City of Saint Paul's

2017 Stormwater Permit Annual Report

Minnesota Pollution Control Agency

National Pollutant Discharge Elimination System

Permit No. MN 0061263

June 2018

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Background

The National Pollutant Discharge Elimination System (NPDES) program was created in 1990 by the United States Environmental Protection Agency to safeguard public waters through the regulation of the discharge of pollutants to surface waters including lakes, streams, wetlands and rivers. The Minnesota Pollution Control Agency (MPCA) is the local authority responsible for administering this program. Under this program, specific permits are issued to regulate different types of municipal, construction and industrial activities.

The MPCA issued the first Municipal Separate Storm Sewer System (MS4) NPDES Permit to the City of Saint Paul on December 1, 2000. The City's MS4 Permit was reissued on January 21, 2011. The reissued permit required submittal of a revised Stormwater Management Program (SWMP), which was approved by the MPCA in October of 2013.

The Saint Paul SWMP was developed and is administered by the City Departments that are responsible for permit activities. Included are the Public Works Department, Saint Paul Parks and Recreation Department and the Department of Safety and Inspection. These stakeholders are jointly responsible for the completion of the required permit submittals. The Department of Public Works provides program coordination. The Permit also requires public input on the development of the priorities and programs, and adoption by Council Resolution of the Annual Report.

This Report provides documentation of the activities conducted in 2017.

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MCM 1: Public Education & Outreach

BMP 1.1: STORMWATER PUBLIC EDUCATION ACTIVITIES

Description

The City implements public education and outreach programs to increase the awareness of stormwater pollution impacts on waters of the state and to encourage changes in public behavior to reduce impacts to receiving waters.

Assessment Process for Annual Reporting

- Narrative of public education and outreach events and activities.
- Narrative of multilingual components of documents, events and activities.
- Listing of public education materials developed.

2017 Activities

Metro WaterShed Partners

Saint Paul has been an active Metro WaterShed Partners since 1997. Metro WaterShed Partners is an innovative, dynamic coalition of over 40 public, private and non-profit organizations in the Saint Paul/Minneapolis metropolitan area that, through collaborative educational outreach, teaches residents how to care for area waters. This partnership has leveraged grant dollars and staff time to develop educational literature and a nationally recognized interactive display. The WaterShed exhibit was at schools and events in and around the Saint Paul area in 2017. The WaterShed exhibit is also at the Minnesota State Fair in the Department of Natural Resources Building each year. In addition, the WaterShed Partners partnered with Hamline University to develop and host the StormDrain Goalie and exhibit in the Eco Experience building at the Minnestoa State Fair. This exhibit raised awareness about the importance of protecting water in Minnesota and asks people to commit to take action at home to prevent run-off pollution.

Clean Water Minnesota

To assist cities with educational efforts, Metro WaterShed Partners is conducting Clean Water Minnesota, a collaborative outreach project of the Metro WaterShed Partners. This type of collaboration allows for the development of a consistent message, which is distributed cost effectively across Saint Paul/Minneapolis metropolitan area. The campaign was funded in 2017 with money raised from local units of government, including the City of Saint Paul. The 2017 report for the Metro Clean Water Campaign is found in the appendix.

Adopt-a-Drain

In 2017, the City of Saint Paul once again partnered with the Center for Global Environmental Education at Hamline University and the Capitol Region Watershed District to develop, and administer, the Adopt-a-Drain Program. This Program allows residents to adopt a storm drain in their neighborhood, and pledge to keep it free of pollutants. The Program consists of an online map of storm drains in Saint Paul, and a simple interface that allows people to sign up to “adopt”

a storm drain. Adopted storm drains are flagged with the name of the resident who has adopted it on an online map. In 2017, the partnering agencies increased the social media marketing efforts, timing information to coincide with activities such as street sweeping.

The program includes the following components:

- Create and produce outreach materials including: yard signs, recruitment materials, automatic confirmation email for registrants and four seasonal reminder messages to be sent to program participants.
- Conduct focus groups of people within the target neighborhood to evaluate the draft outreach materials and to guide the framing of the program.
- Track participation in the program in response to the door hangers.
- Evaluate program by conducting a follow-up survey within the pilot neighborhood.

Annual Spring Parks Clean-Up and Neighborhood Litter Campaign

The Saint Paul Parks and Recreation Department hosts an Annual Spring Parks Clean-Up every year during the month of April. The City provides clean-up supplies, trash removal, recycling services and a “thank you” celebration. During this event volunteers remove litter from Saint Paul's Parks and Recreation Centers. Without the help of volunteers during the cleanup, trash accumulates in these natural areas harming wildlife, polluting lakes and rivers and detracting from the beauty of our community. This event is a fun and effective way to improve the environment in our community.

Waterfest

The City of Saint Paul is a sponsor of Waterfest, which is a family festival put on each May at Lake Phalen by the Ramsey-Washington Metro Watershed District. The Watershed District estimates that 1000 people attend this free family festival. The Parks Department and the Public Works Department assist with this event.

Public Works Open House

The City of Saint Paul hosted a Public Works Open House in May of 2017. Various Public Works and Parks Department Equipment was on display including: Street Sweepers, Combination Jet-Vactors, CCTV Camera Trucks, Catch Basin Cleaners, Plowing/Deicing Equipment, etc. Additionally, various Stormwater Management Partners were in attendance including: Friends of the Mississippi River, Center for Global Environmental Education, etc.

MCM 1: Public Education & Outreach

BMP 1.2: STORM DRAIN STENCILING & WATER QUALITY EDUCATION PROGRAM

Description

The objective of this program is to educate the participants and the public by stenciling storm drains with the message "Storm Drains – Keep 'em Clean," and distribute multi-lingual educational door-hangers to residents and businesses in the stenciled neighborhoods in the City of Saint Paul.

Assessment Process for Annual Reporting

- Report on number of volunteers, storm drains stenciled and door hangers distributed.

2017 Activities

Storm Drain Stenciling Education Program

The City of Saint Paul has been conducting a successful storm drain stenciling education program since 1993. The Friends of the Mississippi River (FMR) coordinates this program for the City. FMR is the leading citizens' organization working to protect the Mississippi River and its watershed in the Twin Cities area. In 2017, FMR coordinated the stenciling of 2,890 storm drains and distribution of 7,529 door hangers in partnership with 1,147 volunteers. The 2017 Stenciling Program Report and a copy of the door hanger are found in the Appendix.

The storm drain stenciling project is designed to meet the following three objectives:

- To involve Saint Paul residents in hands-on learning experiences about urban runoff pollution and ways to prevent it.
- To facilitate school service learning initiatives that include storm drain stenciling, litter cleanups and/or habitat restoration as a key components.
- To stencil storm drains with the message "Keep 'em Clean-Drains to River and distribute educational door hangers to residents and businesses in the stenciled neighborhoods in the City of Saint Paul.

The 2017 program objectives were implemented through the following activities:

- Coordinated the stenciling of storm drains and distribution of door hangers in partnership with volunteers from school groups, community groups, and residents of the City of Saint Paul.
- Provided a 15 to 30 minute educational orientation to each volunteer group.
- Provided educational presentations and workshops on urban runoff pollution to volunteers, classrooms and other community members.
- Coordinated the purchase, maintenance and storage of all stenciling and workshop supplies.

Storm Drain Mural Project

In 2017 the City of Saint Paul, through the Public Works and Parks Departments, coordinated with FMR on the installation of a Storm Drain Mural located at Como Lake. The project involved: engagement with a local artist, public process with a neighborhood group, and installation of Mural at a public event. The public event allowed area residents to learn about water quality, the interaction of stormwater and Como Lake, and observe the artist create the Mural.

MCM 2: Public Participation & Involvement

BMP 2.1: Encourage & Solicit Input from the Public

Description

Saint Paul citizens are actively engaged in many aspects of the City's governance, being involved through commissions, district councils, volunteer organizations and electronic communications. Other public involvement techniques include workshops, web page accessibility and outreach by elected officials. The objective of this program is to make the SWMP and related documents available to the public and to provide a process for public input in the development and implementation of the SWMP.

Assessment Process for Annual Reporting

- Summary of public input and the City's response.
- Annual meeting attendance.
- Adopted council resolution.
- Summary of web site updates.

2017 Activities

The Annual Report is a coordinated effort by various City Departments. Information in the Annual Report provides documentation of the activities conducted in the previous year.

The City holds a public meeting to provide an opportunity for public input regarding the Annual Report. A notice of the availability of the Report for review and public comment is sent to all Saint Paul neighborhood organizations, to the governmental entities that have jurisdiction over activities relating to stormwater management, and to other interested parties.

Once finalized, the Annual Report is also made available on the web site. All testimony presented at the public meeting, and all written comments received, are recorded and given due consideration. The public comments, response to comments and a copy of the council resolution adopting the Stormwater Permit Annual Report are submitted each year to the Minnesota Pollution Control Agency.

MCM 3: Illicit Discharge Detection & Elimination

BMP 3.1 PROHIBITED DISCHARGE MANAGEMENT PROGRAM

Description

The objective of this program is to effectively prohibit through ordinance or other regulatory mechanism and appropriate enforcement procedures, the introduction of non-stormwater discharges into the MS4.

Assessment Process for Annual Reporting

- Number of reported or discovered prohibited discharges, number investigated and number eliminated.
- Development of procedures to address prohibited discharges.
- Training events and staff trained.

2017 Activities

Spill Response

The Sewer Maintenance section of the Sewer Utility and the Saint Paul Fire Department personnel typically serve as the first responders to a spill event. The immediate goals of this response are safety, containment of the spill, recovery of hazardous materials and collection of data for use in assessment of site impacts. Recovery efforts can take several forms, but typically fall into two broad categories: recovery for disposal and the use of absorbents or other media to collect hazardous waste for disposal.

The life cycle of an event requires City personnel to work as a team, utilizing all available resources to protect residents, the environment and property. Each event is followed by a post-action debriefing to determine the cause of the event, to identify measures to improve the City's response, and to determine the means to limit future occurrences. Outside agencies and private emergency response contractors are incorporated as needed. Spills that fall within the minimum reporting requirements are reported to the Minnesota Pollution Control Agency (MPCA) Public Safety Duty Officer. For these spills, an Oil and Hazardous Materials Spill Data form must be completed within 24 hours, or by the next business day. The completed forms are used to document the type of spill, as well as the response to the spill. The Sewer Utility follows the spill reporting policy, which is signed off on by employees as part of the annual policy review.

Prohibited Discharges

Pollution prevention and control is achieved through educational efforts, inspections and coordinated community outreach. These activities may include enforcement, pursuant to applicable City codes, and coordination with other regulatory agencies at the county, state and federal levels. Enforcement yields identification of the responsible party, documentation of clean-up activities, and efforts to reduce the flow of pollutants from illegal dumping and disposal. Complaints are received from the public, City staff and other government agencies.

Department of Safety and Inspections and Public Works staff respond to reports of unauthorized discharges and illicit connections. The City adopted an ordinance (see Appendix for ordinance and fact sheet) in 2013 defining allowable discharges to the storm sewer system.

The City's Right of Way inspectors responded to complaints resulting from utility contractors dewatering or saw cutting and construction site dewatering and tracking. Each year at the Utility Coordination Meeting requirements and BMPs are reviewed with contractors. A handout is provided, which is found in the Appendix. The ROW inspectors enforce these requirements in the field, respond to complaints and coordinate with DSI to address issues originating on private property.

In 2017, DSI sent out 69 leaf letters to properties throughout the City. This letter states that a complaint was received by the City of leaves being raked into the street. It explains these leaves negatively impact downstream water bodies and gives info about compost sites in Ramsey County. The first letter is a warning and subsequent complaints will result in a fine to the property owner.

Discharges addressed in 2017 can be found in the Appendix.

Staff Training

- The Department of Public Works hosts an Annual Utility Coordination meeting to facilitate utility and street system reconstruction projects. A component of this meeting includes stormwater management items such as erosion and sediment control in the public Right-of-Way, etc. Attendees are comprised of various municipal employees and utility businesses.
- In 2017, various Sewer Utility personnel attended Illicit Discharge Management (IDDE) Training conducted by the University of Minnesota Erosion and Stormwater Management Certification Program.
- In 2017, various Sewer Utility personnel attended the Sewer Collection System Operators Conference conducted by the Minnesota Pollution Control Agency.

MCM 3: Illicit Discharge Detection & Elimination

BMP 3.2 STORM SEWER SYSTEM MAP & INVENTORY

Description

The objective of this program is to minimize pollutants in stormwater through the effective use of electronic tools for data storage, retrieval, display and analysis. An electronic inventory and map and electronic inventory is under development to support numerous stormwater management system responsibilities and activities, including operation and maintenance, design, hydrologic and hydraulic modeling, Gopher State One Call locates, capacity, condition and water quality studies, illicit discharge detection and management of spills.

Assessment Process for Annual Reporting

- Report on status of electronic inventory and mapping completion.

2017 Activities

Storm Drain System Infrastructure

Approximately 150 years ago, Saint Paul first constructed portions of a sewer system that today comprises 450 miles of storm sewers and over 26,000 catch basins. The system was designed to satisfy the City's obligation to provide reasonable drainage of stormwater and to prevent street flooding, which satisfied the City's responsibility to protect neighboring properties, allow for normal traffic flows, and prevent damage to streets, sidewalks and boulevards.

The Department of Public Works is developing a computer based asset and infrastructure management system. This system will include both the storm and sanitary sewer networks. When the asset and infrastructure management system is complete, the City will have the data and systems necessary to accurately determine the sub-watershed for each of the outfalls. The Sewer Utility is in the process of converting its hand drawn sewer maps to an electronic format. All of the converted sewer data was checked for accuracy and is now going through a QA/QC process.

Watershed and Storm Sewer Outfall Inventory

An inventory of Saint Paul's storm sewer outfalls is found in the Appendix. This inventory includes the outfall identification number, outfall name, watershed name, size of pipe and drainage area. The following information is provided in the Outfall Inventory found in the Appendix for each of the 23 watersheds in St. Paul: drainage area, land use types and distribution, population, percent impervious surface area, and the runoff coefficient. The following table shows the total number of discharge points to each water body in Saint Paul.

Discharge points to receiving waters

Receiving Water	Total Discharge Points
Bridal Veil Creek	1
Mississippi River	59
Upper Lake	1
Crosby Lake	3
Fairview North Pond	2
Lake Como	11
Loeb Lake	1
Lake Phalen	5
Beaver Lake	4
Suburban Pond	2
Little Pig's Eye Lake	1
Pig's Eye Lake	5
Battle Creek	11

Stormwater Ponds

A map showing the stormwater ponding areas in the City of Saint Paul is found in the Appendix. The Appendix also contains the tributary area and design capacity for each City ponding area and a list of ponding areas by watershed.

NPDES Permitted Facilities

Facilities in Saint Paul that are issued NPDES permits by the MPCA are found in Appendix.

Industrial Land Use

Industrial land uses may generate higher concentrations of hydrocarbons, trace metals, or toxicants than are found in typical stormwater runoff. Maps showing the areas of industrial land use in Saint Paul and potential pollutant source locations are included in the Appendix.

MCM 3: Illicit Discharge Detection & Elimination

BMP 3.3 DRY WEATHER FIELD SCREENING PROGRAM

Description

The objective of this program is to develop, and as necessary continue to develop, and implement a dry weather field screening program to detect and eliminate non-stormwater discharges, including illegal dumping, to the system. The City shall inspect each outfall at least once over the five-year term of the current permit for evidence of illicit discharges.

Assessment Process for Annual Reporting

- Number of outfalls inspected.
- Number of reported or discovered prohibited discharges, number investigated and number eliminated.
- Narrative summarizing dry weather flow inspections, activities, results and responses.
- Training events and staff trained

2017 Activities

Detection and Removal Screening Program

The field screening program to detect and investigate contaminated flows in the storm drain system is part of the City's daily operations. Sewer Maintenance crews routinely inspect and clean storm drain structures throughout the City. In addition, inspections of flows that generate unusual odors, stains, and deposits are included in the annual outfall inspection program.

Any suspect flows are then reported to appropriate City staff for further investigation. These combined efforts result in an annual screening of more than 20% of City drainage areas.

The City works with the Capitol Region Watershed District to conduct a stormwater monitoring program in Saint Paul as well as conducting its own BMP monitoring program. The best avenue for a continued effective screening program in the City of Saint Paul, without duplication of services, is to continue to use current practices, and to explore the development of certain aspects of the program to improve enforcement results.

The City investigates prohibited discharges as part of its regular tunnel, outfall and pond inspection program. The City also investigates complaints and issues identified in the monitoring program. The Department of Safety and Inspections carries out enforcement on property code violations. Under Chapter 45 of City Code, the City is authorized to collect via assessment its cost of abating property-related health and safety problems when an owner has failed to perform the work following notice by the City. The City may assess property owners to recover unpaid city charges.

Continue existing programs as outlined in the program overview, and continue to develop and improve documentation of program activities. GIS mapping will be implemented as a tool to support various activities. Information that is gained through the inspection program will be used to compile data on non-stormwater discharges, storage of hazardous materials, and activities or operations that may be potential water pollution point sources. The City will continue to investigate prohibited discharges as part of its regular tunnel, outfall and pond inspection program.

Standard Operating Procedures and Checklists

- The Parks Department uses a Spill Reporting form and instructions (See Appendix). Form is completed in the event of a spill if petroleum or hydraulic spills greater than five gallons, and other materials spill of any size. The Minnesota Duty Officer is notified, as required, in the event of a reported spill.
- The Parks Department and Public Works Department have Clean Water Policies which are distributed, reviewed, and signed by all field staff. (See Appendix)
- The Sewer Utility began developing a Field Manual in 2017 to aid staff in investigating and responding to Illicit Discharges. The Field Manual is expected to be completed in early 2018, and will include a training component.

MCM 3: Illicit Discharge Detection & Elimination

BMP 3.4 INDUSTRIAL ACTIVITIES MANAGEMENT PROGRAM

Description

The objective of this program is to minimize the discharge of pollutants from industrial activities by administering and enforcing ordinances, exercising municipal authority over activities with high potential for stormwater pollution, and providing information to assist the MPCA in carrying out its industrial permitting program.

Assessment Process for Annual Reporting

- Number of water and land pollution complaints.
- Number of discharge incidents reported to MPCA Industrial Permit Program.
- Industrial facilities inventoried.
- Stormwater hotspots inventoried.
- Number of discharges eliminated from industrial facilities.

2017 Activities

A map of the industrial land use areas in the City is included in the Appendix. Complaints in the ROW are handled by the Public Works ROW inpectors. Those that originate on private property are referred to DSI. The City coordinates with the MPCA Industrial Stormwater Program for sites that are permitted by the MPCA. Discharges addressed in 2017 can be found in the Appendix.

MCM 4: Construction Site Erosion & Sediment Control

BMP 4.1: DEVELOPMENT & REDEVELOPMENT CONTROL PROGRAM

Description

The objective of this program is to minimize the discharge of pollutants from construction sites disturbing one acre or more by requiring erosion prevention and sediment control measures. Chapter 52 of the Saint Paul Code of Ordinances requires projects disturbing one acre or more to provide for erosion and sediment control during construction. Sites one or more acres in size are also required to obtain NPDES General Construction Permits from the Minnesota Pollution Control Agency, the Capitol Region Watershed District and the Ramsey-Washington Metro Watershed District.

This program encompasses a variety of individuals responsible for water quality concerns from construction activities. These individuals include designers of erosion control plans; staff responsible for plan review; and, field inspectors with municipal authority over contractors.

Assessment Process for Annual Reporting

- Report on number of site plans reviewed and approved.
- Report on number of site erosion and sediment control inspections recorded.
- Report on development and implementation of written procedures for site plan review and erosion and sediment control inspections.
- Report on number of non-compliance incidents that were identified and addressed by municipal inspectors.
- Report on development of citizen complaint process and number of citizen complaints received and addressed.
- Report on number of staff trained related to construction site erosion and sediment control.

2017 Activities

Program Overview

Saint Paul Code of Ordinances, Part II – Legislative Code, Title VI - Building and Housing, Chapter 52 Stormwater Runoff contains erosion and sediment control requirements, and stormwater management requirements for new developments and other land-disturbing construction activities. Construction activities and new development projects are reviewed through the City's Site Plan Review process. This review provides comments that are integrated into a final plan submittal that is subsequently routed to the City's Departments for approval. The Department of Safety and Inspections reviews projects for compliance with the erosion & sediment control requirements and water quality requirements. The Sewer Utility reviews projects for rate control, flood protection and capacity issues.

Site Plan Review

DSI and Public Works staff provide a detailed review of site plans, and track process to identify stormwater management opportunities. Additionally, DSI and Public Works staff provide a review of all site plans from a sustainable water quality perspective. During 2017, City Departments reviewed 94 site plans, of which 60 received final approval with the appropriate permits issued. Continued attention to erosion and sediment control plan submittals, along with increased awareness in the industry, provided for better compliance during site inspections.

Requirements

The ordinance addresses development sites, utility excavations, demolition projects and all other land disturbing activities of 1 acre or more. For disturbances less than 1 acre, erosion and sedimentation control practices must be installed and inspected before land disturbing activities begin. Sites disturbing more than 10,000 square feet need to submit an erosion and sediment control plan as part of the City's Site Plan Review process. City Zoning Code Chapter 33 requires a grading permit for the placement, movement and removal of fifty cubic yards of fill and to incorporate stabilization methods on soil stockpiles greater than 10 cubic yards, if left for more than 10 days.

Inspection and Enforcement

Ongoing site inspections are performed by Public Works ROW and DSI inspectors. In 2017, DSI inspectors conducted 148 erosion control inspections at 92 properties.

Inspectors may issue a warning notice citation or a "Stop Work Order". Failure of the permittee to comply with the ordinance will constitute a violation and will be considered a nuisance pursuant to the laws of the State of Minnesota. If there is a demonstrated failure to comply, the City reserves the right to terminate a permit at any time. The City then has the option of proceeding with the necessary restoration of the site. This restoration would be done at the expense of the owner/permittee. Increased awareness of the ordinance, improved plan submittals, and a continued compliance based inspection program resulted in a continued rise in compliance. Inspections were coordinated with the Capitol Region and Ramsey-Washington Metro Watershed Districts.

A stop work order for erosion control violations was issued June 13, 2017 for a single family home development at 34X Pleasant Avenue. This site was also visited on June 29, 2017 as part of the USEPA audit of the city's MS4 program. In coordination with Capitol Region Watershed District (CRWD) inspection and enforcement, non-compliance involving sediment tracking, exposed soils and accumulated sediment were primary issues of concern. After subsequent re-inspection and consultation with CRWD violations were deemed resolved and work was allowed to resume.

New public and private developments and other projects that disturb one acre or more will be inspected for erosion and sediment control. This effort will lead to a continued awareness of the problems associated with construction site sediment. This will also result in a continuing increase

in the overall rate of compliance citywide. The City will continue to study options to increase compliance, and to help limit the amount of erosion and sediment loss associated with construction projects.

Standard Operating Procedures and Checklists

The City of Saint Paul utilizes standard forms for both public and private construction sites. The standard form utilized for documenting field inspections on private projects is found in the Appendix. The forms supplement a database which tracks multiple levels of information including inspections for erosion control. The City has developed the following standard operating procedures (SOPs) and checklists for Erosion and Sediment Control (ESC) on public and private construction sites:

- The City of Saint Paul utilizes a standard form for both public and private construction sites.
- Public Works Right-of-Way Division uses a form when ROW inspectors inspect Utility Installation work. This form was distributed at the annual Utility review meeting. (See Appendix.)
- Continue to improve SOPs and checklists and distribute to appropriate parties. Beginning in mid-June 2017 the city deployed a pilot standard checklist to review erosion and sediment control provisions within site plan review. This pilot standard checklist was used during review of 52 projects.
- City staff will continue to develop performance measures and to improve data collection, tracking and analysis. The City will also pursue means of measuring and understanding water quality impacts.
- Erosion control plans and inspections are tracked in the City's AMANDA system.
- Handouts and worksheets are distributed to all relevant applicants.
- Requested database programming resources from department administration in 2016 in order to develop and implement standardize procedures regarding erosion control for site plan review and field inspection.

Staff Training

- The Department of Public Works hosts an Annual Utility Coordination meeting to facilitate utility and street system reconstruction projects. A component of this meeting includes stormwater management items such as erosion and sediment control in the public Right-of-Way, etc. Attendees are comprised of various municipal employees and utility businesses.
- City of Saint Paul inspectors are trained and certified through the University of Minnesota's Erosion and Stormwater Management Certification Program. This includes Department of Public Works Street Construction inspectors, Public Works ROW inspectors, Department of Safety and Inspections Building inspectors and Parks Environmental Services staff. The certification includes a recertification component within a 3-year period, which ensures training stays

current with techniques and regulations. In 2017, 8 Department of Safety and Inspections staff were recertified.

MCM 4: Construction Site Erosion & Sediment Control

BMP 4.2 MUNICPAL CONTROL PROGRAM

Description

The objective of this program is to minimize the discharge of pollutants from construction sites disturbing 1 acre or more carried out by the City by requiring erosion and sediment control measures. Sites one or more acres in size are required to get NPDES General Construction Permits from the Minnesota Pollution Control Agency, the Capitol Region Watershed District and the Ramsey-Washington Metro Watershed District.

This program encompasses a variety of individuals responsible for water quality concerns from construction activities. These individuals include designers of erosion control plans, staff responsible for plan review and field inspectors.

Assessment Process for Annual Reporting

- Report on number of non-compliance incidents that were identified and addressed on City projects.
- Report on staff attending erosion and sediment control training.
- Report on development of citizen complaint process and number of citizen complaints received and addressed.

2017 Activities

Municipal site projects go through the site plan review process and are inspected by the building inspectors for erosion and sediment control. Please see the description of this program in BMP 4.1. The standard form utilized for documenting field inspections for street reconstruction projects is intended to be handwritten in the field and included in the project file. Staff started using the forms in 2011. During 2017, Public Works Construction inspectors continued to work with internal forces and watershed district staff on erosion and sediment control compliance.

Staff Training

- The Department of Public Works hosts an Annual Utility Coordination meeting to facilitate utility and street system reconstruction projects. A component of this meeting includes stormwater management items such as erosion and sediment control in the public Right-of-Way, etc. Attendees are comprised of various municipal employees and utility businesses.
- City of Saint Paul inspectors are trained and certified through the University of Minnesota's Erosion and Stormwater Management Certification Program. This includes Department of Public Works Street Construction inspectors, Public Works ROW inspectors, Department of Safety and Inspections Building inspectors and Parks Environmental Services staff. The certification includes a recertification component within

a 3-year period, which ensures training stays current with techniques and regulations. In 2017, 8 Department of Safety and Inspections staff were recertified.

MCM 5: Post-Construction Stormwater Management

BMP 5.1: DEVELOPMENT & REDEVELOPMENT MITIGATION PROGRAM

Description

The objective of this program is to minimize the post-construction discharge of pollutants and stormwater runoff volume from construction projects disturbing one acre or more. Chapter 52 of the Saint Paul Code of Ordinances requires projects disturbing one acre or more to provide post-construction stormwater management. Sites one or more acres in size are also required to obtain NPDES General Construction Permits from the Minnesota Pollution Control Agency, the Capitol Region Watershed District and the Ramsey-Washington Metro Watershed District.

Projects are reviewed through the City's site plan review process, which is facilitated by the Department of Safety and Inspections. The Site Plan Review Committee is made up of staff from various departments including the PW Sewer Utility, Saint Paul Regional Water Services, PW Traffic Division, Zoning and Fire & Safety. Building permits are not issued until site plan review approval is formally attained.

Assessment Process for Annual Reporting

- Narrative on number of projects reviewed, number of projects approved, number and type of structural BMPs constructed or installed.

2017 Activities

Ongoing Stormwater Management

Redevelopment of existing sites provides an opportunity to lessen the impacts of urbanization on the Mississippi River and other Saint Paul water resources. During 2017, Stormwater Best Management Practices (BMPs) were installed on sites reviewed through the Site Plan Review process. BMP types that were constructed include:

- Rain gardens
- Pervious pavement
- Infiltration areas
- Stormwater ponds
- Underground infiltration/filtration and detention facilities

Plan Review

Stormwater management plans are required for all construction projects, which disturb one acre or more of land. These plans are reviewed through the Site Plan review process and approved by the Department of Safety and Inspections and the Saint Paul Public Works Sewer Utility. Sites disturbing less than one acre are also required to provide runoff rate control, if the project disturbs greater the 10,000 square feet. In addition, sites under one acre are encouraged to incorporate green infrastructure stormwater BMPs into their design as a means of satisfying other city codes, such as parking requirements. The City updated its Off-Street Parking Code to

include stormwater landscaping requirements in June of 2010. In July of 2010, the City began implementation of the green building policy requirements for city building projects and private projects receiving more than $200,000 in City funding to facilitate design and construction of stormwater quality practices.

Staff Training

- City staff from multiple departments attended the Minnesota Water Resources Conference.

MCM 5: Post-Construction Stormwater Management

BMP 5.2 COMPLIANCE PROGRAM for PRIVATE SITE CONTROLS

Description

The objective of this program is to implement a program for maintenance, inspection, record keeping and reporting of private stormwater devices constructed in accordance with the City's requirements.

Assessment Process for Annual Reporting

- Narrative on development of procedures.
- Number of new listings entered for privately owned BMPs.
- Once procedures are implemented, identify percent compliance with submittal of compliance reporting documents.

