



RAMSEY COUNTY, MN

2020 Stormwater Pollution Prevention Program

Submitted by Environmental Services

Ramsey County Public Works Department

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INTRODUCTION

Ramsey County has been identified as a small Municipal Separate Storm Sewer System (MS4) and has developed this Stormwater Pollution Prevention Program (SWPPP) to manage its stormwater runoff. Although Ramsey County is geographically the smallest county in Minnesota, it is the most densely populated and has been almost fully developed. The County owns and operates over 300 miles of roadway lined with a stormwater conveyance system that includes curbs, gutters, ditches, and storm drains draining into the many different water bodies that make up the area.

The EPA's Phase II Rule of the National Pollutant Discharge and Elimination System (NPDES) requires MS4s in urbanized areas to apply for an MS4 permit. The goal of the MS4 permit is to restore and maintain the chemical, physical, and biological integrity of Waters of the State through management and treatment of urban stormwater runoff. Each MS4 must develop and implement its own SWPPP, which must be designed to reduce the discharge of pollutants to the Maximum Extent Practicable (MEP), protect water quality, and satisfy the appropriate water quality requirements of the Clean Water Act. Best Management Practices (BMP's) must be developed by each MS4 to meet the MEP standards for each of the six minimum control measures (MCM).

Stormwater runoff refers to water that runs off land surfaces after a rainfall or snowmelt event. Stormwater runoff is carried off the land and into the storm sewer systems and eventually into surface waters. The addition of streets, parking lots, driveways, and sidewalks decreases the amount of pervious area, areas where water soaks into the ground, and increases the amount of runoff. The runoff picks up pollutants including pesticides, fertilizers, oils, grease, metals, pathogens, salt, sediment, litter, and other debris as the water flows over the impervious surfaces. These pollutants are transported through the storm sewer system and enter water resources. This contributes to water quality degradation by changing natural hydrologic patterns, accelerating stream flows, destroying aquatic habitats, and elevating pollutant concentrations and loadings. Degradation in water quality can prevent recreational use of water bodies, contaminate drinking water supplies, and disturb the habitat for aquatic wildlife. This SWPPP was developed with the protection of these water bodies in mind and promotes the protection of these natural resources.

Any questions regarding this SWPPP may be directed to the Ramsey County Public Works Environmental Services Department at 651-266-7160 or email to stormwater@co.ramsey.mn.us

Minimum Control Measure 1: **PUBLIC EDUCATION AND OUTREACH**

Key to Unique BMP ID Numbers	Required BMP Title	Permit Reference
1a-1	Distribute Educational Materials	V.G.1.a
1b-1	Implement an Education Program	V.G.1.b
1c-1	Education Program: Public Education and Outreach	V.G.1.c
1c-2	Education Program: Public Participation	V.G.1.c
1c-3	Education Program: Illicit Discharge Detection and Elimination	V.G.1.c
1c-4	Education Program: Construction Site Run-off Control	V.G.1.c
1c-5	Education Program: Post-Construction Stormwater Management in New Development and Redevelopment	V.G.1.c
1c-6	Education Program: Pollution Prevention/Good Housekeeping for Municipal Operations	V.G.1.c
1d-1	Coordination of Education Program	V.G.1.d
1e-1	Annual Public Meeting	V.G.1.e

1a-1: Distribute Educational Materials

MS4 Permit Requirement:

Ramsey County must implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impact of storm water discharges on water bodies and the steps the public can take to reduce pollutants in storm water runoff.

BMP Description:

Distribute brochures and flyers and update website links to educate County residents on stormwater runoff issues. Material will focus on stormwater and water conservation practices, NPDES regulations and how Ramsey County is meeting these. The MS4 annual report and SWPPP will also be available online.

1. Brochures available at compost sites and used oil collection site.
2. Post articles/flyers at County libraries.
3. Update/maintain stormwater link on the Ramsey County website: schedule of stormwater related events, updates on current construction projects, lake level data, water quality data, and comment page.

Measurable Goals:

1. Number of brochures/flyers handed out or posted.
2. Number of electronic comments received.

Timeline/Implementation Schedule:

Calendar Years 2006-2013:

1. Material will be distributed annually by Environmental Health, Parks and Recreation, and Ramsey Washington Metro Watershed District (RWMWD).
2. Website will be updated at least annually prior to construction season.

1b-1: Implement an Educational Program

MS4 Permit Requirement:

Ramsey County must implement an education program that individually addresses each Minimum Control Measure (MCM).

BMP Description:

Develop and implement programs to educate the public on stormwater issues.

1. K-12 presentations on how to protect water in our area.
2. Master Gardener Certification Program.
3. Pesticide safety and environmental education program.
4. Shoreline vegetation and landscape program.
5. Best practices for developing environmental field days for elementary school students to participate in.
6. 651-633-EASY recycling/disposal hotline.

Measurable Goals:

1. Number of school presentations given.
2. Number of attendants at each program.
3. Number of shoreline vegetation projects conducted.
4. Number of calls to the hotline.

Timeline/Implementation Schedule:

Calendar Years 2006-2013: School presentations given on an invitation basis, programs offered annually through University of Minnesota Extension Office.

1c-1: Education Program – Public Education and Outreach

Audience Involved:

Ramsey County staff and residents.

Educational Goals for Each Audience:

To raise public awareness of stormwater and water conservation issues.

Activities Used to Reach Educational Goals:

Presentations given to city councils, community groups, lake associations, and general audiences.

For more information, see 1a-1 and 1b-1.

Activity Implementation Plan:

Calendar Years 2006-2013: Presentations given on an annual basis.

For more information, see 1a-1 and 1b-1.

Performance Measures:

Number of presentations given.

For more information, see 1a-1 and 1b-1.

1c-2: Education Program – Public Participation

Audience Involved:

Ramsey County staff and residents.

Educational Goals for Each Audience:

To have participants realize that individual actions play a role in stormwater management.

Activities Used to Reach Educational Goals:

1. Annual public meeting on the Ramsey County Stormwater Pollution Prevention Plan (SWPPP).
2. Volunteer activities including storm drain stenciling, park clean ups, and native planting projects.
3. Distribute brochures dealing with stormwater management.
4. Provide information and a comment link regarding stormwater management on the County website.

Activity Implementation Plan:

Calendar Years 2006-2013:

1. Annual meeting will be held prior to submitting the MS4 annual report and a newspaper announcement will be published 30 days prior to the meeting. (See BMP 2a-1)
2. Organize annual volunteer events.
3. Distribute brochures annually to County offices.
4. Update website regularly and respond to public comments as necessary.

Performance Measures:

1. Number of attendants and number of comments made.
2. Number of volunteers per event and number of events held.
3. Number of brochures give out.
5. Number of electronic comments received.

1c-3: Education Program – Illicit Discharge Detection and Elimination

Audience Involved:

Ramsey County staff and residents.

Educational Goals for Each Audience:

To increase awareness regarding the effects of illicit discharges on stormwater and connected water bodies.

Activities Used to Reach Educational Goals:

1. Employee IDDE training.
2. Information sent to residents by Environmental Health regarding the Household Hazardous Waste (HHW) collection program.
3. Information on County website about free used oil and filter recycling site.
4. Environmental Health works with cities on Best Management Practices (BMP's) for city clean-up activities and enforces solid and hazardous waste ordinances.
5. Operation of recycling and disposal hotline: 651-633-EASY

Activity Implementation Plan:

Calendar Years 2006-2013:

1. Employees attend annual training.
2. Flyers sent out annually prior to collection dates.
3. Information posted on website and updated regularly.
4. Environmental Health establishes solid and hazardous waste ordinances and requires cities to follow these.
5. Hotline will be reviewed and modified to determine if it can be used for reporting illicit discharges.

Performance Measures:

1. Number of people attending training.
2. Number of flyers sent out.
3. Number of electronic comments.
4. Number of cities that work with Environmental Health.
5. Number of calls made to the hotline regarding IDDE's.

1c-4: Education Program – Construction Site Run-off Control

Audience Involved:

All County employees and contractors involved on construction projects as well as affected area residents.

Educational Goals for Each Audience:

To raise awareness on the adverse effects that erosion at construction sites has on stormwater and connected water bodies.

Activities Used to Reach Educational Goals:

1. Pre-construction meetings and weekly meetings held for all Ramsey County construction projects.
2. Project SWPPP's will be available on-site and on the County website.
3. Erosion/Sediment Control training required for all County staff and contractor erosion control supervisors.
4. Information is sent to affected area residents explaining the construction project.
5. Permits are reviewed by watershed districts, cities, or other local government units.

Activity Implementation Plan:

Calendar Years 2006-2013:

1. Pre-construction meetings held prior to beginning construction and held weekly until project is completed.
2. Post project SWPPP's online after pre-construction meeting.
3. Annual training.
4. Announcements sent prior to opening day.
5. Send permit applications or other information to necessary entities.

Performance Measures:

1. Number of people attending meetings.
2. Number of comments on SWPPP
3. Number of people attending trainings.
4. Number of announcements sent.
5. Number of projects permitted annually.

1c-5: Education Program – Post-Construction Stormwater Management in New Development and Redevelopment

Audience Involved:

Ramsey County employees, contractors, and area residents affected by construction project.

Educational Goals for Each Audience:

To inform all parties of the importance of long-term operation and maintenance of stormwater structures and controls on preserving water quality.

Activities Used to Reach Educational Goals:

1. Information will be sent to residents explaining importance of maintaining stormwater structures.
2. Discuss post-construction measures during the development of projects.
3. Information will be posted on the website regarding stormwater structures that will be built and who will maintain the structures.

Activity Implementation Plan:

Calendar Years 2006-2013:

1. Information sent out as construction is completed.
2. Topics related to stormwater structures will be brought up as projects are developed.
3. Information will be posted on the website as the project is developed.

Performance Measures:

1. Number of flyers sent out.
2. Number of stormwater structures per project.
3. Number of electronic comments made regarding new stormwater structures.

1c-6: Education Program – Pollution Prevention/Good Housekeeping for Municipal Operations

Audience Involved:

Ramsey County employees and public.

Educational Goals for Each Audience:

To raise awareness about storm water issues.

Activities Used to Reach Educational Goals:

The Ramsey County MS4 Annual Report will include maintenance summaries on street sweeping procedures and how much salt and sand is used each winter.

Activity Implementation Plan:

Calendar Years 2006-2013:

The Annual Report will be completed in June of each year and will be posted on the Ramsey County website. A public meeting will be held to discuss the Annual Report prior to submittal and opportunity for public comments will be provided.

Performance Measures:

1. Number of electronic comments received.
2. Number of public comments at the annual meeting.

1d-1: Coordination of Education Program

MS4 Permit Requirement:

Ramsey County must describe how their educational program is coordinated with and makes effective use of other storm water education programs being conducted in its area by other entities as appropriate for the Ramsey County MS4.

BMP Description:

Ramsey County works with cities and watershed districts to coordinate stormwater education programs and develop County programs for stormwater education. Activities Ramsey County currently participates include Ramsey-Washington Metro Watershed District (RWMWD) Water Fest, Capitol Region Watershed District Como Fest, and RWMWD Public Works Forum.

Measurable Goals:

1. Number of activities Ramsey County participates in.
2. Number of new programs created.
3. Number of participants in each program.

Timeline/Implementation Schedule:

Calendar Year 2006: Determine what programs are offered by cities and watershed districts.

Calendar Years 2007-2013: Coordinate efforts to allow the County to participate in these activities and create new programs if necessary.

1e-1: Annual Public Meeting

MS4 Permit Requirement:

Ramsey County must hold at least one public meeting per year addressing the Storm Water Pollution Prevention Program. Ramsey County must hold the public meeting prior to submittal to the Commissioner (of the MPCA) of the annual report required in Part VI.D.

BMP Description:

An annual public meeting will be held prior to the submittal of the MS4 Annual Report.

For more information, see MCM 2.

Measurable Goals:

For more information, see MCM 2.

Timeline/Implementation Schedule:

For more information, see MCM 2.

Minimum Control Measure 2: **PUBLIC PARTICIPATION/INVOLVEMENT**

Key to Unique BMP ID Numbers	Required BMP Title	Permit Reference
2a-1	Comply with Public Notice Requirements	V.G.2.a
2b-1	Solicit Public Input and opinion on the Adequacy of the SWPPP	V.G.2.b
2c-1	Consider Public Input	V.G.2.c

2a-1: Comply with Public Notice Requirements

MS4 Permit Requirement:

Ramsey County must comply with applicable public notice requirements of Part V.G.1.e.2 when implementing the provisions of the Storm Water Pollution Prevention Program.

BMP Description:

Ramsey County will issue notice of the annual public meeting at least 30 days prior to the meeting as required by the permit. The notice will be published in the *St. Paul Pioneer Press* and *Lillie Suburban Newspapers* and copies will be distributed to those who request a copy. The notice will contain reference to the SWPPP, date, time, and location of the public meeting, description of the manner in which the public hearing will be held, and location where a copy of the SWPPP is available for the public to review.

Measurable Goals:

Public notice published 30 days prior to the annual meeting.

Timeline/Implementation Schedule:

Calendar Years 2006-2013: The annual public hearing will be held prior to the submittal of the MS4 Annual Report and public notice will be published 30 days prior to the meeting.

2b-1: Solicit Public Input and Opinion on the Adequacy of the SWPPP

MS4 Permit Requirement:

Ramsey County must solicit public input and opinion on the adequacy of the Storm Water Pollution Prevention Program, including input from the public meeting, describe in Part V.G.1.e, each year prior to the submittal of the annual report to the Commissioner, which is described in Part VI.D.

BMP Description:

Provide an opportunity during the annual meeting for the public to provide suggestions and concerns on the Ramsey County SWPPP.

Measurable Goals:

Number of comments or questions received regarding the SWPPP.

Timeline/Implementation Schedule:

Calendar Years 2006-2013: Provide one annual public meeting prior to the submittal of the annual report that provides the public with opportunity to comment on the SWPPP.

2c-1: **Consider Public Input**

MS4 Permit Requirement:

Ramsey County must consider the public input, oral and written, to the Storm Water Pollution Prevention Program, and Ramsey County shall make adjustments as appropriate.

BMP Description:

Consider all public input related to the SWPPP given at the annual public meeting and through electronic comments and make changes accordingly.

Measurable Goals:

1. Number of public comments received both oral and written.
2. Number of changes made to the SWPPP regarding public input.

Timeline/Implementation Schedule:

Calendar Years 2006-2013: Provide one annual public meeting prior to the submittal of the annual report that provides the public with opportunity to comment on the SWPPP; post a copy of the SWPPP on the County website with a comment section.

**Minimum Control Measure 3: ILLICIT DISCHARGE
DETECTION AND ELIMINATION**

Key to Unique BMP ID Numbers	Required BMP Title	Permit Reference
3a-1	Storm Sewer System Map	V.G.3.a
3b-1	Regulatory Control Program	V.G.3.b
3c-1	Illicit Discharge Detection and Elimination Plan	V.G.3.c
3d-1	Public and Employee Illicit Discharge Information Program	V.G.3.d
3e-1	Identification of Non-Storm Water Discharges and Flows	V.G.3.e

3a-1: Storm Sewer System Map

MS4 Permit Requirement:

Ramsey County must develop a storm sewer system map by June 30, 2008, or on another date established by the Commissioner.

BMP Description:

Prepare a spatial database of the County drainage system and map this information using ArcView GIS.

Measurable Goals:

Base map will be completed by June 30, 2008. (See *FIGURE 1: Ramsey County Storm Sewer System Map*)

Timeline/Implementation Schedule:

Calendar Year 2006: Begin mapping project and continue until complete; work with cities to determine if they have similar mapping completed.

Calendar Year 2008: Map was completed.

