tax shall be paid into a fund reserved for the purposes described herein, or disbursed in support of activities of the Pioneer-Sarah Creek Watershed Management District consistent with the purposes described herein. Any proceeds remaining in the reserve fund at the time the tax is terminated or the district is dissolved shall be transferred and irrevocably pledged to the debt service fund of the local unit to be used solely to reduce tax levies for bonded indebtedness of taxable property in the district.

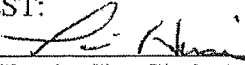
Sec. 2. This ordinance shall be filed with the county auditor and county recorder.

Sec. 3. This ordinance shall be effective the day following its publication.

RJV-236562v1
ND115-75

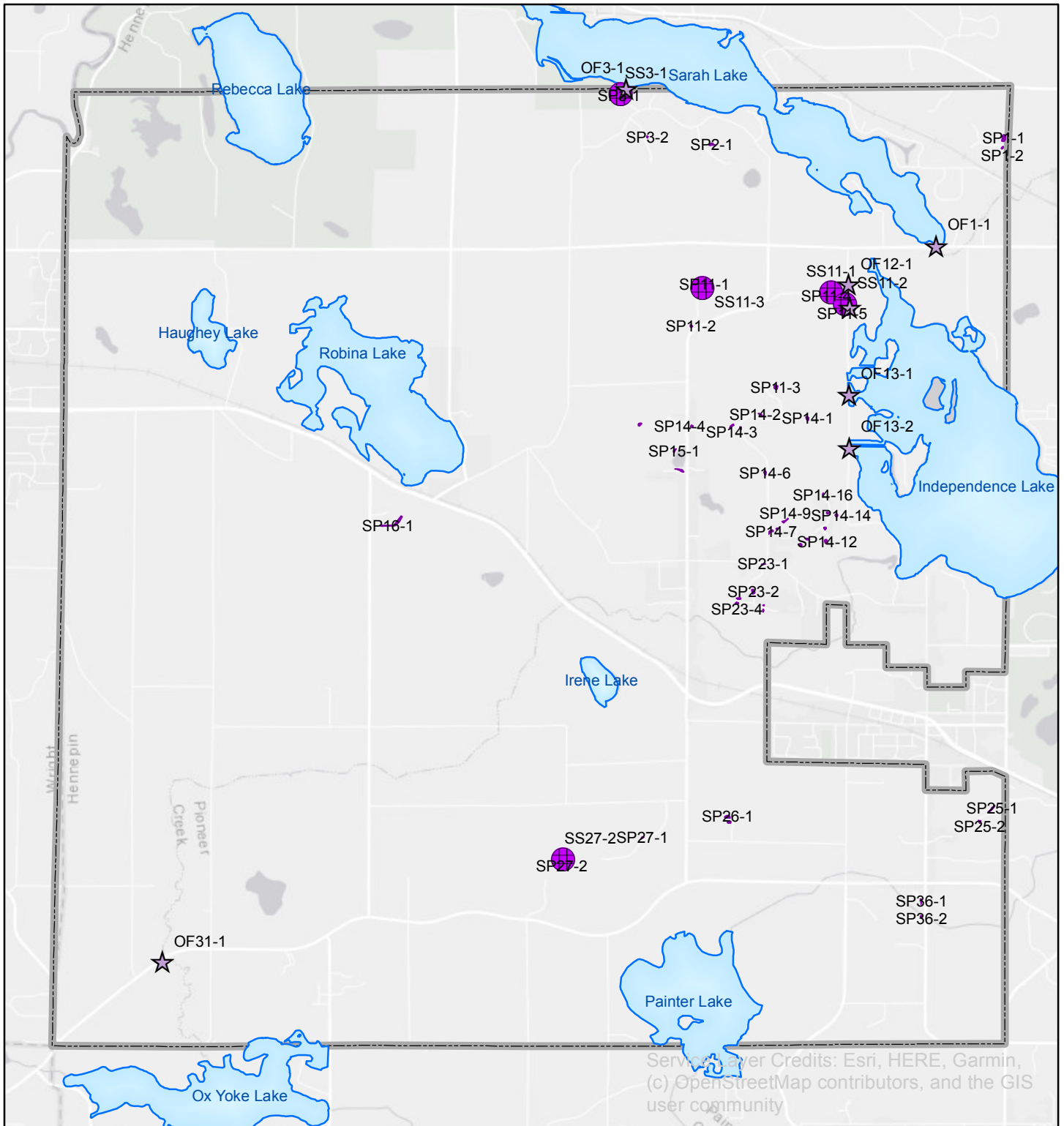
Adopted this 26th day of August, 2003.