2017 Activities

City ordinance requires the design to minimize the need of maintenance and to provide access for equipment and personnel. The facilities must have a plan of operation and maintenance that ensures effective removal of pollutants. The ordinance also allows the City right of entry and inspection. In 2015, the City began a comprehensive review of its stormwater policies. In 2016, the City entered into a contract to update the Local Surface Water Management Plan. As a part of this planning effort, various ordinances will be analyzed and revisions proposed. This will assist in future planning to meet the identified Proposed Activities and Implementation Schedule. The City coordinates with the CRWD and RWMWD in the development of BMP database and procedures to ensure that private BMPs are maintained.

MCM 5: Post-Construction Stormwater Management

BMP 5.3 MUNICIPAL MITIGATION PROGRAM

Description

The stormwater management objective of this practice is to reduce the discharge of pollutants through the proper planning, design, and construction management of projects carried out by the City.

Assessment Process for Annual Reporting

- Inventory of new Stormwater Management Practices installed with City capital improvement projects.

2017 Activities

- ***Public Works Projects***
    - Wheelock Parkway: Public Works installed a CDS System ($110,000).
    - Wheelock Parkway: Public Works installed a subsurface infiltration trench ($70,000).
    - Wheelock Parkway: Public Works completed installation of an Iron-enhanced sand filtration bench ($90,000).
    - Como Avenue: Public Works installed a SAFL Baffle System ($60,000).
    - Battle Creek: Public Works installed a subsurface infiltration trench ($80,000).
    - Idaho-Atlantic: Public Works installed a subsurface infiltration trench ($215,000).
    - Jackson: Public Works completed installation of porous asphalt bike path ($285,000).
    - Jackson: Public Works completed installation of Bioretention Basins ($165,000).
    - Downtown Subwatershed: Public Works engaged with a consultant to create a detailed Hydrologic/Hydraulic Model of the Downtown Subwatershed ($94,000). Maps showing the completed modeling projects in the City is included within the Appendix.
    - Sackett Pond: Public Works initiated the design phase of the Sackett Pond Retrofit with Iron-enhanced sand filtration (Construction Costs TBD).

- ***Parks and Recreation Projects***
    - Swede Hollow Park: Parks and Recreation designed pond dredging and water quality improvements (Anticipated 2018 Completion $114,000).

- Victoria Park: Parks and Recreation conducted a Feasibility Study for a recirculating Stormwater Feature for water quality and park aesthetics (Anticipated Construction withn 5 years, $1.6 Million).
- North Knob: Parks and Recreation designed Slope Stabilization and Park enhancements in the Pickeral Lake Area (Anticipated Construction 2018 $1.0 Million).
- Parks and Recreation received 2,800 hours of in-kind labor from Conservation Corps Minnesota for installation and maintenance of stormwater best management practices in Saint Paul. Funding was made possible through the Legacy amendment.
- Parks and Recreation received a $136,500 Conservation Partners Legacy Grant to enhance approximately 61 acres of bluffland in Cherokee Regional Park.
- Parks and Recreation planted 3.55 acres of prairie at Indian Mounds Regional Park and Como Regional Park to keep water on the land.
- Installation of a Carbitrol washwater recycle system designed to treat and recycle maintenance and golf cart washwater for reuse in vehicle washing operations at the Highland Golf Course facility.

- ***City-Partner Collaborative Efforts***
  - Trout Brook Lift Station: Parks and Recreation, Public Works, and Capitol Region Watershed District began installation of a Storm Lift Station to deliver additional flow to Trout Brook Nature Sanctuary (Anticipated 2018 Completion $1.3 Million).
  - Como Senior High School: Public Works, Saint Paul Public Schools, and Capitol Region Watershed District installed a subsurface infiltration trench at Como Senior High School. ($600,000).
  - Idaho-Atlantic: Public Works and Ramsey-Washington Metro Watershed District coordinated the installation of 2 subsurface infiltration trenches on the Idaho-Atlantic Street Reconstruction Project ($431,000).
  - Cherokee Heights Ravine Stabilization and Water Quality Improvements: Public Works, Lower Mississippi River WMO, West Saint Paul, and Mendota Heights participated in the design of Ravine Stabilization and CDS installations for Cherokee Heights (Anticipated 2018 Construction $1.2 Million).
  - Como Lake In-lake Loading Analysis: Parks and Recreation, Public Works, Capitol Region Watershed District, MNDNR, BWSR, Ramsey County, etc. participated in an In-lake Loading Assessment for Como Lake.
  - Como Park Stormwater Master Plan: Parks and Recreation, Public Works, and Capitol Region Watershed District participated in the initial development of a Como Park Stormwater Master Plan to assist in planning water quality improvements near Como Lake.

Staff Training

- City staff from multiple departments attended the Minnesota Water Resources Conference.

MCM 5: Post-Construction Stormwater Management

BMP 5.4 STORMATER RUNOFF VOLUME REDUCTION PLAN

Description

The objective of this program is to conduct a study of how stormwater volume reduction practices will best fit into Saint Paul's overall goals of stormwater management for projects that disturb one acre or more. Volume reduction practices include infiltration, bioinfiltration, stormwater reuse, evapotranspiration, minimizing and disconnecting impervious surfaces.

Assessment Process for Annual Reporting

- Narrative of progress towards plan development and implementation.

2017 Activities

The City submitted its Volume Reduction Plan to the MPCA in January of 2015. This plan provided a summary of the City's volume reduction projects, identified opportunity sites and identified areas in the City where there are limitations on the construction of volume reduction BMPs.

In 2016, the City entered into a contract to update the Local Surface Water Management Plan. As a part of this planning effort, various ordinances will be analyzed and revisions proposed. This will assist in future planning to meet the identified Proposed Activities and Implementation Schedule.

In 2017, Parks and Recreation, Public Works, and Capitol Region Watershed District participated in the initial development of a Como Park Stormwater Master Plan that will aid in the installation of water quality improvement projects impacting Como Lake.

MCM 6: Pollution Prevention & Good Housekeeping

BMP 6.1: STORM SEWER SYSTEM OPERATION & MAINTENANCE

Description

The objective of this program is to minimize the discharge of pollutants through proper and cost effective operation and maintenance of the City's storm sewer system. General operations and maintenance efforts include inspections, cleaning, repairs, rehabilitation and reconstruction.

The City's stormwater system includes 450 miles of storm sewers, 28 ponding areas, 4 lift stations, numerous water quality best management practices and over 26,000 catch basins. The Sewer Maintenance section allocates substantial resources to cleaning, inspecting and maintaining the City's stormwater system. All installed stormwater facilities are maintained and operated in accordance with adopted policies and ordinances. All storm sewer pipes are cleaned and inspected in advance of City street reconstruction projects. Where defects are observed, repairs are made at the time of discovery or during the reconstruction project. The City also regularly inspects, cleans and maintains stormwater ponding areas. Storm sewer tunnels are inspected every two years.

In 1995, the City completed a ten-year sewer separation program by constructing 189 miles of storm sewer and 12 miles of sanitary sewer (some combined sewer was converted to storm sewer). In 1997, the City began a 20-year rehabilitation program for its storm and sanitary sewer system. The Sewer Utility complies with MnDOT's Standard Specifications for Construction, and has its own set of Standard Plates.

Assessment Process for Annual Reporting

- Report on storm sewer and tunnel repair and rehabilitation projects.
- Report on miles of storm sewers and tunnels assessed, miles of storm sewers and tunnels cleaned and amount of material removed.
- Report on development of standard operating procedures.
- Narrative of training activities including number of staff trained and types of training conducted.

2017 Activities

Phalen Creek Storm Tunnel System

The Phalen Creek Storm Tunnel System was originally constructed in the 1800s. The tunnel system is comprised of varying types of construction (brick, granite blocks, corrugated metal pipe etc.). In 2016, a multi-phase rehabilitation effort was initiated to address deficiencies in the ceiling, walls and invert of the tunnel system. Construction Cost for Phase I of the Phalen Creek Storm Tunnel System Rehabilitation is $3.3 Million. Rehabilitation continued in 2017, with an estimated construction cost of $2.3 Million.

Saint Peter-Rondo Storm Tunnel System

In 2017, the entirety of the Saint Peter-Rondo Storm Tunnel system was inspected. Inspection was intended to verify the condition of the Tunnel. Inspection costs: $123,000.

Pump Stations

The City has four stormwater flood control pump stations that are located along the Mississippi River. These pump stations provide interior drainage during flood events on the Mississippi River. The stormwater flood control pump stations are inspected and operated twice per year. All of the stations are connected to the City's Supervisory Control and Data Acquisition system.

Storm Sewer Inspection, Cleaning & Rehabilitation

- Fairview-University Televised Inspection: 83,482 L.F. of Storm Sewer ($85,000).
- Taylor-Lexington Televised Inspection: 137,932 L.F. of Storm Sewer ($166,000).
- Sewer Maintenance Televised Inspection: 16,062 L.F. of Storm Sewer ($60,000; combined with Cleaning).
- Sewer Maintenance Cleaning: 10,752 L.F. of Storm Sewer
- 2017 Major Sewer Repair: 140 L.F. Storm Sewer and Outfall Replacement ($171,000).

MCM 6: Pollution Prevention & Good Housekeeping

BMP 6.2: CATCH BASIN/MANHOLE OPERATION & MAINTENANCE

Description

The objective of this program is to minimize the discharge of pollutants through the proper operation and maintenance of the MS4 system's catch basins and manholes. Catch basins are structures located along the city's street system that provide entrance of stormwater runoff into the storm sewer system.

Assessment Process for Annual Reporting

- Report on number of catch basins and manholes cleaned and/or repaired and quantity of material removed.
- Report on implementation of the catch basin sump management program.

Catch Basins

A catch basin is an inlet to the storm drain system. A field survey of the City's catch basins using GPS equipment located all city owned catch basins. The total number of catch basins inventoried was 26,200. As part of the City's Saint Paul Street Vitality Program (SPSVP), existing catch basins within a street reconstruction project area are replaced with new catch basins. Cleaning catch basins, while ensuring proper runoff conveyance from City streets, also removes accumulated sediments, trash and debris. Catch basins that are reported as plugged or damaged are given a priority for repair and cleaning. Sewer Maintenance has set a goal of cleaning 2,000 catch basins per year. Augmenting this effort is the street sweeping program, carried out by the Street Maintenance Division. The street sweeping program targets the pick-up of street sediment, debris and leaves prior to their reaching catch basins.

2017 Activities

- Catch Basin Maintenance ($788,185)
  - Inspected: 693
  - Cleaned: 4,287
  - Repaired: 589
- Manhole Maintenance ($125,804)
  - Inspected: 842
  - Cleaned: 367
  - Repaired: 200

MCM 6: Pollution Prevention & Good Housekeeping

BMP 6.3: OUTFALL OPERATION & MAINTENANCE

Description

The objective of this program is to minimize the discharge of pollutants through the proper operation and maintenance of outfalls from the MS4 system to receiving water bodies.

Assessment Process for Annual Reporting

- Report on outfalls inspected, dates, comments on repairs needed and dates of repairs.

2017 Activities

Storm Drain Outfalls

A storm drain outfall is the point where the storm sewer system discharges to receiving waters. Outfalls are inspected on a 5-year schedule. Outfall inspections include an evaluation of the general condition of structure, determination of significant erosion and identification of any non-stormwater discharges. When indications of non-stormwater discharges are observed, they are reported to the appropriate City staff for follow-up investigation and resolution and reported to the Minnesota Duty Officer, as required. Any identified structural repairs or maintenance work is prioritized and scheduled within the constraints of available personnel, funding and coordination with other essential operations. All of the Mississippi River outfalls were inspected in 2013, and in 2017 the following outfalls were inspected:

Mississippi River: 115
Upper Crosby Lake: 8
Crosby Lake: 4
Crosby Pond: 5

Como Lake Outfall Replacement

In 2017, Public Works initiated a Contract to replace a stormwater outfall to Como Lake. Additional work included relaying 140 lineal feet of 42” RCP, installation of a drip wall to mitigate erosion, and the installation of a CDS hydrodynamic separator. Outfall and Pipe Replacement ($171,000), CDS ($110,000).

MCM 6: Pollution Prevention & Good Housekeeping

BMP 6.4: STORMWATER POND/STRUCTURAL POLLUTION CONTROL DEVICE OPERATION & MAINTENANCE

Description

The objective of this program is to minimize the discharge of pollutants through the proper operation and maintenance of stormwater ponds and water quality devices. Stormwater ponds, filtration/infiltration areas, and structural controls are water quality devices that manage stormwater runoff. General operations and maintenance efforts include assessment and maintenance of the functionality of stormwater ponds and water quality devices.

Assessment Process for Annual Reporting

- Report on number of stormwater ponds and structural pollution control devices inspected, assessed and cleaned, by category. Include date of inspection, date and results of assessment, antecedent weather conditions and nature of repairs.

2017 Activities

Stormwater Ponds

Saint Paul's stormwater ponding areas are constructed to collect and detain flows from storm events and in some cases to also improve water quality. These ponds are designed to reduce peak flow rates in downstream storm sewers. A map showing the stormwater ponding areas in the City of Saint Paul is found in the Appendix. The Appendix also contains the tributary area and design capacity for each of the City's ponding areas and a list of stormwater ponding areas by watershed. The City's stormwater ponding areas are inspected by Sewer Maintenance staff after major rainfall events. Routine maintenance is completed as needed based on the inspection results.

The City implemented a program to evaluate its ponding areas for major sediment removal in 2002. This program involves an initial inspection, prioritization, survey, timber removal, sediment removal and inlet/outlet reconstruction. Major sediment removal took place in a majority of the City's ponds in the winters of 2002/2003, 2003/2004, 2013/2014, 2017/2018. The estimated cycle for sediment removal from ponding areas is 20 years. Projects included re-installation of rip rap at inlet and outlet structures and vegetation restoration by seeding and erosion control blankets. Sediment was tested and disposed of in accordance with state guidelines.

Ponds receiving major sediment removal and riprap replacement in 2017/2018 include: Barge Channel North, Great Western, Arthur, Barge Channel South, Sylvan/Acker and Flandrau Hoyt. Removed tonnage equates to approximately 12,000 tons ($700,000, 2017/2018 Costs).

Structural Pollution Control Devices

The city constructs water quality and volume control BMPs as required by the MPCA Construction Permit and Watershed District Rules. Since 2006, the City has constructed BMPs, including infiltration trenches and rain gardens. In 2015, an inventory of constructed BMPs was developed and entered into the City's asset management system. BMPs will be added each year once as-builts are received. The BMPs are programmed to be cleaned annually, beginning in 2015.

As part of the Water Quality and Quantity Monitoring Program, a maintenance inspection is conducted on each of the BMPs that are monitored. This inspection includes documentation of sediment depth in the pre-treatment device, sediment depth in the infiltration gallery, depth of standing water in the infiltration gallery and observation notes.

Staff Training

In 2017, various Sewer Utility personnel attended Stormwater BMP Maintenance Certification Training conducted by the University of Minnesota Erosion and Stormwater Management Certification Program.

MCM 6: Pollution Prevention & Good Housekeeping

BMP 6.5: HANDLING & DISPOSAL of REMOVED MATERIALS

Description

The objective of this stormwater management program is to minimize the discharge of pollutants through proper handling of stored and stockpiled materials such as those removed from the storm sewer system.

Assessment Process for Annual Reporting

- By categories shown in BMP Sheet 6.1.4, report estimated annual total mass (pounds) removed, characterization and destination(s) of material removed.

Program Overview

Material is collected from catch basin sumps, the storm sewer system, ponding areas and water quality BMPs. Removed substances are screened for visual or olfactory indications of contamination. If contamination of the material is suspected, representative samples are selected for an environmental analysis. Contaminated substances are disposed of in a landfill or another site that is approved by the Minnesota Pollution Control Agency. Uncontaminated sediments are disposed in the same manner as street sweepings, as reported in Section IV: Street Management Program. During cleaning operations, sediment control measures are applied as needed to prevent removed material from re-entering the storm drain system.

2017 Activities

- Material removed from stormwater ponds by Contractor: 5,330 tons ($158,173).
- Material removed from stormwater ponds, BMPs and catch basins by Sewer Utility: 1,722 tons ($36,516).

MCM 6: Pollution Prevention & Good Housekeeping

BMP 6.6 STREET SWEEPING PROGRAM

Description

The objective of this program is to minimize the discharge of pollutants to the storm sewer system and receiving waterbodies by removing leaf litter, sediment and debris from streets and gutters before the materials and the pollutants attached to them can be washed into storm drain inlets. The other objectives of the street sweeping program are to protect public health and safety, and to improve cleanliness and livability. The program is divided into several categories, that vary in frequency and work practices, to systematically address the approximately 744 miles of residential streets, 127 miles of arterial streets and the city's approximately 330 miles of alleys. They can be described by two general programs: Spring and Fall Citywide comprehensive sweeping programs, and general sweeping activities outside of those two major activities.

Assessment Process for Annual Reporting

- Number of miles swept in program categories
- Approximate amount of material removed in each program category

2017 Activities

Street Sweeping

The City of Saint Paul conducts a street and alley cleaning program to promote the health and welfare of its citizens and to reduce the amount of pollutants to receiving waters from stormwater discharges. Sweeping is a major operation for the Street Maintenance Division and is done during the spring, summer and fall. Elgin Pelican mechanical sweepers handle the vast majority of the sweeping. An Elgin Crosswind regenerative air sweeper is utilized downtown almost every weekday.

Residential street spring and fall sweeping were completed on May 3, 2017 and November 15, 2017, respectively. The primary material swept in the spring is debris from winter months. Fall sweeping occurred October 23, 2017-November 15, 2017. Typically, the fall sweep is timed so that a majority of the leaves are down and enough time is allowed to sweep all Saint Paul streets before the first snow. Currently, the wide variety of trees with varying leaf drop times makes it impossible to wait for all of the leaves to drop. To compensate for this, touch up sweeping continues most years through November and early December. In the interest of continued improvement to our sweeping program, workers attend training and best management practices are implemented.

Street Sweeping

Streets and alleys are divided into classes, each of which receives a different level of service as defined below:

Class I-A & B Downtown or Loop streets

Downtown or loop streets are within the following boundaries: Kellogg on the south, 12th on the north, Broadway on the east and Main on the west. These streets are swept approximately two times per week during the spring, summer, fall and winter as weather allows. All routine maintenance, including patching and repairing of street surfaces, is performed on an as-needed basis.

Class II - Outlying Commercial and Arterial Streets

These streets, which have business or commercial properties fronting on them, are the City's major arteries. They have heavy volumes of both vehicular and pedestrian traffic. Typical examples are University, Snelling, West 7th, East 7th, Rice, Payne, Arcade, Summit and Grand. Class II streets are typically swept or cleaned six to ten times annually on the following schedule: every two weeks in October and November for fall cleanup and every 3 to 6 weeks in April through September for Spring cleanup, litter, tree debris and sediment cleanup. Occasional winter sweeping is done if weather permits, and there are special events. All routine maintenance, including patching and repairing of street surfaces, is done on a scheduled or as-needed basis. In 2016, Class II maintenance priorities were shifted from sweeping to patching and paving operations. The result of this shift in operations was less frequent sweeping between the spring and fall sweeps.

Class III - Residential Streets

In the spring, all residential streets, including oiled, paved and intermediate streets, receive a thorough sweeping. Patching and repairing is done on a scheduled or as-needed basis. All existing paved and oiled streets are on the 8 year cycle chip seal list. Approximately 1,182,180 square yards of paved streets were chip sealed in 2017. Oil and sand sealing of oiled streets is no longer done. The City recycles the reclaimed chip seal rock. In the fall, streets are swept for leaf pickup. All material swept up during the fall cleanup is hauled to a State licensed disposal facility.

Class IV - Oiled and Paved Alleys

All oiled and paved alleys are swept during the late spring and summer. All routine maintenance, including patching and repairing of the alley surfaces, is performed on a scheduled or as-needed basis. All existing paved and oiled alleys are now on an 8-year cycle chip seal list. Approximately 235,111 square yards of paved alleys were chip sealed in 2017.

Class V and VI - Unimproved Streets and Alleys

Unimproved streets and alleys are right-of-ways that have not been developed. There are approximately 50 miles of unimproved streets and approximately 288 miles of unimproved assessed alleys in the City. Because they are City right-of-ways, the City has the

responsibility to perform minimal repairs and maintenance work on them to make them passable and to reduce hazards. The maintenance and repair of these streets and alleys consists of patching, minor blading, and placing of crushed rock or other stabilized material.

Disposal

The materials collected from street sweeping are delivered to the City's Pleasant/View and Como/Western yards. The City's hauling contractor hauls the material away to have it screened and disposed of properly. The contractor composts the organic materials, which are mostly collected in the fall sweep.

Street Maintenance has a Hazardous Waste Disposal Policy in place. Any hazardous materials collected from City streets are disposed of in environmentally acceptable means. In 2001, the sweepings collected from City streets and alleys were tested and found to be within the Environmental Protection Agency's guidelines for recycling purposes, after screening out waste and debris. Approximately 7 to 10% of swept up material is disposed of in a landfill. Street Maintenance also services over 440 trash receptacles and disposes of refuse from neighborhood cleanups each year.

2017 Street Sweeping Quantities (Cubic Yards)

Season	Spring/Summer	Fall
Totals	5,278	19,376

MCM 6: Pollution Prevention & Good Housekeeping

BMP 6.7: ROADWAY DEICING MATERIALS MANAGEMENT

Description

The objective of this program is to minimize the runoff of deicing materials applied to roadways under its jurisdiction, consistent with public safety and to properly store deicing materials.

Assessment Process for Annual Reporting

- Report on quantity of deicing materials, chemicals, and sand applied.
- Report location and description of deicing materials storage facilities.
- Report number of staff attending training on use of salt.

2017 Activities

Snow and Ice Control

Minnesota weather conditions may require ice control from late September through early May. Frost forming on bridge decks is usually the first and last ice control event of the winter season. From early November through mid-April, the need for pavement treatment is determined by temperature and precipitation. Frequency of snow events through the winter season influences amounts of material used. The City's foremost objective is to maintain safe roads for all users. The consequences of icy roads are longer travel times, adverse economic impact, accidents and injuries.

Salt is the primary material used to melt snow and ice. Salt and treated salt is effective to 15°F and 0°F respectively, but factors such as darkness, continuing snow, type and quantity of precipitation, all reduce melting performance. Sand is sometimes used to enhance traction, usually when temperatures are below 0°F and snowfall amount is likely to be greater than 3 inches. Specific application rates are decided upon for each snow event and adjusted to the minimum amount necessary to achieve the desired results.

Saint Paul uses treated salt for pavement temperatures below 15°F and regular salt for temperatures from 15°F and above. Salt brine is used to pre-wet salt from the salt spreaders, making the salt more effective. The benefits of pre-wetted salt are better melting performance, less bounce, residual value and reduction in amount of salt used. All salt trucks are presently fitted with salt pre-wetting equipment. Public Works developed and adopted a formal Salt Management Plan in the fall of 2011.

Additionally, Saint Paul anti-ices major streets and bridges with salt brine prior to winter events. Anti-icing helps decrease the bond of snow and ice to the pavement. Anti-icing can be used as the primary tool to fight frost.

Storage of De-icing Materials

Salt and mixed piles of sand and salt are covered year round to eliminate runoff. Storage facilities are located at the following locations:

873 N. Dale Street
310 South Victoria Street

Snow and Ice Control

One snow emergency was declared late in 2017. Typically 3 or 4 snow emergencies are declared during this period. It is anticipated that ice control materials used for 2018 will be similar to 2017 quantities.

2017 Ice Control Material Quantities

	Jan to March	Nov to Dec	Total
Salt (tons)	4,061	2,123	6,184
Treated Salt (tons)	2,203	2,041	4,344

Employee Training

Saint Paul Public Works is an advocate of networking and regularly attends events such as the American Public Works Association North American Snow Conference and the Fresh Water Society Road Salt Symposium. All new operators attended a Snow and Ice Control training session in October & November 2017. Attendees received certification from the MPCA. The main purpose of this session was to train employees to get the most out of every application, maintaining the safest roads possible in the most economical way, while protecting the environment. The session addressed the following: abrasives, salt, pre-wetting. anti-icing, equipment calibration and material storage. The Minnesota Snow and Ice Control Handbook and Saint Paul Public Works Salt Management Plan are available to all employees and are used as a guide in our best practices.

MCM 6: Pollution Prevention & Good Housekeeping

BMP 6.8: CITY PARKING LOT & EQUIPMENT YARD MANAGEMENT

Description

The objective of these activities is to minimize the discharge of pollutants by utilizing proper fleet and building maintenance practices, and proper operation and maintenance of parking lots and equipment and storage yards. Program categories include the following:

a) Saint Paul Parks and Recreation – parks, recreation centers, maintenance facilities

b) Planning & Economic Development –city owned parking lots

c) Public Works

- Dale Street Facility includes Street Maintenance, Traffic Operations and Municipal Equipment
- Sewer Maintenance
- Asphalt Plant

Assessment Process for Annual Reporting

- Narrative of training activities
- Report on development of standard operating procedure

2017 Activities

The Parks Department and the Department of Public Works have Clean Water Policies which are distributed, reviewed, and signed by all field staff. (See Appendix)

Dale Street Facility Sediment Control Structure: Public Works hired WSB and Associates to complete a Facility Improvements Feasibility Report for four Public Works facilities and one Parks and Recreation facility. In 2012, a large pre-fabricated sediment control and collection structure was constructed at the Public Works' Dale Street Facility. This structure is inspected and cleaned as necessary.

***Parks and Recreation Wash Stations*:** Contracted with ESD Waste2Water, Incorporated to complete site visits and provide five proposals for installation of permanent or portable equipment wash stations. Parks will seek funding for future installation.

Employee Training

- Saint Paul Public Works is an advocate of networking and regularly attends events such as the American Public Works Association North American Snow Conference and the Fresh Water Society Road Salt Symposium. All new operators attended a Snow and Ice Control training session in October & November 2017. Attendees received certification from the

MPCA. The main purpose of this session was to train employees to get the most out of every application, maintaining the safest roads possible in the most economical way, while protecting the environment. The session addressed the following: abrasives, salt, pre-wetting. anti-icing, equipment calibration and material storage. Public Works and Parks staff annually attends the Road Salt Symposium. The Minnesota Snow and Ice Control Handbook and Saint Paul Public Works Salt Management Plan are available to all employees and are used as a guide in our best practices.

- The Department of Public Works hosts an Annual Utility Coordination meeting to facilitate utility and street system reconstruction projects. A component of this meeting includes stormwater management items such as erosion and sediment control in the public Right-of-Way, etc. Attendees are comprised of various municipal employees and utility businesses.
- In 2017, various Sewer Utility personnel attended Illicit Discharge Management (IDDE) Training conducted by the University of Minnesota Erosion and Stormwater Management Certification Program.
- A fact sheet was developed and distributed with the adoption of the new ordinance (See Appendix). Several staff meetings were held throughout the development of the ordinance.

MCM 6: Pollution Prevention & Good Housekeeping

BMP 6.9: FIELD OPERATIONS MANAGEMENT

Description

The objective of this program is to minimize the discharge of pollutants from the operation and maintenance of City right-of-way and park property.

Assessment Process for Annual Reporting

- Narrative of training activities
- Report on development of standard operating procedures

2017 Activities

The Parks Department and the Department of Public Works have Clean Water Policies which are distributed, reviewed, and signed by all field staff. (See Appendix)

Employee Training

- Saint Paul Public Works is an advocate of networking and regularly attends events such as the American Public Works Association North American Snow Conference and the Fresh Water Society Road Salt Symposium. All new operators attended a Snow and Ice Control training session in October & November 2017. Attendees received certification from the MPCA. The main purpose of this session was to train employees to get the most out of every application, maintaining the safest roads possible in the most economical way, while protecting the environment. The session addressed the following: abrasives, salt, pre-wetting. anti-icing, equipment calibration and material storage. Public Works and Parks staff annually attends the Road Salt Symposium. The Minnesota Snow and Ice Control Handbook and Saint Paul Public Works Salt Management Plan are available to all employees and are used as a guide in our best practices.
- The Department of Public Works hosts an Annual Utility Coordination meeting to facilitate utility and street system reconstruction projects. A component of this meeting includes stormwater management items such as erosion and sediment control in the public Right-of-Way, etc. Attendees are comprised of various municipal employees and utility businesses.
- In 2017, various Sewer Utility personnel attended Illicit Discharge Management (IDDE) Training conducted by the University of Minnesota Erosion and Stormwater Management Certification Program.
- A fact sheet was developed and distributed with the adoption of the new ordinance (See Appendix). Several staff meetings were held throughout the development of the ordinance.

- Approximately thirty Parks staff attended Turf Management training for clean water hosted by the University of Minnesota.
- Approximately eighty Parks staff renewed their non-commercial pesticide application licenses to ensure proper application and management of pesticides.

MCM 7: Monitoring & Analysis

BMP 7.1: Cooperative Monitoring Program

Description

The objective of this program is to develop and implement a cooperative monitoring, analysis, and reporting effort with partnerships that could include: adjacent municipalities, Capitol Region Watershed District, Mississippi Watershed Management Organization, Ramsey-Washington Metro Watershed District, Metropolitan Council Environmental Services, Ramsey County Environmental Health and Metropolitan Mosquito Control District.

Assessment Process for Annual Reporting

- Number and type of monitoring sites.
- Annual monitoring and analysis results.

History

As part of the two part application for the NPDES permit, the City of Saint Paul conducted stormwater monitoring at 5 sites for one season. From 2001 through 2004, the Cities of Saint Paul and Minneapolis and the Minneapolis Park and Recreation Board participated in a joint stormwater monitoring program, as required by the stormwater permit. Minneapolis Park Board staff conducted the monitoring program. The Stormwater Monitoring Program Manual was completed by Minneapolis Park Board staff and submitted separately to the MPCA in April of 2001. The joint monitoring agreement was submitted to the MPCA in 2002.