Calendar Years 2008-2013: Map will be updated as new projects are completed.

3b-1: Regulatory Control Program

MS4 Permit Requirement:

Ramsey County must, to the extent allowable under law, effectively prohibit, through ordinance or other regulatory mechanism, non-storm water discharges into the Ramsey County storm sewer system and implement appropriate enforcement procedures and actions.

BMP Description:

On March 13, 2012, the Ramsey County Board approved Ordinance #2012-078 regulating illicit discharges and connections to the County storm sewer system. The stated objectives of the Ordinance include:

1. To regulate the contribution of pollutants to the MS4 by storm water discharges by any user.
2. To prohibit illicit connections and discharges to the MS4.
3. To establish legal authority to carry out all inspection, surveillance, monitoring, and enforcement procedures necessary to ensure compliance with this ordinance.

Failure to comply with the County's requirements following discovery of an illicit discharge or connection may be punishable by restriction of access to the County MS4 and a misdemeanor fine. A copy of the ordinance may be found on the RCPW Illicit Discharge Web page:

www.co.ramsey.mn.us/pw/IllicitDischarge.htm

Measurable Goals:

Number of violations and enforcement proceedings enacted.

Timeline/Implementation Schedule:

Calendar Year 2006-2011: Ordinances and enforcement policies reviewed; revisions made to existing policies.

Calendar Year 2012-2013: Ordinance #2012-078 adopted and implemented.

3c-1: Illicit Discharge Detection and Elimination Plan

MS4 Permit Requirement:

Ramsey County must develop and implement a program to detect and address non-storm water discharges, including illegal dumping, to the Ramsey County system.

BMP Description:

Develop and implement a program to detect and address non-stormwater discharges and illegal dumping into the County MS4. The program will focus on finding and fixing illicit discharges and preventing illicit discharges. The Ramsey County staff member in charge of the Illicit Discharge Detection and Elimination plan will follow the guidance of the Center for Watershed Protection's Illicit Discharge Detection and Elimination manual or equivalent program. Citizens may currently report illicit discharges via an electronic survey form (SurveyMonkey.com) on Ramsey County's Stormwater Management web page.

Measurable Goals:

1. Number of outfalls identified.
2. Number of outfalls inspected annually.
3. Amount of sites that required removal of illicit discharges.
4. Number of outfalls requiring maintenance.
5. Expand our IDDE program

Timeline/Implementation Schedule:

Calendar Years 2006-2007:

1. Identify all outfalls and add to maintenance inspection spreadsheet
2. Work with cities and watershed districts to determine their IDDE plans
3. Determine if 633-EASY can be used as detection hotline or if a new hotline must be created
4. Respond to IDDE reports within 24 hours and perform maintenance in a reasonable amount of time; notify public of any illicit discharges that are detected.

Calendar Years 2007-2013: Inspect at least 20% of all outfalls annually; identify and remove illicit substances as necessary.

3d-1: Public and Employee Illicit Discharge Information Program

MS4 Permit Requirement:

Ramsey County must inform employees, businesses, and the general public in the MS4 area of hazards associated with illegal discharges and improper disposal of waste.

BMP Description:

Establish a program to educate employees, business, and the general public regarding illegal dumping and illicit discharges and how to report illicit discharges.

Measurable Goals:

For more information see 1c-3.

Timeline/Implementation Schedule:

For more information see 1c-3.

3e-1: Identification of Non-Storm Water Discharges and Flows

MS4 Permit Requirement:

Ramsey County must address the following categories of non-storm water discharges or flows (i.e. illicit discharges) only if they are identified as significant contributors of pollutants to the Ramsey County MS4.

Water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated ground water infiltration (as defined by 40 CFR 35.2005(b)(20)), uncontaminated pumped ground water, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, street wash water, discharges or flows from fire fighting activities.

BMP Description:

1. Ramsey County will identify non-stormwater discharges and flows that are significant contributors of pollutants to the County MS4.
2. Discharges will be evaluated to determine the effects they have on stormwater quality.
3. Procedures will be changed if discharges are found to have an adverse effect on stormwater quality.

Measurable Goals:

1. Number of non-stormwater discharges and flows that are identified.
2. Number of changes made to minimize impacts on stormwater quality.

Timeline/Implementation Schedule:

Calendar Years 2006-2007: Meet with city and private entities to determine their non-stormwater discharges and flows.

Calendar Years 2008-2013: Monitor non-stormwater discharge, determine, and implement procedures to minimize impacts on stormwater quality.

**Minimum Control Measure 4: CONSTRUCTION SITE
STORMWATER RUNOFF CONTROL**

Key to Unique BMP ID Numbers	Required BMP Title	Permit Reference
4a-1	Ordinance or other Regulatory Mechanism	V.G.4.a
4b-1	Construction Site Implementation of Erosion and Sediment Control BMP's	V.G.4.b
4c-1	Waste Controls for Construction Site Operators	V.G.4.c
4d-1	Procedure for Site Plan Review	V.G.4.d
4e-1	Establishment of Procedures for the Receipt and Consideration of Reports of Stormwater Noncompliance	V.G.4.e
4f-1	Establishment of Procedures for Site Inspections and Enforcement	V.G.4.f
4g-1	Erosion Control for Maintenance Activities	

4a-1: Ordinance or other Regulatory Mechanism

MS4 Permit Requirement:

Ramsey County must develop an ordinance or other regulatory mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable by law.

BMP Description:

1. Construction projects in excess of 1 acre are covered under NPDES Phase II permit which is enforced by the MPCA.
2. Additional regulatory coverage is provided by city and watershed level local government units (LGU's).
3. All Ramsey County projects are conducted in compliance with NPDES stormwater regulations.
4. Ramsey County adopted an amended Right of Way (ROW) ordinance on January 19, 2010 which includes specific provisions requiring permittees to follow erosion and sediment control standards comparable to those required under the NPDES Construction Stormwater Permit. The ROW permit imposes these standards on all projects in County ROW regardless of the disturbance size. A copy of the ROW Ordinance may be obtained at the RCPW Permits office (1425 Paul Kirkwold Dr, Arden Hills) or at:

<http://www.co.ramsey.mn.us/NR/rdonlyres/F840563B-4B9E-4A20-82F0-CB4C29E3D9A8/33556/RightofWayOrdinancerevised2010.pdf>

Target Audience:

RCPW staff, contractors, Ramsey County ROW Permittees.

Measurable Goals:

Number of Right of Way Permits issued.

Percent of Right of Way Permits requiring connections to Ramsey County's MS4.

Timeline/Implementation Schedule:

This BMP is at full implementation status.

4b-1: Construction Site Implementation of Erosion and Sediment Control BMP's

MS4 Permit Requirement:

Ramsey County must use an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable by law.

BMP Description:

1. Ramsey County Right-of-Way Permit erosion control measure requirements may be found in the following sections of the ordinance:
 - Sec. 1.10 Permit Applications
 - Sec. 1.14 Stormwater Pollution Prevention Plan (SWPPP)
 - Sec. 1.20 Inspection
2. Ramsey County construction projects will follow NPDES Phase II construction permit requirements as well as additional regulations required by applicable watershed districts and LGU's. Standard language included in project specification for bidders is: "This contract requires strict adherence to the NPDES – Stormwater Permit for Construction Activity. It is the contractor's responsibility to make himself/herself familiar with it. Copies are available by request from RCPW or via the internet at ..."
3. RCPW design staff attend annual MNDOT certified SWPPP design course.
4. RCPW Erosion Control Inspectors, Construction Managers, and Design Staff attend annual MNDOT certified Erosion Control Management Training.

Target Audience:

Ramsey County Public Works staff.
RCPW Construction Project Contractors
Ramsey County Right-of –Way Permittees

Measurable Goals:

Number of RCPW employees attending applicable training courses.
Number of permits obtained for projects: NPDES, watershed districts, wetland impact notices, etc.

Timeline/Implementation Schedule:

BMP is at full implementation

4c-1: Waste Controls for Construction Site Operators

MS4 Permit Requirement:

Ramsey County must require control construction site operators to control waste at the construction site that may cause adverse impacts to water quality. Construction site waste includes: discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste.

BMP Description:

1. Ramsey County's ROW Permit includes a waste control provision (*see Section 1.14 Subd.6 Site Waste Controls*).
2. Construction site waste handling is covered under NPDES Phase II permit for projects in excess of 1 acres. NPDES waste handling requirement will also be followed on Ramsey County projects under 1 acre in size.

Target Audience:

RCPW staff, contractors, Right of Way permittees.

Measurable Goals:

BMP is in progress.

Timeline/Implementation Schedule:

This BMP is at full implementation.

4d-1: Procedure for Site Plan Review

MS4 Permit Requirement:

Ramsey County must implement procedures for site plan review, which incorporate consideration of potential water quality impacts.

BMP Description:

1. County ROW Permit applications require submission of scaled drawings and a SWPPP. All plan submittals for County Right-of-Way Permits are evaluated for suitability of stormwater BMP's.
2. Ramsey County standard operating procedure requires assessment of proposed County construction projects utilizing a stormwater modeling program and the addition of Temporary Erosion Control methods into the project plans. Stormwater modeling for Ramsey County construction projects is conducted using P8 and HydroCAD programs.
3. Environmental Review Process: County projects will have an environmental assessment worksheet prepared and submitted to the Minnesota Environmental Quality Board. After a thirty-day public comment period, it is determined whether an environmental impact statement is necessary.
4. Endangered Species Review Process: For County projects, Ramsey County will submit a Data Request Form to the Minnesota Natural Heritage Information System (MN DNR) with a map detailing the proposed project. The results are evaluated to determine the necessity for alterations to the project.
5. Drinking Water Source Review Process: Ramsey County will contact the Minnesota Department of Health to determine if any project is located in a vulnerable Wellhead Protection Area (WHPA) or Drinking Water Supply Management Area (DWSMA) as defined by MN Rules (4720.5100-5590). Project planners will evaluate land use in the surrounding area for the potential to provide stormwater contamination and assess the vulnerability of the local aquifers. Ramsey County's MS4 currently has surface water discharge into the St. Paul DWSMA and 58 listed Public Water Sources including 9 with established Source Water Protection Areas (*see Figures 2-11 for further information*). Ramsey County will follow the MDH suggested guidance (*see Appendices A-C: "Evaluating Proposed Storm Water Infiltration Projects in Vulnerable Wellhead Protection Areas"*).
6. Historical Review Process: Ramsey County will request that Minnesota's State Historic Preservation Office conduct an inventory database search covering the area or corridor of a planned project. If a sensitive property is discovered within range of the project, proper planning and care will be taken to prevent/minimize impact.

Target Audience:

RCPW Staff, general public.

Measurable Goals:

1. Number of construction project plans prepared.
2. Number of construction permits obtained and the permitting organizations.
3. Number of stormwater modeling projects completed.
4. Number of applicable reviews conducted for each project.

Timeline/Implementation Schedule:

BMP is at full implementation

4e-1: Establishment of Procedures for the Receipt and Consideration of Reports of Stormwater Noncompliance

MS4 Permit Requirement:

Ramsey County must establish procedures for receipt and consideration of reports of noncompliance or other information on construction related issues submitted by the public.

BMP Description:

Complaints related to stormwater violations on County construction projects can be reported by calling the Public Works office at 651-266-7100 or by email to stormwater@co.ramsey.mn.us. These and an illicit discharge report link can be found on the RCPW Stormwater Management website at www.co.ramsey.mn.us/pw/stormwater.htm.

The following numbers are also available to contact with possible construction site stormwater violations:

Ramsey Conservation District	651-266-7270
MPCA 24-hr Emergency Number	651-649-5451
Rice Creek Watershed District	763-398-3070
Ramsey Washington Metro Watershed District	651-792-7950
Capitol Region Watershed District	651-644-8888

Target Audience:

RCPW Staff, general public.

Measurable Goals:

Number of complaints per year with responses and remedial actions taken (if necessary).

Timeline/Implementation Schedule:

Calendar Year 2006: Plan and evaluate complaint process

Calendar Years 2007-2010: Implement plan

Calendar Year 2011-2013: Evaluate program

4f-1: Establishment of Procedures for Site Inspections and Enforcement

MS4 Permit Requirement:

Ramsey County must establish procedures for site inspection and enforcement of control measures.

BMP Description:

Site Inspection

1. Projects being conducted under the County ROW Permit are subject to inspection by the RCPW Permit Department (*see Ramsey County ROW Permit Section 1.20 Subd. 2. Site Inspection*).
2. Private and municipal construction projects in excess of 1 acre are subject to NPDES Phase II regulations. Inspections and enforcement are handled by the MPCA, local watershed districts, and cities within the County.
3. Ramsey County Public Works construction projects are subject to inspections by trained County personnel weekly and within 24 hours of rainfall events in excess of 0.5 inches.
4. Contractors on Ramsey County Public Works construction projects will be directed by Ramsey County staff to remedy items out of compliance with NPDES Erosion Control requirements.

Enforcement

1. County ROW Permittees may be held responsible for noncompliance with the County ROW under the following provisions in the County ROW Ordinance:
 - Sec. 1.14 Stormwater Pollution Prevention Plan (SWPPP) Subd.4 Failure to Implement Erosion & Sediment Controls
 - Sec. 1.18 Denial of Permit
 - Sec. 1.20 Inspection Subd.3 Authority of County
 - Sec. 1.23 Revocation of Permits
2. Noncompliance of site procedures per the site inspector leaves the contractor vulnerable to the fee schedule determined by Ramsey County from Mn/DOT Standard Specifications for Construction section 1717.2 part G.

Target Audience:

Ramsey County Public Works staff, contractors, ROW Permittees.

Measurable Goals:

Number of inspections of active Ramsey County projects per year.
Number of corrective actions on County ROW permit per year.

Timeline/Implementation Schedule:

BMP in full implementation

4g-1: Erosion Control for Maintenance Activities

MS4 Permit Requirement:

BMP not required for permit

BMP Description:

1. Ramsey County staff will follow erosion control guidelines for County maintenance activities.
2. More information may be found in section 6b-4.
3. Ramsey County maintenance department will follow NPDES Construction Site requirements even for projects less than 1 acre in size
4. Ramsey County erosion control inspectors will inspect maintenance sites at regular intervals.
5. Ramsey County Maintenance Division must contact Ramsey County Environmental Services Division at least 7 days before performing soil-disturbing activities. Environmental Services Division will inspect projects within one week of their completion for proper permanent stabilization practices.

Target Audience:

Ramsey County Public Works and Park & Recreation Dept staff.

Measurable Goals:

Number of inspections per year of Ramsey County maintenance sites.

Timeline/Implementation Schedule:

BMP in progress.

**Minimum Control Measure 5: POST-CONSTRUCTION STORMWATER
MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT**

Key to Unique BMP ID Numbers	Required BMP Title	Permit Reference
5a-1	Development and Implementation of Structural and/or Non-structural BMP's	V.G.5.a
5b-1	Regulatory Mechanism to Address Post Construction Runoff From New Development and Redevelopment	V.G.5.b
5c-1	Long-term Operation and Maintenance of BMP's	V.G.5.c

5a-1: Development and Implementation of Structural and/or Non-structural BMP's

MS4 Permit Requirement:

Ramsey County must develop and implement post-construction stormwater management strategies, which include a combination of appropriate structural and/or non-structural BMP's.

BMP Description:

1. Ramsey County construction projects use structural BMP's approved by MNDOT, and projects are regulated under permits issued by the MPCA, the applicable local watershed district, and other local government entities.
2. Ramsey County Right of Way Permit project applications are evaluated for appropriate post-construction BMP's. This is detailed further in section 5b-1.
3. Additional non-structural BMP's are listed under Minimum Control Measure 1.
4. Ramsey County participates in preliminary design meetings on projects where BMP's are evaluated by all affected parties. Cities that are partners with Ramsey County on projects are able to review plans, discuss maintenance and cost share agreements while identifying maintenance responsibilities through project agreements.