Marvin D. Johnson, Mayor

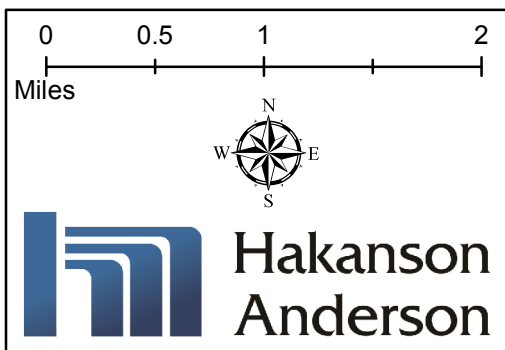
ATTEST:

Toni Hirsch, City Clerk-Administrator

Appendix C





MS4 Map



Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community



Legend

-  Municipal Boundary
-  Outfalls
-  Water Control Structures
-  Stormwater Ponds

**Appendix C
MS4 Map**



Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

MS4 Inventory

Municipal Separate Storm Sewer System (MS4) Program

Doc Type: Plans/Specifications/Maps

Name of MS4 Permittee	Unique ID Number	Type of Feature	X Coordinate (Longitude) Decimal Degrees	Y Coordinate (Latitude) Decimal Degrees
City of Independence	SP-1-1	Storm Pond	-93.64647689	45.0610034
City of Independence	SP-1-2	Storm Pond	-93.64662985	45.06013686
City of Independence	SP-2-1	Storm Pond	-93.68392845	45.06020316
City of Independence	SP-3-1	Storm Pond	-93.69587689	45.06460253
City of Independence	SP-3-2	Storm Pond	-93.69221197	45.06084432
City of Independence	SP-11-1	Storm Pond	-93.68468783	45.04747867
City of Independence	SP-11-2	Storm Pond	-93.68639003	45.04366064
City of Independence	SP-11-3	Storm Pond	-93.67545352	45.03817538
City of Independence	SP-11-4	Storm Pond	-93.66906984	45.04650804
City of Independence	SP-11-5	Storm Pond	-93.66703466	45.04546255
City of Independence	SP-14-1	Storm Pond	-93.67138059	45.03534104
City of Independence	SP-14-2	Storm Pond	-93.6773809	45.03565826
City of Independence	SP-14-3	Storm Pond	-93.68108208	45.03461171
City of Independence	SP-14-4	Storm Pond	-93.68619248	45.03454391
City of Independence	SP-14-5	Storm Pond	-93.6799219	45.03444372
City of Independence	SP-14-6	Storm Pond	-93.67674839	45.0303714
City of Independence	SP-14-7	Storm Pond	-93.67593954	45.02503449
City of Independence	SP-14-8	Storm Pond	-93.67513814	45.02526981
City of Independence	SP-14-9	Storm Pond	-93.67414614	45.02600134
City of Independence	SP-14-10	Storm Pond	-93.67211545	45.02383796
City of Independence	SP-14-11	Storm Pond	-93.67125927	45.02437007
City of Independence	SP-14-12	Storm Pond	-93.66889073	45.02416981
City of Independence	SP-14-13	Storm Pond	-93.66899481	45.02537378
City of Independence	SP-14-14	Storm Pond	-93.66754493	45.02655886
City of Independence	SP-14-15	Storm Pond	-93.66869241	45.02676171
City of Independence	SP-14-16	Storm Pond	-93.66928795	45.02843413
City of Independence	SP-15-1	Storm Pond	-93.68839034	45.03231825
City of Independence	SP-15-2	Storm Pond	-93.69288325	45.03467863
City of Independence	SP-15-3	Storm Pond	-93.68763434	45.03053921
City of Independence	SP-16-1	Storm Pond	-93.72433634	45.02550788
City of Independence	SP-23-1	Storm Pond	-93.67690244	45.02203852
City of Independence	SP-23-2	Storm Pond	-93.67815511	45.01955797
City of Independence	SP-23-3	Storm Pond	-93.67997027	45.01890901
City of Independence	SP-23-4	Storm Pond	-93.680222	45.01848349
City of Independence	SP-23-5	Storm Pond	-93.67679659	45.01830972
City of Independence	SP-23-6	Storm Pond	-93.6768194	45.0178182
City of Independence	SP-25-1	Storm Pond	-93.64729057	44.99997508
City of Independence	SP-25-2	Storm Pond	-93.64886091	44.9987834
City of Independence	SP-26-1	Storm Pond	-93.68120168	44.99904469
City of Independence	SP-26-2	Storm Pond	-93.6809701	44.99854641
City of Independence	SP-27-1	Storm Pond	-93.69209115	44.99706205
City of Independence	SP-27-2	Storm Pond	-93.70243949	44.99445782
City of Independence	SP-36-1	Storm Pond	-93.65627651	44.99150776
City of Independence	SP-36-2	Storm Pond	-93.65622509	44.99006236
City of Independence	OF-1-1	Outfall	-93.655051	45.051156
City of Independence	OF-3-1	Outfall	-93.695031	45.065207
City of Independence	OF-12-1	Outfall	-93.666781	45.047853
City of Independence	OF-12-2	Outfall	-93.666383	45.045476
City of Independence	OF-13-1	Outfall	-93.666069	45.037552
City of Independence	OF-13-2	Outfall	-93.665981	45.032714
City of Independence	OF-31-1	Outfall	-93.748369	44.977807
City of Independence	SS-3-1	Skimmer Structure	-93.695658	45.064749
City of Independence	SS-11-1	Skimmer Structure	-93.668498	45.046864
City of Independence	SS-11-2	Skimmer Structure	-93.666646	45.045849
City of Independence	SS-11-3	Skimmer Structure	-93.685029	45.047111
City of Independence	SS-27-2	Skimmer Structure	-93.702243	44.995078