Sampling sites were identified in the Stormwater Monitoring Program Manual. The sampling sites were selected from the sites used in the stormwater permit application monitoring program. Five sites were chosen, representative of the following land use types: two residential sites, two industrial/commercial sites and one mixed use site. Two sites were located in Minneapolis and three were in Saint Paul. The permit required two years of mercury monitoring, which was conducted in 2002 and 2003.

Beginning In 2005, the City began a partnership with the Capitol Region Watershed District, to conduct the stormwater permit monitoring program for Saint Paul as part of CRWD's overall monitoring program. CRWD established a monitoring program in 2004 to collect stormwater data from the major subwatersheds and stormwater best management practices (BMPs).

In 2012, the City began its Stormwater Monitoring Program. Monitoring is completed at various locations including: constructed stormwater BMPs, proposed locations for stormwater BMPs, and groundwater sites. Electronic water monitoring equipment is used to collect water quantity and quality data on a continuous basis from selected sites.

2017 Activities

Monitoring Program

The City of Saint Paul collaborated with CRWD on the 2017 Stormwater Monitoring Program. Sites monitored by CRWD include: outfalls, BMPs, lakes and ponds. Many sites are full water quality monitoring stations, while other sites capture level data. CRWD publishes their current Monitoring information on their website at: www.capitolregionwd.org.

In 2017, the City, through a consultant, conducted the Stormwater Monitoring Program. Below is a list of the range of Stormwater Monitoring. Electronic water monitoring equipment was used to collect water quantity and quality data on a continuous basis from stormwater BMPs, which included:

- Water level in 11 BMPs
- Flow volumes at 7 of the BMPs
- Composite water quality sampling at 5 of the BMPs
- Groundwater at 5 locations

Analysis of the collected data generated valuable information related to the performance of each BMP. This information included:

- Average infiltration rates measured in the BMPs exceeded the rates recommended in the Minnesota Stormwater Manual and watershed district rules for specific soil types.
- The BMPs are more effective at reducing stormwater volume and pollutant loads to downstream water bodies than is currently being recognized by the watershed districts.
- The Dynamic Method for sizing volume reduction BMPs was shown to be more accurate than the Simple Method. Allowing the use of the Dynamic Method in demonstrating compliance with watershed district rules would generate significant cost savings to the public.

A map summarizing the CRWD and City monitoring sites in Saint Paul can be found in the Appendix. The City's BMP monitoring program can be found on the City's Stormwater page at https://www.stpaul.gov/departments/public-works/sewer-utility-divison/stormwater.

In 2017, the City, through a consultant, participated in the formation of the Twin Cities Water Monitoring and Data Assessment Group. The group is formed from public-sector water resources practitioners as a way to establish and promote standard practices for: water quality monitoring, data analysis and data stewardship.

Stormwater Runoff and Water Quality Modeling

In 2010, the City completed the first phase of a program that includes stormwater modeling, a citywide volume reduction inventory and plan to address stormwater on the 2010 Residential Street Reconstruction Program. The modeling includes the development of an XPSWMM and P8 modeling and uses the CRWD monitoring data for calibration. Three major subwatersheds, as well as the 2010 street reconstruction subwatersheds, were modeled. In 2011, the City began

modeling as a component of the storm tunnel rehabilitation program. The Saint Anthony Park and Davern subwatersheds have been modeled. In 2012, the City began modeling the Phalen Creek storm sewer interceptor. Modeling projects were completed in support of the Sewer and street projects. The citywide modeling map is found in the Appendix. These models will be used by the City in the development of future stormwater programs and projects.

Pollutant Loading Calculations

The estimation of pollutant loadings from 2016 & 2017 is found in the Appendix. Historically, pollutant loading calculations were offset by one year due to analysis timelines. With improvements in data management, the timeline needed for analysis has been reduced. As such, the 2017 Annual Report is reporting two years' worth of pollutant loadings. In addition, the average concentrations and annual loading results for the subwatersheds monitored by the CRWD can be found in Capitol Region Watershed District's 2017 Monitoring Report.

MCM 8: Discharges to Impaired Waters with a TMDL

BMP 8.1: TMDL Program

Description

Stormwater runoff from Saint Paul is discharged to several surface waterbodies including the Mississippi River. Several of these have been listed on Minnesota's Impaired Waters List for having the presence of concentrations of certain pollutants identified at levels higher than Minnesota standards. A TMDL study has been completed and approved for Lake Como.

Assessment Process for Annual Reporting

- For each impaired waterbody with an EPA-approved TMDL, report on progress toward addressing Waste Load Allocations.

2017 Activities

The City participated in the Metro Chloride Project and the Upper Mississippi River Bacteria TMDL process. Through the LMRWMO, the City participated in a WRAPs Project that was completed in 2015, which included Pickerel Lake.

Como TMDL

This is a categorical TMDL for which CRWD is the aggregator. Outfalls that drain to Como Lake can be found in the Outfall Inventory in the Appendix.

- Como Lake In-lake Loading Analysis: Parks and Recreation, Public Works, Capitol Region Watershed District, MNDNR, BWSR, Ramsey County, etc. participated in an In-lake Loading Assessment for Como Lake.

- Como Park Stormwater Master Plan: Parks and Recreation, Public Works, and Capitol Region Watershed District participated in the initial development of a Como Park Stormwater Master Plan to assist in planning water quality improvements near Como Lake.

- Wheelock Parkway Infiltration Trench and CDS Hydrodynamic Separator: Public Works installed these BMPs in conjunction with street reconstruction activities to remove sediments and nutrients from entering Como Lake.

Appendix

Minnesota Pollution Control Agency

National Pollutant Discharge Elimination System

Permit No. MN 0061263

June 2018

Budget	2017	2018	2019	2020	2021	2022
Storm Sewer Projects						
Stormwater Quality Improvements	$850,000	$850,000	$500,000	$500,000	$500,000	$500,000
Storm Sewer Tunnel Rehabilitation	$4,000,000	$4,000,000	$4,080,000	$4,161,600	$4,244,832	$4,329,729
	$4,850,000	**$4,850,000**	**$4,580,000**	**$4,661,600**	**$4,744,832**	**$4,829,729**
Storm Sewer Maintenance						
Storm Sewer Cleaning, Inspection & Repair	$482,000	$491,640	$501,473	$511,502	$521,732	$532,167
Pond Inspection & Maintenance	$208,804	$212,980	$217,239	$221,584	$226,016	$230,536
Catch Basin Inspection, Cleaning & Repair	$788,186	$803,949	$820,028	$836,429	$853,158	$870,221
Manhole Cleaning, Inspection & Repair	$125,804	$128,320	$130,887	$133,504	$136,174	$138,898
BMP Cleaning	$87,864	$89,622	$91,414	$93,242	$95,107	$97,009
	$1,692,658	**$1,726,511**	**$1,761,041**	**$1,796,262**	**$1,832,187**	**$1,868,831**
Stormwater Modeling & Monitoring						
Stormwater Modeling	$199,600	$200,000	$204,000	$208,080	$212,242	$216,486
Stormwater Monitoring	$198,497	$189,292	$193,078	$196,939	$200,878	$204,896
	$398,097	**$389,292**	**$397,078**	**$405,019**	**$413,120**	**$421,382**
Street Maintenance						
Street Sweeping	$2,681,600	$2,735,232	$2,789,937	$2,845,736	$2,902,650	$2,960,703
Neighborhood Cleanups	$173,895	$177,373	$180,921	$184,539	$188,230	$191,995
	$2,855,496	**$2,912,605**	**$2,970,858**	**$3,030,275**	**$3,090,880**	**$3,152,698**
Public Education Program						
Storm drain stenciling including door hangers	$49,815	$49,500	$50,490	$51,500	$52,530	$53,580
MN Cities Stormwater Coalition	$4,950	$4,950	$4,950	$4,950	$4,950	$4,950
Metro Clean Water Campaign	$10,500	$10,500	$10,500	$10,710	$10,924	$11,143
Adopt a Storm Drain	$15,000	$20,566	$20,977	$21,397	$21,825	$22,261
	$80,265	**$85,516**	**$86,917**	**$88,556**	**$90,229**	**$91,934**
Total Budget	**$9,876,515**	**$9,963,924**	**$9,795,894**	**$9,981,712**	**$10,171,248**	**$10,364,574**

2% used for annual inflation where projected amounts unknown

DEPARTMENT OF SAFETY AND INSPECTIONS
Ricardo X. Cervantes, Director

CITY OF SAINT PAUL
Christopher B. Coleman, Mayor

375 Jackson Street, Suite 220
Saint Paul, Minnesota 55101-1806

Telephone: *651-266-9090*
Facsimile: *651-266-9124*
Web: *www.stpaul.gov/dsi*

Standard Operating Procedures for Erosion and Sediment Control Complaint

1) Someone sees an erosion and sediment control issue (dirt on street, etc).
- They should call the City Complaints Office: 651-266-8989

2) Complaint is passed on from Complaints Office to Senior Building Inspector (651-266-9021)

3) Building Inspector follows up on complaint using DSI Erosion and Sediment Control Worksheet

4) If Building Inspector determines source is from the Public Right-of-Way (ROW) or from City Construction Projects the complaint will be forwarded to the Public Works Inspectors –
- For Private Utility Construction in ROW: 651-487-7250 (General Number for ROW Permit Section)
- For City Construction Projects: 651-266-6081 (Street Engineering Construction Division)

Public Works Inspector will inspect and follow up accordingly

5) First Inspection
- DSI Erosion and Sediment Control Worksheet completed
- If site is non-compliant: Building Inspector issues immediate verbal order, if possible, or issues a written order if no one is on site, to address situation, sets a compliance date based on the nature of the complaint, and notes details of non-compliance in Worksheet

6) Second Inspection
- Building Inspector Conducts 2nd inspection of site after compliance date
- 2nd DSI Erosion and Sediment Control Worksheet completed
- If continued non-compliance: Building Inspector issues written orders, sets a new compliance date based on the nature of the complaint, and notes details of non-compliance in Worksheet

7) Third Inspection
- Building Inspector Conducts 3rd inspection of site after compliance date
- 3rd DSI Erosion and Sediment Control Worksheet completed
- If continued non-compliance, proceed with stopping construction work at the site, or submitting the violation to the City Attorney for potential prosecution, or pursue abatement if sediment crosses boundary of the site and project is greater than 1 acre.

DEPARTMENT OF SAFETY AND INSPECTIONS
Bob Kessler, Director

CITY OF SAINT PAUL
Christopher B. Coleman, Mayor

375 Jackson Street, Suite 220
Saint Paul, Minnesota 55101-1806

***Telephone**: 651-266-9090*
***Facsimile**: 651-266-9124*
***Web**: www.stpaul.gov/dsi*

Erosion and Sediment Control Worksheet

Property Address:

Inspector:

Permit # (if applicable):

Inspection Date:

Re-inspection Date:

Inspection Type:

Size of Site:

Inspection Results

Sewer Inlet Protection:

Comments:

Street Condition:

Comments:

Rock Entrance:

Comments:

Concrete Washout Area:

Comments:

Silt Fence/Sediment Control:

Comments:

Stock Pile Erosion Control:

Comments:

Site Erosion Control:

Comments:

Corrective Action:

Comments:

Staff Procedure - Review Checklist for Site Plan Erosion Control

1)	Does this project result in moving less than 50 c.y. of fill?	☐ YES – Stop.	☐ NO – Continue.
2)	Does this project disturb greater than 10,000 square feet? If yes, city site plan review required	☐ YES – Continue below	☐ NO – Grading / building permit only.
3)	Does this project disturb greater than 1-acre? If yes, MPCA Construction Stormwater Permit required	☐ YES – Continue below	

Document on this form, or other form as appropriate, the adequacy of erosion and sediment control. Use the minimal criteria below as a starting point for beginning the standard procedure.

	CRITERIA	OK	See Notes	N/A	Comment
	Rock construction entrance identified on plans	☐	☐	☐	
	Silt Fence around perimeter of grading /disturbance and around stockpiles	☐	☐	☐	
	If catch basin located on property, plans show Inlet protection on catch basins	☐	☐	☐	
	Street sweeping note on plans	☐	☐	☐	
	Stabilization shown for disturbed areas	☐	☐	☐	
	Other items as scope of work requires	☐	☐	☐	

Staff Notes for site plan revision/approval:

Procedure

1. Review plan in accordance with site plan review and approval §61.402(c)(11) and/or stormwater pollution control plan §52.04. (MPCA "Manual for Protecting Water Quality in Urban Areas")
2. Document plan review comments in Site Plan Review Committee conditional approval letter.
3. Document plan review decision in Site Plan Review approval letter. State if MPCA Construction Stormwater Permit is required; if so, approval contingent on obtaining permit card, verified at https://cf.pca.state.mn.us/water/stormwater/csw/search.cfm

CITY OF SAINT PAUL
Christopher B. Coleman, Mayor

Public Works
Right-of Way Division

Telephone: 651-266-6151
Facsimile: 651-266-9765
Email: PW-ROWpermits@ci.stpaul.mn.us

EROSION AND SEDIMENT CONTROL FOR UTILITY PROJECTS IN THE RIGHT-OF-WAY

It is essential to prevent dirt, debris, oils and other waste from entering storm drains or water resources.

Erosion and sediment control devices are **REQUIRED** for any utility construction or grading project that will result in significant land disturbing activity in the public right-of-way.

- Sediment control practices (inlet protection and perimeter control /silt fence) must be installed **BEFORE** any land disturbance activities begin.
- Temporary land stabilization practices should be installed:
  - Daily over all temporary stockpiles on or near street (including plastic cover and temporary down drains); *and*,
  - Within 7 days after work is completed over all disturbed areas not on or near the street (including temporary seeding of spoil piles though seeding and mulching).

Refer to the Mn/DOT Pocketbook Guide (June 2009) for guidance to preventing pollutants from leaving construction sites. Note: general operations, including dewatering and concrete washout, begin on page 57.
http://www.dot.state.mn.us/environment/pdf_files/erosion-sediment-control-handbook.pdf

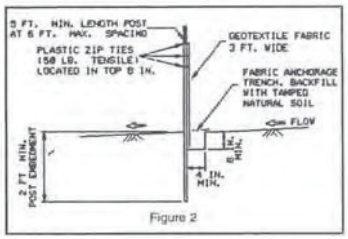

Figure 2

SILT FENCE

Silt fence is used as perimeter control to keep sediment on-site and away from areas you want to protect. For work in the right-of-way, silt fence can be installed between the top of the curb and the disturbed boulevard.

TEMPORARY SEEDING AND MULCHING OR PLASTIC COVER

Temporary seeding and mulching is to quickly provide temporary cover that will protect the soil from erosion until establishment of permanent stabilization. Applicable areas include any topsoil stockpiles and any areas disturbed by grading activities.

For areas that must be stabilized each day (located on or near the street) plastic cover should be used instead.

STORM DRAIN INLET PROTECTION

Storm drain inlet protection prevents sediment from entering a storm drain by surrounding or covering the inlet with a filtering material. This allows sediment-laden runoff to pond and settle before entering the storm drain.

The type of filter used will depend on inlet type (curb inlet or drop inlet), slope, and amount of flow. Some commercial inlet filters are placed in front of or on top of an inlet, others are placed inside the inlet and under the grate.

DAILY AND AS-NEEDED STREET SWEEPING

Street sweeping is used to clean the pavement and curb-line area on a regular basis to remove sediment, debris, and other pollutants from road and parking lot surfaces that are a potential source of pollution to waterways.

CITY OF SAINT PAUL
Christopher B. Coleman, Mayor

Public Works
Right-of-Way Division

Telephone: 651-487-7250
Fax: 651-487-7245

ROW Erosion and Sediment Control Worksheet

Project: **Project File No.**:

Property Address:

Inspection Date: **Re-inspection Date**:

Inspection Type: **Size of Site**:

Inspection Results

Sewer Inlet Protection:

Comments:

Street Condition:

Comments:

Silt Fence/Sediment Control:

Comments:

Stock Pile On or Near Street:

Comments:

Stock Pile Not On or Near Street:

Comments:

Corrective Action:

Comments:

SPILL REPORTING FORM

City of Saint Paul - Department of Parks and Recreation

INSTRUCTIONS

EMPLOYEE: Form should be filled out as completely as possible, on the same day as the spill occurred, by the individual involved in the spill. Describe all the events in as much detail as possible, especially the cleanup activities. If you have any questions regarding this form, contact your supervisor, or Environmental Services staff (651-632-5111). When completed, return form to your supervisor.

SUPERVISOR: Please return form as soon as possible to Adam Robbins, Como Central Service Facility.

Date of Spill:_____ Name (PRINT):_____

Time of spill:_____ Supervisor:_____

Section:_____ Phone number to reach you:_____

What was spilled?:_____

How much was spilled?:_____

Did the spill flow into a sewer? If yes, what type of sewer (sanitary, storm or unknown)?

_____

What type of surface did the spill occur on (soil, concrete, etc)?:

_____

Location of Spill (Be specific- address, intersection, exact location):

_____

_____

Describe what was happening when the spill occurred:

_____

_____

_____

What caused the spill (overfill, broken line, etc)? Be specific:

_____

Describe how the spill was cleaned up:

_____

_____

How were the spill cleanup materials disposed of?:

_____

List the names of other employees involved in the spill or cleanup:

_____

Was the MN Duty Officer called (651-649-5451)? _____

If yes: Who called?_____ Date_____Time_____

Duty Officer Report #:_____PCA Spill #_____

Employee Signature:_____

Spill Kit Instructions

Stop source of spill, if it can be safely done. If not, immediately call the Minnesota Duty Officer.

Contain spill. Wear gloves. Your first priority is to protect the spill from flowing into a storm sewer or drain. Use the 3" x 4' socks to create a barrier between the spill storm sewers/drains. Use the pillows to absorb pools of contained material (up to a half gallon per pillow). Small spills can be cleaned up with the absorbent pads.

Contact your supervisor or Environmental Services staff as soon as it is safe/practical to do so. If neither are available, contact the MN Duty Officer.

Complete a spill report form for all spills, **regardless of size**. The Minnesota Duty Officer must be notified for:

Petroleum (gasoline, diesel, hydraulic fluid, oil) spills of unknown amounts or over 5 gallons
Non-petroleum (antifreeze, pesticides, etc) spills of any amount

Phone Numbers
Environmental Services – (651) 632-5111
MN Duty Officer – (651) 649-5451

Disposal of used materials:
Used socks, pads and pillows should be placed in yellow hazardous waste bags found in the spill kit. Materials used to soak up petroleum spills should be disposed of in the 55 gallon barrel marked "Used Oil Sorbents" in the fuel shed at the Como Central Service Facility. For instructions on how to dispose of materials used to clean up non-petroleum substances, contact your supervisor or Environmental Services staff.

Replace used spill kit items promptly. All materials found in your spill kit are available from the Storeroom at the Como Central Service Facility.

FACILITY SPILL KIT INVENTORY	**qty**	**type**
kit absorbs ~8 gallons	30	17"x19" pads
	3	3"x4' socks
	4	2"x10"x10" pillows
	4	Hazardous Waste Bags
	2	Pair Nitrile Gloves
	4	Spill Reporting Forms

VEHICLE SPILL KIT INVENTORY	**qty**	**type**
kit absorbs ~5 gallons	10	17"x19" pads
	2	3"x4' socks
	2	Hazardous Waste Bags
	1	Pair Nitrile Gloves
	4	Spill Reporting Forms

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SAINT PAUL PARKS AND RECREATION

POLICY

DEPARTMENT

NUMBER: DIV. 4.4.2
PLACEMENT: Physical Resource Management
EFECTIVE DATE: 03/2010
UPDATED: 03/10

SUBJECT: Water Protection Policy

PURPOSE: To protect natural water bodies through the use of best management practices by all employees working near rivers, streams, lakes, ponds, and/or near storm sewers and impervious surfaces that lead to such water.

SCOPE: All Parks and Recreation employees.

POLICY STATEMENT:
As stewards of the environment, employees will take all precautionary measures to protect local water resources. The Department is committed to maintaining compliance with applicable environmental laws and regulations and to continually improve operations to prevent pollution of waterways that can harm local ecosystems and public health. This policy applies to any intentional act or unintentional act resulting from poor or neglectful work practices.

PROCEDURES (AND/OR REQUIREMENTS, EXPECTATIONS):

1. No dirt, silt, vegetation, organic material, debris, or other foreign materials will be deposited into any river, lake, stream, pond, or into any sewer system that leads to such water.

2. Employees will not blow, broom, sweep, whip, or shovel anything including dirt, silt, sand, debris, weeds, or other organic material into such body of water.

3. While performing work near such water, all debris will be picked up and removed from the site to be properly disposed of. In the event that an employee is not sure of proper disposal, the Supervisor should be called immediately.

4. No dirt, grass, organic material, debris or other foreign materials shall be intentionally deposited onto streets or other impervious surfaces without a plan for its immediate removal. This includes anything that may enter the sewer system. Exception: Sand/salt/deicers approved for controlling snow and ice when used appropriately.

5. When sweeping boulevards or edging curbs, a plan is required to immediately remove all dirt and debris deposited into the street. This may mean coordinating the clean up with Public Works or other street sweepers prior to the start of the job. If rain is expected, work should be delayed.

REQUIRED ITEMS AND/OR RELATED INFORMATION:

SECTION MANAGER'S RESPONSIBILITIES	SUPERVISOR'S RESPONSIBILITIES	EMPLOYEE'S RESPONSIBILITIES
Ensure all employees under his/her jurisdiction are aware of this policy and procedures.	Advise all employees of this policy and procedures.	Adhere to the policy.
Ensure that supervisors in his/her section enforce this policy and procedures.	Ensure that employees follow this policy and procedures.	Follow the procedures.
	Issue warnings or initiate disciplinary action as needed to ensure employee compliance.	Ask for additional training if needed.

Owner: Karin Misiewicz, Parks Supervisor **Next Review Date:** 02/11

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DEPARTMENT OF PUBLIC WORKS
Policy and Procedures
Water Protection
Number:_____ Effective Date: November 1, 2010, Revision Date:

POLICY STATEMENT:
As stewards of the environment, employees will take all precautionary measures to protect local water resources. The Department of Public Works is committed to maintaining compliance with applicable environmental laws and regulations and to continually improve operations to prevent pollution of waterways that can harm local ecosystems and public health. This policy applies to any intentional act or unintentional act resulting from poor or neglectful work practices.

PROCEDURES (AND/OR REQUIREMENTS, EXPECTATIONS):

1. No dirt, silt, vegetation, organic material, debris, or other foreign materials will be deposited into any river, lake, stream, pond, or into any sewer system that leads to such water.

2. Employees will not blow, broom, sweep, whip, or shovel anything including dirt, silt, sand, debris, weeds, or other organic material into such body of water.

3. While performing work near such water, all debris will be picked up and removed from the site to be properly disposed of. In the event that an employee is not sure of proper disposal, the Supervisor should be called immediately.

4. No dirt, grass, organic material, debris or other foreign materials shall be intentionally deposited onto streets or other impervious surfaces without a plan for its immediate removal. This includes anything that may enter the sewer system. Exception: Sand/salt/deicers approved for controlling snow and ice when used appropriately.

5. When sweeping streets or edging curbs, a plan is required to immediately remove all dirt and debris deposited into the street. This may mean coordinating the clean up with other street sweepers prior to the start of the job. If rain is expected, work should be delayed.

Policy Approval:

Rich Lallier, Public Works Director

Date: November 1, 2010

Owner: Rich Lallier	**Next Review Date:** November 1, 2010

CITY OF SAINT PAUL
Mayor Christopher B. Coleman

390 City Hall
15 West Kellogg Boulevard
Saint Paul, MN 55102

Telephone: 651-266-8510
Facsimile: 651-228-8513

Fact Sheet

Chapter 51. Allowable Discharges to the Storm Sewer System

What is the focus of the new ordinance?

This ordinance is intended to prevent pollution from entering the City's storm sewer system, which discharges directly to our lakes and the Mississippi River. The ordinance formally defines what is allowed and prohibited.

Prohibitions include, but are not limited to:

- Motor oil, paint, solvents, or other liquids poured into a catch basin;
- Grass, leaves, or landscape material intentionally disposed in the street or waters;
- Sanitary connections to the storm system; or,
- Wash water, concrete wash out to the street or other improper disposal of waste.

Why is the ordinance needed?

The Minnesota Pollution Control Agency regulates Saint Paul's stormwater under the federal Clean Water Act. This serves to protect water quality in lakes and rivers. Under this permit, the City is obligated to enact regulatory controls to prevent pollutants from entering the storm sewer system.

What is the City currently doing to address this and how will this help?

- The City educates citizens on how to prevent pollution going into the storm sewer system by working with volunteer groups to stencil "don't pollute, drains to river" graphics on city storm drains and distribute multi-lingual door hangers.
- The City addresses municipal maintenance operations by implementing policies and procedures to avoid improper behaviors leading to stormwater pollution.
- Improper discharges to the storm sewer system are currently addressed on a complaint basis.

Several existing ordinances indirectly address pollution prohibitions, but lack specificity. The new ordinance clarifies and strengthens pollution prevention controls. It better positions the City to take enforcement steps, if necessary. Public Works and DSI jointly share enforcement responsibilities.

How does this ordinance affect citizens, businesses, or other constituents?

It is difficult to generalize due to the range of potential circumstances and impacts of prohibited discharges – from raking leaves into the street to dumping oil into a storm drain.

This ordinance will primarily be used to respond to public complaints. Awareness and education about the new ordinance, and avoiding water quality impacts, will be stressed. Enforcement in the form of abatement letters may be taken, depending on the circumstance and threat to water quality.

2017 Discharges Addressed

Date	Discharge	Action
February 2017	Blockage in sanitary sewer main 2020 Energy Park Drive	Blockage removed by Sewer Maintenance Debris cleaned up.
February 2017	Faulty valve on MCES overland sanitary bypass line.	Addressed by MCES Contractor.
April 2017	Neighborhood Concerns regarding the potential for automotive fluids to leak from Car lot at 1280 Jackson St. Neighborhood directed complaints to Anglo, Anglo directed to MPCA, MPCA directed to City Stormwater and County Hazardous Waste Staff	Addressed by DSI
April 2017	Report made to Ramsey County PW regarding fluids and electronic waste at 2576 Doswell Ave.	Addressed by DSI
May 2017	Defective private sanitary service at 1152 Bush Ave.	Sewer Maintenance vacuumed standing water. SPRWS shut off water to property.
May 2017	Paint Spill at Grotto and Minnehaha	Storm drain and roadway cleaned by City.
May 2017	Complaint regarding State Capitol Front Lawn Stormwater BMPs. City Stormwater contacted by MPCA.	ROW Inpsector determined site controls were in place, and vehicle tracking was being addressed. State of MN Project Manager Contact given to MPCA.
May 2017	Concrete/mortar washout on storm drain cover and storm sewer at First Baptist Church: 499 Wacouta.	Sewer Maintenance cleaned storm sewer, educated property owner on proper disposal techniques.
May 2017	Complaint received by MPCA regarding Gasoline Spilling from Vehicle in Hidden Falls Parking Lot.	Parks Department Investigated, found no actively leaking vehicles, no evidence of runoff past impervious areas. Duncanson notified by Murphy
June 2017	Complaint received from MWMO regarding potential illicit discharge from Highland Outfall.	MWMO/CRWD collected sample for analysis. Sewer Maintenance traced upstream pipe network. Testing revealed no sanitary waste. Flow derived from watermain flushing on Ford Pkwy.
July 2017	RV dumped sanitary sewage in storm drain at 1053 Beech	Sewer Maintenance cleaned street and storm drain. Referred to Police Dept.
August 2017	Complaint received by PW regarding sediment/debris from private property entering storm sewer at 360 Summit.	Sewer Maintenance cleaned storm sewer/grate. DSI addressed private property.
August 2017	Complaint received from FMR regarding poor ESC practices on Utility Project on Market Street near Rice Park.	ROW Inspector determined site controls were in place, and Contractor is maintaining them.
August 2017	Complaint received by MPCA regarding significant tracking from private property at 833 Minnehaha	Addressed by DSI
September 2017	Complaint received from FMR regarding hydraulic leak on Traffic Maintenance Vehicle at Wabasha & 7th.	Hydraulic fluid cleaned up by Traffic Maintenance. Vehicle repaired.
October 2017	Complaint of Coolant Spill on Fourth Street, East of St. Peter.	Sewer Maintenance cleaned Street and downstream CBs.
October 2017	Complaint received from CRWD regarding an unprotected soil pile and tracking near Ford Bridge.	Addressed by Area ROW Inspector.
November 2017	Orange Discharge observed by Sewer Maintenance in open channel near Fourth and Commercial.	Sewer Maintenance worked with Braun-Intertec to obtain sample. Orange Discharge determined to be naturally occuring Iron Bacteria.
November 2017	Blockage in private sanitary sewer service.	Sewer Maintenance contained spill. SPRWS shutoff water to property.
November 2017	Complaint received from MPCA regarding tracking on Childs Road.	Investigated by ROW, tracking derived from multiple properties with Gravel Parking Lots.

Metro Watershed Partners

2017 Annual Program Report

Metro Watershed Partners is a coalition of more than seventy public, private and non-profit organizations in the Twin Cities metro area. Through collaborative education and outreach, the Metro Watershed Partners promote a public understanding that inspires people to act to protect water in their watershed. Since 1996, partners have cooperated through educational projects, networking, and resource sharing.

MINNESOTA WATER
LET'S KEEP IT CLEAN

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Metro Watershed Partners 2017 Report

Introduction

Metro Watershed Partners is a coalition of more than seventy public, private and non-profit organizations in the Twin Cities metro area. Through collaborative education and outreach, the Metro Watershed Partners promote a public understanding that inspires people to act to protect water in their watershed. Since 1996, partners have cooperated through educational projects, networking, and resource sharing.