Target Audience:

Ramsey County staff, ROW permittees, general public.

Measurable Goals:

1. Number of BMP's implemented.
2. Number of permits applied for and received for Ramsey County construction projects.
3. List new structural BMP's added to Ramsey County's system yearly and record them on the RCPW maintenance spread sheet.

Timeline/Implementation Schedule:

BMP in progress.

5b-1: Regulatory Mechanism to Address Post Construction Runoff from New Development and Redevelopment

MS4 Permit Requirement:

Ramsey County must use an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable by law.

BMP Description:

1. Development projects applying for a Right of Way (ROW) Permit to discharge post-construction run-off into Ramsey County's MS4 must have BMP's in place to ensure that peak discharge rates will be unchanged and pre-treatment is maximized. Projects are restricted from routing stormwater over curbs and onto roadways. Stormwater ponds must be designed so that the 100-year elevation is at least one foot below the roadway low point.
2. Most development occurring in Ramsey County is discharged into city stormsewer trunk lines.
3. Ramsey County's own construction projects are designed to comply with local watershed districts' runoff control regulations and are evaluated with stormwater modeling. More details may be found in section 5a-1.

Target Audience:

Ramsey County Staff, ROW permittees.

Measurable Goals:

Number of ROW permits issued per year.

Timeline/Implementation Schedule:

BMP in progress.

5c-1: Long-term Operation and Maintenance of BMP's

MS4 Permit Requirement:

Ramsey County must ensure adequate long-term operation and maintenance of BMP's installed to address post-construction run-off.

BMP Description:

1. Ramsey County Public Works staff schedules and conducts regular maintenance of structures in our stormwater conveyance system. Additional details may be found under Minimum Control Measure 6.
2. Ramsey County establishes cooperative maintenance agreements for structural BMP's with appropriate local government units whenever possible.
3. Enforcement of structure maintenance for non-RCPW projects located in Ramsey County is outside our present enforcement powers. This portion of the BMP would be more effectively applied by the cities or local watershed districts.
4. Funding for maintenance of BMPs comes from Ramsey County Public Works' Maintenance Division budget which is funded from tax levy and State Aid funding.

Target Audience:

Ramsey County staff.

Measurable Goals:

1. Number of maintenance activities by BMP type.
2. Number of cooperative agreements per year.

Timeline/Implementation Schedule:

BMP in progress.

**Minimum Control Measure 6: POLLUTION
PREVENTION/GOOD HOUSEKEEPING**

Key to Unique BMP ID Numbers	Required BMP Title	Permit Reference
6a-1	Municipal Operations and Maintenance Program	V.G.6.a
6a-2	Road Surface Sanding, Salting, and Sweeping	
6b-2	Annual Inspection of All Structural Pollution Control Devices	V.G.6.b.2
6b-3	Inspection of a Minimum of 20 percent of the MS4 Outfalls, Sediment Basins and Ponds Each Year on a Rotating Basis	V.G.6.b.3
6b-4	Annual Inspection of All Exposed Stockpile, Storage, and Material Handling Areas	V.G.6.b.4
6b-5	Inspection Follow-up Including the Determination of Whether Repair, Replacement, or Maintenance Measures are Necessary and the Implementation of the Corrective Measures	V.G.6.b.5
6b-6	Record Reporting and Retention of all Inspections and Responses to the Inspections	V.G.6.b.6
6b-7	Evaluation of Inspection Frequency	V.G.6.b.7
6b-8	Lake Water Quality Monitoring	
6b-9	Impaired Waters Review and Monitoring	IV.D

6a-1: Municipal Operations and Maintenance Program

MS4 Permit Requirement:

Ramsey County must establish an operation and maintenance program that includes a training component and has the ultimate goal of preventing or reducing pollutant run-off from MS4 operations. The program must include employee training to prevent and reduce stormwater pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and stormwater system maintenance.

BMP Description:

1. Fleet maintenance and Park & Recreation staff will be trained in Spill Prevention and Response by the Ramsey County Department of Health.
2. A Ramsey County staff member will be trained in Illicit Discharge Detection and Elimination program development. Additional details may be found under Minimum Control Measure 3.
3. RCPW Design staff are trained annually in MNDOT certified SWPPP design and implementation.
4. Ramsey County Public Works Maintenance Division staff receives annual erosion control installation training.

Target Audience:

Ramsey County Public Works staff.

Measurable Goals:

1. Number of Ramsey County staff trained per year.
2. Ongoing
3. Design staff training is further detailed in section 4b-1.
4. Number of installers trained per year.

Timeline/Implementation Schedule:

Calendar Year 2006:

Spill Prevention and Response Training beginning in the Fall.

IDDE Training May 2006. Begin program development.

Calendar Years 2007-2008: Initiate IDDE program.

Calendar Year 2009: Evaluate IDDE program and implement changes, if needed.

Calendar Years 2010-2013: Continue operating IDDE program.

Remainder of programs listed are currently being implemented.

6a-2: Road Surface Sanding, Salting, and Sweeping

MS4 Permit Requirement:

Ramsey County's MS4 permit does not specifically require a street sweeping component, but this information has been requested by the MPCA, and Ramsey County considers sweeping and efforts to reduce the amounts of sand and salt applied during the winter season to be a very pertinent part of our pollution prevention program.

BMP Description:

1. Street sweeping is conducted twice per year: Once in early Spring to remove sand from the Winter and in the Fall to remove leaf litter.
2. Ramsey County Public Works uses brush-type sweepers.
3. Areas that are targeted for more frequent sweeping include roadways adjacent to lakes or drainage areas.
4. RCPW recycles its own sweepings and those from partner municipalities for use as fill material. Garbage recovered from the sweepings is put into a landfill.
5. RCPW winter road maintenance personnel receive training for salt application that includes pre-wetting, anti-icing treatment, and metered application rates to maintain roadway safety and manage the amount of salt applied on Ramsey County roadways each winter.
6. RCPW is an active participant in the Ramsey-Washington Public Works Forum Street Sweeping Study.

Target Audience:

RCPW staff.

Measurable Goals:

1. Miles of roadway swept per year.
2. Number of RCPW employees trained in salt application.
3. Sections and miles of road targeted for additional sweeping.
4. Total amounts of sand and salt applied during winter application season vs. total amount of sand recovered by sweeping activities.

Timeline/Implementation Schedule:

BMP in progress.

6b-2: Annual Inspection of All Structural Pollution Control Devices

MS4 Permit Requirement:

Ramsey County must inspect annually all structural pollution control devices, such as trap manholes, grit chambers, sumps, floatable skimmers and traps, separators, and other small settling or filtering devices.

BMP Description:

1. Compile a list of all Ramsey County structural pollution control devices: sediment traps, weirs, etc.
2. Inspect them annually at minimum.
3. Add devices added to Ramsey County's MS4 to the list each year.

Target Audience:

Ramsey County Public Works staff.

Measurable Goals:

1. Number and percent of devices inspected annually.
2. Number of structures requiring maintenance activities.

Timeline/Implementation Schedule:

BMP in progress.

**6b-3: Inspection of a Minimum of 20 percent of the MS4 Outfalls,
Sediment Basins and Ponds Each Year on a Rotating Basis**

MS4 Permit Requirement:

Ramsey County must inspect at minimum, 20% of the MS4 Outfalls, sediment basins and ponds each year on a rotating basis, during the effective period of this permit.

BMP Description:

1. Compile a list of MS4 outfalls, sediment basins, and ponds.
2. Track inspections and maintenance performed on these structures.

Target Audience:

Ramsey County Public Works staff.

Measurable Goals:

1. Number and percent of structures inspected per year.
2. Percent of structures inspected in a five-year rotation.

Timeline/Implementation Schedule:

BMP in progress.

6b-4: Annual Inspection of All Exposed Stockpile, Storage, and Material Handling Areas

MS4 Permit Requirement:

Ramsey County must inspect all exposed stockpile, storage, and material handling areas at least annually.

BMP Description:

Stockpiles, storage, and material handling areas on Ramsey County maintenance facilities are inspected five times per year in bimonthly inspections required by each facility's SWPPP. Facilities that qualify for the No Exposure Exemption are inspected at least two times per year to determine that they remain eligible.

Target Audience:

RCPW staff, Ramsey County Dept. of Public Health, Ramsey County Parks and Rec. Dept., Ramsey County Corrections.

Measurable Goals:

Number of inspections of each permitted location per year.

Timeline/Implementation Schedule:

BMP in progress.

6b-5: Inspection Follow-up Including the Determination of Whether Repair, Replacement, or Maintenance Measures are Necessary and the Implementation of the Corrective Measures

MS4 Permit Requirement:

Ramsey County must, based on facility and BMP inspections, determine if repair, replacement, or maintenance actions are necessary for proper operation and to prevent environmental impacts such as erosion. The necessary measures shall be completed as soon as possible, usually during the same year as the inspection. When this is not practicable, the reasons and a schedule for completion shall be submitted in the annual report.

BMP Description:

1. Record maintenance needs and necessary procedural changes discovered during facility and structural BMP inspections.
2. Record corrective actions taken.

Target Audience:

RCPW Staff, RC Parks and Rec. Dept, RC Public Health Dept, RC Corrections.

Measurable Goals:

1. Number of inspections and corrective actions taken annually.
2. List maintenance not completed within the same year as the maintenance need is discovered and a schedule for anticipated completion.

Timeline/Implementation Schedule:

BMP in progress.

6b-6: Record Reporting and Retention of all Inspections and Responses to the Inspections

MS4 Permit Requirement:

Ramsey County must summarize the results of all inspections in the annual report. Keep records on the dates of inspection and responses to the inspections, including the date of completion of repairs and major additional protection measures.

BMP Description:

1. Facility inspection and maintenance records will be kept at least three years until the end of the current permit expiration in 2007.
2. Structural BMP inspection and maintenance records will be kept until at least three years beyond the term of the MS4 permitting period (ending in 2011*).

Target Audience:

Ramsey County staff, general public.

Measurable Goals:

BMP in progress.

Timeline/Implementation Schedule:

BMP in progress.

*MS4 Permit period was extended to 2013

6b-7: Evaluation of Inspection Frequency

MS4 Permit Requirement:

Ramsey County may after two years of inspections, evaluate if patterns of maintenance become apparent, and adjust the frequency of inspections.

BMP Description:

1. Ramsey County facility SWPPP's require inspections to be performed bimonthly during the growing season. The inspection schedules will be evaluated for effectiveness.
2. Ramsey County structural BMP inspection schedules are set based on a schedule required by the MS4 permit. This schedule will also be evaluated for effectiveness.

Target Audience:

Ramsey County staff responsible for inspections of permitted facilities and structural BMP's.

Measurable Goals:

List adjustments made to inspection schedules.

Timeline/Implementation Schedule:

CalendarYears 2006-2007: Follow current inspection schedules.

CalendarYear 2008: Evaluate and adjust schedule if deemed necessary.

CalendarYears 2008-2009: Follow adjusted schedules.

CalendarYear 2011-2013: Re-evaluate inspection schedules

6b-8: Lake Water Quality Monitoring

MS4 Permit Requirement:

This BMP is not specifically required by the MS4 permit. Ramsey County believes that this activity serves as a valuable tool for evaluating the effectiveness of our Stormwater Pollution Prevention Plan.

BMP Description:

Ramsey County has monitored the water quality of recreational lakes (30 sites in 2012) annually since 1981. Sampling protocol includes profile sampling in the deepest portion of the lake from 6 to 8 times during May through September. County beach water quality is monitored weekly from June through August. Field and laboratory analyses are completed for several lake water quality parameters. The County laboratory is certified by the Minnesota Department of Health. Data are reviewed, edited, and submitted to the MPCA for inclusion in the EPA's STORET national database. Lake water quality data are utilized for water quality trend analysis and in nutrient load and lake response models.

Target Audience:

Ramsey County staff, general public.

Measurable Goals:

Number of lakes/times monitored per year.

Timeline/Implementation Schedule:

BMP in progress.