Appendix D

Facilities Inventory

FACILITY INVENTORY

FOR



**Best Management Practices and Safety Procedures to
Prevent Illicit Discharge and Improve Water Quality**

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INTRODUCTION

The City of Independence owns and/or operates several facilities within its municipality. The City is required to maintain an inventory of the facilities that contribute pollutants to stormwater discharges and develop and implement best management practices (BMPs) to minimize pollutants to the maximum extent practicable as specified in the Minnesota small Municipal Separate Storm Sewer System (MS4) permit. This document identifies each facility and the BMPs applied on the site. The facilities can be categorized into three different groups: buildings, parks, and vacant lots. Facilities within the same category will have similar concerns and BMPs to address those concerns, so the information will be provided for each category instead of each facility. Additionally, since streets also contribute to stormwater input, a section for BMPs for urban streets is also included.

The inventory includes two sites with buildings, three parks, seven vacant lots, and city streets (**Table 1**). A map depicting all the facilities as well as the impaired waters is shown on the next page. The facilities and their appropriate BMPs are described in the sections below.

Table 1. City of Independence Facility Inventory List








Facility	Address	Owner	Operator
Buildings			
City Hall/Public Works	1920 Co Rd 90	City of Independence	City of Independence
Town Hall Museum	1790 Co Rd 90	VIL of Independence	City of Independence
Parks			
Tamarack Park	4740 Lake Sarah Dr	City of Independence	City of Independence
Pioneer Creek Park	2055 Co Rd 90	City of Independence	City of Independence
Lyndale Park	260 Hart St	City of Independence	City of Independence
Vacant Lots			
PID 1311824240011	Unassigned	City of Independence	City of Independence
PID 2311824310019	Unassigned	Hennepin Forfeited Land	City of Independence
PID 3211824420052	251 Hart St	City of Independence	City of Independence
PID 3411824410008	Unassigned	City of Independence	City of Independence
PID 3411824410009	Unassigned	City of Independence	City of Independence
PID 0111824340006	Unassigned	City of Independence	City of Independence
PID 0111824420014	Unassigned	Hennepin Forfeited Land	City of Independence
City Streets			



CITY OF INDEPENDENCE

Facility Inventory



<p>0 0.5 1 2 Miles</p>  <p>Hakanson Anderson</p> 	Legend	
	<p> Boundary</p> <p> Impaired Waters</p>	<p>Facilities</p> <p> Vacant Lot</p> <p> Park</p> <p> Building</p>

BUILDINGS

Facility Description: City of Independence maintains three buildings on two parcels that could potentially contribute to stormwater pollution: City Hall, Public Works, and the Town Hall Museum. Buildings are often used as storage for deicing materials, herbicides, pesticides, fertilizers, maintenance projects, etc. that could possibly impact water quality if they are not stored properly. The parking lots associated with the buildings can also facilitate deicing materials and vehicle fuels to drain into the stormwater. Additionally, some buildings contain dumpsters that could potentially be a source of litter if debris is carried away by wind.

Pollutants of Concern: Only known pollutants of concern are listed below. If additional chemicals, fluids, or other pollutants are stored or handled at this location they should be added to the inventory and additional BMPs should be developed and implemented accordingly.

- *Deicing materials (salt, sand, etc.) applied to parking lots can drain into the stormwater system and pollute creeks and lakes by increasing salt concentrations and turbidity.*
- *Storage of chlorine, fluoride, salt, sand, fuel, soap, and other maintenance materials could be harmful to bodies of water if they are not stored properly.*
- *Temporary stockpiles of dirt or sand could increase turbidity and/or phosphorus levels if they stockpiles are left to erode into the stormwater system.*
- *Littering of trash, liquids, and cigarette butts can be a source of harmful chemicals to water bodies.*
- *Dumpsters without lids can contribute to littering due to wind blowing out debris and into the waters.*

BMPs: The City will minimize the pollutants to maximum extent practicable by implementing the following BMPs. In general, the City will utilize a combination of good house-keeping measures and employee training to minimize the discharge of pollutants. The following general BMPs shall be utilized:

- *Chlorine, fluoride, salt, fuel, soap, and other maintenance materials should be stored in a place where wind, water, or other mode of transportation cannot carry the substances downstream.*
- *Temporary stockpiles should be surrounded by silt fencing within five feet of the base.*
- *Provide covered trash cans near high-traffic building entrances.*
- *Cover dumpsters and maintain a routine cleaning schedule to avoid leaks.*

Deicing: Deicing application methods vary depending on surface temperature, weather conditions, and the type of deicer being used. A thermometer (gun sensor type) can be used to determine the surface temperature of the pavement. Calculate the area to be deiced and use

the application rate guidelines in the MN Snow & Ice Control Field Handbook as included herein.

If weather is too cold for the deicer or if it is still snowing, this will impact the application process as well. There are various deicer products. Sodium Chloride is typically the most economical and widely used deicer. However, it is only effective with temperatures above 15 degrees. Many water bodies have been listed on the MPCA's 303d list of impaired waters for chloride due to its potency. One 50lb bag of salt could contaminate over 10,000 gallons of water.