WATERSHED
PARTNERS

The mission of the Metro Watershed Partners is two-fold:

- to provide and promote collaborative watershed education programs with consistent messages to the general public, local government staff and elected officials, and
- to provide WSP members a place and means to share information, generate ideas, and coordinate and support collaborative watershed education programs.

In 2017 members contributed $32,824.75 to support monthly meetings, exhibit checkout, administrative functions, and state fair outreach to hundreds of thousands of people. Members contributed $93,474.25 to support the Clean Water Minnesota outreach campaign.

Leadership

The work of **Metro Watershed Partners** is guided by a steering committee that includes stormwater education professionals from watershed organizations, non-profits and government agencies. In 2017, our steering committee members were:

Angie Hong, Washington Conservation District (*convenor)*
Cole Landgraf, Minnesota Pollution Control Agency
Deirdre Coleman, Freshwater Society
Jen Dullum, Vermillion River Watershed JPO
Jessica Bromelkamp, Capitol Region Watershed District
Lyndon Torstenson, National Park Service, Mississippi National River & Recreation Area
Telly Mamayek, Minnehaha Creek Watershed District
Tracy Fredin, Center for Global Environmental Education, Hamline University

Clean Water MN

2017 Outreach Projects Report

MINNESOTA WATER
LET'S KEEP IT CLEAN

Clean Water MN is the collaborative outreach project of the Metro Watershed Partners. Working together, we provide resources, training, and support to partners as they work to inspire homeowners in the Twin Cities metro area to keep water clean and healthy.

The steering committee of the Metro Watershed Partners oversees the work of Clean Water MN. Jana Larson from Hamline University manages campaign fundraising and the creation and implementation of communication and outreach programs. As part of this work, we regularly ask stakeholders to tell us how to best serve the needs of MS4s.

New last year, **Cleanwatermn.org** features seasonally appropriate stories about metro area residents taking action at home and in their lives to keep Minnesota water clean and healthy. The stories are designed for partners to use in their own communications—via websites, Facebook, Twitter, newsletters, and such.

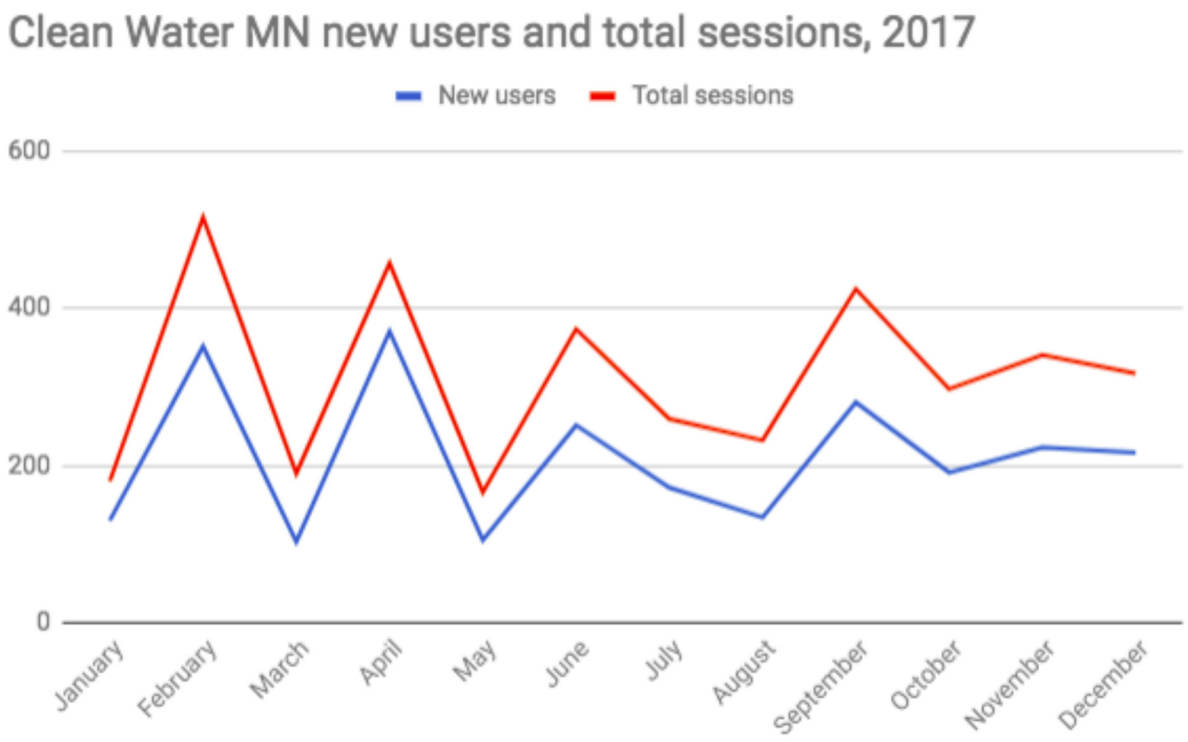
Along with each story we create a suite of professional photographs, accessible to partners online for use in their own stories and publications. Additionally, each story links to informational resources on our own site and other websites. In 2017 we published 12 new stories.

The cleanwatermn.org website also features informational pages, calls to action, a “Find My Watershed” map, information about the partnership, and a list of our partners. We will continue to develop and add content to the site in 2018 and beyond.

Campaign Analytics

In order to provide some measure of the impact of our work, we have created a system of unique, trackable links for our partners to use when they publish a story from Clean Water MN. This allows us to measure click-through rates to CleanWaterMN.org for each partner individually. Below you will find a summary of these analytics, which paint a general picture of engagement with each story. These numbers do not reflect, however, the total number of readers for any given story, since trackable links are not always used, and some readers may not click on the link to read the full story. Analytics reports with a breakdown for each partner can be found at: http://bit.ly/2rxvGE6

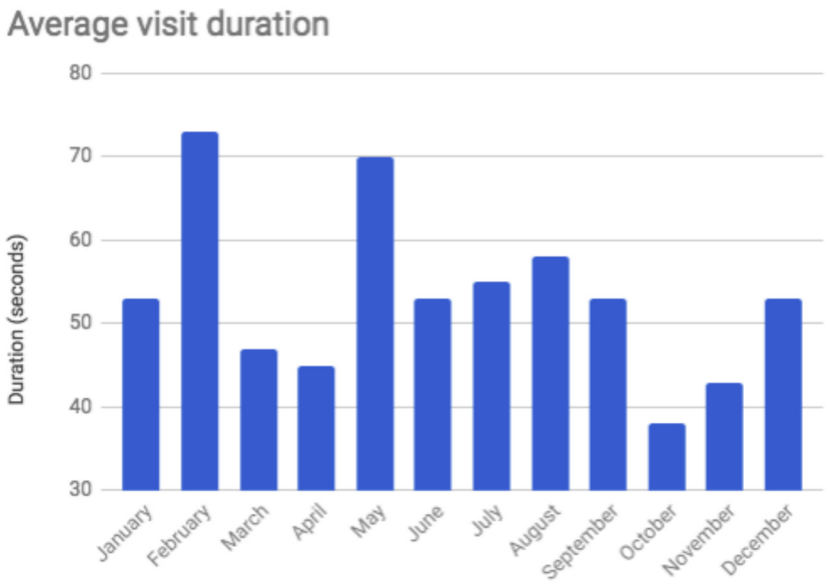
Month	Blog Title	Total sessions	New users	Pages per visit	Average duration
January 2017	The Iceman Cometh: Sidewalk Salt Pollutes Our Lakes and Streams	180	130	1.48	00:54
February 2017	Recent Immigrants Become Water Stewards	515	351	1.4	01:13
March 2017	Tree-Huggers Unite: Protecting Urban Tree Canopies	190	103	1.33	00:47
April 2017	Planting Native Seeds with a New Generation	457	370	1.13	00:45
May 2017	Rain Barrels Herald Spring	166	105	1.34	01:10
June 2017	Organic Lawn Care and Maintenance Yields Field of Dreams	373	251	1.36	00:53
July 2017	What's in a Ribbet? Frogtown Frogs Signal Environmental Health	259	172	1.32	00:55
August 2017	Going Native with Shoreline Restoration	232	134	1.47	00:58
September 2017	Urban Agriculture Spawns North Side Enterprise	424	280	1.33	00:53
October 2017	Improving Health and the Planet with Organic Lawn Care	297	191	1.32	00:38
November 2017	Becoming a Mississippi River Water Quality Action Hero	340	223	1.39	00:43
December 2017	Friends Turn Stormwater Problem Into a Cistern Solution	317	216	1.36	00:53
Total click-throughs to CWMN site		3750	2526		



The blog posts that generated the most traffic were:

- *Recent Immigrants Become Water Stewards* (February),
- *Planting Native Seeds with a New Generation* (April),
- *Urban Agriculture Spawns North Side Enterprise* (September),
- and *Organic Lawn Care and Maintenance Yields Field of Dreams* (June).

Visitors to cleanwatermn.org spent the longest time on the site in February and May.



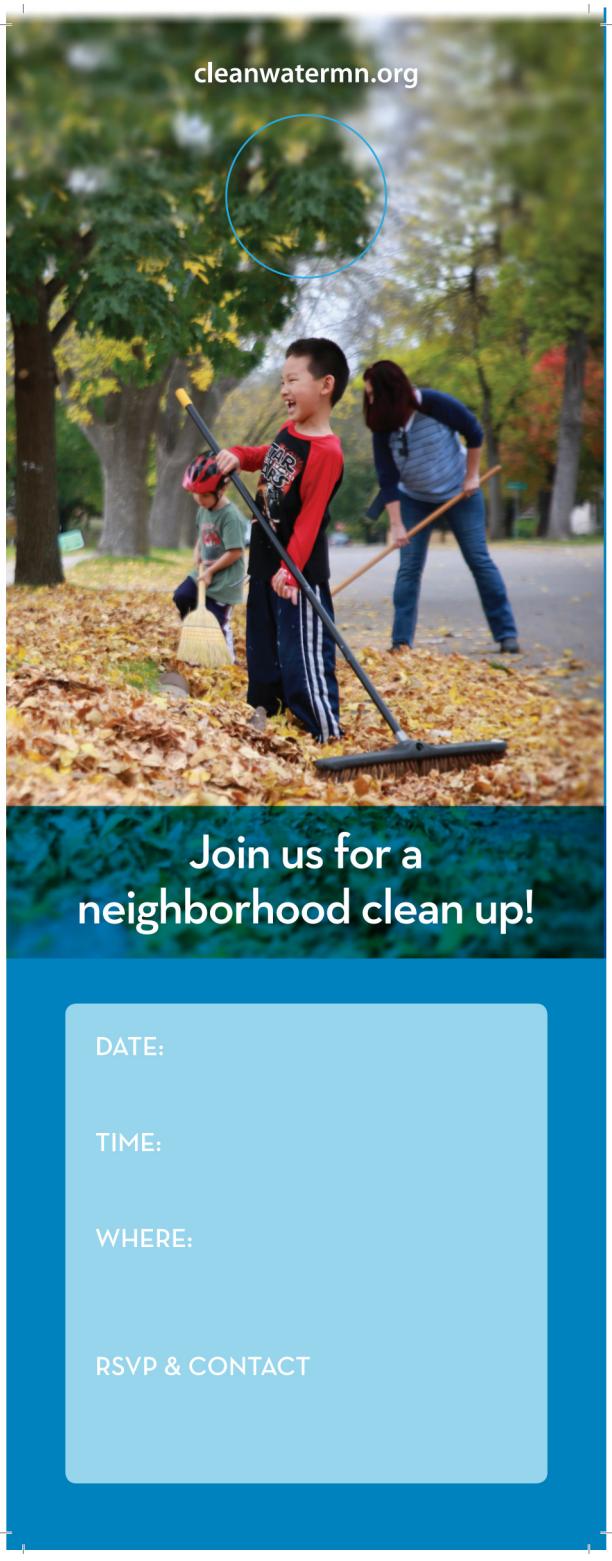
Clean Water MN, new projects in 2017

As part of Clean Water MN's continuing efforts to inspire local residents to take action to protect lakes and rivers from run-off pollution, we created a new tool: the ***Clean Streets, Clean Water Neighborhood Cleanup Kit.*** It's like a party in a box, and the goal is to take all of the guesswork out of organizing a block-level street cleanup, so community groups can easily plan an event that invites local residents to participate in cleaning up streets and storm drains in their neighborhood. Where the program is available, cleanup organizers would ask participants to take the next step of signing up to "adopt" a storm drain on their block at adopt-a-drain.org.

We plan to officially launch this new cleanup kit on cleanwatermn.org this fall, but will pilot it this coming spring (2018) with five to twenty neighborhood and community groups from across the metro area.

As an incentive to participate, printed outreach materials will be provided (free of charge) to groups to plan and promote a neighborhood clean-up in April or early May. In exchange, event leaders participate in a follow-up focus group to give us feedback on what worked well, and suggestions on how to improve the kit.

If you or a group in your area would like to plan a spring cleanup and participate in the pilot and focus group, please contact us by email: jlarson25@hamline.edu.



Clean Water MN, new projects and accomplishments in 2017 (cont.)

In 2017, we continued to maintain and improve the Clean Water MN website.

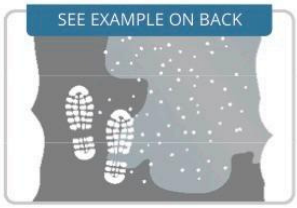
- Making programming modifications to the format of blog posts,
- fixing the watershed map tool on the home page,
- and creating a new resources page to house the downloadable informational PDFs we are creating on topics such as: composting, water-wise salt use, and organic lawn care. We will continue to create and add resources to this page over the years. (Look for this to go live soon.)

1. Shovel

Clear walkways before snow turns to ice, and before you apply salt. The more snow you clear manually, the less salt you'll need.

2. Select

Salt doesn't melt ice if the pavement is below 15 degrees, so use sand for traction when it's too cold, or choose a different de-icer.



3. Scatter

Use salt only where it's critical. When you apply salt to pavement, leave plenty of space between granules. A 12-ounce coffee cup of salt is enough to cover 10 sidewalk squares or a 20-foot driveway.

4. Sweep

Clean up leftover salt, sand, and de-icer to save and reuse as needed.

Protect our water!

Looking forward to 2018

Adopt-a-Drain is a pilot program created in 2014 by Hamline University with support from the City of Saint Paul and Capitol Region Watershed District. Adopt-a-Drain allows residents to claim responsibility for a storm drain near their home and keep it clear of trash and organic debris in order to reduce water pollution. The program was developed using principles from psychology and marketing, and revised using feedback from community focus groups and online surveys. Residents sign up online to adopt a storm drain, and act as clean water ambassadors to their neighbors.

Since launching the program in Saint Paul, Hamline has expanded implementation, adding new neighborhoods and cities. There are currently more than 1,000 residents participating in the program, who have adopted thousands of drains and have together diverted many thousands of pounds of trash and organic debris from local waterways.

In 2018, we will be working to make the Adopt-a-Drain program available to all residents in the seven-county metro area. Clean Water MN will help fund the creation of a new online registration tool, which will be accessible through Cleanwatermn.org. We aim to have the new Adopt-a-Drain registration tool with metro-wide GIS data online by September of 2018. Stay tuned for updates and information on how you can be involved.

With your continued support, in addition to working toward the launch of a metro-wide Adopt-a-Drain program, we will continue to update and improve cleanwatermn.org, publishing monthly blog stories, with new photographs, and informational PDFs.

Please find the proposed budget for 2018 on page 16 of this report. The invoice for 2018 membership can be returned with payment to to: Hamline University, CGEE, 1536 Hewitt Ave. MS-A1760, Saint Paul, MN 55104

2017 Accomplishments of the Metro Watershed Partners

Networking and Sharing Resources

The Watershed Partners hold monthly meetings that provide members a way to gather, share information, generate ideas, and form partnerships that support watershed education in the state of Minnesota. These meetings keep our members up to date on new developments in the field of water resources and water education by featuring presentations by experts in fields such as watershed management, education, marketing, legislation and outreach.

In 2017, the Watershed Partners held 11 meetings. Meeting attendance totaled 389; attendance varied from 12 to 74 but on average 35 partners attended each meeting. We're pleased to see that partners continue to value our meetings, and demonstrate energy for collaboration and information sharing; we plan to continue offering workshops and events our partners will find useful in 2018 and beyond.

2017 PARTNER MEETINGS — TOPICS AND PRESENTERS

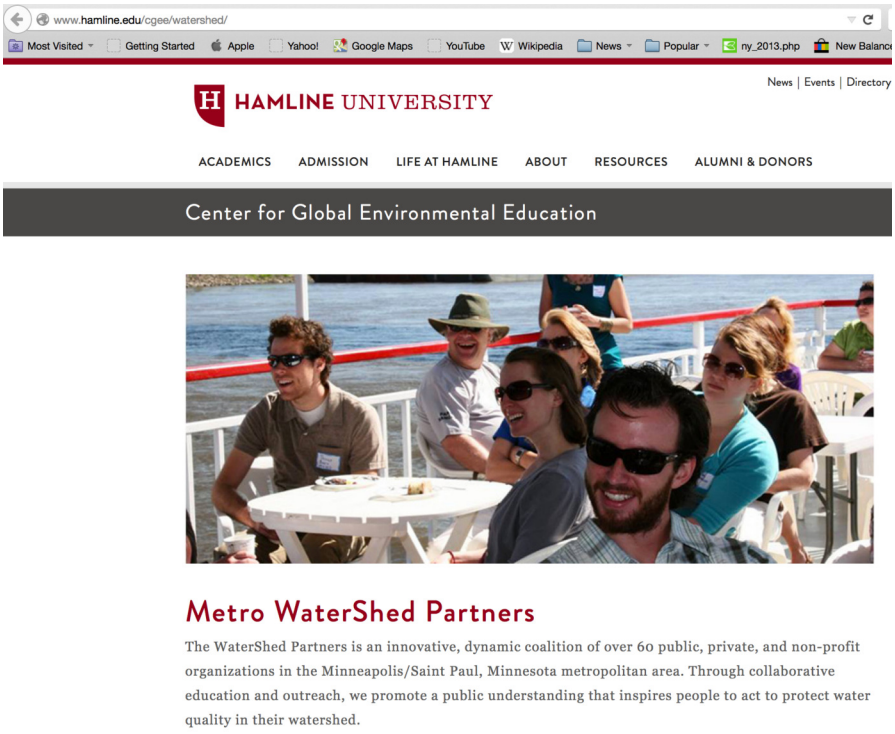
January	Karen Solas, MPCA and Anita Urvina Davis, Richardson, Richter & Associates	Environmental Justice in Minnesota
February	Anitra Cottledge and Anne Phibbs, Office of Equity and Diversity, University of MN	Communicating on Issues of Equity and Diversity Workshop
March	Missy Voronyak, Group Director of Social Strategy & Engagement, WCG	Twitter for Communicators – Build your network and unlock opportunities
April	Peggy Knapp and Deirdre Coleman from Freshwater Society, and Jana Larson from Hamline University	Community Clean-ups for Water Quality and Adopt-a-Drain
May	Amy Rager and Andrea Lorek Strauss, UMN Extension and Master Naturalists program	Volunteer Management—The Care and Feeding of Volunteers to Ensure your Return on Investment!
June	Magnolia Blossom River Boat with presenters: Steve Woods and Carrie Jennings from Fresh Water Society	Steve Woods: The Metro Surface Water Management Act; Carrie Jennings: The Future Minnesota River
August		Canoe share paddle down the Mississippi River
September	Angie Hong, Facilitator	25x25 Community Discussion
October	Missy Voronyak, Group Director of Social Strategy & Engagement, WCG	Social Media Training
November	Fred Rozumalski, Barr Engineering—Local impacts of the changing climate. Leslie Yetka, Freshwater Society—What cities can do to become more resilient. Kristin Poppleton, Climate Generation—Strategies for engaging audiences in dialogue.	Watershed Partners Roundtable Conversation: Climate Change and Clean Water, Communicating with and engaging residents to prepare for changing communities
December	Mike Davis, MN DNR, and Olivia Dorothy, American Rivers	The Prospect and Process of River Gorge Restoration

The internal website for the Metro Watershed Partners

is hosted by Hamline University at: www.hamline.edu/cgee/watershed.

The site contains:

- information about our monthly meetings
- an archive of minutes, agendas and presentations from past meetings
- the most recent annual report
- information on becoming a member and contributing membership funds to support our partnership and outreach activities
- a directory of partners
- information on borrowing exhibits
- information about outreach activities at the Minnesota State Fair
- general information and a brief history of the partnership



Please contact Jana Larson if you have questions or need help finding the information you are looking for: jlarson25@hamline.edu.

Watershed Partners listserv

The Metro Watershed Partners listserv is a forum for watershed educators, legislators and industry professionals throughout the state to share information and resources.

In 2017, the Metro Watershed Partners listserv continued to provide more than two hundred user-members with an effective tool to promote educational programs, share information about professional programs, and exchange information with other watershed educators, legislators and businesses. The email address for the listserv is: watershedpartners@listserv.hamline.edu. If you would like to send and receive listserv emails, send a request to Jana Larson: jlarson25@hamline.edu.

Education and Outreach at the Minnesota State Fair and Community Events

2017 was another record year for attendance at the fair, with nearly 2 million visitors. (1,997,320 to be exact, beating the previous record in 2016 by more than 50,000.) The Watershed Partners had two exhibits—at the DNR and Eco-experience—where approximately 800,000 people were exposed to our messages about taking action to protect Minnesota's lakes and rivers.

Eco Experience: The Metro Watershed Partners partnered with Hamline University to host the Storm Drain Goalie photo booth and exhibit at Eco Experience for the sixth consecutive year. The Eco-action exhibit features: a photo booth, StormDrain Goalie air hockey, iPad games, a video table with in-depth interactive information about the Mississippi River, and three portable Exhibits-in-a-Box focused on the science of Eutrophication, taking action to reduce run-off, and the urban water cycle. Together, these exhibits raise awareness about the importance of protecting water in Minnesota and ask people to commit to take action at home to prevent run-off pollution.

There were more than 200,000 visitors to the Eco-experience in 2017, and we figure more than 8,000 of them took a photo in the Storm Drain Goalie photo booth. (We took and printed 3,378 photos during the fair, with an average of 2.5 people per photo.) 52% of visitors shared their photo via Facebook, Twitter, email, or text. Our Facebook posts reached an additional 1,200 followers.

There was a Watershed Partner or Master Water Steward present during 60 of the 144 hours of the fair, to interact with the public, answer questions, and promote water-friendly behaviors. Hamline's student workers also made sure to explain the significance of the props (especially the ever-popular giant dog poop). This likely accounts for the fact that most visitors had fun *and* understood the clean water messages of the exhibit.

Minnesota Department of Natural Resources (DNR) building:
Approximately 500,000 (one in four) fair-goers visit the DNR building each year. Our *StormDrain Goalie* foosball table was a big hit again this year. In 2017, we expanded our DNR building presence to include the Mississippi River Multimedia Gallery table.

Community events:
Throughout the year, the Metro Watershed Partners make our tabletop exhibits available free of charge to organizations doing education and outreach on non-point source pollution and preservation of clean water. If you are interested in checking out one of our kiosks or table-top exhibits (see below) for an event in your community, you can find more information and a check-out form at: http://www.hamline.edu/education/environmental/cgee/watershed/exhibit/index.html

Exhibit-in-a-Box, on Eutrophication.

2017 Financial Report

In response to our fundraising requests, 48 supporting members contributed: $32,824.75 to the Watershed Partners in support of meetings, state fair outreach, administration, exhibit maintenance, development and checkout; and $93,474.25 to support the Clean Water MN website and public outreach campaign.

Supporting Members of the Metro Watershed Partners and the Clean Water MN Media Campaign in 2017

Andover
Bassett Creek WMC
Blaine
Bloomington
Brown's Creek WD
Canon River WP
Capitol Region Watershed District
Carver County
Chisago Lakes Improvement District
Columbia Heights
East Metro Water Resources
Eden Prairie
Edina
Elm Creek WMC
Excelsior
Faribault
Farmington
Hennepin County
Hilltop
Lauderdale
Lower Mississippi River WMO
Middle Saint Croix WMO
Minneapolis
Minnehaha Creek WD
Minnetonka
Minnetrista
MNRRA
Mississippi WMO
New Brighton
Nine Mile Creek WD
Pioneer-Sarah Creek WC
Prior Lake
Rice Creek WD
Riley-Purgatory Bluff Creek WD
Rochester
Roseville
Ramsey-Washington Metro WD
Saint Louis Park
Saint Paul
Shingle Creek WMC
Shoreview
South Washington WD
Vadnais Lake Area WMO
Vermillion River Watershed JPO
Washington County
Wayzata
West Mississippi WMC
Woodbury

Clean Water MN/Watershed Partners 2017 Financial Report

	IN-KIND	CASH	TOTAL
REVENUE			
CWMN funds rollover		$2,102.76	$2,102.76
Watershed Partners coordination	$53,800.00	$32,824.75	$86,624.75
Watershed Partners exhibit	$22,000.00		$22,000.00
Media campaign	$5,500.00	$93,474.25	$98,974.25
Meeting registration fees		$1,720.00	$1,720.00
Total revenue	$81,300.00	**$130,121.76**	$211,421.76
EXPENSE			
1. Watershed Partners Coordination			
Principle Investigator	$2,500.00	$6,500.00	$9,000.00
Program Coordinator	$12,000.00	$12,000.00	$24,000.00
Steering Committee	$32,400.00		$32,400.00
Meeting room rental fees	$4,500.00	$96.00	$4596.00
Technology maintenance	$2,400.00		$2400.00
Meeting expenses		$3,392.12	$3,392.12
Postage and printing		$105.64	$105.64
Accounting/indirect fees		$2,625.98	$2,625.98
Subtotal	$53,800.00	**$24,719.74**	$78,519.74
2. Watershed Exhibit Implementation			
Exhibit coordination	$4,500.00	$5,500.00	$10,000.00
State fair expenses	$15,000.00	$5,898.70	$20,898.70
Storage and check-out	$2,500.00		$2,500.00
Subtotal	$22,000.00	**$11,398.70**	$33,398.70
3. Clean Water MN			
Campaign coordination	$5,500.00	$39,843.00	$45,343.00
Printing and postage		$403.04	$403.04
Blog writing and photography		$12,820.00	$12,820.00
Web hosting and maintenance		$2,379.50	$2,379.50
Graphic design		$1,620.00	$1,620.00
Web design and programming		$13762.50	$13762.50
Meeting expenses		$412.68	$412.68
Accounting/indirect fees		$7,477.94	$7,477.94
Subtotal	$5,500.00	**$78,718.66**	$84,218.66
TOTAL	$81,300.00	**$114,837.10**	$196,137.10
ROLLOVER TO 2018		**$15,284.66**	$15,284.66

Clean Water MN/Watershed Partners 2018 Proposed Budget

	IN-KIND	CASH	TOTAL
REVENUE			
CWMN funds rollover		**$15,284.66**	$15,284.66
Watershed Partners coordination	$53,800.00	$32,824.75	$86,624.75
Watershed Partners exhibit	$22,000.00		$22,000.00
Media campaign	$5,500.00	$93,474.25	$98,974.25
Meeting registration fees			$0.00
Total revenue	$81,300.00	**$141,583.66**	$222,883.66
EXPENSE			
1. Watershed Partners Coordination			
Principle Investigator	$2,500.00	$4,500.00	$7,000.00
Program Coordinator	$12,000.00	$12,000.00	$24,000.00
Steering Committee	$32,400.00		$32,400.00
Meeting room rental fees	$4,500.00	$600.00	$5100.00
Technology maintenance	$2,400.00		$2400.00
Meeting expenses		$3,000.00	$3,000.00
Postage and printing		$200.00	$200.00
Accounting/indirect fees		$2,625.98	$2,625.98
Subtotal	$53,800.00	**$22,925.98**	$76,725.98
2. Watershed Exhibit Implementation			
Exhibit coordination	$4,500.00	$5,500.00	$10,000.00
State fair expenses	$15,000.00	$6,000.00	$21,000.00
Storage and check-out	$2,500.00		$2,500.00
Subtotal	$22,000.00	**$11,500.00**	$33,500.00
3. Clean Water MN			
Campaign coordination	$5,500.00	$40,000.00	$45,500.00
Printing and postage		$400.00	$400.00
Blog writing and photography		$15,000.00	$15,000.00
Web hosting and maintenance		$2,500.00	$2,500.00
Graphic design		$6,000.00	$6,000.00
Programming new AAD online tool		$18,000.00	$18,000.00
Focus group research		$6,000.00	$6,000.00
Adopt-a-Drain program support		$10,000.00	$10,000.00
Meeting expenses		$500.00	$500.00
Accounting/indirect fees		$7,477.94	$7,477.94
Subtotal	$5,500.00	**$105,877.94**	$111,377.94
TOTAL	$81,300.00	**$140,303.92**	$221,603.92
ROLLOVER TO 2019		**$1,279.74**	$1,279.74

2017 Implementation of Adopt-a-Drain in Saint Paul

Adopt-a-Drain engages residents in regularly clearing debris from storm drains and keeping the street clean, thereby preventing pollutants from entering storm drains and ending up in local waterways. A web-based application at adopt-a-drain.org allows residents of Saint Paul to sign up to adopt a storm drain in their neighborhood and pledge to keep it free of pollutants.

In addition to reducing pollutants that flow into local lakes and streams, Adopt-a-Drain works to create new social norms around water-friendly behaviors by making commitments visible. Yard signs displayed by program participants provide social cues to neighbors that protecting water is the right, accepted thing to do for everyone in the city.