FIGURES

Figure 1. Ramsey County Storm Sewer System Map

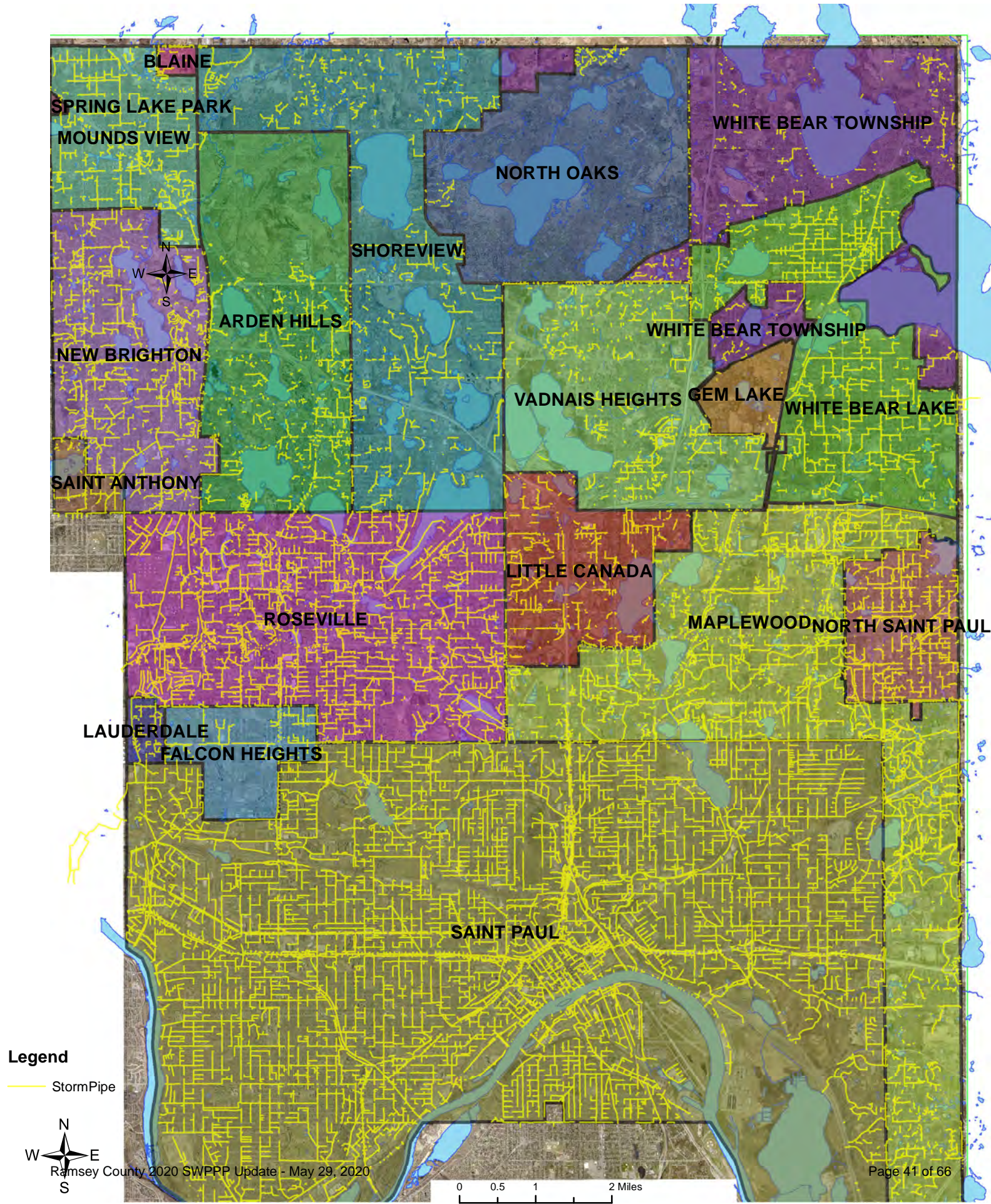


FIGURE 2 - Ramsey County 2013 Source Water Assessment Listings

PWS Name	ID	Surface/Ground Water Assessment	Address	City	County
Amidon Graphics	5620516	GW	1966 Benson Avenue	St. Paul	Ramsey
Arden Hills	1620001		1425 Paul Kirkwold Drive	Arden Hills	Ramsey
Barnett Chrysler-Jeep-Kia (Main Bldg.)	5620020	GW	3610 Highway 61 and County Road E	Gem Lake	Ramsey
Bella Cibo	5620813	GW	1581 East County Road E	Gem Lake	Ramsey
BHGDN, LLC	5620202	GW	882 West Seventh Street	St. Paul	Ramsey
Big Ten Supper Club	5620817	GW	4703 Highway 10	Arden Hills	Ramsey
Brookside Mobile Home Park	1620021	GW	1600 County Road J	Shoreview	Ramsey
Canadian Pacific Railroad-St. Paul Yard	5620373	GW	1000 Shop Road	St. Paul	Ramsey
Capital City Adventist Christian School	5620534	GW	1220 South McKnight Road	St. Paul	Ramsey
Freddy's Tiki Hut	5620832	GW	1870 Rice Street	Maplewood	Ramsey
Charley Lake Townhomes Association	1620036	GW	52 Wildflower Way	North Oaks	Ramsey
Dale's Laundromat	5620285	GW	1315 Frost Avenue	Maplewood	Ramsey
Dean's Tavern	5620318	GW	1986 Rice Street	Maplewood	Ramsey
Enterprise Car Rental	5620812	GW	1567 County Road E East	Gem Lake	Ramsey
Five Star Mobile Home Park	1620017	GW	200 Mayfair Road	St. Paul	Ramsey
Fridley	1020031	GW	601 61st Ave	Fridley	Anoka
Gem Lake Hills Golf Course	5620826	GW	4039 Scheuneman Road	Gem Lake	Ramsey
Kessler and Maguire Funeral Home	5620210	GW	640 West Seventh Street	St. Paul	Ramsey
Kohler Mix Specialties	5620340	GW	4041 Highway 61	White Bear Lake	Ramsey
Little Canada	1620005		515 Little Canada Road	Little Canada	Ramsey
Manitou Ridge Golf Course	5620792	GW	3200 North McKnight Road	White Bear Lake	Ramsey
Minneapolis	1270024	SW	4300 Marshall Street NE	Minneapolis	Hennepin
Mounds View	1620008	GW	2466 Bronson Drive	Mounds View	Ramsey
Nelson Marine	5620849	GW	3800 Highway 61 East	Gem Lake	Ramsey
New Brighton	1620009	GW	803 Old Highway 8 Northwest	New Brighton	Ramsey
New Horizon Academy	5620519	GW	586 Carlton Street	Maplewood	Ramsey
North Oaks - West Recreation Center	5620791	GW	14 West Pleasant Lake Road	North Oaks	Ramsey
North Oaks Beach	5620839	GW	10 Sandpiper Lane	North Oaks	Ramsey
North Oaks East Recreation Center	5620002	GW	5 Mink Lane	North Oaks	Ramsey
North Oaks Golf Club - Clubhouse	5620522	GW	54 East Oaks Road	North Oaks	Ramsey
North Oaks Golf Course	5620844	GW	54 East Oaks Road	North Oaks	Ramsey
North Saint Paul	1620011	GW	2400 Margaret Street North	North St. Paul	Ramsey
Oakdale	1820016	GW	1900 Hadley Avenue North	Oakdale	Washington
Pearson Candy Company	5620212	GW	2140 West Seventh Street	St. Paul	Ramsey
Ramsey County Vadnais-Snail Lake Park	5620529	GW	4500 Rice Street	Vadnais Heights	Ramsey
Rapit Printing	5620847	GW	2520 Larpenteur Avenue	Lauderdale	Ramsey
Roseville	1620013		2660 Civic Center Drive	Roseville	Ramsey
Saint Paul Regional Water Services	1620026	SW GW	1900 Rice Street	St. Paul	Ramsey
Schreier Cabinets	5620097	GW	99 South Owasso West	Little Canada	Ramsey
Science Museum of Minnesota	5620848	GW	120 West Kellogg Boulevard	St. Paul	Ramsey
Shoreview	1620020	GW	4615 Victoria North Street	St. Paul	Ramsey
Spooner Park - City of Little Canada	5620846	GW	350 Eli Road	Little Canada	Ramsey
Saint Anthony Village	1270048	GW	3301 Silver Lake Road NE	Minneapolis	Hennepin
St. Paul Pottery	5620537	GW	1601 East County Road E	Gem Lake	Ramsey
Structural Wood Corporation	5620532	GW	4000 Labore Road	Vadnais Heights	Ramsey
Tamarack Nature Center - Destination Dis	5620850	GW	5287 Otter Lake Road	White Bear	Ramsey
Terrace Heights Trailer Park	1620018	GW	2442 Rice Street	Little Canada	Ramsey
Thirty-Two Estates	1620019	GW	3020 Rice Street	St. Paul	Ramsey
Town and Country Mobile Home Park	1620016	GW	2557 Highway 61	St. Paul	Ramsey
Trike Shop	5620518	GW	3744 Schueneman Road	Gem Lake	Ramsey
Vadnais Heights	1620030	GW	Shop - 4105 Clover Avenue	Vadnais Heights	Ramsey
Vadnais Inn	5620811	GW	3364 North Rice Street	Vadnais Heights	Ramsey
Waldoch Properties/Hoffman Corners	5620023	GW	3588 North Highway 61/County Road E	Gem Lake	Ramsey
Watergate Marina	5620372	GW	2500 Crosby Farm Road	St. Paul	Ramsey
White Bear Floral Shop	5620523	GW	3550 Hoffman Road/Highway 61	Gem Lake	Ramsey
White Bear Lake	1620024	GW	2401 Orchard Lane	White Bear Lake	Ramsey
White Bear Township	1620025	GW	1281 Hammond Road	White Bear	Ramsey
Number of PWS selected	58				

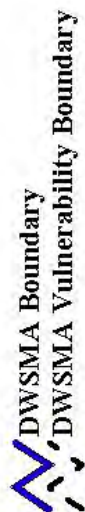
A Source Water Protection Area has been designated. See FIGURES 3-13 for details.

Source: <http://www.health.state.mn.us/divs/eh/water/swp/swa/swainfo/default.cfm>

Figure 3

Fridley

*Drinking Water Supply
Management Area
(DWSMA) MN-00163
10 year Time of Travel*



H = High Vulnerability
M = Moderate Vulnerability
L = Low Vulnerability

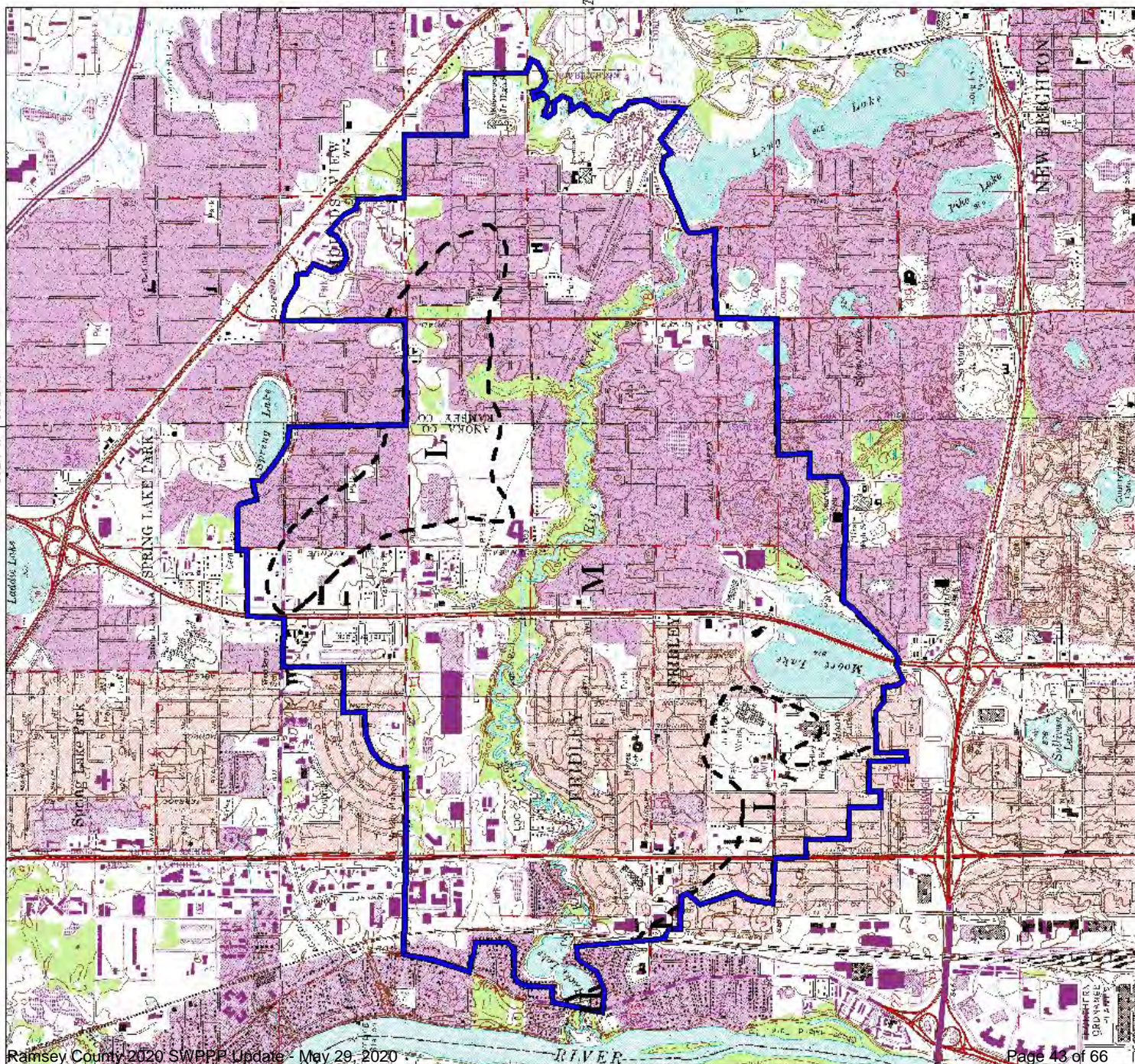
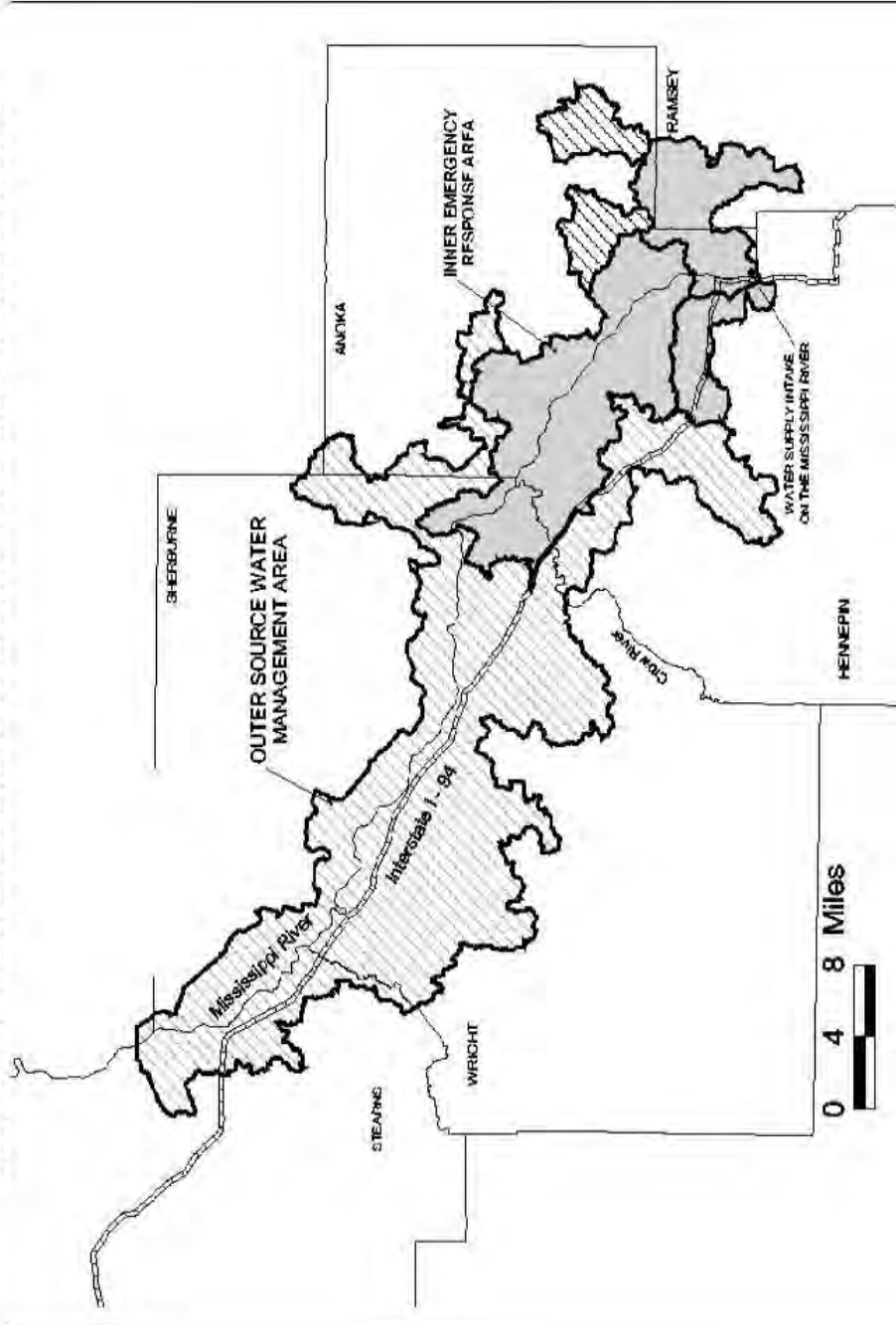


Figure 4

SOURCE WATER ASSESSMENT AREAS FOR THE CITY OF MINNEAPOLIS



Prepared by the Minnesota Department of Health August, 2001

SOURCE WATER ASSESSMENT AREAS FOR THE CITY OF MINNEAPOLIS

New Brighton Drinking Water Supply Management Area (DWSMA) MN-00503 - Variable Vulnerability