Non-chloride deicers are the best product to use for low environmental impact, but they are also the most expensive and difficult to find. Sand is an abrasive that provides traction on top of the ice. If snowy conditions continue after sand has been applied, the sand becomes ineffective.

- *Anti-icing is a quick and easy strategy to save time and money. Applying a small amount of pre-wet deicer before a storm can prevent snow and ice from bonding to the pavement.*
- *Apply just enough deicer to loosen the bond between the pavement surface and ice so that the ice can be plowed off.*
- *Calibrate equipment yearly, measure usage, and document strategies. This will help improve efficiency and reduces costs.*
- *Covering your stockpile protects the salt from wind, rain, snow and reduces waste.*
- *De-icing materials must be stored in a permanent storage structure.*
- *Sweep up parking lot areas as needed. Sand and sand/salt mixes which have already been used may contain pollutants such as chloride, oil, grease, metal, and rubber. Therefore, used sand should be disposed of appropriately.*
- *Even minor spills can have major effects on surface waters, so clean up any spills that occur.*

Deicing Application Rate Guidelines for Parking Lots and Sidewalks

These rates are based on road application guidelines (Mn Snow & Ice Control Field Handbook, Manual 2005-1). Develop your own application rates by adjusting your current rates incrementally downward toward these guidelines. Where temperature categories overlap, select the rate most applicable to your situation.

Pavement Temp. (°F) and Trend (↑↓)	Weather Condition	Maintenance Actions	Application Rate in lbs/per 1000 square foot area			
			Salt Prewetted/ Pretreated With Salt Brine	Salt Prewetted/ Pretreated With Other Blends	Dry Salt	Winter Sand (abrasives)
>30°↑	Snow	Plow, treat intersections only	0.75	0.5	0.75	not recommended
	Frz. Rain	Apply chemical	1.25	1.0	1.5	not recommended
30°↓	Snow	Plow & apply chemical	1.25	1.0	1.5	not recommended
	Frz. Rain	Apply chemical	1.5	1.25	1.75	not recommended
25 - 30° ↑	Snow	Plow & apply chemical	1.25	1.0	1.5	not recommended
	Frz. Rain	Apply chemical	1.5	1.25	1.75	not recommended
25 - 30° ↓	Snow	Plow & apply chemical	1.25	1.0	1.5	not recommended
	Frz. Rain	Apply chemical	1.75	1.5	2.25	3.25
20 - 25° ↑	Snow or Frz. Rain	Plow & apply chemical	1.75	1.5	2.25	3.25 for frz. rain
20 - 25° ↓	Snow	Plow & apply chemical	2.0	2.0	2.75	not recommended
	Frz. Rain	Apply chemical	2.5	2.0	3.0	3.25
15° to 20°↑	Snow	Plow & apply chemical	2.0	2.0	2.75	not recommended
	Frz. Rain	Apply chemical	2.5	2.0	3.0	3.25
15° to 20°↓	Snow or Frz. Rain	Plow & apply chemical	2.5	2.0	3.0	3.25 for frz. rain
0 to 15° ↑ ↓	Snow	Plow, treat with blends, sand hazardous areas	not recommended	3.0	not recommended	5.0 spot treat as needed
< 0°	Snow	Plow, treat with blends, sand hazardous areas	not recommended	4.5	not recommended	5.0 spot treat as needed



CITY OF INDEPENDENCE

Buildings



DEPARTMENT: Public Works
RESPONSIBLE PERSON: Shawn Bode
PHONE NUMBER: 763-479-0530

PARKS

Facility Description: City of Independence maintains three parks: Lyndale Park, Pioneer Creek Park, and Tamarack Park. Some of the most common activities that contribute to water quality degradation in the parks are excessive fertilizer application, pet waste, sediment erosion, and trash and garbage can leaks. There are also parking lots in many of the parks where vehicle traffic and deicing can contribute harmful chemical pollutants.

Pollutants of Concern: Only known pollutants of concern are listed below. If additional chemicals, fluids, or other pollutants are stored or handled at this location they should be added to the inventory and additional BMPs should be developed and implemented accordingly.

- *Excessive fertilizer and pesticide application to lawns causes excessive nutrient loading of rivers, lakes, and wetlands with phosphorus.*
- *Field mowing can result in grass clippings blown into streets which act as a direct transporting source for fertilizer. Excessive grass clippings can also cause storm drains to clog.*
- *Compost or mulch waste washes onto streets and sidewalks after storm events where it can easily reach the stormwater system.*
- *Pet and wildlife waste is easily transported to the stormwater system through runoff. The waste has bacteria and excess nutrients.*
- *Leaks or spills that occur from portable outhouses can increase bacteria and nutrients in nearby water bodies.*
- *Petroleum, oil, grease, coolant, spray lubricant, de-greasers and other similar chemicals are routinely used for maintaining and repairing vehicles and equipment. If not properly disposed of, these pollutants will end up in the storm sewer system and public water ways.*
- *High levels of phosphorus, nitrogen, and other nutrients are found in many soils. Sediment transported by stormwater runoff can contribute to downstream pollutant loading. Further, sediment can result in clogged gutters, ditches, sumps, and storm drains; which leads to flooding.*
- *Littering of trash, liquids, and cigarette butts can be a source of harmful chemicals to water bodies.*
- *Dumpsters without lids can contribute to littering due to wind blowing out debris and into the waters.*