Individuals have the capacity to take action to protect and improve their neighborhoods and local water bodies.

Engaging in one action often expands their capacity for engagement, and thus a community's capacity to engage in sustainability also increases.

Adopt-a-Drain Saint Paul is a collaborative project of Hamline University, the City of Saint Paul, Capitol Region Watershed District, and Ramsey Washington Metro Watershed District.

The Adopt-a-Drain program began in 2013, when Hamline University proposed the idea in a partner grant to Capitol Region Watershed District (CRWD). The idea was given support, and Hamline developed the web application in 2014. Hamline held focus groups, developed promotional materials and began pilot implementation in the Como Lake neighborhood in the fall of 2014, with funding from the City of Saint Paul. In 2015 and 2016, Hamline promoted Adopt-a-Drain with a neighborhood approach by hanging doorhangers in Como, Railroad Island, North End and Hamline-Midway neighborhoods.

Currently, implementation of the Adopt-a-Drain program continues with support from Saint Paul and CRWD. In 2017, we promoted the program with doorhangers in a portion of the Payne-Phalen neighborhood and around Phalen Lake. Ramsey Washington Metro Watershed District funded a Master Water Steward project promoting Adopt-a-Drain around Phalen Lake. The City of Saint Paul promoted the program with Facebook and Instagram ads in the spring and fall of this year.

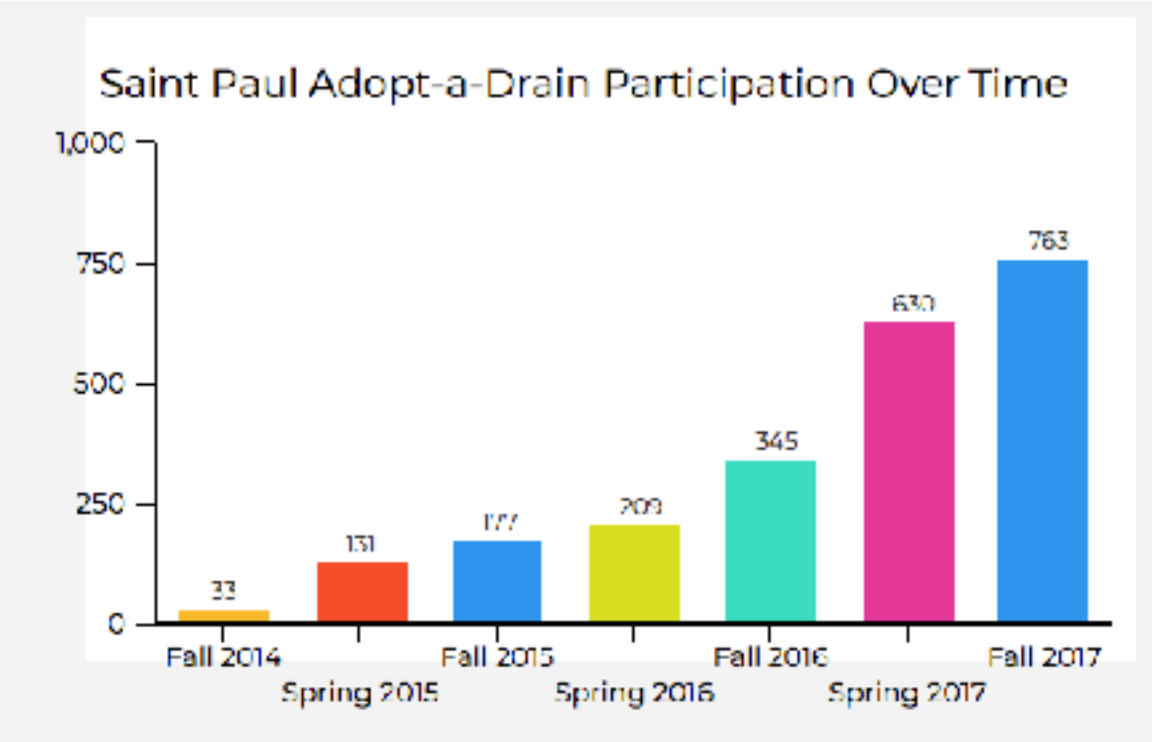
Adopt-a-Drain Saint Paul
Promotion Timeline

Adopt-a-Drain Participation in Saint Paul

Since the program began in 2014, **763 participants** have adopted **1,222 storm** drains in Saint Paul.

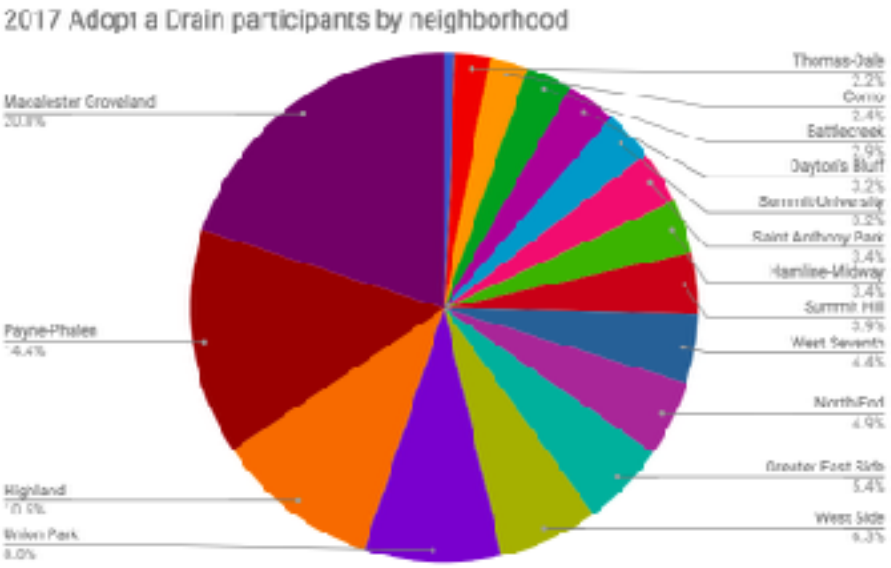
In 2017, **425 new participants** joined the Adopt-a-Drain program and adopted 665 storm drains. 40 of these participants are in the Phalen Lake neighborhood.

The program **more than doubled** in 2017, rising from 345 participants to 763!



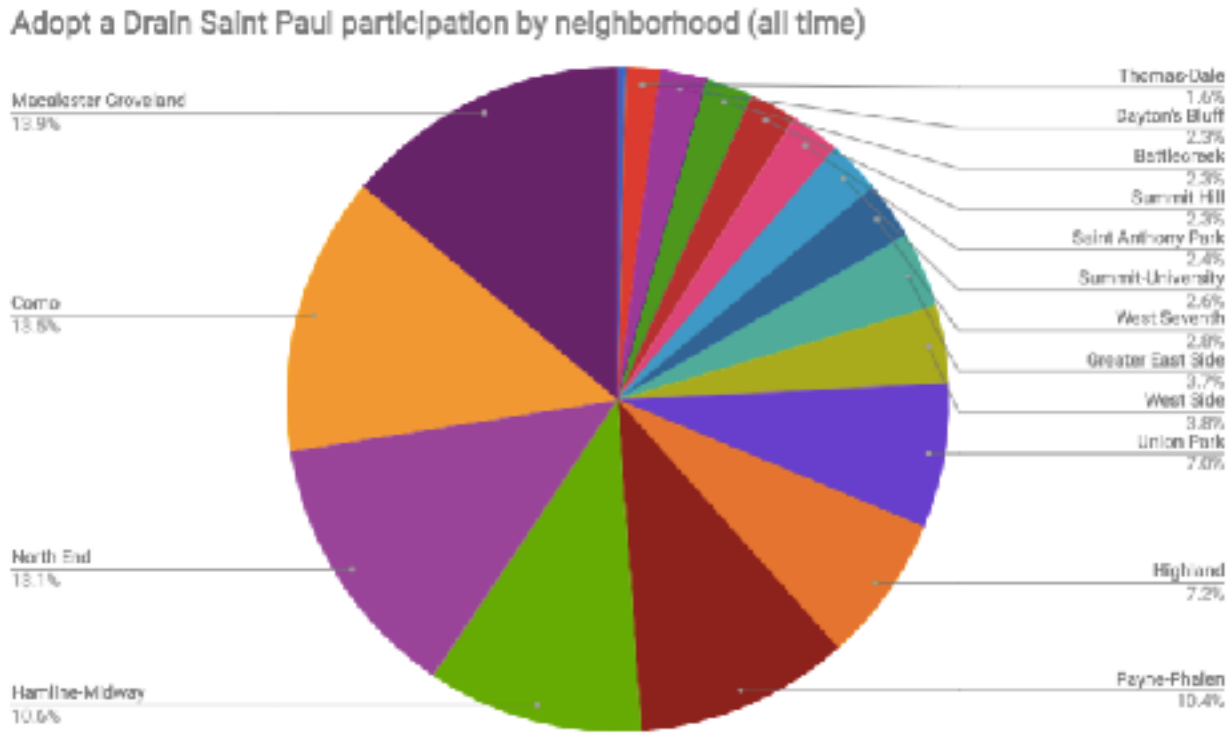
Adopt-a-Drain Participation by Neighborhood

In 2017, we promoted in Payne-Phalen neighborhoods with doorhangers.



Due to more generalized promotion on social media, residents from all over Saint Paul signed up to adopt their storm drain.

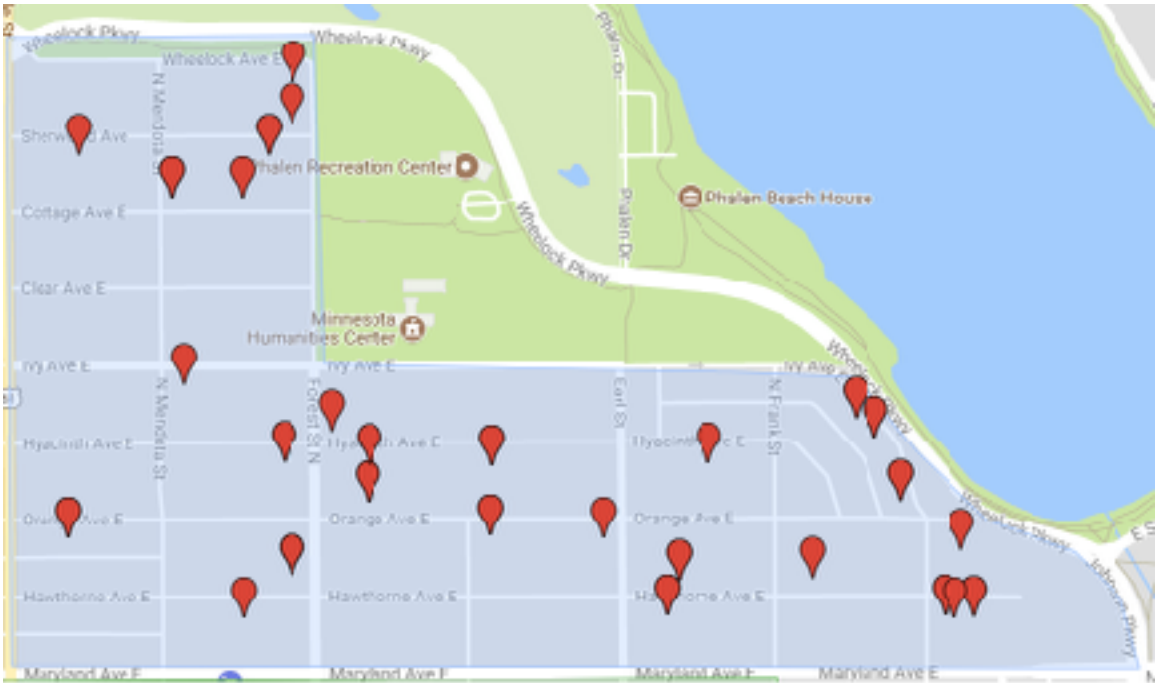
We continue to see a strong interest from Macalester-Groveland and Highland neighborhoods despite no targeted promotion in those neighborhoods.



We have done doorhanging promotion in Como, North End, Hamline-Midway, and Payne-Phalen, areas that, aside from Mac/Groveland, show the highest participation rates.

Promotion of Adopt-a-Drain, 2017

Phalen Lake Pilot:
Master Water Stewards hung doorhangers on 750 homes around Lake Phalen on April 10, 2017. Roughly 20 people adopted storm drains around that time. Over the year, 40 people have adopted 69 storm drains in the area.



The Master Water Stewards exceeded their initial goal to have 10% of storm drains in the pilot area adopted (15 of 150 total). In the pilot area, over 30% of drains are now adopted. The influence spread to the rest of the Lake Phalen watershed, with 12 new participants outside the targeted area.

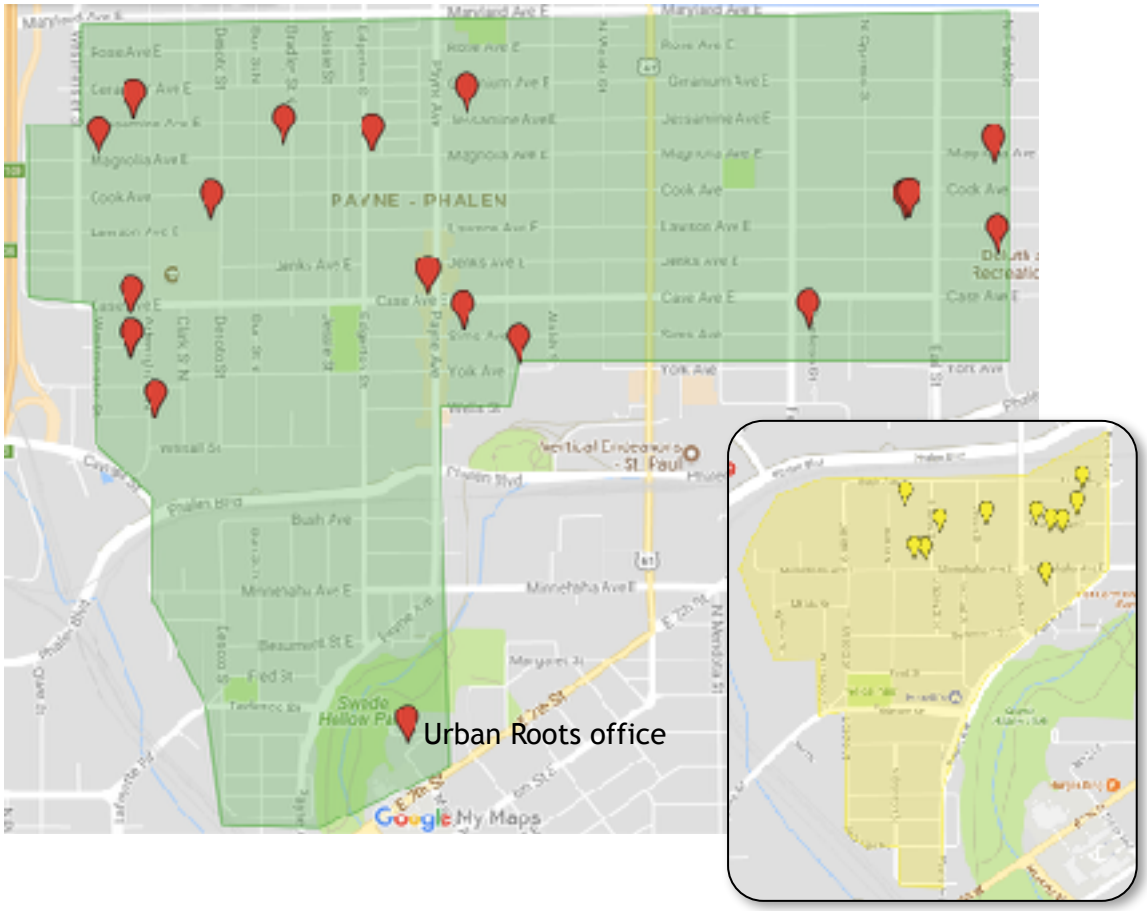
The Master Water Stewards found this to be a very successful project and were able to educate over 100 individuals in their neighborhood about storm water management.

In addition to their promotional efforts, Master Water Stewards delivered yard signs to new participants around Phalen Lake. This worked well, however it is unclear how to proceed with new adoptions in this area now that their capstone project is over.

Promotion of Adopt-a-Drain, 2017

Payne-Phalen Promotion:

Urban Roots hung doorhangers on approximately 3,000 homes on April 11, 2017 and April 13, 2017. 20 people adopted drains in the target area.



Railroad Island originally received doorhangers in Fall 2015, yielding 11 adopters (shown above). The second promotion in this area did not increase participation.

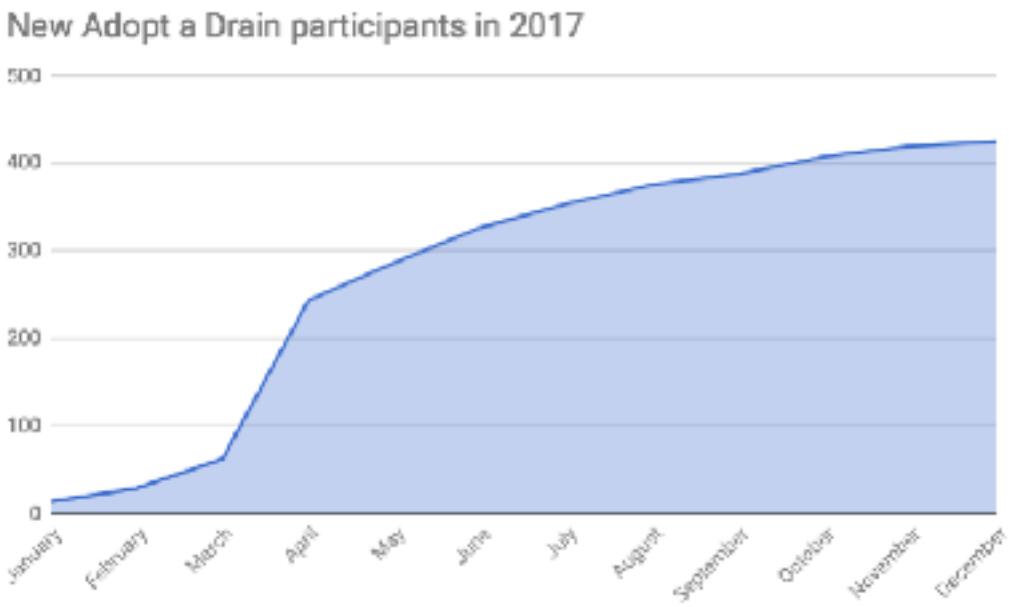
Urban Roots interns delivering doorhangers

Promotion of Adopt-a-Drain, 2017

Spring Facebook campaign: The City of Saint Paul sponsored an Adopt-a-Drain ad on its Facebook page from March 30-April 27. During this time, 142 people adopted drains outside of the Payne-Phalen neighborhood.

Fall Facebook campaign: The City of Saint Paul ran another Adopt-a-Drain ad on its Facebook page and Instagram page from Oct 20-Nov 15. During this time, 30 people adopted storm drains.

Month	Total
January	14
February	15
March	34
April	181
May	43
June	40
July	27
August	22
September	12
October	20
November	12
December	5
Total	425



Debris Diversion 2017

Reporting Spring 2017

- 135 participants reported removing 325.5 bags of debris
- 30 lbs per bag = 9,765 pounds of debris
- Total 630 participants
- 21.4% participants reported
- Average of 2.4 bags per person

If all 630 participants collected the average 2.4 bags per person, they will have diverted 45,360 pounds of debris!

Reporting Fall 2017

- 165 participants reported removing 729.25 bags of debris
- 30 lbs per bag = 21,877.5 pounds of debris
- Total 763 participants
- 21.6% participants reported
- Average of 4.4 bags of debris per person

If all 763 participants collected the average 4.4 bags per person, they will have diverted 100,716 pounds of debris!

Photos from Saint Paul Resident, Fall 2017

Summary conclusions and questions

This year, we reached our goal of 300* new adoptions for the year in July. We then raised our goal to 550 for the year; a goal we a did not meet. By the end of the year, 385* people had adopted drains in 2017 in Saint Paul. (*These numbers do not include the Phalen Lake Pilot. 40 additional people signed up as part of that pilot, implemented by Master Water Stewards in the RWMWD.)

In 2017, we promoted the program on social media and with doorhangers. In spring, we partnered with Urban Roots to promote Adopt-a-Drain with door hangers in the Payne-Phalen neighborhood. We also piloted Adopt-a-Drain in Ramsey Washington Metro Watershed District working with Master Water Stewards for their capstone project.

We had a great response to the Facebook ads in the spring, and decided to promote Adopt-a-Drain only via social media in the fall. The result was that far fewer people signed up to adopt drains than we anticipated. We don't have any data to explain why the response fell short in the fall, however it may be that we had captured most everyone who follows Saint Paul's Facebook page and was going to sign up for Adopt-a-Drain with the ads we ran in the spring.

The Payne-Phalen and Phalen Lake promotions are very near to each other, and had very different rates of adoption. 700 doorhangers were delivered in the Phalen Lake pilot, resulting in 40 people adopting. 3,000 doorhangers were delivered in the Payne-Phalen area, just blocks away, and only 20 people signed up. Further analysis would be required to determine the reason for this disparity.

This year, Macalaster-Groveland and Highland Park residents continued to adopt at a high rate. We also saw high rates of adoption from both neighborhoods last year.

Recommendations for 2018

1. We recommend continuing and expanding our efforts to promote Adopt-a-Drain, including:

- Continuing to run ads on social media
- Returning to promotion of the program with doorhangers, especially in areas that show interest, such as the Macalaster-Groveland and Highland Park neighborhoods.
- Continuing to investigate additional promotional strategies that fall within our budget. (For example, Joe and Jana have ideas for short promotional videos that may be possible.)

2. As the yard sign seems to be one of the most effective ways of promoting the Adopt-a-Drain program (see addendum), we recommend continuing to deliver yard signs to participants. As a cost-saving measure, when our current supply of signs runs out, we recommend a slight re-design to a two-color yard sign that can be screen-printed on a slightly thinner aluminum substrate. This would afford a savings of a few dollars per sign, while still giving us an attractive and durable sign that participants will continue to want to have in their yard long-term.

3. When our current supply of printed materials runs out, we recommend moving away from postcards to email and online reporting only. Though we are sad to see them go—we love getting hand-written reports with comments from program participants—the bulk of our reports come in via email. And, if we transition to a new website by next year, participants will have a user account that will allow them to easily record the debris they collect, and to see how it's adding to the larger rolling total of debris collected by program participants. That said, we recommend printing an additional 500 postcards to take us to that time of transition.

Addendum: First steps in evaluation of Adopt-a-Drain

In addition to the work Hamline is doing as part of the contract with Capitol Region WD and the city to implement Adopt-a-Drain in Saint Paul, Hamline has taken on the project of evaluating the current Adopt-a-Drain program with an eye to: 1) more effectively serve current participants of Adopt-a-Drain; and 2) understand how to modify and market the program to reach a broader audience, specifically in underrepresented communities in Saint Paul and across the metro area.

As a first step, we hired evaluators Vanessa Perry and Emma Ramsbottom of Lune LLC to create an online survey to send to Adopt-a-Drain participants in Saint Paul. The survey was vetted (and edited) by staff at both Capitol Region Watershed District and the City of Saint Paul before it was sent, via email, to all Adopt-a-Drain participants in June. The survey was open from June 26th until August 7, 2017; during that time 275 AAD participants responded, which amounts to 41% of all participants at that time. More than half of those that responded had just signed up for the program in spring, likely as a response to ads on Saint Paul's Facebook page, and thus survey responses should be interpreted with that in mind. (Though responders were also roughly representative of neighborhood participation rates as cited above.)

Some highlights from the survey are shared below.

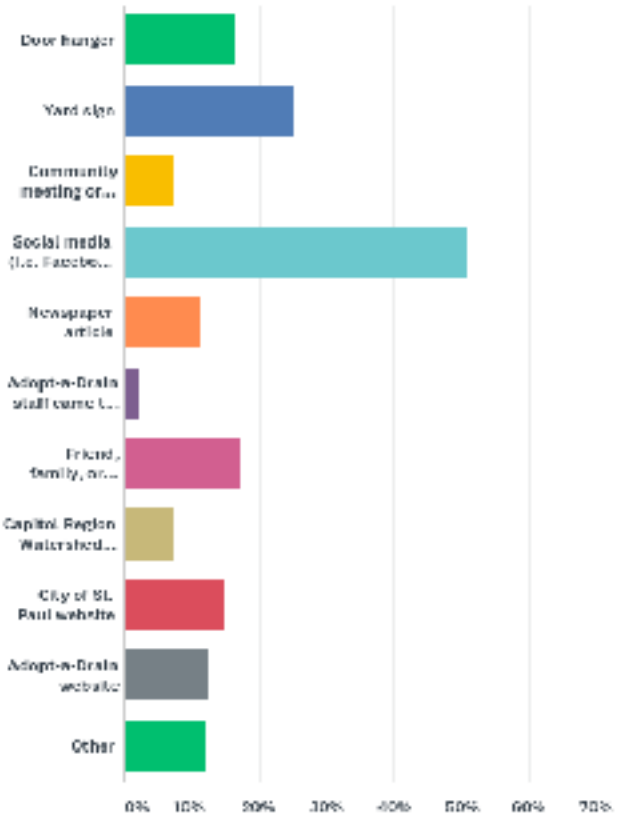
Question 2:

More than half of respondents said they learned about the program via social media. (See chart to the right.)

This answer is most likely influenced by the fact that half of the respondents had just signed up for the program in response to ads on Facebook.

Interestingly, the next most popular way people learned about the program was by seeing a yard sign.

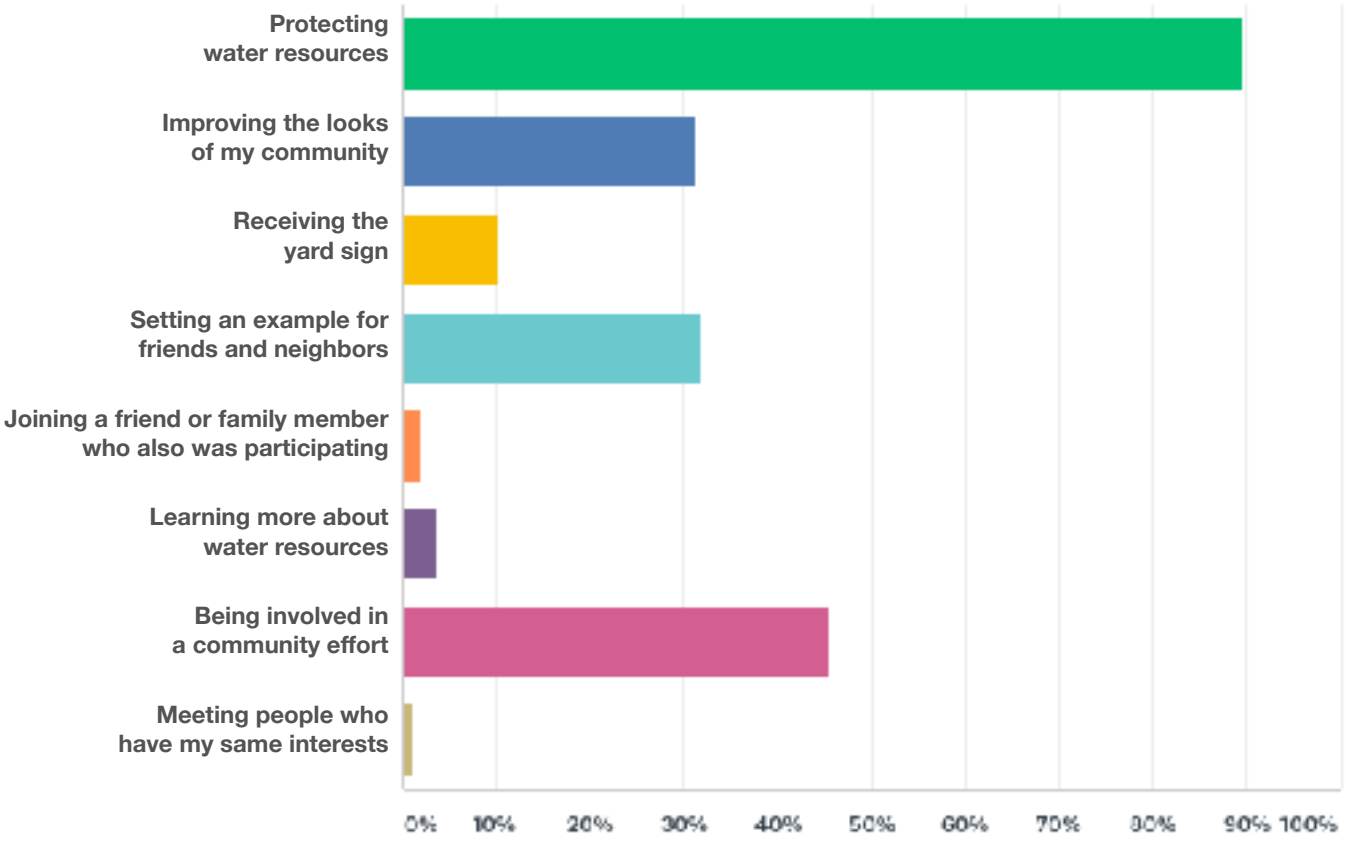
Q2: In what ways have you heard about the Adopt-a-Drain program? Select all that apply.



Questions 4 & 8:

Participants cited “protecting water resources” as the number one reason they signed up for the program, followed by “being involved in a community effort”. Similarly, they felt the primary benefits of the program were: “cleaner water” and “cleaner neighborhoods”.