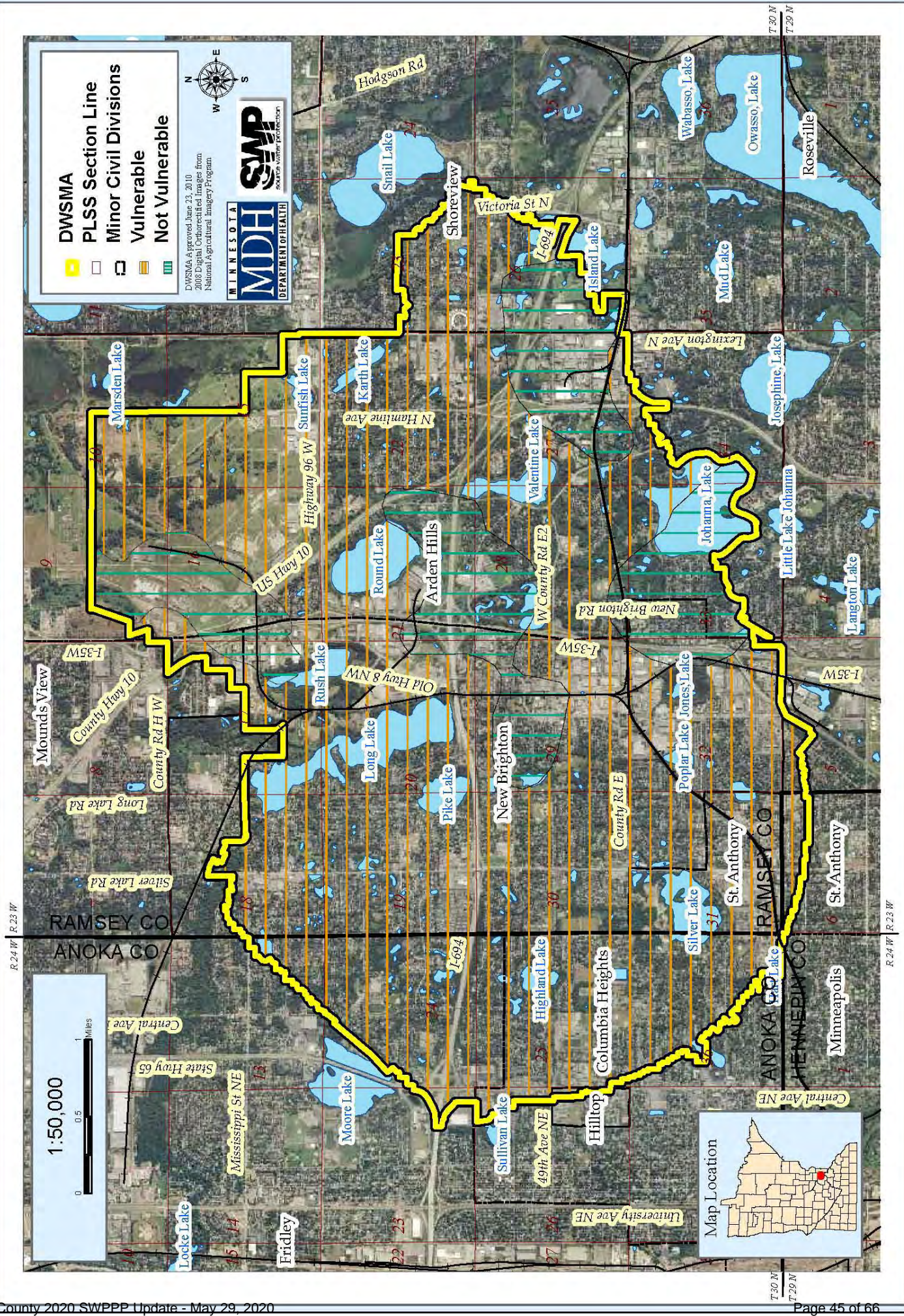


Figure 6

North Saint Paul

Drinking Water Supply

Management Area

(DWSMA) MN-00470

10 year Time of Travel

DWSMA

DWSMA Vulnerability Boundary



V = Vulnerable

N = Not Vulnerable

0.5 0 0.5 Miles



Approved November 4, 2008

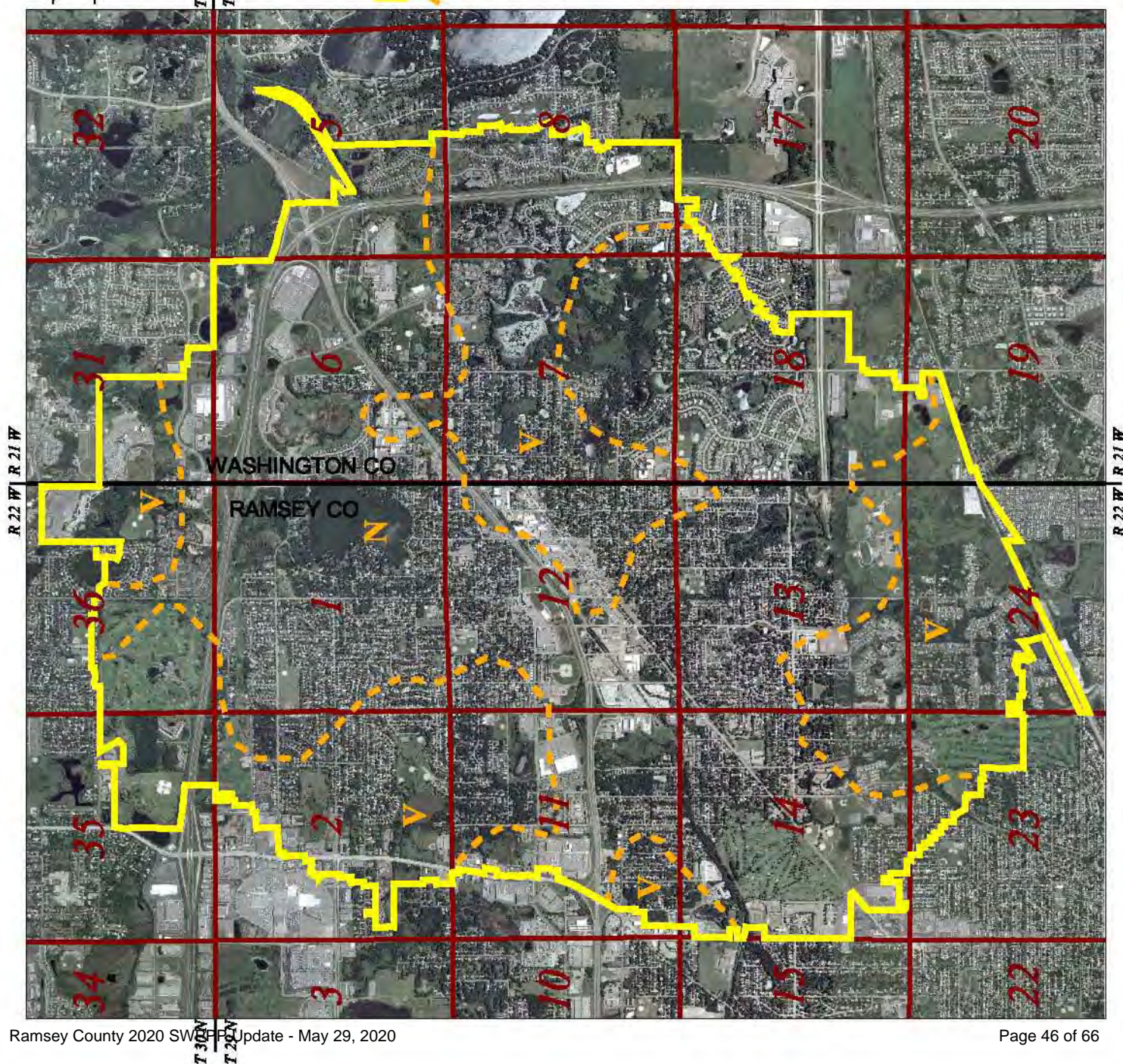


Figure 7

Oakdale North

Drinking Water Supply Management Area (DWSMA) MN-00159 10 year Time of Travel

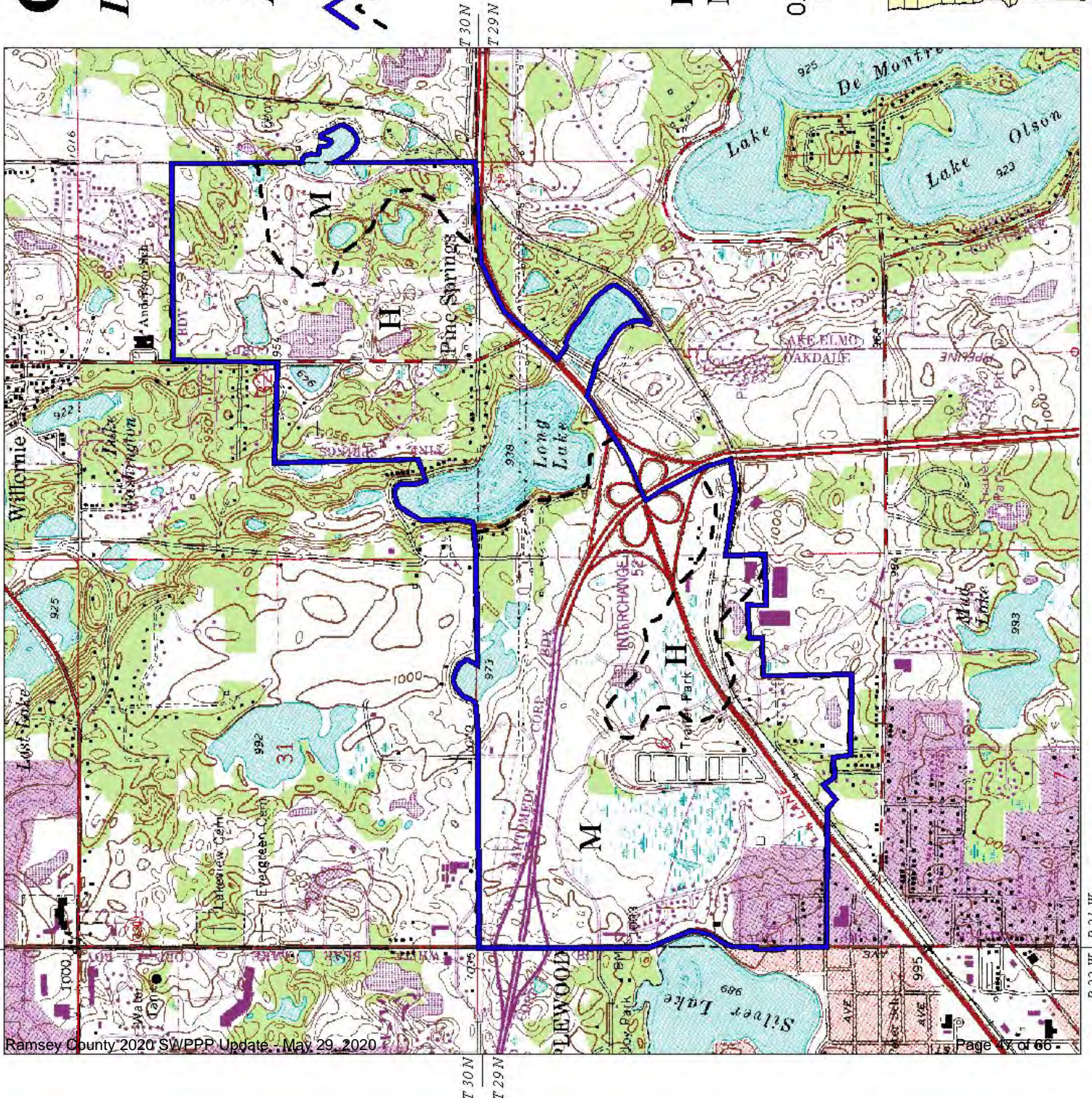


Figure 8

Saint Anthony Village

***Drinking Water Supply
Management Area
(DWSMA) MN-00225
10 year Time of Travel***



M = Moderate Vulnerability
L = Low Vulnerability
VL = Very Low Vulnerability



Approved July 10, 2003

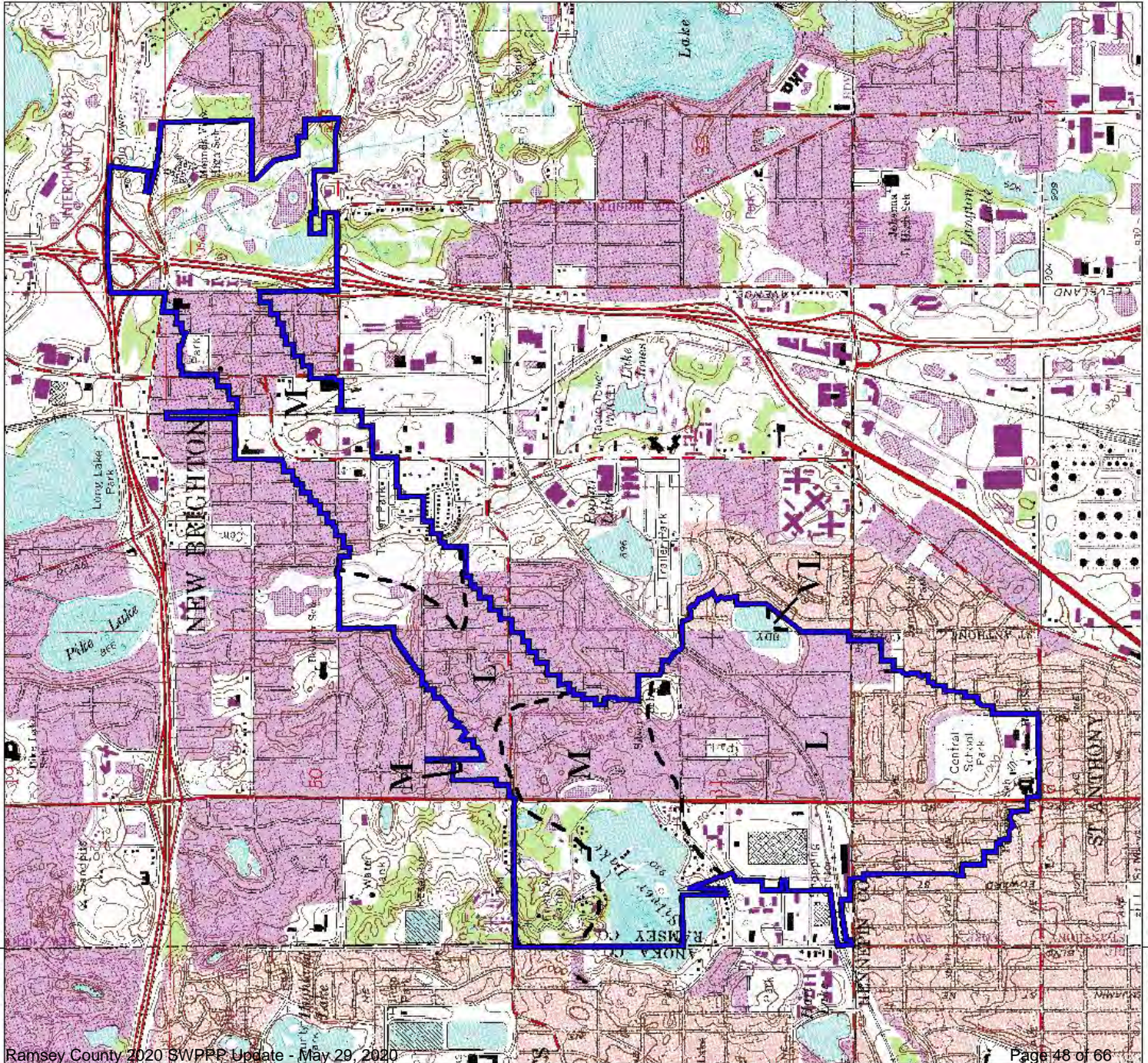


Figure 9

Saint Paul

*Drinking Water Supply
Management Area
(DWSMA) MN-00346
10 year Time of Travel*

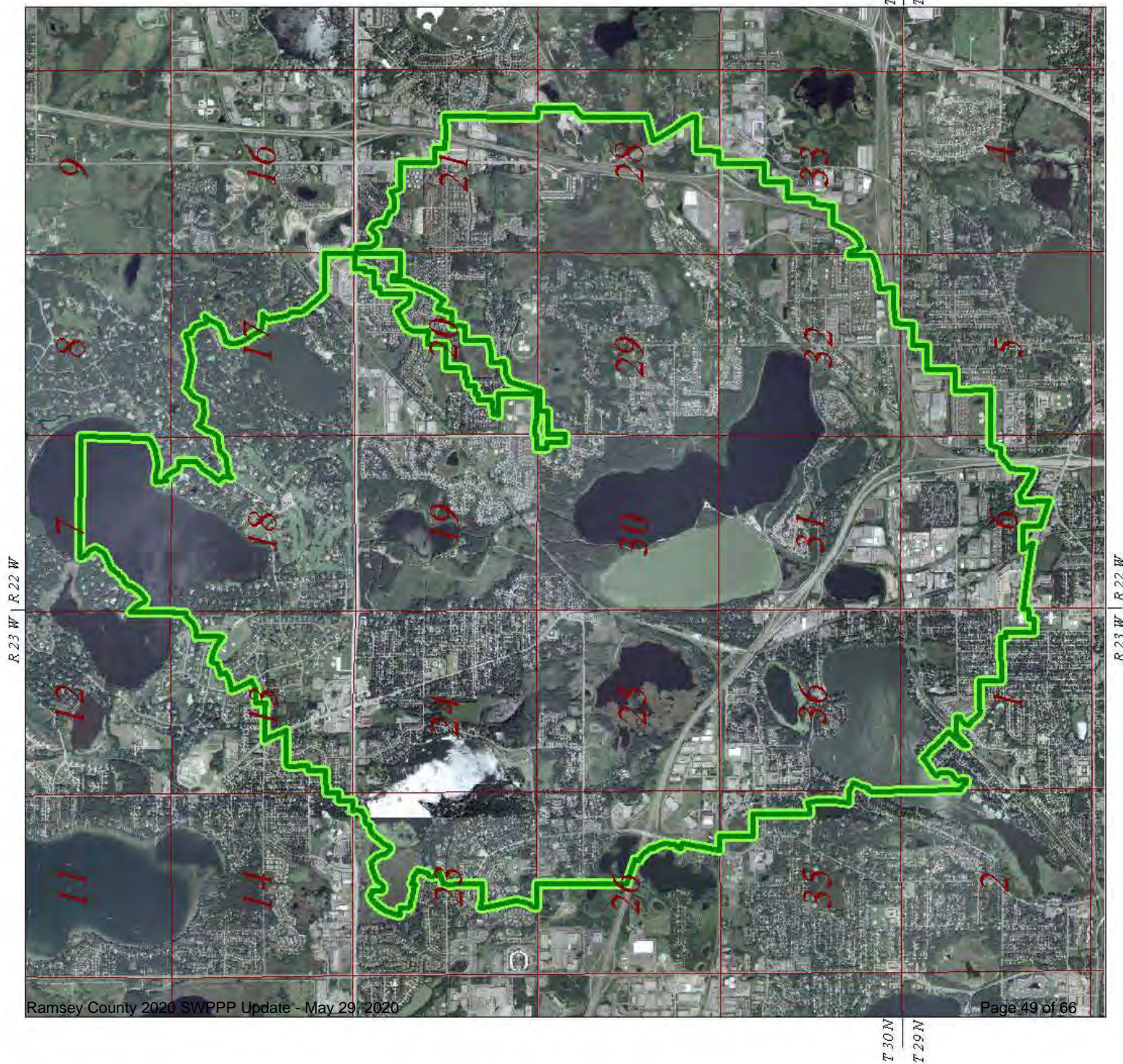
 DWSMA

Variable Vulnerability

0.7 0 0.7 Miles



Approved June 22, 2005



Shoreview Drinking Water Supply Management Area (DWSMA) MN-00517 - Variable Vulnerability