BMPs: The City will minimize the pollutants to maximum extent practicable by implementing the following BMPs. In general, the City will utilize a combination of good house-keeping measures and employee training to minimize the discharge of pollutants. The following general BMPs shall be utilized:

- *Use recommended amounts of pesticides and fertilizers. A soil test will tell you how much, if any, fertilizer the lawn needs. Use low or phosphorus-free lawn fertilizers.*
- *Avoid overwatering grass. Consider using a soaker hose instead of a sprinkler. This will help prevent continuous runoff.*

- *Sweep grass clippings and leaves from streets, and dispose of properly. Efforts should be primarily focused around sweeping near the storm drains as needed.*
- *Cover piles of soil or mulch being used in landscaping projects. This will help minimize runoff of the loose particles.*
- *Maintain a vegetated filter strip around any pond edges. This will help prevent pollutants from reaching vulnerable water bodies.*
- *Cover dumpsters and maintain a routine cleaning schedule to avoid leaks.*
- *Provide informative signs about pet waste and trash disposal for public awareness.*
- *Some of these parks include storm ponds that require yearly inspections. These inspections are covered under Part VI.E.2 of the MS4 Permit.*

The University of Minnesota offers services for soil testing for a cost of \$17 per sample.

- *Tests are available for Phosphorus, Potassium, pH, and Soluble Salts.*
- *Provides information to establish proper fertilizer recommendations.*
- *Economically feasible service.*
- *Ensures fertile soil without excess fertilizer application or pollution of the environment.*

Deicing: Deicing application methods vary depending on surface temperature, weather conditions, and the type of deicer being used. A thermometer (gun sensor type) can be used to determine the surface temperature of the pavement. Calculate the area to be deiced and use the application rate guidelines in the MN Snow & Ice Control Field Handbook as included herein.

If weather is too cold for the deicer or if it is still snowing, this will impact the application process as well. There are various deicer products. Sodium Chloride is typically the most economical and widely used deicer. However, it is only effective with temperatures above 15 degrees. Many water bodies have been listed on the MPCA's 303d list of impaired waters for chloride due to its potency. One 50lb bag of salt could contaminate over 10,000 gallons of water.

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- *Anti-icing is a quick and easy strategy to save time and money. Applying a small amount of pre-wet deicer before a storm can prevent snow and ice from bonding to the pavement.*
- *Apply just enough deicer to loosen the bond between the pavement surface and ice so that the ice can be plowed off.*
- *Calibrate equipment yearly, measure usage, and document strategies. This will help improve efficiency and reduces costs.*

- *Covering your stockpile protects the salt from wind, rain, snow and reduces waste.*
- *De-icing materials must be stored in a permanent storage structure.*
- *Sweep up parking lot areas as needed. Sand and sand/salt mixes which have already been used may contain pollutants such as chloride, oil, grease, metal, and rubber. Therefore, used sand should be disposed of appropriately.*
- *Even minor spills can have major effects on surface waters, so clean up any spills that occur.*

Deicing Application Rate Guidelines for Parking Lots and Sidewalks

These rates are based on road application guidelines (Mn Snow & Ice Control Field Handbook, Manual 2005-1). Develop your own application rates by adjusting your current rates incrementally downward toward these guidelines. Where temperature categories overlap, select the rate most applicable to your situation.

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			Salt Prewetted/ Pretreated With Salt Brine	Salt Prewetted/ Pretreated With Other Blends	Dry Salt	Winter Sand (abrasives)
>30°↑	Snow	Plow, treat intersections only	0.75	0.5	0.75	not recommended
	Frz. Rain	Apply chemical	1.25	1.0	1.5	not recommended
30°↓	Snow	Plow & apply chemical	1.25	1.0	1.5	not recommended
	Frz. Rain	Apply chemical	1.5	1.25	1.75	not recommended
25 - 30° ↑	Snow	Plow & apply chemical	1.25	1.0	1.5	not recommended
	Frz. Rain	Apply chemical	1.5	1.25	1.75	not recommended
25 - 30° ↓	Snow	Plow & apply chemical	1.25	1.0	1.5	not recommended
	Frz. Rain	Apply chemical	1.75	1.5	2.25	3.25
20 - 25° ↑	Snow or Frz. Rain	Plow & apply chemical	1.75	1.5	2.25	3.25 for frz. rain
20 - 25° ↓	Snow	Plow & apply chemical	2.0	2.0	2.75	not recommended
	Frz. Rain	Apply chemical	2.5	2.0	3.0	3.25
15° to 20°↑	Snow	Plow & apply chemical	2.0	2.0	2.75	not recommended
	Frz. Rain	Apply chemical	2.5	2.0	3.0	3.25
15° to 20°↓	Snow or Frz. Rain	Plow & apply chemical	2.5	2.0	3.0	3.25 for frz. rain
0 to 15° ↑ ↓	Snow	Plow, treat with blends, sand hazardous areas	not recommended	3.0	not recommended	5.0 spot treat as needed
< 0°	Snow	Plow, treat with blends, sand hazardous areas	not recommended	4.5	not recommended	5.0 spot treat as needed