Q4: Of the following options, what were the most appealing reasons for you to sign up for the Adopt-a-Drain program? Select up to 2.

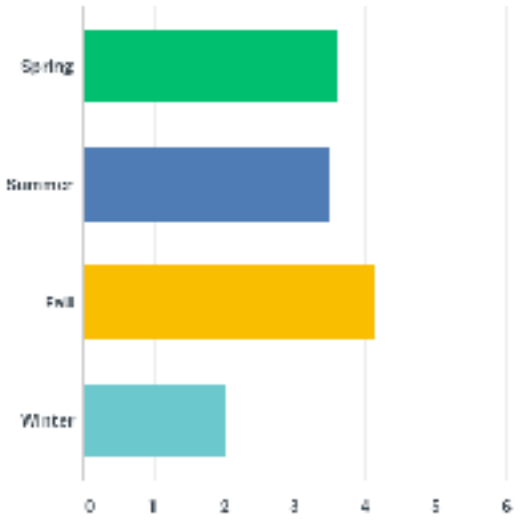


Questions 5 & 6:

In response to questions about the impact participants felt they were having on lakes and rivers, and on their communities, more than 70% of respondents said they felt their efforts had helped “somewhat”.

Question 7:

Participants reported clearing their drains an average of 3 - 4 times per season, and twice in the winter.



Question 9:

Perhaps the most extensive question pertained to various water quality actions and whether participants were already engaged in these actions, had started doing these actions since signing up for Adopt-a-Drain, or would consider doing these actions in the future. Below is an attempt to summarize.

- Roughly 35% of survey respondents reported that they were already **clearing their drains** before signing up for the program, the other 65% reported clearing their drains since signing up for the program.
- 42% of respondents reported having **participated in a community clean-up** before signing up for Adopt-a-Drain, 15% reported having done so since signing up, and roughly 55% said they would consider doing so in the future.
- 58% of survey respondents reported they were already **sweeping streets and sidewalks** before signing up for the program, 33% reported doing so since signing up for the program, and 26% said they would consider doing so in the future.
- 25% of survey respondents reported they had already **installed a rain garden** before signing up for the program, 8% reported doing so since signing up for the program, and 72% said they would consider doing so in the future.
- 68% of survey respondents reported they had already **planted natives** before signing up for the program, 12% reported doing so since signing up for the program, and 32% said they would consider doing so in the future.

- 76% of survey respondents reported they were already **minimizing their use of salt and deicers** before signing up for the program, 15% reported doing so since signing up for the program, and 22% said they would consider doing so in the future.
- 84% of survey respondents reported that they were already **composting yard waste** before signing up for the program, 12% reported doing so since signing up for the program, and 20% said they would consider doing so in the future.
- 88% of survey respondents reported that they were already **minimizing their use of yard chemicals** before signing up for the program, 13% reported doing so since signing up for the program, and 17% said they would consider doing so in the future.
- 91% of survey respondents reported that they were already **picking up after their pets** before signing up for the program, 9% reported doing so since signing up for the program, and 13% said they would consider doing so in the future.
- 10% of survey respondents reported that they had already installed **pervious pavement** before signing up for the program, 3% reported doing so since signing up for the program, and 87% said they would consider doing so in the future.
- 33% of survey respondents reported that they had already **talked to friends and neighbors about protecting water resources** before signing up for the program, 38% reported doing so since signing up for the program, and 41% said they would consider doing so in the future.
- 18% of survey respondents reported that they were already **participating in neighborhood environmental committees** before signing up for the program, 6% reported doing so since signing up for the program, and 80% said they would consider doing so in the future. (Nearly half of respondents left this blank, however, signifying low interest in this action.)
- 11% of survey respondents reported that they were already **participating in watershed district training programs** before signing up for the program, 5% reported doing so since signing up for the program, and 85% said they would consider doing so in the future. (Nearly half of respondents left this blank, however, signifying low interest in this action.)

In addition to multiple choice questions, survey respondents were given the opportunity to write in suggestions for improving the program.

By far the most popular comment was that we need to do a better job of promoting the program. (35 responses fell into this category. The next most popular category had 9 similar responses.) Many people said things like: This program is great. I would have signed up a long time ago, had I known about it. You need to do a better job of getting the word out! (Not a direct quote.)

Several responses (8) were suggestions for the city: to start curbside collection of yard waste, to give participants a "credit" on their bills for city services in recognition of their efforts, to do more street sweeping, to design storm drains more effectively. A big one was a request that the city allow program participants to bring waste (especially sediment) to the city waste facility. Currently, there is nothing residents can do with toxic sediment swept up in the spring: trash collectors won't take it, it can't be composted (because it's toxic), and the city won't let them drop it off at their waste sites. One of our take-aways was to start recommending to participants that they leave the spring layer of sediment to the street sweepers.

Several participants made comments about the reporting process: they wanted it simplified, they wanted it clarified, they wanted access to the data. Our take-away here was to continue to simplify the process, especially by giving people options on how to estimate their data, and by continuing to emphasize the fact that we are asking for an *estimate*. We will also continue and improve our efforts to share the summarized data with participants.

Finally, some respondents said they wanted to hear from us more often, and wanted better information from us on what they are supposed to be doing as a participant of Adopt-a-Drain, and how to do it safely and effectively. In response, as a start, we created a new printed insert that we send to new Adopt-a-Drain participants: *Tips on how to clear your drain and be safe while doing it*. We sent this electronically to existing participants as well.

We view this survey evaluation as a first step in taking a more in-depth look at the Adopt-a-Drain program. One shortcoming of this survey is that a we only heard from a self-selected group of Adopt-a-Drain participants. Nearly 60% of program participants did not respond to the survey, nor did we hear from people who received a door hanger or saw the ad on Facebook and didn't sign up.

In 2018, we plan to continue and go deeper with the project of evaluating the Adopt-a-Drain program by: a) working to build a new Adopt-a-Drain website that will include many new improvements, and will open the program to participation by residents in the seven-county metro area; b) conducting an in-depth evaluation of the Adopt-a-Drain program in Minneapolis, in partnership with the Center for Changing Landscapes at the University of Minnesota, that will include qualitative interviews with residents from underrepresented communities, with an eye to understanding how to broaden participation in the Adopt-a-Drain program to new communities, and a mailed survey to Minneapolis residents who received a door hanger but did not sign up for the program; 3) working to develop and pilot an Adopt-a-Drain program for businesses in Minneapolis, a program which will become available to participation by businesses in Saint Paul and other cities as early as 2019.

We expect these efforts to have a positive impact on the Adopt-a-Drain program for residents of Saint Paul.

FRIENDS OF THE MISSISSIPPI RIVER

Working to protect the Mississippi River and its watershed in the Twin Cities area.

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St. Paul Water Quality Education Project- 2017 Final Report

Submitted by Friends of the Mississippi River
December 1, 2017

This report summarizes Friends of the Mississippi River's activities in fulfillment of our 2017 Water Quality Education Program contract with the City of St. Paul. The Program Objectives were:

1. To involve St. Paul residents and community members in hands-on learning experiences about urban runoff pollution and ways to prevent it.
2. To facilitate school service learning initiatives including storm drain stenciling, litter cleanups and/or habitat restoration as key components.
3. To stencil storm drains with the message "Keep 'em Clean—Drains to River," and distribute educational door-hangers to residents and businesses in the stenciled neighborhoods.

These objectives were met through four key program areas, which are described in this report:

1. Storm drain stenciling and cleanups
2. Extra education
3. Storm drain mural installation
4. Community educational workshops, events and tours

What follows are descriptions of activities, outreach and promotion efforts, and specific accomplishments for each program area.

Storm Drain Stenciling

Description:

Storm drain stenciling is a service-learning program in which community volunteers receive a 15-30 minute lesson about urban runoff pollution and ways to prevent it, then spray paint the message "Keep 'em Clean – Drains to River" next to storm drains on St. Paul city streets. Volunteers also distribute educational door hangers and pick up trash along their way. This year FMR utilized three stenciling kits, all available for check out, to groups of less than 15 people. These kits provide all of the supplies to stencil as well as educational materials, however these groups do not receive the 15-30 minute presentation. In addition

to stenciling outings, FMR also coordinates 3-4 litter-cleanups/invasive species pulls within the city each year.

Outreach:

In 2017, storm-drain stenciling and cleanups were promoted using the following means:

- Emailing previous years' stenciling participants
- Contacting past participants and potential new contacts (St. Paul schools, after-school programs and service-learning programs)
- Posting on FMR's website, social media (Facebook, Instagram and Twitter pages), as well as announcements in FMR's email newsletter, *Mississippi Messages*
- Postings on other websites including VolunteerMatch, TwinCities.com/Pioneer Press, Do It Green, Next Step/SEEK, Minnesota Parent, The Villager, and the Children and Nature Network
- Announcement at Big River Journey teacher trainings in February 2017

Accomplishments:

Stenciling:

Kate Clayton (Youth Coordinator) and Daurius Mikroberts (Outreach Assistant) of FMR facilitated storm drain stenciling outings with 57 school and college groups, community groups, corporations and residents of the City of St. Paul. A list of the 57 groups, with event dates and goals achieved, is attached at the end of this report.

In total, 1,147 volunteers stenciled 2,890 storm drains and distributed 7,529 educational door hangers within the City, for a total of 1,869 hours of volunteer work. Stenciling took place in a majority of St. Paul neighborhoods. A map of specific locations will be attached as a separate item with this report.

Cleanups:

The interest in clean-ups seems to vary widely from year to year. In 2017 FMR facilitated 6 groups with a total of 156 people, contributing 253 hours in cleanups around St. Paul. A list of groups, with event dates and goals achieved, will be attached as a separate item with this report. For these outings, FMR provided general education, trash bags and gloves as well as coordinated with the City of St. Paul Parks and Recreation Department.

In 2017 FMR engaged 1,303 volunteers for 2,346 hours in cleanup and stenciling outings. FMR met and surpassed goals for total number of volunteers (1,100), volunteer hours (1,600), drains stenciled (2,400), and door hangers distributed (7,000) set out in the contract.

Due to weather and group coordinator decisions, 6 scheduled stenciling outings were canceled. None of these events were ever successfully rescheduled and this had a great impact on the number of volunteers. Because a similar number of hours are spent on planning an outing whether or not that outing is canceled, these cancellations also lead to a higher ratio of program-hours/volunteers.

All feedback from the participant survey was positive. The program continues to be well-received, educational and productive. 100% of survey respondents think that the stenciling program is a good teaching tool and 100% rated their experience with FMR as good or excellent. Most of the survey respondents also express an interest in continuing to work with FMR to learn more about water quality.

Equipment:

FMR staff coordinated purchase, storage and maintenance of storm drain stenciling supplies for the 2017 season. Below is an inventory of supplies remaining at the end of the 2017 season. See previous reports for a comparison with prior years.

Equipment:
Gloves: Plenty
Clipboards: 29
Goggles: 59
Full paint cans: 23
Partial paint cans: 19
Brushes: 37
Vests: 58
Cones: 6
Buckets: 18
Trash Bags: 60+
Door Hangers: 3.5 boxes, approx. 7,000 doorhangers

Stencils:
Drains to River: 31
Drains to Creek: old, w/ fish: 19
Drains to Lake: 36
Hmong language: 7
Somali language: 12

EXTRA EDUCATION

Description:

Additional water-quality education programming, separate from the lessons included in storm drain stenciling outings, is provided to schools and community groups in multiple

formats including classroom presentations, interpretive field trips, participation in special events (i.e. the Children's Water Festival) or through tabling at local fairs, expos or locations. Each educational program includes information about urban runoff pollution and methods for its prevention, but additional topics may include the water cycle, watersheds, erosion, wetlands, river ecosystems, landscape change, and habitat restoration. These presentations are designed to increase knowledge of urban non-point source pollution and related environmental issues, and may include demonstrations, PowerPoint presentations, games and/or group discussions. Primarily Kate Clayton provided extra education, with assistance from Daurius Mikroberts.

Outreach:

In 2017, extra educational programs were promoted using the following means:

- Emailing previous-years' stenciling participants
- Contacting past participants and potential new contacts (St. Paul schools, after-school programs and service-learning programs)
- Announcement at Big River Journey teacher trainings in February 2017
- Posting on FMR's website, social media (Facebook and Twitter pages), as well as announcements in FMR's email newsletter, *Mississippi Messages*
  Postings on other websites including VolunteerMatch, TwinCities.com/Pioneer Press, Do It Green, TC Daily Planet, Next Step, Green Hands USA, Minnesota Parent and the Children and Nature Network

Accomplishments:

This year, FMR coordinated 24 classroom presentations, and participated in 2 special events (Children's Water Festival at the State Fair Grounds and Waterfest located around Lake Phalen) as well as staffed a table on natural cleaners at Whole Foods. In total we provided extra education for 690 participants in the City of St. Paul. Classroom lessons averaged 1 hour while interactions with classes at Children's Waterfest were half hour. A list of the schools and participants is attached to the end of this report.

Storm Drain Mural

New to this year was a goal to create a storm drain mural through community outreach and contracted work with a local artist. Storm drain murals are common through out the country, but this mural is potentially the first in the twin cities. The hope is that the mural will draw the attention of people and groups who usually are not interested in what effect material that goes down a drain with storm water has on water quality. Discussions about the possibility of a mural started in January of 2017 and FMR included neighbors and partners in those conversations as well as contracted with artist Gustavo Lira by May of 2017. Workshops and opportunities for input were held through out the summer and the neighbors chose a design by mid-August. The mural was painted in mid-October, which was later than

intended, and we hope that the extended time was just a matter of learning the steps of the process.

- 6/11/2017 Tabling at Como Shallow Lake Symposium (15 people)
- 7/13/2017 Community Workshop for idea generation (17 people)
- 10/14-10/15 Painting Installation

COMMUNITY EDUCATION WORKSHOPS AND EVENTS

Description:

FMR hosted three community education workshops or stenciling outings open to the public in 2017. Each event provided attendees with background on river pollutants coming from our homes, yards, and streets or developed areas, and encouraged water-friendly actions for individuals to take to improve water quality.

Stewardship Program Manager Adam Flett coordinated all of the educational workshops and events, with assistance from other FMR staff.

The workshops and stenciling outings included continued development of our River Friendly Homes and Gardens workshops (updating information on the impact of storm water pollutants on water quality, best practices for rain garden design and installation, benefits and techniques for composting in residential yards and gardens, rain barrel assembly, installation and use, watershed-friendly lawn care strategies, and local resources related to these topics). Much of the messaging is crafted around quick, memorable items that individuals can take home, making them more easily interjected under shorter formats for presenting, like those of the stenciling events. Staff also updated a host of printed materials on these topics that were distributed at the workshops.

Specific descriptions of each event follow.

Brewing Clean Water and Storm Drain Stenciling:

In the past the Brewing Clean Water program focused on presenting information within the brewery setting. Starting last year, FMR began to offer storm drain stenciling as the primary activity in addition to providing the educational aspect. This past year, FMR hosted 2 storm drain stenciling events for the public. As part of another FMR program, “Brewing Clean Water,” enables FMR and Brewer’s to unite around clean water interests, and provides a new venue for delivering our message to new and old FMR participants.

- Tin Whiskers Brewing Company, July 13, 2017 (21 participants)
- Bad Weather Brewing Company, October 03, 2017 (11 participants)

River Friendly Homes and Gardens- Make and Take Rain Barrel Workshop:

Much of the workshop focuses on conserving water and reducing runoff pollution. In addition to providing an overview of stormwater issues related to urban runoff pollution, the workshop introduces alternative lawn-care practices, landscaping with native plant species, proper use of lawn fertilizer, rain gardens, rain barrels, backyard composting, green roofs, pervious pavement, soil testing and more. Participants are provided with handouts listing local resources for additional education, cost-share programs, or purchasing supplies. The workshop was presented at the following venues. These also have a specific focus on rain barrels and provide an opportunity for participants to assemble and take home their own 55-gallon rain barrel. Coca-Cola donated the barrels, and workshop participants purchased conversion kits at a reduced price. Participants were then guided through assembling their own rain barrel, which they took with them to install and use at home. The workshop was presented at the following venue:

Wellstone Center/Neighborhood House June 20, 2017 (35 participants, 30 barrels)

Outreach:

Participants for the workshops and outings were recruited using the following means:

- Email or posts to various daily and community newspapers both print and online
- Posting on FMR's website and announcements in FMR's Mississippi Messages and through social media, including Facebook and Twitter
- Posting on various online event calendars: Mississippi National River and Recreation Area/National Park Service, Minnesota Environmental Forum, Minnesota Environmental Partnership, MNOEA's Next Step, TwinCities.com/PioneerPress, BlueThumb, Do It Green, TC Daily Planet, Northern Gardener, Minnesota Master Naturalist, GreenHandsUSA, Riverfront Development Corporation, 1Mississippi (Mississippi River Network) and Good Age and MN Parent
- Emailing to all St. Paul FMR contacts, including numerous partner and civic organizations such as community organizations and neighborhood groups and local institutions such as the Science Museum of Minnesota, the Department of Natural Resources, Metropolitan Council, Friends of the Parks and Trails of St. Paul, and additional various foundation, student and civic groups
- Emailing to special interest groups, such as garden clubs, home school group outing organizers, biology club members and others

Accomplishments:

The following table summarizes public event participation in 2017:

Name	Date	Location	# Participants
Make and Take Rain Barrel Workshop	6/20/17	Wellstone Center	35

Storm Drain Stenciling @ Tin Whiskers Brewing	7/13/17	Tin Whiskers Brewing Co.	21
Storm Drain Stenciling @ Bad Weather Brewing	10/03/17	Bad Weather Brewing Co.	11
Total			67

Photos:

Photographs of the events listed in this report can be viewed on FMR's Flickr site at the following links:

Storm Drain Stenciling

- https://www.flickr.com/photos/friendsmissriv/albums/72157680530538343

Storm Drain Mural

- https://www.flickr.com/photos/friendsmissriv/albums/72157686268345485
- https://www.flickr.com/photos/friendsmissriv/albums/72157686243147152

"Brewing Clean Water"

- Tin Whiskers: https://www.flickr.com/photos/friendsmissriv/albums/72157683622258614

- Bad Weather: https://www.flickr.com/photos/friendsmissriv/albums/72157687117733660


Drains to River
Storm
Drains
Keep em'
Clean

KEEP THESE OUT OF STORM DRAINS

PET WASTE

Desechos de mascotas

Quav tsiaj yug

LEAVES, GRASS & TRASH

Hojas, hierba y basura

Nplooj ntoos, Nyom & Khib Nyiab

HAZARDOUS WASTES

Residuos peligrosos

Khoom Phem Siv Tas Lawm

MANTENGA FUERA DE LOS DRENAJES PARA TORMENTAS

MUAB COV NTAWM NO TSHEM TAWM NTAWM LUB QHOV DEJ NQIS

Keep storm drains clean. These drains are part of the storm sewer system, which carries rainfall and snowmelt directly from your neighborhood to our lakes and rivers.

What You Can Do

1. Keep leaves and grass clippings out of street.
Mantenga las hojas y las hierbas o el cesped podados fuera de la calle.
Muab cov nplooj ntoos thiab nyom tshem tawm ntawm txoj kev.

2. Keep fertilizer off paved surfaces and sweep up excess.
Mantenga el fertilizante fuera de las superficies pavimentadas y limpie los excesos.
Txhob muab cov tshuaj ywg nyom tso rau ntawm cov kev luam yas thiab muab cov tshuaj seem cheb mus.

3. Don't litter and pick up pet waste. No arroje basura en la vía pública. Recoja los desechos de sus mascotas.
Tsis txhob pov khib nyiab. Khaws tej quav tsiaj yug.

4. Wash your car on the lawn or at a carwash - not in the driveway or street.
Lave su vehículo en el jardín o en un lavadero – no lo haga en el entrada de su casa o en la calle.
Ntxuav koj lub tsheb rau ntawm cov nyom ntawm koj tog tsev los yog tom lub chaw ntxuav tsheb - tsis txhob ntxuav rau ntawm lub chaw nres tsheb los yog tom kev.

5. Keep your vehicle tuned up and clean up any oil leaks or spills from paved surfaces.
Mantenga su vehículo en buenas condiciones y limpie cualquier pérdida de aceite o salpicaduras en las superficies pavimentadas.
Saib xyuas thiab tu koj lub tsheb thiab tu tej roj uas tau txeej los yog nchuav rau tej kev luam yas.

6. Properly dispose of paint and other household hazardous wastes.
Deshágase adecuadamente de restos de pinturas y de otros residuos domésticos peligrosos.
Muab cov xim tha thiab lwm cov khoom phem hauv vaj tsev pov tseg kom zoo.

7. Shovel snow first and only apply salt when it is above 15° F.
Retire la nieve con una pala primero y aplique sal cuando esté sobre los 15°F.
Thob daus ua ntej thiab tsuas siv ntsev.

SAINT PAUL
The Most Livable City in America

FRIENDS OF THE MISSISSIPPI RIVER

Recycling & Disposal Guide
ramseyatoz.co.ramsey.mn.us
www.stpaul.gov/publicworks
www.fmr.org

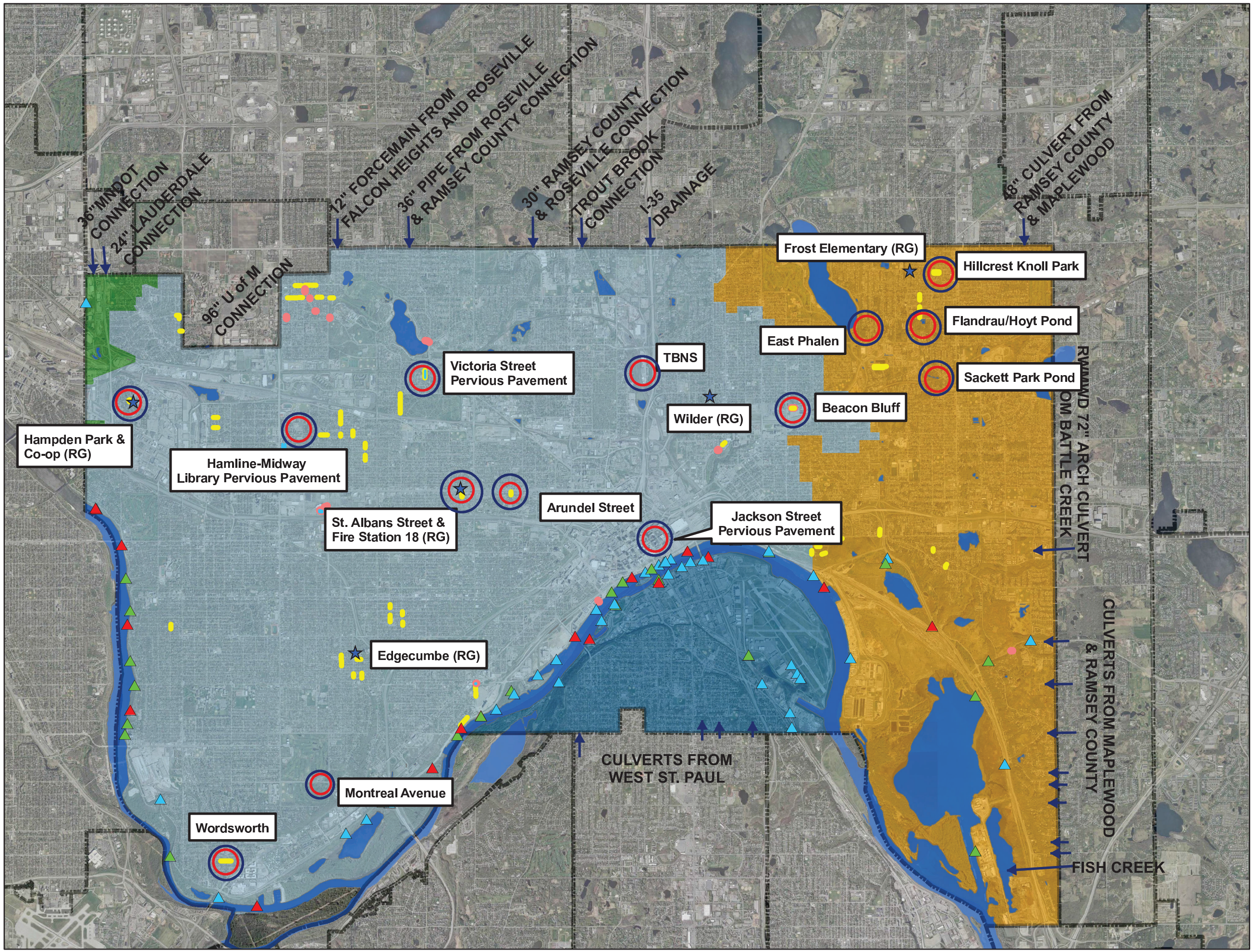
City of St. Paul

2017 Water Quantity & Quality Monitoring Program

The Most Livable City in America

Figure 1-1

2017 Monitoring Site Locations



N
W E
S

0 2,500 5,000 10,000 Feet

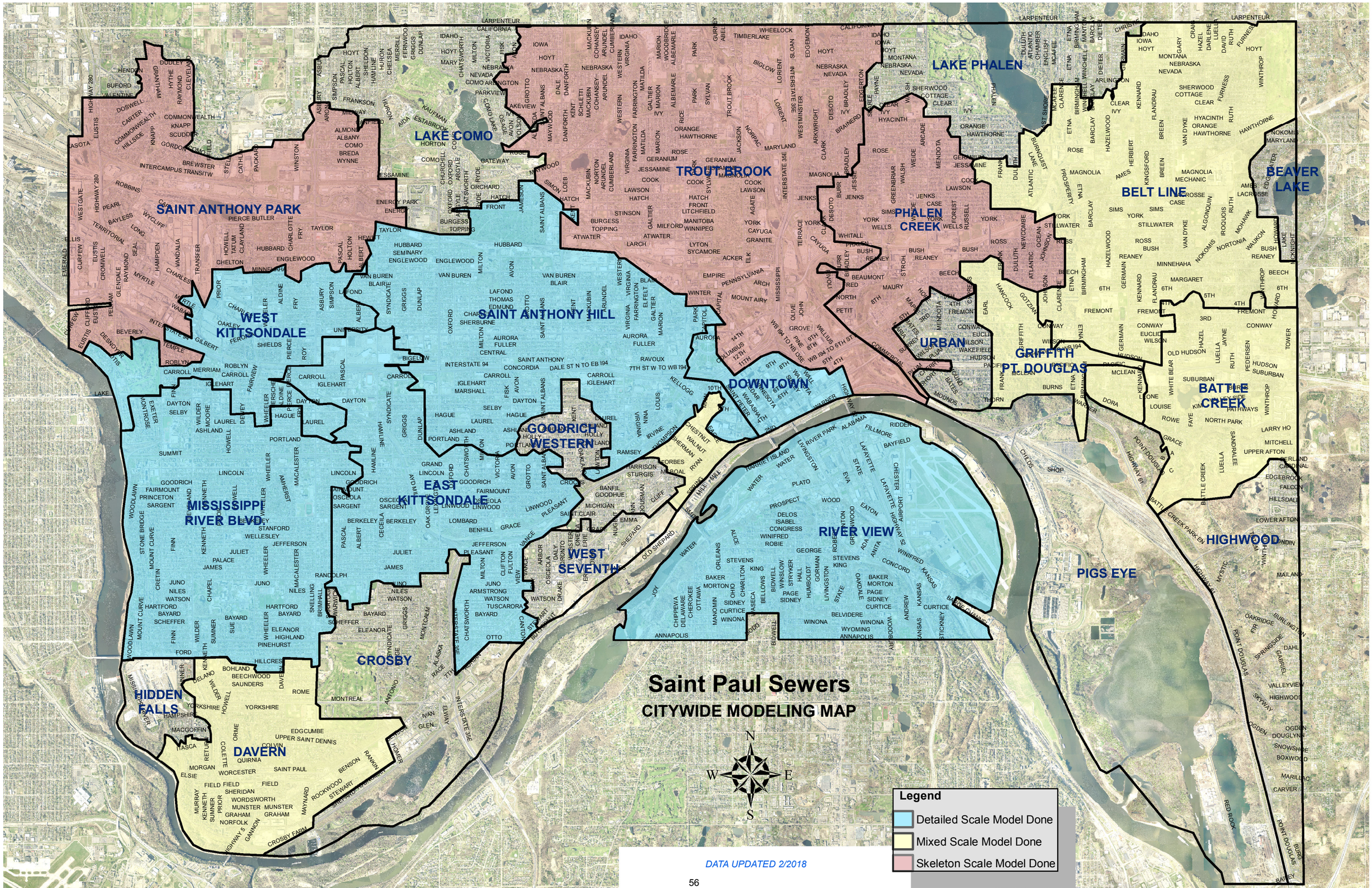
Legend

- Raingarden/Infiltration Basin
- Infiltration Trench
- Pervious Pavement
- Capitol Region Watershed District
- Lower Mississippi River WMO
- Mississippi WMO
- Ramsey/Washington/Metro WD
- 2016 Monitoring Locations
- 2017 Monitoring Locations
- Rain Gauge Locations

Outfalls

- 30" - 48"
- 50" - 72"
- > 72"

55



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Saint Paul Sewers

CITYWIDE P8 MODELING MAP

LAKE PHALEN
LAKE COMO
TROUT BROOK
BEAVER LAKE
BELT LINE
PHALEN CREEK
SAINT ANTHONY PARK
SAINT ANTHONY HILL
WEST KITTSONDALE
URBAN
GRIFFITH
PT DOUGLAS
DOWNTOWN
BATTLE CREEK
GOODRICH
WESTERN
EAST KITTSONDALE
WEST SEVENTH
RIVER VIEW
MISSISSIPPI RIVER BLVD
CROSBY
HIDDEN FALLS
DAVERN
PIGS EYE
HIGHWOOD

N
W E
S

Legend
P8 Model Done

DATA UPDATED 2/2018

Document Path: Z:\sewers\projects\City Stormwater Modeling Projects\Maps\Citywide P8 Modeling Map.mxd

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Memorandum

To: ***Pat Murphy, City of St. Paul***

From: ***Linnea Henkels, WSB & Associates***

Date: ***April 19th, 2018***

Re: ***Estimates of 2016 Annual and Season Stormwater Pollutant Loads (2017 Report)***
WSB Project No. 01610-130

The City of St. Paul (City) is a Phase I MS4 permittee and is required to evaluate their annual and seasonal pollutant loads. This memorandum summarizes the loading assessment completed for the City for 2016.