Figure 10

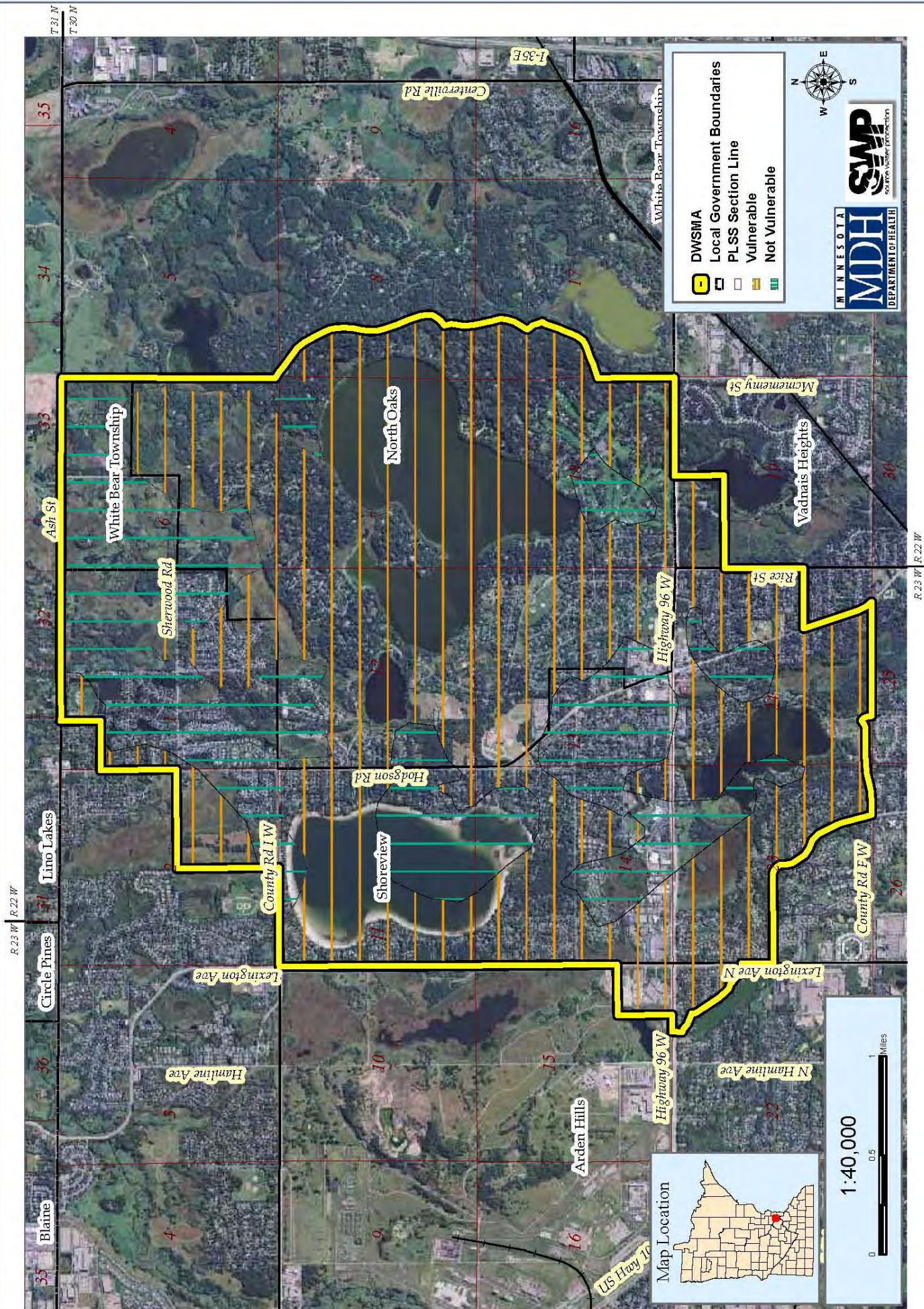


Figure 11

Vadnais Heights

Drinking Water Supply
Management Area
(DWSMA) MN-00404
10 year Time of Travel

 DWSMA
 DWSMA Vulnerability Boundary

V = Vulnerable
N = Not Vulnerable

0.5 0 0.5 Miles



Approved November 9, 2006



**White Bear Lake Drinking Water Supply Management Area
(DWSMA) MN-00483 - Variable Vulnerability**

Figure 12

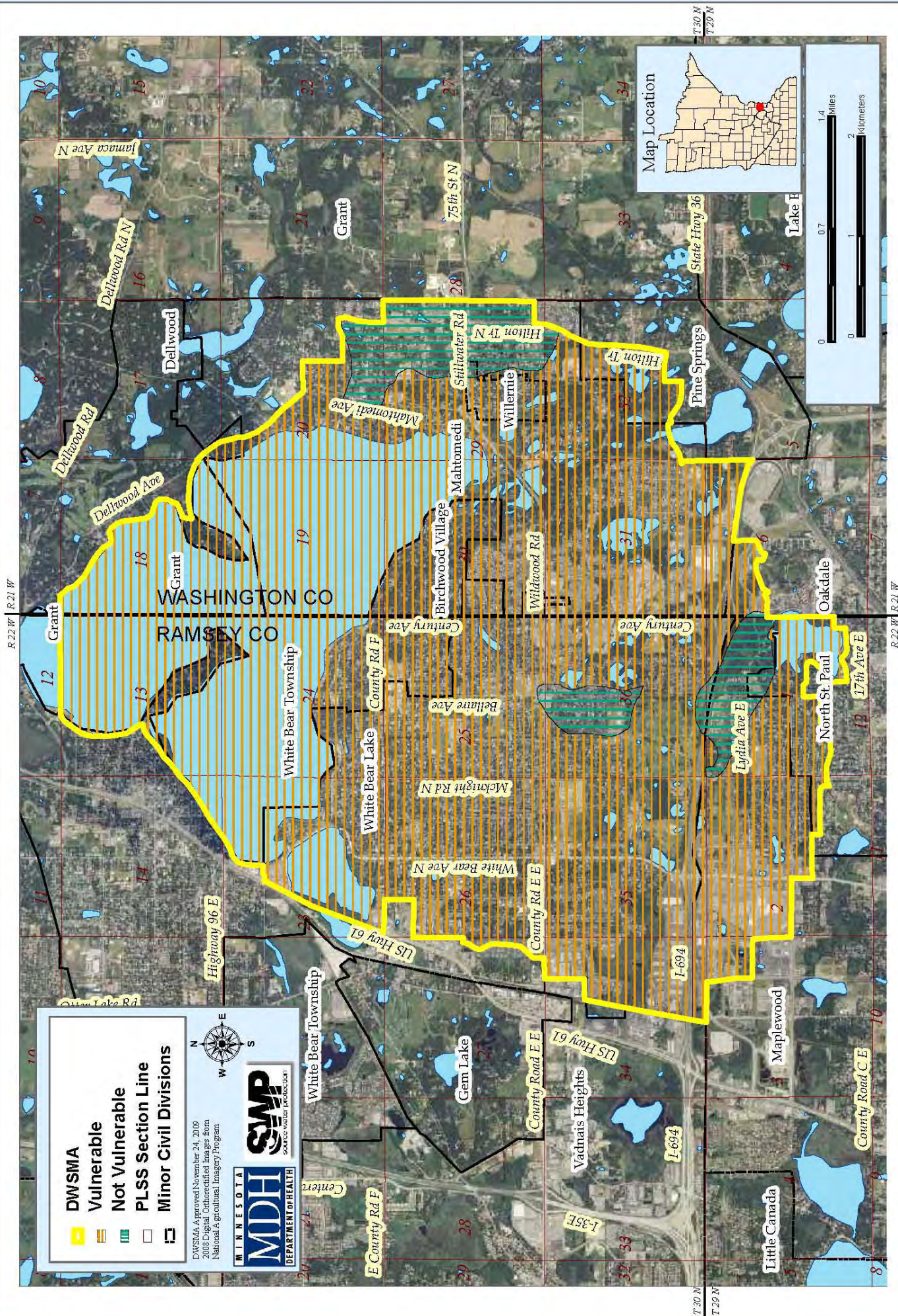


Figure 13

White Bear Township

Drinking Water Supply
Management Area
(DWSMA) MN-00448
10 year Time of Travel

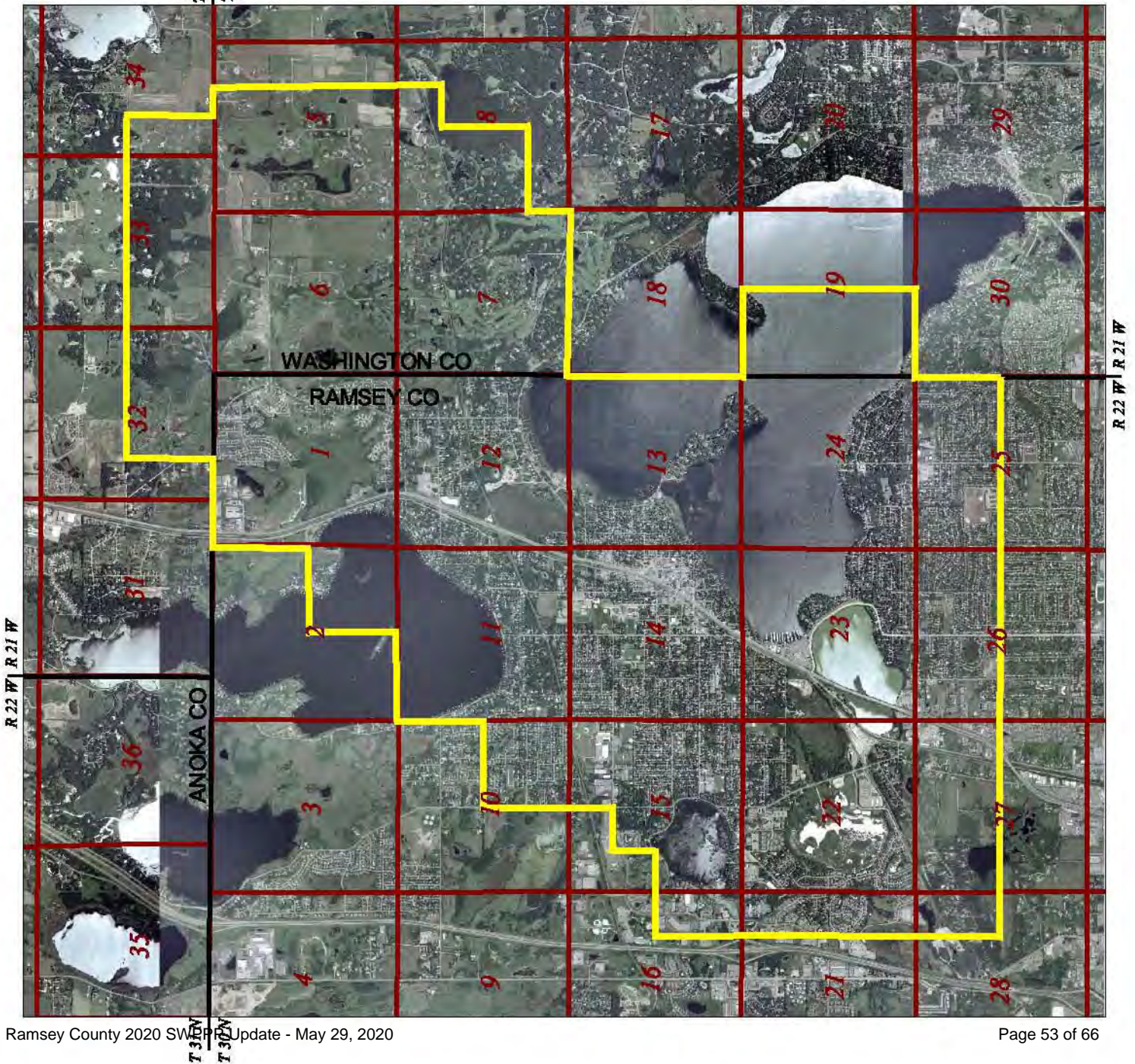
DWSMA
County

For Vulnerability Assessment
Contact MDH

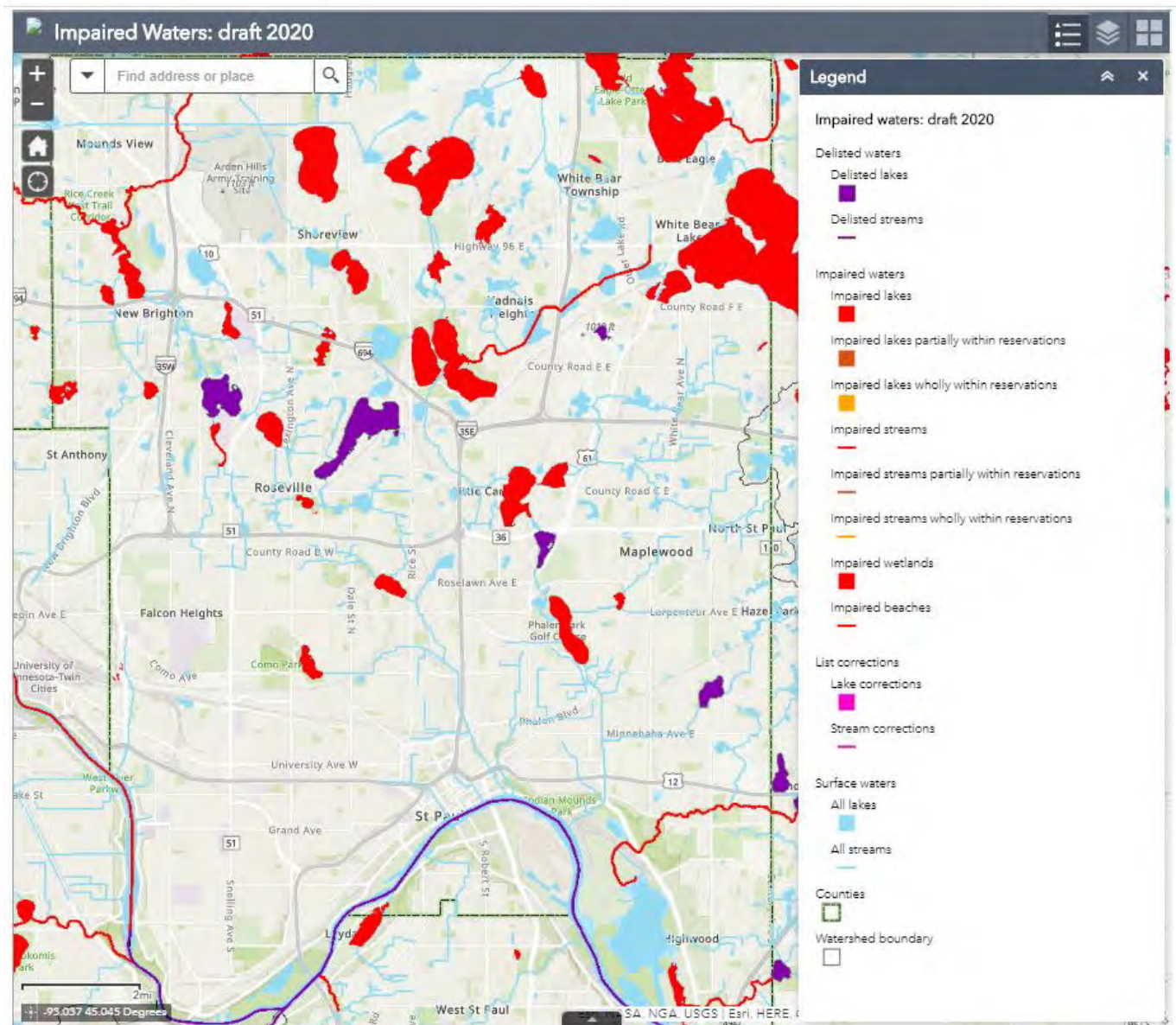
0.5 0 0.5 Miles



Approved May 26, 2009



Ramsey County 2020 SWPPP Update - May 29, 2020



Ramsey County 2020 Impaired Waters Inventory

Water body name	Water body description	Water body type	Year added to List	Basin	AUID	Use Class	County	HUC 8	Watershed name	Partial tribal designation	Affected designated use	Pollutant or stressor
Battle Creek	Battle Creek Lk to Pigs Eye Lk	Stream	2014	Upper Mississippi River, Upper Portion	07010206-01	2Bg, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Benthic macroinvertebrates bioassessments
Battle Creek	Battle Creek Lk to Pigs Eye Lk	Stream	2008	Upper Mississippi River, Upper Portion	07010206-01	2Bg, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Chloride
Battle Creek	Battle Creek Lk to Pigs Eye Lk	Stream	2014	Upper Mississippi River, Upper Portion	07010206-01	2Bg, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Fish bioassessments
Beaver	Lake or Reservoir	Lake	2008	Upper Mississippi River, Upper Portion	62-0016-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in fish tissue
Bennett	Lake or Reservoir	Lake	2012	Upper Mississippi River, Upper Portion	62-0048-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in fish tissue
Bennett	Lake or Reservoir	Lake	2006	Upper Mississippi River, Upper Portion	62-0048-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Nutrients
Como	Lake or Reservoir	Lake	1998	Upper Mississippi River, Upper Portion	62-0055-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in fish tissue
Como	Lake or Reservoir	Lake	2014	Upper Mississippi River, Upper Portion	62-0055-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Chloride
Como	Lake or Reservoir	Lake	2002	Upper Mississippi River, Upper Portion	62-0055-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Nutrients
East Vadnais	Lake or Reservoir	Lake	1998	Upper Mississippi River, Upper Portion	62-0038-01	1C, 2Bd, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in fish tissue
Fish Creek	Carver Lk to Unnamed (North Star) Lk	Stream	2014	Upper Mississippi River, Upper Portion	07010206-01	2Bg, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Escherichia coli (E.coli)
Gervais	Lake or Reservoir	Lake	1998	Upper Mississippi River, Upper Portion	62-0007-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in fish tissue
Gillfillan	Lake or Reservoir	Lake	2010	Upper Mississippi River, Upper Portion	62-0027-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Nutrients
Goose	Lake or Reservoir	Lake	2010	Upper Mississippi River, Upper Portion	62-0034-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Nutrients
ISLAND (BASIN N. OF I-694)	Lake or Reservoir	Lake	2012	Upper Mississippi River, Upper Portion	62-0075-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in fish tissue
ISLAND (BASIN N. OF I-694)	Lake or Reservoir	Lake	2002	Upper Mississippi River, Upper Portion	62-0075-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Nutrients
Island (Basin S. of I-694)	Lake or Reservoir	Lake	2012	Upper Mississippi River, Upper Portion	62-0075-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in fish tissue
Island (Basin S. of I-694)	Lake or Reservoir	Lake	2002	Upper Mississippi River, Upper Portion	62-0075-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Nutrients
Johanna	Lake or Reservoir	Lake	2010	Upper Mississippi River, Upper Portion	62-0078-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Perfluorooctane sulfonate (PFOS) in fish tissue
Jones	Wetland	Wetland	2008	Upper Mississippi River, Upper Portion	62-0076-01	2D, 3D, 4C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Aquatic plant bioassessments
Jones	Wetland	Wetland	2008	Upper Mississippi River, Upper Portion	62-0076-01	2D, 3D, 4C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Benthic macroinvertebrates bioassessments
Josephine	Lake or Reservoir	Lake	1998	Upper Mississippi River, Upper Portion	62-0057-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in fish tissue
Kasota Pond North	Lake or Reservoir	Lake	2014	Upper Mississippi River, Upper Portion	62-0280-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Chloride
Kasota Pond West	Lake or Reservoir	Lake	2014	Upper Mississippi River, Upper Portion	62-0281-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Chloride

Ramsey County 2020 Impaired Waters Inventory

Water body name	Water body description	Water body type	Year added to List	Basin	AUID	Use Class	County	HUC 8	Watershed name	Partial tribal designation	Affected designated use	Pollutant or stressor
Kohlman	Lake or Reservoir	Lake	2014	Upper Mississippi River, Upper Portion	62-0006-00	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Chloride
Kohlman	Lake or Reservoir	Lake	2002	Upper Mississippi River, Upper Portion	62-0006-00	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Nutrients
Little Johanna	Lake or Reservoir	Lake	2012	Upper Mississippi River, Upper Portion	62-0058-00	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Perfluorooctane sulfonate (PFOS) in fish tissue
Little Johanna	Lake or Reservoir	Lake	2014	Upper Mississippi River, Upper Portion	62-0058-00	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Chloride
Little Johanna	Lake or Reservoir	Lake	2004	Upper Mississippi River, Upper Portion	62-0058-00	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Nutrients
Mallard Marsh	Lake or Reservoir	Lake	2014	Upper Mississippi River, Upper Portion	62-0259-00	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Chloride
McCarron	Lake or Reservoir	Lake	2010	Upper Mississippi River, Upper Portion	62-0054-00	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in fish tissue
Mississippi River	Upper St Anthony Falls to St Croix R	Stream	1998	Upper Mississippi River, Upper Portion	07010206	2Bg, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in fish tissue
Mississippi River	Upper St Anthony Falls to St Croix R	Stream	1998	Upper Mississippi River, Upper Portion	07010206	2Bg, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in water column
Mississippi River	Upper St Anthony Falls to St Croix R	Stream	1998	Upper Mississippi River, Upper Portion	07010206	2Bg, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	PCBs in fish tissue
Mississippi River	Upper St Anthony Falls to St Croix R	Stream	2014	Upper Mississippi River, Upper Portion	07010206	2Bg, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Perfluorooctane sulfonate (PFOS)
Mississippi River	Upper St Anthony Falls to St Croix R	Stream	2008	Upper Mississippi River, Upper Portion	07010206	2Bg, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Perfluorooctane sulfonate (PFOS) in fish tissue
Mississippi River	Upper St Anthony Falls to St Croix R	Stream	2020	Upper Mississippi River, Upper Portion	07010206	2Bg, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Aluminum