CITY OF INDEPENDENCE

Parks - Lyndale



DEPARTMENT: Public Works
RESPONSIBLE PERSON: Shawn Bode
PHONE NUMBER: 763-479-0530



CITY OF INDEPENDENCE

Parks - Pioneer Creek



DEPARTMENT: Public Works
RESPONSIBLE PERSON: Shawn Bode
PHONE NUMBER: 763-479-0530



CITY OF INDEPENDENCE

Parks - Tamarack



DEPARTMENT: Public Works
RESPONSIBLE PERSON: Shawn Bode
PHONE NUMBER: 763-479-0530

VACANT LOTS

Facility Description: City of Independence contains seven vacant lots that have the potential to negatively affect nearby waterbodies: Lake Independence, Lake Sarah, Painter Lake, and Pioneer Creek. Vacant lots typically do not contribute much, if any, pollutants to the watershed. However, Lake Independence, Lake Sarah, and Pioneer Creek are considered impaired waters, so the vacant lots are included in the facility inventory.

Pollutants of Concern: Only known pollutants of concern are listed below. If additional chemicals, fluids, or other pollutants are stored or handled at this location they should be added to the inventory and additional BMPs should be developed and implemented accordingly.

- *High levels of phosphorus, nitrogen, and other nutrients are found in many soils. Sediment transported by erosion can contribute to downstream pollutant loading.*
- *Pet and wildlife waste is easily transported to the stormwater system through runoff. The waste has bacteria and excess nutrients.*
- *Littering of trash, liquids, and cigarette butts can be a source of harmful chemicals to water bodies.*

BMPs: The City will minimize the pollutants to maximum extent practicable by implementing the following BMPs. In general, the City will utilize a combination of good house-keeping measures and employee training to minimize the discharge of pollutants. The following general BMPs shall be utilized:

- *Maintain a vegetated buffer strip around any water edges. This will help prevent pollutants from reaching vulnerable water bodies.*
- *Provide informative signs about pet waste and trash disposal for public awareness.*



CITY OF INDEPENDENCE
Vacant Lots - PID 0111824340006



DEPARTMENT: Public Works
RESPONSIBLE PERSON: Shawn Bode
PHONE NUMBER: 763-479-0530



CITY OF INDEPENDENCE
Vacant Lots - PID 0111824420014



DEPARTMENT: Public Works
RESPONSIBLE PERSON: Shawn Bode
PHONE NUMBER: 763-479-0530



CITY OF INDEPENDENCE
Vacant Lots - PID 1311824240011



DEPARTMENT: Public Works
RESPONSIBLE PERSON: Shawn Bode
PHONE NUMBER: 763-479-0530



CITY OF INDEPENDENCE
Vacant Lots - PID 2311824310019



DEPARTMENT: Public Works
RESPONSIBLE PERSON: Shawn Bode
PHONE NUMBER: 763-479-0530



CITY OF INDEPENDENCE
Vacant Lots - PID 3211824420052



DEPARTMENT: Public Works
RESPONSIBLE PERSON: Shawn Bode
PHONE NUMBER: 763-479-0530



CITY OF INDEPENDENCE

Vacant Lots - PID 3411824410008
PID 3411824410009



DEPARTMENT: Public Works
RESPONSIBLE PERSON: Shawn Bode
PHONE NUMBER: 763-479-0530

CITY STREETS

Facility Description: Independence has miles of city streets. These streets can experience a large amount of pollution from leaking cars, sediment tracking, and chemicals from deicing. Other causes of pollution in the streets are from the nearby residents. Residents wash chemicals off of their vehicles, spread lawn fertilizers, and produce grass clippings from mowing their lawns. The pollutants are easily transported into the streets through stormwater runoff if not properly managed. These nuisances are manageable by public awareness or sequential fines resident behavior persists.

Pollutants of Concern: Only known pollutants of concern are listed below. If additional chemicals, fluids, or other pollutants are stored or handled at this location they should be added to the inventory and additional BMPs should be developed and implemented accordingly.

- *Petroleum, oil, grease, coolant, spray lubricant, de-greasers and other similar chemicals are routinely used for maintaining and repairing vehicles and equipment. If not properly disposed of, these pollutants will end up in the storm sewer system and public water ways.*
- *High levels of phosphorus, nitrogen and other nutrients are found in many soils. Sediment transported by stormwater runoff can contribute to downstream pollutant loading. Further, sediment can result in clogged gutters, ditches, sumps, and storm drains; which leads to flooding.*
- *Sediment from winter maintenance activities can contain chlorides and must be properly disposed of. Also, when sand is left on the streets during the winter months it accumulates copper, lead, and zinc from brake dust.*
- *Dumping of trash, liquids, and cigarette butts can be a source of harmful chemicals.*