2016 Pollutant Loading Calculations

Monitoring of major outfalls within the City of Saint Paul was completed by Capitol Region Watershed District (CRWD) in 2016. The City of Saint Paul's Stormwater Monitoring Program was focused on BMP performance monitoring, and that data is summarized under a separate report. Annual and seasonal pollutant loads were estimated for each subwatershed within the City for the loading parameters identified in the City's MS4 permit which include: chloride (Cl), total kjeldahl nitrogen (TKN), total phosphorus (TP), nitrate plus nitrite (NO_3 +NO_2), total suspended solids (TSS), and volatile suspended solids (VSS). The subwatersheds within the City are included in **Table 1** below and on **Figure 1** (attached).

Monitoring data collected by CRWD from the following subwatershed was utilized for this assessment: East Kittsondale, St. Anthony Park, Trout Brook, Hidden Falls, and Phalen Creek. Monitoring of each subwatershed was completed at or near the outfall. The stations were configured to collect continuous flow measurements, and water quality, in accordance with the City's MS4 Permit.

Table 1. Watershed Inventory

Watershed	Area [acre]	Runoff Coefficient [.]	Rainfall Station
Battle Creek	1,089	0.54	Wilder
Beaver Lake	278	0.33	Frost Elem.
Belt Line	2,882	0.55	Frost Elem.
Crosby	1,446	0.45	Hampden Park Co-op
Davern	1,277	0.55	Hampden Park Co-op
Downtown	669	0.75	Engine House 18
East Kittsondale	1,870	0.62	Engine House 18
Fish Creek	46	0.70	Wilder
Goodrich/Western	424	0.63	Engine House 18
Griffith/Pt. Douglas	458	0.61	Wilder
Hidden Falls	237	0.55	Hampden Park Co-op
Highwood	1,139	0.50	Wilder
Lake Como	1,240	0.47	Hampden Park Co-op
Lake Phalen	995	0.42	Frost Elem.
Mississippi River Blvd.	2,373	0.58	Hampden Park Co-op
MRWMO	135	0.52	Hampden Park Co-op
Phalen Creek	1,406	0.62	Wilder
Pigs Eye	2,995	0.40	Wilder
Riverview	2,658	0.57	Wilder
St. Anthony Hill	2,542	0.64	Engine House 18
St. Anthony Park	2,467	0.68	Hampden Park Co-op
Trout Brook	3,959	0.62	Wilder
Urban	339	0.57	Wilder
West Kittsondale	847	0.67	Hampden Park Co-op
West Seventh	450	0.60	Fire House 18
Monitored Subwatershed			

Annual and seasonal city-wide flow-weighted averages were calculated for each of the loading pollutants from the monitored outfall data. TKN, TP, TSS and VSS loads were generated by CRWD in the WISKI data management program. This allowed for the extraction of baseflow and the associated load from the event load for those parameters. Cl and NO_2+NO_3 loads were calculated for the event-based volume (baseflow volume extracted), although the base flow loading for those parameters was not extracted. The following formula was used to calculate the annual/seasonal flow weighted mean concentrations (**Table 2**):

$$\boldsymbol{C} = \frac{\sum(\boldsymbol{F_i} \times \boldsymbol{C_i})}{\sum(\boldsymbol{F_i})}$$

C = annual/seasonal flow weighted mean concentration [mg/L]*

F_i = the event based flow for an individual event [cf]

C_i = the pollutant concentration for an individual event [mg/L]

*As described above, the flow-weighted mean concentration for TKN, TP, TSS, and VSS, was calculated from loads generated in the WISKI program, which extracted baseflow loading (not reflected in the formula above)

Table 2: City-wide Annual and Seasonal Flow-weighted Mean Concentrations

Parameter	Cl	TKN	TP	NO_2+NO_3	TSS	VSS
Units	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]
Annual	28.1	1.71	0.41	0.31	326.2	74.8
Q1 (Jan-Mar)	363.5	5.49	0.93	0.67	434.0	162.0
Q2 (Apr-Jun)	38.9	1.90	0.29	0.44	143.0	59.2
Q3 (Jul-Sep)	14.6	1.58	0.39	0.29	375.1	77.4
Q4 (Oct-Dec)	20.3	1.35	0.57	0.21	110.7	45.0

Based on these calculated flow-weighted mean concentrations, the Simple Method was used to calculate each subwatershed's pollutant loading. Loads for the five monitored subwatersheds were generated using actual monitored loads. The Simple Method is show below:

$$\boldsymbol{L = 2.72\left(\frac{PP_j R_v}{12}\right)(CA)}$$

L = pollutant loading for the year/season [lb]
P = rainfall depth for the year/season [in]
P_j = correction factor for storms that produce no runoff [.]
R_v = runoff coefficient [.]
C = flow-weighted mean concentration [mg/L]
A = area of the watershed [acre]

Values used in loading calculations:
R_v and A = Table 1
C = Table 2
P = Table 3
P_j = 0.85

The annual/seasonal precipitation totals for four different rainfall monitoring locations in St. Paul are provided in the **Table 3**. Each subwatershed was assigned precipitation data from the nearest precipitation monitoring site (see **Table 1** for assignments). The rainfall data was used as an input to the Simple Method for load calculations, as described above.

Table 3: Precipitation Data

Season[1]	Engine House 18	Frost Elementary	Hampden Park Co-op	Wilder
Annual	33.39	32.27	33.47	33.81
Q1 (Jan-Mar)	4.14	4.14	4.15	4.14
Q2 (Apr-Jun)	12.66	11.54	12.56	12.59
Q3 (Jul-Sep)	10.88	10.89	11.01	10.85
Q4 (Oct-Dec)	6.95	6.94	6.99	7.47

1 – Rainfall data collected from the HD location was used to supplement periods of no data at the seasonally monitored rainfall stations.

The annual and seasonal pollutant loads for each of the City's subwatersheds are presented in **Tables 4-8**. Loads for the five monitored sites are actual totals calculated for each station. Those sites are highlighted blue.

Table 4. Annual Pollutant Loadings (lbs)

Subwatershed	Cl	TKN	Total P	NO2+NO3	TSS	VSS
Battle Creek	109371	6659	1607	1197	1269096	291140
Beaver Lake	11074	674	163	121	128503	29480
Belt Line	289742	17642	4258	3172	3362060	771282
Crosby	138894	8457	2041	1520	1611668	369729
Davern	131641	8015	1935	1441	1527517	350424
Downtown	74601	4542	1096	817	865647	198586
East Kittsondale	155014	6432	1106	950	516850	182398
Fish Creek	4380	267	64	48	50828	11660
Goodrich/Western	48309	2941	710	529	560562	128597
Griffith/Pt. Douglas	51385	3129	755	563	596257	136786
Hidden Falls	2539	210	49	40	32243	6260
Highwood	102826	6261	1511	1126	1193151	273718
Lake Como	110254	6713	1620	1207	1279347	293492
Lake Phalen	74364	4528	1093	814	862896	197955
Mississippi River Blvd.	254933	15522	3747	2791	2958148	678622
MRWMO	17131	1043	252	188	198787	45603
Phalen Creek	66977	3726	707	600	311945	108255
Pigs Eye	219826	13385	3231	2406	2550772	585166
Riverview	106157	6464	1560	1162	1231804	282585
St. Anthony Hill	306841	18683	4509	3359	3560465	816797
St. Anthony Park	269632	8661	1700	2331	1365963	324914
Trout Brook	212292	12083	3101	1689	2141609	547615
Urban	34133	2078	502	374	396067	90861
West Kittsondale	126563	7706	1860	1385	1468584	336904
West Seventh	49745	3029	731	545	577218	132418

Monitored Subwatershed

Table 5: Q1 (Jan-Mar) Pollutant Loading (lbs)

Subwatershed	Cl	TKN	Total P	NO2+NO3	TSS	VSS
Battle Creek	173159	2617	443	317	206742	77182
Beaver Lake	18370	278	47	34	21933	8188
Belt Line	480620	7264	1229	880	573833	214227
Crosby	219058	3311	560	401	261543	97641
Davern	207620	3138	531	380	247887	92543
Downtown	119597	1808	306	219	142792	53308
East Kittsondale	130682	1775	227	179	98218	39324
Fish Creek	6935	105	18	13	8280	3091
Goodrich/Western	77447	1171	198	142	92467	34520
Griffith/Pt. Douglas	81355	1230	208	149	97133	36262
Hidden Falls	158	44	6	1	480	218
Highwood	162797	2460	416	298	194370	72564
Lake Como	176331	2665	451	323	210529	78596
Lake Phalen	123355	1864	315	226	147278	54983
Mississippi River Blvd.	402072	6077	1028	736	480051	179216
MRWMO	27399	414	70	50	32712	12212
Phalen Creek	49684	999	158	166	27323	11882
Pigs Eye	348035	5260	890	637	415533	155130
Riverview	168071	2540	430	308	200667	74914
St. Anthony Hill	491910	7435	1258	900	587313	219260
St. Anthony Park	164949	557	68	242	40199	9104
Trout Brook	21372	843	163	60	93761	27411
Urban	54040	817	138	99	64521	24087
West Kittsondale	202413	3059	518	371	241670	90222
West Seventh	78456	1186	201	144	93672	34970

Monitored Subwatershed

Table 6: Q2 (Apr-Jun) Pollutant Loading (lbs)

Subwatershed	Cl	TKN	Total P	NO2+NO3	TSS	VSS
Battle Creek	56360	2746	418	642	207141	85808
Beaver Lake	5480	267	41	62	20142	8344
Belt Line	143386	6985	1063	1633	526990	218307
Crosby	55046	2682	408	627	202311	83808
Davern	52172	2542	387	594	191748	79432
Downtown	39143	1907	290	446	143863	59595
East Kittsondale	12863	1614	245	397	119415	47798
Fish Creek	2257	110	17	26	8296	3437
Goodrich/Western	25348	1235	188	289	93160	38592
Griffith/Pt. Douglas	26479	1290	196	302	97320	40315
Hidden Falls	395	43	8	8	6941	1561
Highwood	52987	2581	393	603	194745	80673
Lake Como	57256	2789	425	652	210432	87172
Lake Phalen	36801	1793	273	419	135256	56030
Mississippi River Blvd.	101034	4922	749	1151	371334	153826
MRWMO	8896	433	66	101	32697	13545
Phalen Creek	12351	1361	231	198	125350	47027
Pigs Eye	113279	5518	840	1290	416335	172467
Riverview	54704	2665	406	623	201054	83287
St. Anthony Hill	160998	7843	1194	1833	591717	245120
St. Anthony Park	9890	2893	444	202	267850	108014
Trout Brook	21372	1777	315	60	113393	37143
Urban	17589	857	130	200	64646	26780
West Kittsondale	65725	3202	487	748	241559	100066
West Seventh	19715	960	146	225	72458	30016

Monitored Subwatershed

Table 7: Q3 (Jul-Sep) Pollutant Loading

Subwatershed	Cl	TKN	Total P	NO2+NO3	TSS	VSS
Battle Creek	18196	1978	489	358	468301	96670
Beaver Lake	1937	211	52	38	49864	10293
Belt Line	50691	5511	1361	999	1304609	269308
Crosby	28790	3130	773	567	740951	152953
Davern	27287	2966	733	538	702263	144967
Downtown	12602	1370	338	248	324339	66953
East Kittsondale	7631	2329	415	297	248372	76474
Fish Creek	729	79	20	14	18756	3872
Goodrich/Western	8161	887	219	161	210030	43356
Griffith/Pt. Douglas	8549	929	230	168	220021	45418
Hidden Falls	1541	104	29	29	22003	3854
Highwood	17107	1860	459	337	440277	90886
Lake Como	18803	2044	505	370	483911	99893
Lake Phalen	13010	1414	349	256	334837	69120
Mississippi River Blvd.	52843	5745	1419	1041	1359984	280739
MRWMO	2922	318	78	58	75191	15522
Phalen Creek	5925	1365	319	266	172293	137370
Pigs Eye	36572	3976	982	720	941244	194299
Riverview	17661	1920	474	348	454540	93830
St. Anthony Hill	51834	5635	1392	1021	1334028	275381
St. Anthony Park	5934	1136	268	191	148142	43555
Trout Brook	90550	7831	1986	1119	1745936	418147
Urban	5679	617	152	112	146150	30169
West Kittsondale	21584	2346	579	425	555490	114669
West Seventh	10311	1121	277	203	265371	54780

Monitored Subwatershed

Table 8: Q4 (Oct-Dec) Pollutant Loading (lbs)

Subwatershed	Cl	TKN	Total P	NO2+NO3	TSS	VSS
Battle Creek	17462	1164	487	181	95151	38642
Beaver Lake	1721	115	48	18	9378	3809
Belt Line	45030	3001	1256	467	245364	99644
Crosby	21795	1453	608	226	118761	48230
Davern	20657	1377	576	214	112560	45712
Downtown	11221	748	313	116	61144	24831
East Kittsondale	3837	714	218	79	50845	18801
Fish Creek	699	47	20	7	3811	1548
Goodrich/Western	7266	484	203	75	39595	16080
Griffith/Pt. Douglas	8204	547	229	85	44705	18155
Hidden Falls	444	18	5	2	2819	627
Highwood	16417	1094	458	170	89457	36329
Lake Como	16640	1109	464	172	90668	36821
Lake Phalen	11557	770	322	120	62974	25574
Mississippi River Blvd.	40004	2666	1116	414	217982	88524
MRWMO	2585	172	72	27	14088	5721
Phalen Creek	7745	961	260	66	45183	25459
Pigs Eye	35098	2339	979	364	191246	77666
Riverview	16949	1130	473	176	92355	37506
St. Anthony Hill	46154	3076	1288	478	251489	102132
St. Anthony Park	1469	230	50	41	11131	5790
Trout Brook	42374	1632	637	303	188519	64914
Urban	5450	363	152	56	29695	12059
West Kittsondale	19101	1273	533	198	104079	42267
West Seventh	7806	520	218	81	42534	17274

Monitored Subwatershed

City of St. Paul
Loading Assessment

SAINT PAUL
The Most Livable City in America

MRWMO
LAKE COMO
LAKE PHALEN
TROUT BROOK
BELTLINE STORMSEWER
BEAVER LAKE
ST. ANTHONY FALLS
PHALEN CREEK
WEST KITTSONDALE
ST. ANTHONY HILL
URBAN
GRIFFITH PT DOUGLAS
DOWNTOWN
BATTLE CREEK
GOODRICH-WESTERN
EAST KITTSONDALE
MISSISSIPPI RIVER BLVD
RIVERVIEW
WEST SEVENTH
BLUFFLANDS
PIGS EYE
HIDDEN FALLS
CROSBY
DAVERN
FISH CREEK

Figure 1
Watersheds

N
W E
S

0 2,000 4,000 8,000
Feet

Legend

Major Subwatersheds

WSB & Associates, Inc.

178 East 9th Street, Suite 200 | St. Paul, MN 55101 | (651) 286-8450

Memorandum

To: ***Pat Murphy, City of St. Paul***

From: ***Linnea Henkels, WSB & Associates***

Date: ***April 20th, 2018***

Re: ***Estimates of 2017 Annual and Season Stormwater Pollutant Loads (2017 Report)***
WSB Project No. 01610-130

The City of St. Paul (City) is a Phase I MS4 permittee and is required to evaluate their annual and seasonal pollutant loads. This memorandum summarizes the loading assessment completed for the City for 2017.

2017 Pollutant Loading Calculations

Monitoring of major outfalls within the City of Saint Paul was completed by Capitol Region Watershed District (CRWD) in 2017. The City of Saint Paul's Stormwater Monitoring Program was focused on BMP performance monitoring, and that data is summarized under a separate report. Annual and seasonal pollutant loads were estimated for each subwatershed within the City for the loading parameters identified in the City's MS4 permit which include: chloride (Cl), total kjeldahl nitrogen (TKN), total phosphorus (TP), nitrate plus nitrite (NO_3 +NO_2), total suspended solids (TSS), and volatile suspended solids (VSS). The subwatersheds within the City are included in **Table 1** below and on **Figure 1** (attached).

Monitoring data collected by CRWD from the following subwatershed was utilized for this assessment: East Kittsondale, St. Anthony Park, Trout Brook, and Hidden Falls. Monitoring of the Phalen Creek subwatershed was not completed in 2017 due to a tunnel replacement at that location. Monitoring of each subwatershed was completed at or near the outfall. The stations were configured to collect continuous flow measurements, and water quality, in accordance with the City's MS4 Permit.

Table 1. Watershed Inventory

Watershed	Area [acre]	Runoff Coefficient [.]	Rainfall Station
Battle Creek	1,089	0.54	Wilder
Beaver Lake	278	0.33	Frost Elem.
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Crosby	1,446	0.45	Hampden Park Co-op
Davern	1,277	0.55	Hampden Park Co-op
Downtown	669	0.75	Engine House 18
East Kittsondale	1,870	0.62	Engine House 18
Fish Creek	46	0.70	Wilder
Goodrich/Western	424	0.63	Engine House 18
Griffith/Pt. Douglas	458	0.61	Wilder
Hidden Falls	237	0.55	Hampden Park Co-op
Highwood	1,139	0.50	Wilder
Lake Como	1,240	0.47	Hampden Park Co-op
Lake Phalen	995	0.42	Frost Elem.
Mississippi River Blvd.	2,373	0.58	Hampden Park Co-op
MRWMO	135	0.52	Hampden Park Co-op
Phalen Creek	1,406	0.62	Wilder
Pigs Eye	2,995	0.40	Wilder
Riverview	2,658	0.57	Wilder
St. Anthony Hill	2,542	0.64	Engine House 18
St. Anthony Park	2,467	0.68	Hampden Park Co-op
Trout Brook	3,959	0.62	Wilder
Urban	339	0.57	Wilder
West Kittsondale	847	0.67	Hampden Park Co-op
West Seventh	450	0.60	Fire House 18

Monitored Subwatershed

Annual and seasonal city-wide flow-weighted averages were calculated for each of the loading pollutants from the monitored outfall data. TKN, TP, TSS and VSS loads were generated by CRWD in the WISKI data management program. This allowed for the extraction of baseflow and the associated load from the event load for those parameters. Cl and NO_2+NO_3 loads were calculated for the event-based volume (baseflow volume extracted), although the base flow loading for those parameters was not extracted. The following formula was used to calculate the annual/seasonal flow weighted mean concentrations (**Table 2**):

$$\boldsymbol{C} = \frac{\sum(\boldsymbol{F_i} \times \boldsymbol{C_i})}{\sum(\boldsymbol{F_i})}$$

C = annual/seasonal flow weighted mean concentration [mg/L]*

F_i = the event based flow for an individual event [cf]

C_i = the pollutant concentration for an individual event [mg/L]

*As described above, the flow-weighted mean concentration for TKN, TP, TSS, and VSS, was calculated from loads generated in the WISKI program, which extracted baseflow loading (not reflected in the formula above)

Table 2: City-wide Annual and Seasonal Flow-weighted Mean Concentrations

Parameter	Cl	TKN	TP	NO_2+NO_3	TSS	VSS
Units	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]
Annual	57.9	1.8	0.30	0.28	178.3	60.2
Q1 (Jan-Mar)	730.0	5.1	0.36	0.83	148.8	56.3
Q2 (Apr-Jun)	27.9	1.7	0.31	0.27	222.3	80.3
Q3 (Jul-Sep)	1.6	1.6	0.28	0.26	150.3	50.7
Q4 (Oct-Dec)	7.4	1.7	0.35	0.17	185.5	48.6

Based on these calculated flow-weighted mean concentrations, the Simple Method was used to calculate each subwatershed's pollutant loading. Loads for the five monitored subwatersheds were generated using actual monitored loads. The Simple Method is show below:

$$\boldsymbol{L = 2.72\left(\frac{PP_j R_v}{12}\right)(CA)}$$

L = pollutant loading for the year/season [lb]
P = rainfall depth for the year/season [in]
P_j = correction factor for storms that produce no runoff [.]
R_v = runoff coefficient [.]
C = flow-weighted mean concentration [mg/L]
A = area of the watershed [acre]

Values used in loading calculations:
R_v and A = Table 1
C = Table 2
P = Table 3
P_j = 0.85

The annual/seasonal precipitation totals for four different rainfall monitoring locations in St. Paul are provided in the **Table 3**. Each subwatershed was assigned precipitation data from the nearest precipitation monitoring site (see **Table 1** for assignments). The rainfall data was used as an input to the Simple Method for load calculations, as described above.

Table 3: Precipitation Data

Season[1]	Engine House 18	Frost Elementary	Hampden Park Co-op	Wilder
Annual	29.19	27.95	29.25	29.63
Q1 (Jan-Mar)	1.15	1.16	1.15	1.14
Q2 (Apr-Jun)	12.66	11.54	12.56	12.59
Q3 (Jul-Sep)	10.88	10.89	11.01	10.85
Q4 (Oct-Dec)	4.50	4.36	4.53	5.05

1 – Rainfall data collected from the HD location was used to supplement periods of no data at the seasonally monitored rainfall stations.

The annual and seasonal pollutant loads for each of the City's subwatersheds are presented in **Tables 4-8**. Loads for the five monitored sites are actual totals calculated for each station. Those sites are highlighted blue.

Table 4. Annual Pollutant Loadings (lbs)

Subwatershed	Cl	TKN	Total P	NO2+NO3	TSS	VSS
Battle Creek	197442	6196	1035	965	607958	205329
Beaver Lake	19759	620	104	97	60840	20548
Belt Line	516947	16222	2709	2527	1591771	537597
Crosby	246574	7737	1292	1205	759245	256424
Davern	233699	7333	1225	1142	719602	243035
Downtown	134343	4216	704	657	413667	139710
East Kittsondale	155014	6432	1106	950	516850	182398
Fish Creek	7908	248	41	39	24349	8224
Goodrich/Western	86996	2730	456	425	267876	90471
Griffith/Pt. Douglas	92764	2911	486	453	285635	96469
Hidden Falls	2539	210	49	40	32243	6260
Highwood	185626	5825	973	907	571576	193041
Lake Como	198480	6228	1040	970	611154	206408
Lake Phalen	132678	4163	695	649	408539	137978
Mississippi River Blvd.	452576	14202	2372	2212	1393562	470655
MRWMO	30840	968	162	151	94962	32072
Phalen Creek	66977	3726	707	600	311945	108255
Pigs Eye	396840	12453	2080	1940	1221942	412692
Riverview	191640	6014	1004	937	590093	199295
St. Anthony Hill	552563	17339	2896	2701	1701440	574636
St. Anthony Park	269632	8661	1700	2331	1365963	324914
Trout Brook	212292	12083	3101	1689	2141609	547615
Urban	61619	1934	323	301	189735	64080
West Kittsondale	227838	7149	1194	1114	701554	236939
West Seventh	88129	2765	462	431	271366	91650

Monitored Subwatershed

Table 5: Q1 (Jan-Mar) Pollutant Loading (lbs)

Subwatershed	Cl	TKN	Total P	NO2+NO3	TSS	VSS
Battle Creek	95765	675	48	109	19517	7380
Beaver Lake	10338	73	5	12	2107	797
Belt Line	270468	1905	135	308	55123	20844
Crosby	122212	861	61	139	24907	9418
Davern	115831	816	58	132	23607	8927
Downtown	66723	470	33	76	13598	5142
East Kittsondale	130682	1775	227	179	98218	39324
Fish Creek	3835	27	2	4	782	296
Goodrich/Western	43207	304	22	49	8806	3330
Griffith/Pt. Douglas	44993	317	22	51	9170	3467
Hidden Falls	158	44	6	1	480	218
Highwood	90034	634	45	103	18349	6938
Lake Como	98374	693	49	112	20049	7581
Lake Phalen	69417	489	35	79	14148	5350
Mississippi River Blvd.	224315	1580	112	256	45716	17287
MRWMO	15286	108	8	17	3115	1178
Phalen Creek	49684	999	158	166	27323	11882
Pigs Eye	192479	1356	96	219	39228	14833
Riverview	92951	655	46	106	18944	7163
St. Anthony Hill	274435	1933	137	313	55931	21149
St. Anthony Park	164949	557	68	242	40199	9104
Trout Brook	21372	843	163	60	93761	27411
Urban	29887	211	15	34	6091	2303
West Kittsondale	112926	796	56	129	23015	8703
West Seventh	43770	308	22	50	8921	3373

Monitored Subwatershed

Table 6: Q2 (Apr-Jun) Pollutant Loading (lbs)

Subwatershed	Cl	TKN	Total P	NO2+NO3	TSS	VSS
Battle Creek	40367	2447	456	397	322119	116371
Beaver Lake	3925	238	44	39	31323	11316
Belt Line	102699	6227	1160	1010	819508	296061
Crosby	50946	3089	575	501	406532	146867
Davern	48286	2928	545	475	385305	139198
Downtown	28036	1700	317	276	223717	80822
East Kittsondale	12863	1614	245	397	119415	47798
Fish Creek	1617	98	18	16	12901	4661
Goodrich/Western	18155	1101	205	179	144871	52337
Griffith/Pt. Douglas	18966	1150	214	186	151340	54674
Hidden Falls	395	43	8	8	6941	1561
Highwood	37952	2301	429	373	302843	109407
Lake Como	41009	2486	463	403	327238	118220
Lake Phalen	26358	1598	298	259	210332	75986
Mississippi River Blvd.	93509	5669	1056	919	746172	269567
MRWMO	6372	386	72	63	50847	18369
Phalen Creek	12351	1361	231	198	125350	47027
Pigs Eye	81135	4919	916	798	647431	233895
Riverview	39181	2376	443	385	312653	112951
St. Anthony Hill	115313	6991	1302	1134	920164	332425
St. Anthony Park	9890	2893	444	202	267850	108014
Trout Brook	21372	1777	315	60	113393	37143
Urban	12598	764	142	124	100529	36318
West Kittsondale	47075	2854	532	463	375642	135707
West Seventh	18391	1115	208	181	146758	53019

Monitored Subwatershed

Table 7: Q3 (Jul-Sep) Pollutant Loading

Subwatershed	Cl	TKN	Total P	NO2+NO3	TSS	VSS
Battle Creek	1949	1949	345	322	187589	63340
Beaver Lake	208	208	37	34	19974	6744
Belt Line	5430	5430	961	896	522591	176455
Crosby	2502	2502	443	413	240812	81311
Davern	2372	2372	420	391	228239	77066
Downtown	1350	1350	239	223	129922	43869
East Kittsondale	7631	2329	415	297	248372	76474
Fish Creek	78	78	14	13	7513	2537
Goodrich/Western	874	874	155	144	84132	28408
Griffith/Pt. Douglas	916	916	162	151	88134	29759
Hidden Falls	1541	104	29	29	22003	3854
Highwood	1833	1833	324	302	176363	59550
Lake Como	2014	2014	356	332	193842	65452
Lake Phalen	1394	1394	247	230	134127	45289
Mississippi River Blvd.	4593	4593	812	758	442001	149244
MRWMO	313	313	55	52	30119	10170
Phalen Creek	5925	1365	319	266	172293	137370
Pigs Eye	3918	3918	693	647	377037	127308
Riverview	1892	1892	335	312	182076	61479
St. Anthony Hill	5553	5553	982	916	534376	180435
St. Anthony Park	5934	1136	268	191	148142	43555
Trout Brook	90550	7831	1986	1119	1745936	418147
Urban	608	608	108	100	58544	19768
West Kittsondale	2312	2312	409	382	222514	75133
West Seventh	886	886	157	146	85229	28778

Monitored Subwatershed

Table 8: Q4 (Oct-Dec) Pollutant Loading (lbs)

Subwatershed	Cl	TKN	Total P	NO2+NO3	TSS	VSS
Battle Creek	4303	962	201	100	107788	28229
Beaver Lake	394	88	18	9	9873	2586
Belt Line	10311	2305	482	241	258298	67648
Crosby	4883	1092	228	114	122318	32035
Davern	4628	1035	216	108	115931	30362
Downtown	2648	592	124	62	66339	17374
East Kittsondale	3837	714	218	79	50845	18801
Fish Creek	172	39	8	4	4317	1131
Goodrich/Western	1715	383	80	40	42958	11251
Griffith/Pt. Douglas	2021	452	95	47	50642	13263
Hidden Falls	444	18	5	2	2819	627
Highwood	4045	905	189	94	101338	26540
Lake Como	3930	879	184	92	98460	25786
Lake Phalen	2646	592	124	62	66294	17362
Mississippi River Blvd.	8962	2004	419	209	224510	58798
MRWMO	611	137	29	14	15299	4007
Phalen Creek	7745	961	260	66	45183	25459
Pigs Eye	8648	1934	404	202	216644	56738
Riverview	4176	934	195	97	104620	27400
St. Anthony Hill	10892	2435	509	254	272855	71460
St. Anthony Park	1469	230	50	41	11131	5790
Trout Brook	42374	1632	637	303	188519	64914
Urban	1343	300	63	31	33639	8810
West Kittsondale	4512	1009	211	105	113024	29601
West Seventh	1737	388	81	41	43518	11397

Monitored Subwatershed

City of St. Paul
Loading Assessment

SAINT PAUL
The Most Livable City in America

MRWMO
LAKE COMO
LAKE PHALEN
TROUT BROOK
BELTLINE STORMSEWER
BEAVER LAKE
ST. ANTHONY FALLS
PHALEN CREEK
WEST KITTSONDALE
ST. ANTHONY HILL
URBAN
GRIFFITH
PT DOUGLAS
DOWNTOWN
BATTLE CREEK
GOODRICH-WESTERN
EAST KITTSONDALE
MISSISSIPPI RIVER BLVD
WEST SEVENTH
RIVERVIEW
BLUFFLANDS
PIGS EYE
HIDDEN FALLS
CROSBY
DAVERN
FISH CREEK

Figure 1.
Watersheds

N
W E
S

0 2,000 4,000 8,000
Feet

Legend

Major Subwatersheds

WSB & Associates, Inc.