Mississippi River	Upper St Anthony Falls to St Croix R	Stream	2016	Upper Mississippi River, Upper Portion	07010206	2Bg, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Nutrients
Mississippi River	Upper St Anthony Falls to St Croix R	Stream	2014	Upper Mississippi River, Upper Portion	07010206	2Bg, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Total suspended solids (TSS)
Mississippi River	Upper St Anthony Falls to St Croix R	Stream	1994	Upper Mississippi River, Upper Portion	07010206	2Bg, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Fecal coliform
North Long	Lake or Reservoir	Lake	1998	Upper Mississippi River, Upper Portion	62-0067-00	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in fish tissue
Phalen	Lake or Reservoir	Lake	2012	Upper Mississippi River, Upper Portion	62-0013-00	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in fish tissue
Pike	Lake or Reservoir	Lake	2014	Upper Mississippi River, Upper Portion	62-0069-00	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Chloride
Pike	Lake or Reservoir	Lake	2002	Upper Mississippi River, Upper Portion	62-0069-00	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Nutrients
Pleasant	Lake or Reservoir	Lake	2002	Upper Mississippi River, Upper Portion	62-0046-00	1C, 2Bd, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in fish tissue
Pleasant	Lake or Reservoir	Lake	2014	Upper Mississippi River, Upper Portion	62-0046-00	1C, 2Bd, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Nutrients
Priebe	Lake or Reservoir	Lake	2014	Upper Mississippi River, Upper Portion	62-0036-00	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Nutrients
Rice Creek	Unnamed lk (02-0041-00) to Long Lk	Stream	2006	Upper Mississippi River, Upper Portion	07010206	1C, 2Bdg, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Benthic macroinvertebrates bioassessments

Ramsey County 2020 Impaired Waters Inventory

Water body name	Water body description	Water body type	Year added to List	Basin	AUID	Use Class	County	HUC 8	Watershed name	Partial tribal designation	Affected designated use	Pollutant or stressor
Rice Creek	Unnamed lk (02-0041-00) to Long Lk	Stream	2004	Upper Mississippi River, Upper Portion	07010206-01	1C, 2Bdg, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Fish bioassessments
Snail	Lake or Reservoir	Lake	2002	Upper Mississippi River, Upper Portion	62-0073-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in fish tissue
South Long	Lake or Reservoir	Lake	1998	Upper Mississippi River, Upper Portion	62-0067-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in fish tissue
South Long	Lake or Reservoir	Lake	2014	Upper Mississippi River, Upper Portion	62-0067-02	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Chloride
South Long	Lake or Reservoir	Lake	2002	Upper Mississippi River, Upper Portion	62-0067-03	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Nutrients
Sucker	Lake or Reservoir	Lake	1998	Upper Mississippi River, Upper Portion	62-0028-01	1C, 2Bd, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in fish tissue
Turtle	Lake or Reservoir	Lake	2002	Upper Mississippi River, Upper Portion	62-0061-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in fish tissue
Unnamed	Lake or Reservoir	Lake	2014	Upper Mississippi River, Upper Portion	62-0022-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Nutrients
Unnamed	Lake or Reservoir	Lake	2010	Upper Mississippi River, Upper Portion	62-0126-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Nutrients
Unnamed	Lake or Reservoir	Lake	2008	Upper Mississippi River, Upper Portion	62-0237-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in fish tissue
Unnamed	Lake or Reservoir	Lake	1998	Upper Mississippi River, Upper Portion	62-0237-02	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	PCBs in fish tissue
Unnamed creek	Unnamed lk (62-0205-00) to Little Lk Johanna	Stream	2014	Upper Mississippi River, Upper Portion	07010206-02	2Bg, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Chloride
Unnamed creek (Lambert Creek)	Highway 96 to Vadnais Lk	Stream	2008	Upper Mississippi River, Upper Portion	07010206-03	2Bg, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Fecal coliform
Valentine	Lake or Reservoir	Lake	2014	Upper Mississippi River, Upper Portion	62-0071-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Life	Chloride
Valentine	Lake or Reservoir	Lake	2002	Upper Mississippi River, Upper Portion	62-0071-02	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Nutrients
Wakefield	Lake or Reservoir	Lake	2002	Upper Mississippi River, Upper Portion	62-0011-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Nutrients
West Vadnais	Lake or Reservoir	Lake	2014	Upper Mississippi River, Upper Portion	62-0038-01	1C, 2Bd, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Nutrients
White Bear	Lake or Reservoir	Lake	1998	Upper Mississippi River, Upper Portion	82-0167-01	2B, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Consumption	Mercury in fish tissue
Wilkinson	Lake or Reservoir	Lake	2010	Upper Mississippi River, Upper Portion	62-0043-01	1C, 2Bd, 3C	Ramsey	07010206	Mississippi River - Twin Cities		Aquatic Recreation	Nutrients

APPENDICES

Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas

Minnesota Department of Health

Introduction

Infiltration is widely promoted because it is a practice with demonstrated long-term value in managing stormwater. As a management technique, properly designed and executed infiltration practices convey several benefits, including the following (as identified in the Minnesota Stormwater Manual): 1) reducing the volume of stormwater runoff; 2) controlling and improving water quality; 3) recharging groundwater; 4) mitigating thermal affects on cold-water fisheries; and 5) attenuating peak flows. Infiltration is clearly a versatile and effective technique for addressing a wide range of stormwater issues. Accordingly, Minnesota Department of Health (MDH) encourages its use in most settings statewide.

Infiltration practices redirect stormwater into the subsurface, where it becomes groundwater. As most people in Minnesota use groundwater as a source of drinking water, the MDH would like to see care exercised in planning projects involving stormwater infiltration, especially in vulnerable wellhead protection areas.

Stormwater runoff often carries with it contaminants that can lead to adverse health effects. The types of contaminants vary widely depending on land use; common contaminants include nitrates, pathogens, metals, chloride, and hydrocarbons. When present at high concentrations, these contaminants can pollute groundwater supplies if infiltrated into the ground. The effects of such contamination can be devastating. An example involving not urban stormwater but runoff from agricultural fields in Ontario illustrates the danger posed by pathogens. Infiltration of the runoff led directly to bacteriological contamination of a well and the associated public water supply system. The resulting disease outbreak took several lives and sickened hundreds of others. This example not only demonstrates the potential for rapid connection between surface water and groundwater, but it clearly indicates that groundwater quality can be jeopardized by infiltration of stormwater from the ground surface.