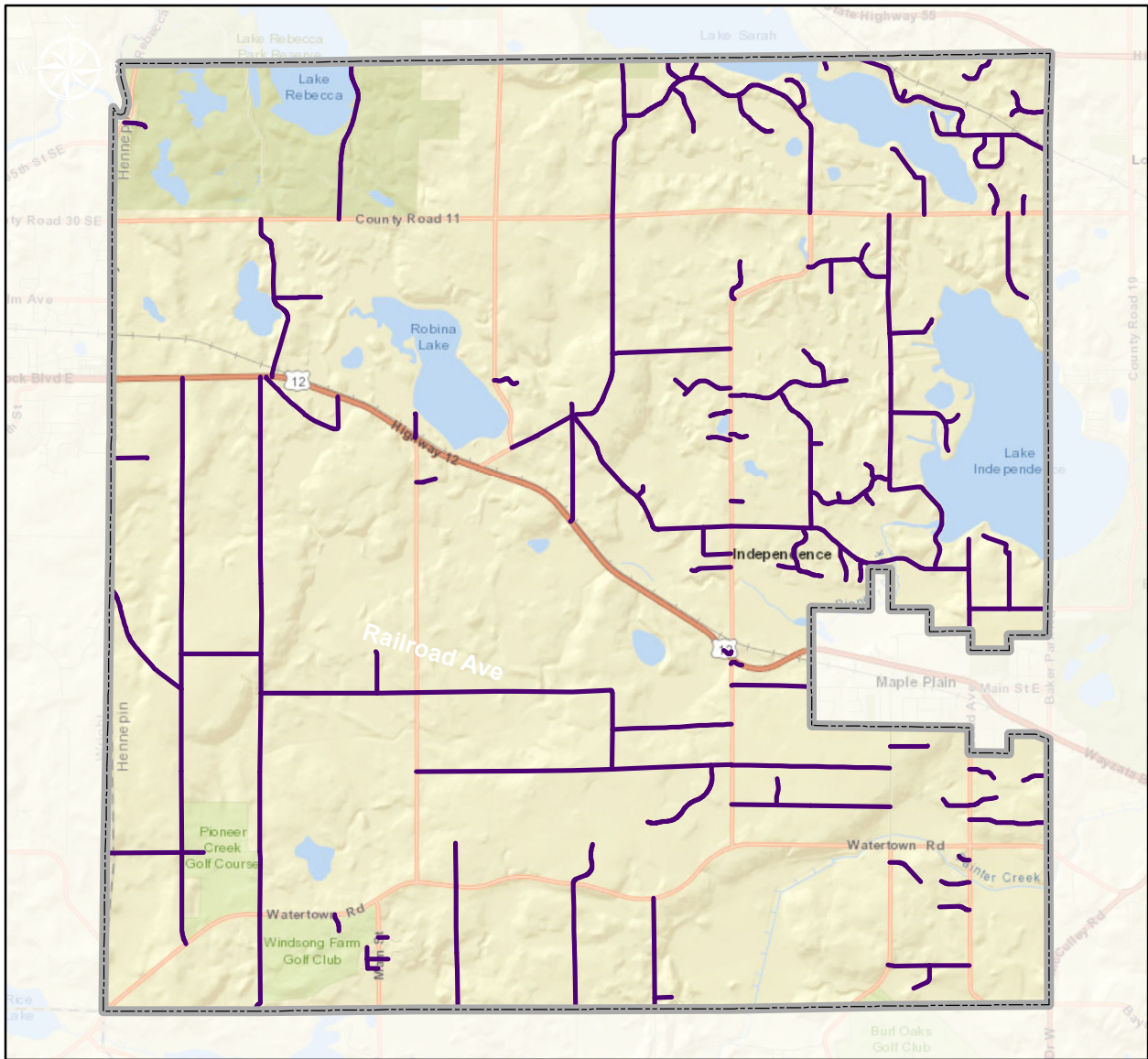
BMP's: The City will minimize the pollutants to maximum extent practicable by implementing the following BMPs. In general, the City will utilize a combination of good house-keeping measures and employee training to minimize the discharge of pollutants. The following general BMPs shall be utilized:





- *Use correct snow removal techniques and alternative deicing compounds. Dump snow in pervious areas where it can infiltrate, or in a stormwater pond for treatment prior to discharge.*
- *Sweep up sand, salt, and other debris. Efforts should be primarily focused around sweeping near the storm drains as needed.*
- *Implement an employee training program commensurate with each employee's field duties. Included in the training will be: recognition of illicit discharges, spill response, snow removal and winter maintenance activities, and material handling.*
- *Storm drain stenciling provides for some public awareness. Other forms of public awareness can be accomplished by distributing fliers and conducting meetings with local businesses to provide education about the effect of pollution on our public waters.*



CITY OF INDEPENDENCE

City Streets



<p>0 0.75 1.5 3 Miles</p> <p> Hakanson Anderson</p> 	<p>Legend</p> <ul style="list-style-type: none"> City Boundary City Streets
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Appendix E
Independence - MCWD Coordination Plan