Most of the public water supply systems that distribute drinking water in Minnesota rely on groundwater as their source. Drinking water protection activities are the responsibility in Minnesota of the MDH. As part of these efforts, MDH regulates wellhead protection planning activities carried out by public water suppliers in the state. One of the goals of wellhead protection planning is to determine the recharge area (i.e., the wellhead protection area) for a well and to manage that area in a manner consistent with safeguarding the drinking water supply.

Stormwater management occurs in urban or suburban areas and in developing communities where impervious surfaces begin to replace natural ground cover. This

document describes suggested considerations for evaluating projects that use infiltration to manage stormwater, with emphasis on how such projects may affect groundwater used for drinking water purposes in wellhead protection areas. A flowchart (Appendix A) is attached to help understand the process.

General Requirements

Federal, regional and state authorities regulate various aspects of the manner in which stormwater is handled, managed, and controlled in Minnesota. For example, the Minnesota Pollution Control Agency (MPCA) administers the Stormwater program, which regulates much of the management of stormwater through the use of permits. The MPCA, regional and local authorities are typically the governmental entities implementing and enforcing stormwater requirements. This guidance applies regardless of whether the stormwater management at the site is regulated or not.

The Minnesota Department of Health has no regulatory authority over most routine handling of stormwater, but does administer the Wellhead Protection Program and other drinking water protection programs. Wellhead protection planning is largely a local activity in Minnesota. Individual public water supply systems decide how to manage land use within wellhead protection areas. Certain land use activities may adversely affect groundwater supplies. Therefore wellhead protection strategies are balanced with aquifer vulnerability. As wellhead protection planning and stormwater management both involve a substantial amount of local government involvement and leadership, good opportunities exist for adopting a consistent approach in the application of each.

Assembling Existing Information

This document is intended for use as guidance for local authorities in evaluating stormwater infiltration projects. Prior to doing so, existing information must be gathered, as described in this section.

- *Is your proposed project in an approved wellhead protection area?* Information in a wellhead plan may help to evaluate proposed infiltration projects. Copies of the report are usually kept with the wellhead protection manager for the public water supplier. While municipalities are typically the largest groundwater users for public consumption, other entities that may have wellhead plans are schools, mobile home parks, and large businesses or employers. Step 1, below, describes how to identify wellhead activities in your area of interest.
- *What aquifer is used by drinking water supply wells in the area of the proposed infiltration?* It is important to know the aquifer used by area wells because in some parts of the state, many potential aquifers are available and depending on local geology, each aquifer may have a different sensitivity to activities at the ground surface.
- *Where is the aquifer(s) vulnerable to contamination from activities at the land surface?* Vulnerability means the degree to which the aquifer is likely to be affected by activities at the ground surface. A wellhead protection plan

distinguishes between zones within the wellhead protection area that are vulnerable from those that are not. Understanding this characteristic helps in evaluating the risk posed by activities like stormwater management.

- *What land uses exist or are proposed for the area generating stormwater?* Local authorities are the best source of information on local land use. Land uses vary in their potential to generate contaminants in stormwater runoff. For example, potential contaminants from industrial or commercial areas are far different from those that may be generated from park or residential areas. The Minnesota Stormwater Manual (links in Appendix B) describes certain land uses that it terms “potential stormwater hotspots (PSH)” that may be incompatible with infiltration in wellhead protection areas. Land use is very hard to characterize broadly. Accordingly, site-specific considerations should be made wherever possible. Consult the Minnesota Stormwater Manual for information on land uses and associated stormwater problems.
- *What are the contaminants of concern in the stormwater and can contaminants be managed?* Do the stormwater management protocols identify any type of pre-treatment that may help to mitigate contaminants in the runoff and are they appropriate for the types of contaminants that are likely to be present in the stormwater?

Each of these items is considered as part of the evaluation process that MDH proposes for considering stormwater infiltration projects in vulnerable wellhead protection areas. The process is described below and is summarized in the flowchart attached as Appendix A.

Process for Evaluating Stormwater Infiltration Projects

Step 1: Determine if any part of the proposed infiltration site is within a vulnerable wellhead protection area (WHPA) or drinking water supply management area (DWSMA) as defined by Minnesota Rules (4720.5100-5590). This information is available from the Wellhead Protection Manager at the public water supplier or from MDH staff (651-201-4700). Also, the wellhead protection plan likely contains a section describing the vulnerability assessment, which describes how the vulnerability is determined and how it may vary throughout the DWSMA.

The term ‘infiltration site’ refers to any structure or device designed to transfer surface waters to the subsurface. In practice, these facilities range in size from rain gardens designed to handle runoff from residential rooftops to basins collecting runoff from large commercial areas. The scale of the infiltration project, in terms of the volume of stormwater handled, clearly must be considered, along with land use, as part of this review process. MDH generally encourages multiple small-scale infiltration projects distributed over a large site in lieu of one large structure to handle stormwater from a site.

If yes, proceed to Step 2. Yes means that the infiltration site is in close proximity to wells used to supply a public water supply system. The wellhead report may indicate the travel time in years between the proposed site and the wells. A vulnerable determination (very high, high, or moderate vulnerability) means the

aquifer will likely be affected by activities at the ground surface. Hence, the proposed infiltration needs to be considered in more detail.

If no, it is unlikely that the proposed stormwater management project will affect drinking water supplies for a public water supply system (with a defined wellhead area), but the project still must comply with MPCA and local requirements for stormwater handling.

Step 2: Does the aquifer receiving the water from the infiltration basin exhibit fracture or solution-enhanced groundwater flow conditions (secondary porosity features)? This means groundwater flow through rocks or other geologic materials exhibiting porosity is dominated by fractures or dissolution features (examples include the Prairie du Chien Dolomite and the Galena Limestone). Aquifers characterized by secondary porosity can display extremely rapid groundwater travel times that can put a well at risk in a matter of hours and can have complicated and tortuous flowpaths that are difficult to predict without special testing. Infiltration of stormwater within WHPAs is not recommended in such settings, especially if karst features exist. Infiltration might be acceptable if the karst aquifer is covered by 100 feet or more of other materials. The Minnesota Stormwater Manual identifies karst settings as especially problematic in managing stormwater. Appendix B contains web links to the complete stormwater manual, which should be consulted for more background on managing stormwater in karst areas, as well as maps showing the location of Minnesota's karst areas. However, the manual does not specifically cover the issue of stormwater infiltration in wellhead protection areas of a fractured or solution-enhanced aquifer.

If no, proceed to Step 3.

If yes, infiltration may not be appropriate for this setting. Consider other stormwater handling procedures such as stormwater retention and conveyance outside of the WHPA or moving the infiltration area to a non-vulnerable part of the DWSMA. Additional handling alternatives are presented in the Minnesota Stormwater Manual (see reference in Appendix B).

Step 3: Is the proposed infiltration site within the 1-year time-of-travel (emergency response zone) as designated by MDH? A 1-year travel time is significant for several reasons. Most pathogens are not viable in the groundwater after 365 days. So a 1-year travel time represents a margin of safety that will allow some contaminants to attenuate or, additionally, sufficient time for local authorities to react.

If no, proceed to Step 4.

If yes, infiltration is not appropriate in this setting as insufficient time is available after infiltration to cause pathogens to die off or for local authorities to react to a spill. Extenuating circumstances here might be the presence of a sufficiently thick unsaturated zone between the water table and the base of the infiltration site that pathogen attenuation would take place.

Step 4: What current or proposed land uses drain into the infiltration site?

Classify the predominant land use upgradient of the infiltration site into one of the following categories:

1. Commercial and industrial;
2. Transportation corridors;
3. Forest, parkland, open space;
4. Low density residential;
5. High density residential; and
6. Golf course, active agricultural (i.e., cropland, feedlots).

Stormwater infiltration in commercial and industrial areas, as well as in transportation corridors is only appropriate if the collection and infiltration system is designed to allow spill containment. MPCA permitting requirements currently prohibit infiltration from industrial areas containing exposed potential contaminant sources or from vehicle fueling or maintenance areas. Categories 3 through 6 represent land uses from which infiltrated runoff is not as likely to contain contaminants that may adversely affect human health if introduced into a drinking water supply, although this may depend on 1) the degree to which land management BMPs have been adopted, and 2) stormwater pretreatment measures. The use of stormwater infiltration devices may be acceptable in areas where they would otherwise be inappropriate if flows from, say, rooftop drainage could be collected for infiltration separate from runoff from industrial areas.

The land use categories presented here are quite broad and there will be differences in the kinds of contaminants that could be generated in runoff from each. The Minnesota Stormwater Manual contains a lengthy discussion (chapter 13) about potential stormwater hotspots (PSHs), which are land uses that have the potential to affect the water quality of stormwater. The Minnesota Stormwater Manual describes conditions under which infiltration of runoff from land uses containing PSHs as a practice is not appropriate. Users of this guidance should be familiar with the PSHs identified in the Minnesota Stormwater Manual as a means of providing context for evaluating general land uses. While the manual identifies many PSHs, the list is not exhaustive, and each land use should be considered on its own merits.

Step 5: (This step does not apply to some land uses – see flow chart): **Are emergency procedures for containment of spills established and acceptable?** The primary concern here relates to transportation corridors. Fuels, chemicals, and other potentially hazardous materials all are moved on roadways and railways. Accidents that happen in unpredictable locations have the potential to affect groundwater. While it may not be practical to design protections against the eventuality of all possible such accidents, local and regional authorities should have a means of responding should a spill occur.

If no, infiltration is not appropriate in this setting.

If yes, infiltration may be acceptable but only if contingency responses for spill containment are included in the site planning process.

Step 6: Are site planning, BMPs, pre-treatment, or secondary containment measures, or natural attenuation characteristics in the vadose zone acceptable to meet federal drinking water standards? Every infiltration device or basin should be designed to do as much as is practical at every opportunity to limit the pollutant load to the subsurface. This extends to maintaining the infiltration device so its performance does not deteriorate with age. Regardless of the approach used, the goal is that the water exiting the infiltration device and recharging the groundwater system should meet federal drinking water quality standards. This goal is more stringent than is required by MPCA for routine consideration of stormwater management, but is warranted if a large proportion of the water pumped for drinking water purposes is comprised of infiltrated stormwater. However, it should be noted that drinking water standards are not enforceable except in the water delivered in the public water supply system. Dilution and other attenuation processes may significantly impact concentrations between where stormwater infiltration takes place and where the well pumps water for drinking water purposes.

If no, infiltration is not appropriate in this setting.

If yes, planned infiltration appropriate unless site conditions differ in a manner likely to affect stormwater quality adversely thereby not meeting drinking water standards.

Special Situations

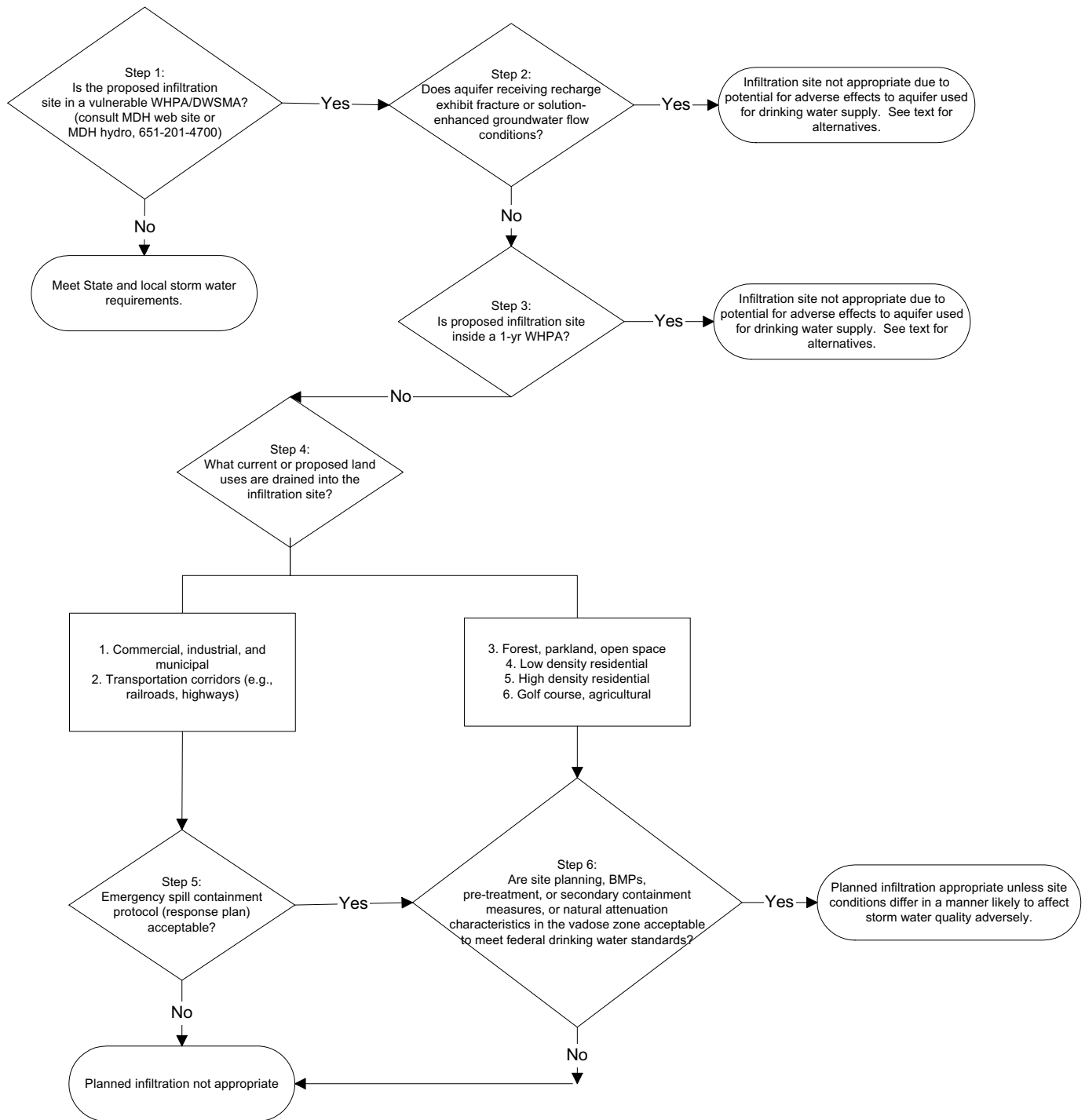
Certain circumstances may dictate a response to the proposed infiltration different from the recommendations of this guidance. For instance, a project involving the infiltration of volumes of water that are large relative to the amount pumped by a nearby well may leave little room for natural processes to dilute the stormwater. Or perhaps specialized predictive tools, such as a groundwater flow model, are available that can help to forecast the effects of the infiltration. Such tools may make it easier to interpret likely effects of the proposed infiltration. While it is impossible to predict all such extenuating circumstances, it will be the role of the user to decide how to incorporate such conditions in the analysis of site-specific infiltration proposals.

Contacting Minnesota Department of Health Staff

Appendix B lists various resources available to help work through this guidance, including MDH staff contacts. MDH hydrologists are generally assigned to specific regions of the state (see Appendix B) but additional assistance is available by calling the Source Water Protection Unit at 651-201-4700.

Appendix 6 .

A Flow Chart for Evaluating Proposed Stormwater Infiltration Projects in Areas with Vulnerable Groundwater



Note: This flow chart intended for use in conjunction with MDH guidance on evaluating storm water infiltration projects in vulnerable wellhead protection areas.

Appendix C - Hydrologist Areas, Wellhead Protection