INDEPENDENCE – MCWD COORDINATION PLAN

Background

Minnehaha Creek Watershed District (MCWD/District) has defined its role as a regional water planning agency through its Water Management Plan. The Plan focuses on partnership with the land use community and incorporates a subwatershed focus to address areas of significant resources needs with a level of complexity that requires sustained effort and coordination across multiple partners. Within the City of Independence, the MCWD has identified the Painter Creek subwatershed as a priority area of focus for the 2018-2027 plan cycle. The Painter Creek subwatershed contains a number of large wetlands, many of which have been ditched or altered. The subwatershed also includes areas of high quality wetland and upland, including regionally significant ecological areas. The Painter Creek system delivers high phosphorus loads to Jennings Bay of Lake Minnetonka which is listed as impaired and requires the second largest load reduction within the District. Painter creek is also impaired by excess E. coli bacteria.

Purpose

The Minnehaha Creek Watershed District's (MCWD) approach to water resource planning recognizes the environmental, social and economic value created when built and natural systems work in harmony. Through its Water Management Plan the MCWD emphasizes early coordination of land use and water resources planning with Cities to integrate water resources goals with other public and private goals to add this broader value and quality of life to the community. To maintain awareness of needs and opportunities to implement projects that reflect the cooperation of other public and private partners, align investments, and secure a combined set of District, City and partner goals, the MCWD requests that cities establish a coordination plan as part of the Local Water Management Plan that the City and MCWD can implement at a staff level.

Improving coordination between land use planning at the City and watershed planning at the MCWD at the conceptual level planning phase will result in better projects that meet agency goals and are a more efficient use of public funds. Early coordination and collaboration between entities is the key to maximizing shared water resource goals and community goals for private redevelopment and public capital improvements. Through this coordination, it is the intent of the City to efficiently manage water quality concerns and maximize the asset value of the City's natural resources in the future. Commitment of MCWD resources relies on the level of City coordination at the early stages project planning as outlined in this plan.

Coordination Plan

The following coordination plan will be adjusted and expanded as deemed appropriate by the City and MCWD during implementation. The City Planner is the primary City contact and the Planning Policy Manager will be the District contact for the coordination plan.

1. Annual meeting. City and MCWD staff will meet during the first quarter of each year to review the following:
 - a. National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer Systems (MS4) reports and activity from the previous year
 - b. Draft Capital Improvement Plans (CIP) or budgeting for each organization for the upcoming year. The City will focus coordination of the Streets, Stormwater and Park

budgets with MCWD.

- c. Opportunities for early or improved coordination and review of land use change applications
 - d. Regulatory coordination to identify areas of collaboration
 - e. Areas for improved coordination and process improvement.
 - f. Public Education plans, resources and opportunities.
2. Land Use Planning
- a. The City will continue to coordinate with MCWD to implement water resource priorities identified in the MCWD Watershed Management Plan; align local plans and capital investment to identify opportunities where local investments intersect with natural resource goals. Through on-going coordination of land use planning and changes the City and MCWD will adaptively evaluate project opportunities.
 - b. Specific opportunities to improve water quality of the system have been identified through a previously established partnership between the MCWD and United States Army Corps of Engineers. These include the potential restoration of four major wetland systems that would be eligible for funding under the Federal Section 206 Program.
 - c. Key Conservation areas- The City will assist MCWD in the preservation of those areas identified by MCWD by considering them in land use and zoning decisions.
3. Regulatory Coordination. The City staff will continue to route requests for land use approvals to the District in an effort to maximize water resource benefits and streamline regulatory processes. Specific areas of regulatory coordination include the following:
- a. The City will continue to rely on MCWD to maintain authority for reviewing and approving applications for compliance with MCWD's rules and enforcing those rules as necessary. The City will rely on the water resource management standards set forth by MCWD
 - b. The City will require documentation of required MCWD permits in advance of issuing applicable City permits. Approved MCWD permits will be stored with other project documentation for future reference.
 - c. Pre-application meetings and permit reviews will be coordinated with MCWD early in the planning process as necessary.
 - d. The City will continue to collaborate with MCWD on construction site inspections and compliance.
 - e. MCWD will keep the City apprised of water resource violations and expectations for compliance.
 - f. The primary person responsible for regulatory coordination at the City of Independence is the City Planner and the Permitting Program Manager at MCWD
 - g. The City and MCWD will include each other in the notification protocols for Illicit Discharges.
4. Public Infrastructure Improvements. The City of Independence staff will continue to route significant infrastructure improvements (streets, stormwater conveyance, and parks in particular) to the MCWD as early in the planning process as possible in order to maximize resourcing opportunities, reduce any regulatory process delays and solicit any best practice expertise/ experience.
- a. Infrastructure and land improvements that require MCWD permits will be coordinated early in the planning and design process so that the regulatory process

may be efficient and integrated water and natural resource improvements may be explored.

- b. The City will brief the MCWD on the public road improvement and CIP budgets each year at the annual meeting. The City intends to coordinate applicable projects at the concept stage of project development, partner on competitive grant programs and leverage MCWD technical resources and planning assistance.
5. Education coordination and partnership. The City and MCWD's Communication and Education Program will coordinate on information sharing and promotional materials.

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