Outfall Inventory

Outfall	Location	Watershed	Pipe Size	Acres
	Bridal Veil Creek			
005	South of Buford	Bridal Veil	42"	
	Mississippi River			
010	Eustis	St. Anthony Park	tunnel	2467
020	Lotus	Miss. River Blvd.	tunnel	31
030	Marshall	Miss. River Blvd.	tunnel	121
040	West Kittsondale	West Kittsondale	tunnel	977
050	Otis	Miss. River Blvd.	tunnel	14
060	Portland Ave	Miss. River Blvd.	tunnel	508
070	Summit	Miss. River Blvd.	16" cast iron	30
080	Goodrich	Miss. River Blvd.	tunnel	456
090	Princeton	Miss. River Blvd.	tunnel	150
095	Berkeley	Miss. River Blvd.	24"	
100	Jefferson	Miss. River Blvd.	tunnel	139
110	Randolph	Miss. River Blvd.	tunnel	39
115	Hartford	Miss. River Blvd.	tunnel	580
120	Scheffer	Miss. River Blvd.	tunnel	8
130	Highland Parkway	Miss. River Blvd.	tunnel	165
135	Hidden Falls	Hidden Falls	48"	269
140	Sheridan	Davern	tunnel	145
145	West 7th	Davern	30"	30
150	Davern	Davern	tunnel	963
151	Watergate Marina	Crosby	21"	

Outfall Inventory

Outfall	Location	Watershed	Pipe Size	Acres
156	Elway	Crosby	60"	
158	Elway	Crosby	90"	820
160	Otto	E. Kittsondale	tunnel	177
170	Bay	E. Kittsondale	tunnel	1699
180	Sumac	West 7th	tunnel	8
190	Drake	West 7th	tunnel	158
195	Fountain Cave	West 7th	42"	39
200	Richmond	West 7th	20"	142
201	Richmond	West 7th	42"	
206	Western	West 7th	30"	98
210	Smith -1992	Good/West	tunnel	424
220	Sherman	Downtown	48"	41
230	Chestnut	Downtown	27"	82
240	Eagle	Downtown	3'x5' brick	77
~~250~~	~~Ontario~~ abandoned	~~Downtown~~	~~24"~~	
260	Market	Downtown	24"	
270	St. Peter	St. Anthony Hill	tunnel	2653
280	Cedar	Downtown	tunnel	
290	Minnesota	Downtown	tunnel	115
295	Robert	Downtown	tunnel	5
300	Jackson	Downtown	36"	27
310	Sibley	Downtown	48"	10
~~315~~	~~Wacouta~~	~~Downtown~~	~~12"~~	~~10~~

Outfall Inventory

Outfall	Location	Watershed	Pipe Size	Acres
320	Broadway	Downtown	7'x8' concrete	115
325	Troutbrook	Troutbrook	dual 10'	4025
330	Plum	Phalen Creek	tunnel	1406
340	Urban	Urban	48" brick	328
343	Warner and Childs	Pig's Eye	24"	
346	Warner and Childs	Pig's Eye	18"	
350	Beltline (RWMWD's)	Beltline	9'	3524
~~352~~	~~off Child's Road~~	~~Pig's Eye~~	~~12"~~	
~~354~~	~~off Child's Road~~	~~Pig's Eye~~	~~12"~~	
~~356~~	~~off Child's Road~~	~~Pig's Eye~~	~~12"~~	
360	Battle Creek	Pig's Eye	36"	
365	Wyoming	Riverview	30" culvert	8
380	Page and Barge Ch Rd	Riverview	42"	69
385	Robie and Witham	Riverview	54"	
390	Robie and Kansas	Riverview	42"	264
400	Airport	Riverview	12"	
405	Chester St	Riverview	tunnel	326
407	Eva St	Riverview	36"	
410	Custer St	Riverview	tunnel	188
420	Moses St	Riverview	5'6"	95
430	Belle	Riverview	2-36"x40"	37
440	Riverview	Riverview	2-77"x121"	801
460	Chippewa and Baker	Riverview	16"	71

Outfall Inventory

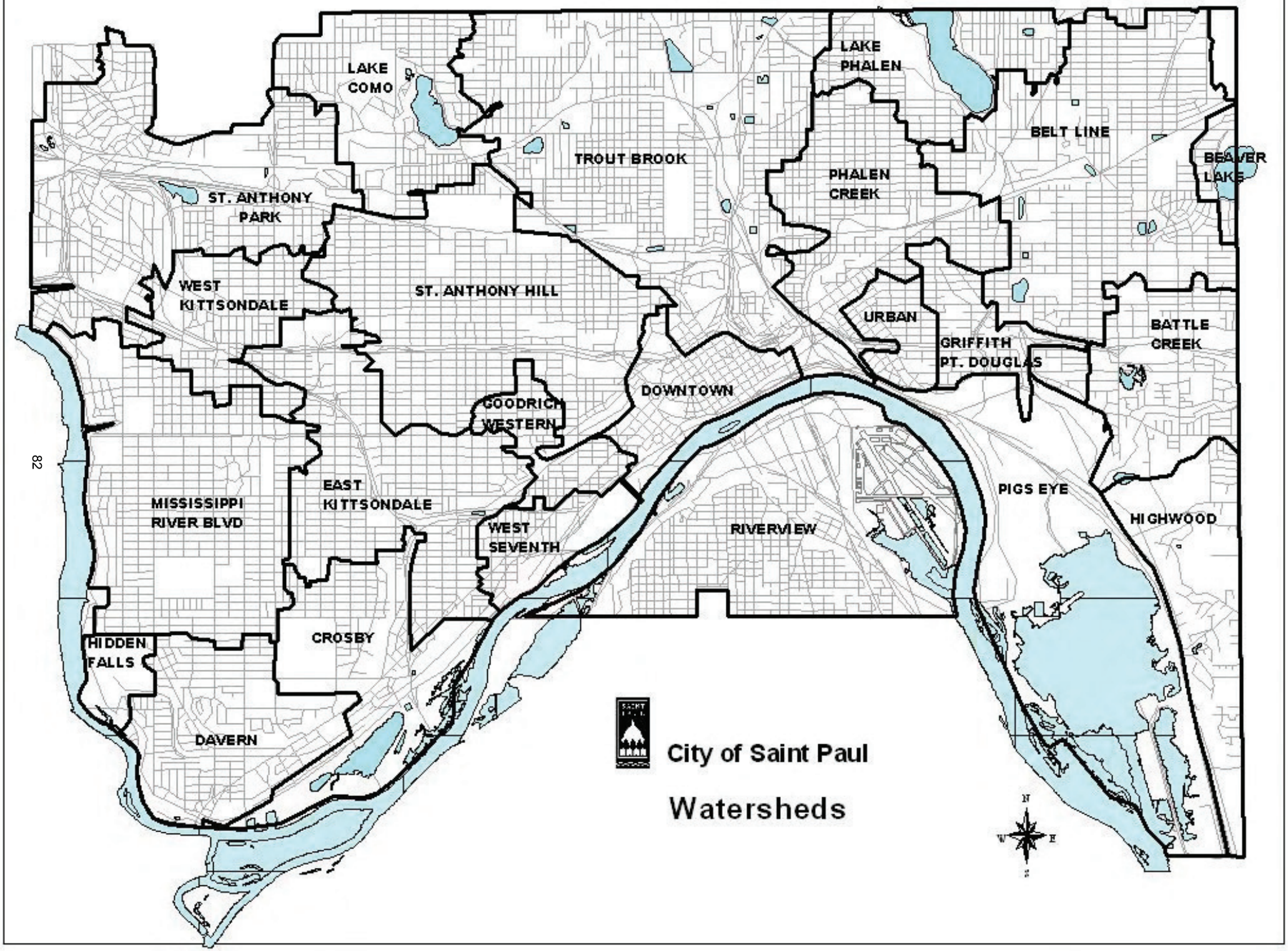
Outfall	Location	Watershed	Pipe Size	Acres
	Upper Lake			
152	Springfield	Crosby	15"	
	Crosby Lake			
153	Rankin	Crosby	27"	
154	Homer	Crosby	30"	
155	Leland	Crosby	30"	
	Fairview North Pond			
500	Tatum & Pierce Butler	St. Anthony Park	6'	
510	Pierce Butler & Aldine	St. Anthony Park	54"	
	Lake Como			
520	Arlington & Chelsea	Como	60"	310
530	Chatsworth North	Como	36"	201
540	Milton North	Como	36"	79
550	Parkview East	Como	18"	17
560	Ivy East	Como	18"	24
570	Wheelock Pkwy East	Como	24"	23
580	Rose East	Como	36"	30
590	Victoria South	Como	30"	49
600	Chatsworth South	Como	24"	75
610	Horton West	Como	15"	311
620	Park West	Como	36"	50

Outfall Inventory

Outfall	Location	Watershed	Pipe Size	Acres
	Loeb Lake			
630	Jessamine	Troutbrook	36"	
	Lake Phalen			
680	Arlington West	Phalen	72"	380
690	Blomquist South	Phalen	36"	71
700	Arlington East	Phalen	42"	209
710	between Hoyt & Neb.	Phalen	42"	69
720	Larpenteur East	Phalen	84"	17
	Beaver Lake			
726	Lacrosse	Beaver	15"	
728	Ames	Beaver	15"	
730	Rose North	Beaver	42"	67
740	McKnight North	Beaver	21"	22
	Suburban Pond			
---	Suburban & VanDyke (RWMWD's)	Battle Creek	102"	
750	Suburban & WB Ave	Battle Creek	27"	
760	Suburban & Hazel	Battle Creek	54"	
	Little Pig's Eye Lake			
770	near fish hatchery	Griffith/Pt. Douglas	72"	
	Pig's Eye Lake			
780	Burlington	Highwood	66"	
784	Winthrop @ Lower Afton	Highwood	30"	

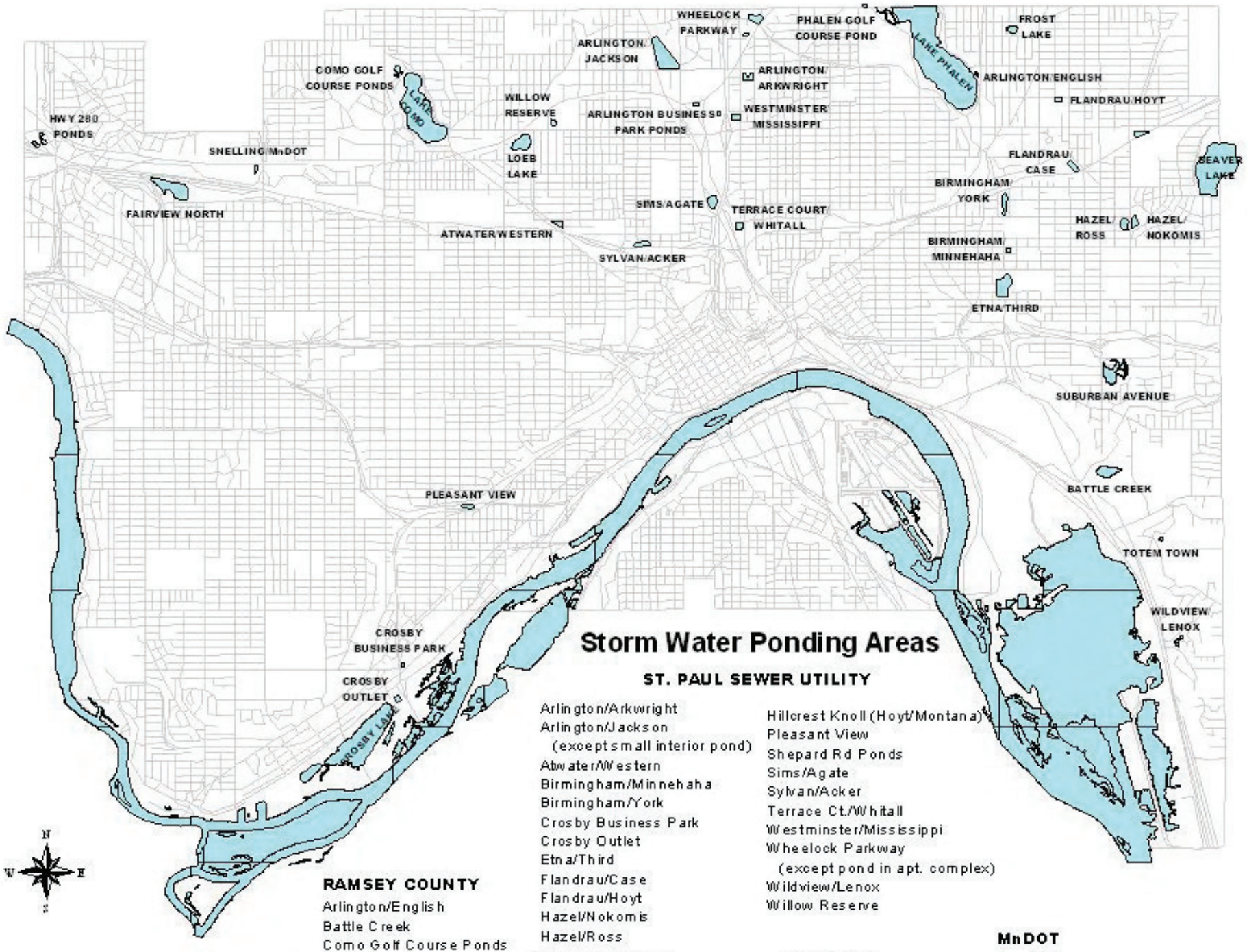
Outfall Inventory

Outfall	Location	Watershed	Pipe Size	Acres
786	Morningside @ Lower Afton	Highwood	18"	
790	Springside Drive	Highwood	33"	
791	Highwood	Highwood	48"	
	Battle Creek			
~~800~~	~~N. Park Drive & Faye~~	~~Battle Creek~~	~~33"~~	
808	Sandralee	Battle Creek	24"	
810	Ruth	Battle Creek	42"&73-1/2" arch	
812	Warren	Battle Creek	18"	
814	Cutler	Battle Creek	24"	
816	Nelson	Battle Creek	24"	
818	Winthrop & Larry Ho	Battle Creek	30"	
820	Winthrop & N. Park Dr	Battle Creek	36"	
825	Michael N	Battle Creek	33"	
826	Michael S	Battle Creek	30"	
830	McKnight & N. Park Dr	Battle Creek	36"	
836	A Street	Battle Creek	18"	


LAKE COMO
LAKE PHALEN
TROUT BROOK
BELT LINE
BEAVER LAKE
PHALEN CREEK
ST. ANTHONY PARK
WEST KITTSONDALE
ST. ANTHONY HILL
URBAN
BATTLE CREEK
GRIFFITH
PT. DOUGLAS
DOWNTOWN
GOODRICH
WESTERN
EAST KITTSONDALE
MISSISSIPPI RIVER BLVD
WEST SEVENTH
RIVERVIEW
PIGS EYE
HIGHWOOD
CROSBY
HIDDEN FALLS
DAVERN
City of Saint Paul
Watersheds
N
W
E

Watershed Inventory

Watershed	WS#	Area (acres)	Population (2000 Census)	Percent Impervious	Runoff Coefficient
Beaver Lake	1	278	2,070	31	0.33
Belt Line	2	2,882	30,994	56	0.55
Lake Phalen	3	995	7,626	41	0.42
Trout Brook	4	3,959	37,665	63	0.62
Lake Como	5	1,240	9,753	47	0.47
St. Anthony Park	6	2,467	13,140	70	0.68
Phalen Creek	7	1,406	18,418	64	0.62
St. Anthony Hill	8	2,542	36,410	66	0.64
Griffith/Pt. Douglas	9	458	5,264	63	0.61
W. Kittsondale	10	847	7,732	69	0.67
Urban	11	339	4,491	58	0.57
Battle Creek	12	1,089	8,201	54	0.54
Downtown	13	669	6,097	78	0.75
E. Kittsondale	14	1,870	18,353	64	0.62
Mississippi River Blvd.	15	2,373	27,251	59	0.58
Goodrich/Western	16	424	5,010	64	0.63
Pigs Eye	17	2,995	913	39	0.40
Riverview	18	2,658	14,860	58	0.57
Highwood	19	1,139	5,216	50	0.50
W. Seventh	20	450	2,543	61	0.60
Crosby	21	1,446	8,804	45	0.45
Davern	22	1,277	6,628	56	0.55
Hidden Falls	23	237	1,263	56	0.55
Total		34,040	278,706		



Storm Water Ponding Areas

ST. PAUL SEWER UTILITY

Arlington/Arkwright
Arlington/Jackson
(except small interior pond)
Atwater/Western
Birmingham/Minnehaha
Birmingham/York
Crosby Business Park
Crosby Outlet
Etna/Third
Flandrau/Case
Flandrau/Hoyt
Hazel/Nokomis
Hazel/Ross
Hillcrest Knoll (Hoyt/Montana)
Pleasant View
Shepard Rd Ponds
Sims/Agate
Sylvan/Acker
Terrace Ct./Whitall
Westminster/Mississippi
Wheelock Parkway
(except pond in apt. complex)
Wildview/Lenox
Willow Reserve

RAMSEY COUNTY

Arlington/English
Battle Creek
Como Golf Course Ponds
Surburban Avenue
Totem Town

ST. PAUL PARKS

Phalen Golf Course Pond

RAILROAD

Fairview/North

MnDOT

Hwy. 280
Snelling/MnDOT

City of Saint Paul

Storm Water Ponding Area Inventory

Ponding Area	Drainage Area (acres)	Population 2000 Census	Pond Area (acres)	Storage Capacity (Acre-feet
Arlington/Arkwright	302.3	4001	5	20.4
Arlington/Jackson	699.4	6562	14.5	75.6
Atwater/Western	127.3	1230	2.7	13.3
Birmingham/Minnehaha	41.0	457	0.9	2.5
Birmingham/York	146.5	2050	2.2	9.5
Crosby Business Park	39.6	198	1	5.52
Crosby Outlet	866.0	6295	5.5	40.6
Etna/Third	244.0	2457	4.7	25.1
Flandrau/Case	95.2	1331	0.7	3
Flandrau/Hoyt	479.5	4582	1.9	20.8
Hazel/Nokomis	73.0	511	2.3	6.3
Hazel/Ross	67.8	949	4	3.8
Pleasant View	164.5	2053	2.3	14.5
Sims/Agate	174.6	1357	5.3	12.8
Sylvan/Acker	376.9	3617	2.1	11.7
Terrace Ct./Whitall	4.7	28	0.5	0.5
Westminister/Mississippi	123.4	1912	2.2	10.1
Wheelock Parkway	19.0	265	1.3	1.7
Wildview/Lenox	19.3	111	0.73	2.2
Willow Reserve	372.1	3669	20.3	42.6
Total	4436.2	43633.6		

Drainage area only includes area in St. Paul.

Storage capacity is for a 100 year storm in acre-feet.

Storm Water Ponding Areas by Watershed Area

Beaver Lake	None
Belt Line	Birmingham/Minnehaha Birmingham/York Etna/Third Flandrau/Hoyt Flandrau/Case Hazel/Nokomis Hazel/Ross Hillcrest Knoll (Hoyt/Montana)
Lake Phalen	Arlington/English Phalen Golf Course Pond
Trout Brook	Arlington/Jackson Arlington/Arkwright Atwater/Western Sims/Agate Sylvan/Acker Terrace Ct./Whitall Westminster/Mississippi Wheelock Parkway Willow Reserve
Lake Como	Como Golf Course Ponds
St. Anthony Park	Fairvew/North Highway 280 Snelling/MnDOT
Phalen Creek	None
St. Anthony Hill	None
Griffith/ Pt. Douglas	None
W. Kittsondale	None
Urban	None
Battle Creek	Battle Creek Surburban Avenue
Downtown	None

E. Kittsondale	Pleasant View
Mississippi River Blvd.	None
Goodrich/ Western	None
Pigs Eye	None
Riverview	None
Highwood	Totem Town Wildview/Lenox
W. Seventh	None
Crosby	Crosby Business Park Crosby Outlet
Davern	None
Hidden Falls	None

List of Industrial Stormwater Permit Holders
Obtained from MPCA Industrial Stormwater Permit database on 9/11/2017

Permit site number shown on City Permit Location Maps	Address Number	Street Address	Facility Name	Does MPCA Consider Site No Exposure ?	Owner Name
MNRNE396P	1199	7th St E	Buzzard Lips Press	Yes	Buzzard Lips Press
MNR0534ZL	44	Acker St E	HAP Transportation	No	PET Enterprises
MNR0534NK	206	Airport Dr	Army Aviation Support - Holman Field	No	Met Council Environmental Services, Mn Dept Of Military Affairs
MNR053CBY	206	Airport Dr	Army Aviation Support - Holman Field	No	Met Council Environmental Services, Mn Dept Of Military Affairs
MNR053526	270	Airport Rd	St Paul Flight Center	No	St Paul Flight Center
MNR0534ZS	335	Alpha Ln	Horton Transportation Inc	No	Horton Transportation Inc.
MNR0538R7	335	Alpha Ln	Horton Transportation Inc	No	Horton Transportation Inc.
MNR0533Z2	106	Arlington Ave E	Action Auto Parts of St Paul Inc	No	Action Auto Parts
MNR053C35	106	Arlington Ave E	Action Auto Parts of St Paul Inc	No	Action Auto Parts
MNR05379G	240	Arlington Ave E	Addco Building	No	Actus Manufacturing Inc
MNR053B84	240	Arlington Ave E	Addco Building	No	Actus Manufacturing Inc
MNR053B2W	80	Arlington Ave East Ste A B	First Student Inc 20757	No	First Student, Inc.
MNRNE38FV	300	Atwater St	Northern Screw Machine Co Inc	Yes	Thomas Kieger
MNR05372L	432	Atwater St	Linders Specialty Co Inc	No	Dan and Vince Linders
MNR05393N	432	Atwater St	Linders Specialty Co Inc	No	Dan and Vince Linders
MNR053487	521	Barge Channel Rd	Great Western Recycling Industries Inc	No	Northern Metals LLC dba Northern Metal Recycling
MNR053BKF	521	Barge Channel Rd	Northern Metal Recycling - St Paul	No	Northern Metals LLC dba Northern Metal Recycling
MNR053534	565	Barge Channel Rd	Keith Krupenny & Son Disposal Service	No	Keith Krupenny & Sons
MNR053CB5	565	Barge Channel Rd	Keith Krupenny & Son Disposal Service	No	Keith Krupenny & Sons
MNR0533F8	607	Barge Channel Rd	J&J Recycling	No	J & J Recycling
MNR053CNV	607	Barge Channel Rd	J&J Recycling	No	J & J Recycling
MNR053429	701	Barge Channel Rd	Hawkins Terminal II - SW	No	Hawkins, Inc., Hawkins, Inc.
MNR053B8Z	701	Barge Channel Rd	Hawkins Terminal II - SW	No	Hawkins, Inc., Hawkins, Inc.
MNR0534J4	751	Barge Channel Rd	Alter River Terminal	No	Saint Paul Port Authority
MNR053BSY	780	Barge Channel Rd	Gerdau - St Paul Metallics Raw Materials	No	Gerdau - Metallics Raw Materials
MNR053B2J	795	Barge Channel Rd	St Paul Alter River Terminal	No	Alter Trucking and Terminal Corporation
MNR05343M	801	Barge Channel Rd	Alter Metal Recycling - St Paul	No	Alter Trading Corp
MNR053B32	801	Barge Channel Rd	Alter Trading Corp	No	Alter Metal Recycling
MNR0534Z2	644	Bayfield St	St. Paul Downtown Airport	No	Metropolitan Airports Commission
MNR053B4B	644	Bayfield St	Metropolitan Airport Commission	No	Metropolitian Airports Commission
MNR053473	690	Bayfield St	3M - St Paul - Holman Field	No	3M Company
MNR0539WR	690	Bayfield St	3M - St Paul - Holman Field	No	3M Company
MNRNE399W	1966	Benson Ave	Amidon Graphics	Yes	Amidon Graphics
MNR053C79	500	Block Of Eaton St	Eaton Maintenance Facility	No	Union Pacific Railroad
MNRNE38JG	1520	Buerkle Rd	Loftech Prototype Mfg LLC	Yes	Daniel Feser
MNRNE39WL	1927	Case Ave E	3M Saint Paul Distribution Center	Yes	Ras Properties LLC
MNR0535G5	261	Chester St	ISD 625 Transportation Garage	No	Fedex
MNR0534NC	936	Childs Rd	Cemstone Products - Childs Rd	No	Cemstone Products Company
MNR053486	1031	Childs Rd	Great Western Dock & Terminal	No	Northern Metals LLC dba Northern Metal Recycling

List of Industrial Stormwater Permit Holders
Obtained from MPCA Industrial Stormwater Permit database on 9/11/2017

Permit site number shown on City Permit Location Maps	Address Number	Street Address	Facility Name	Does MPCA Consider Site No Exposure ?	Owner Name
MNR053BKC	1031	Childs Rd	Northern Metal Recycling - Dock	No	Northern Metals LLC dba Northern Metal Recycling
MNR053426	1125	Childs Rd	Hawkins Inc - Terminal I	No	Hawkins Inc
MNR053B94	1125	Childs Rd	Hawkins - Terminal 1	No	Hawkins Inc
MNR0534C3	2209	Childs Rd	Flint Hills Resources Pine Bend LLC - St Paul	No	Flint Hills Resources Pine Bend LLC
MNR053CJ3	2209	Childs Rd	Flint Hills Resources Pine Bend LLC - St Paul	No	Flint Hills Resources Pine Bend LLC
MNR0535RN	2400	Childs Rd	Met Council Metropolitan WWTP	No	Metropolitan Council Env Services
MNR053CNY	515	Cleveland Ave	Overhaul Base	No	Metro Transit
MNR05346G	508	Cleveland Ave N	Minnesota Commercial Railway Co	No	Minnesota Commercial Railway Co
MNR053C5X	508	Cleveland Ave N	Minnesota Commercial Railway Co	No	Minnesota Commercial Railway Co
MNR05353R	515	Cleveland Ave N	Metro Transit Overhaul Base - SW	No	Metropolitan Council
MNR0534MS	309	Como Ave	Advanced Disposal Services	No	Advanced Disposal Services Vasko Solid Waste Inc
MNR053B96	309	Como Ave	Advanced Disposal Services Vasko Solid Waste Inc	No	Advanced Disposal Services Vasko Solid Waste Inc
MNRNE38FS	1608	Como Ave Ste B1	Engraphics Inc	Yes	Engraphics Inc
MNR05349X	2576	Doswell Ave	Metro Metals Corp	No	Metro Metals Corp
MNR053CQY	2576	Doswell Ave	Metro Metals Corp	No	Metro Metals Corp
MNR053DGV	930	Duluth St	Ray Anderson & Sons	No	Ray Anderson & Sons Co Inc, Ray Anderson & Sons Co Inc
MNRNE3BLZ	355	E 8th St	Meritex - St. Paul	Yes	Meritex
MNR05374S	51	E Maryland Ave	Splash Products Inc	No	Elliott Auto Supply Co Inc dba Splash Products
MNR05384T	51	E Maryland Ave E	Splash Products	No	Elliott Auto Supply Co Inc dba Splash Products
MNRNE37ZP	223	E Plato Blvd	Tursso Companies Inc	Yes	Tursso Companies, Inc
MNR0537Y3	345	E Plato Blvd	528 Partnership LLP Brown & Bigelow Bldg	No	528 Limited Partnership
MNR0534ZY	515	Eaton St	Signature Flight Support STP	No	Signature Flight Support
MNR0538P4	515	Eaton St	Signature Flight Support STP	No	Signature Flight Support
MNR0535N5	701	Eaton St	Hubbard Broadcasting Hanger	No	Hubbard Broadcasting Inc, St Croix Partners LLC
MNR0537VP	701	Eaton St	Hubbard Hanger	No	Rodney Burwell, TriFly LLC
MNR0538PH	701	Eaton St	Hubbard Broadcasting Hanger	No	Hubbard Broadcasting Inc, St Croix Partners LLC
MNR053939	701	Eaton St	Hubbard Hanger	No	Rodney Burwell, TriFly LLC
MNR0535N2	719	Eaton St	Minnesota Jet Inc	No	Northern States Power a MN Corp dba Xcel
MNR0538VB	719	Eaton St	Minnesota Jet Inc	No	Northern States Power a MN Corp dba Xcel
MNR053772	22	Empire Dr	Molex Inc - Copper Flex Products	No	Molex Copper Flex Products Inc
MNRNE39DG	87	Empire Dr	Saint Paul Stamp Works	Yes	Saint Paul Stamp Works
MNRNE3BLL	1220	Energy Park Dr	Quality Tool	Yes	Lakewood Land LLC
MNRNE38Q5	1835	Energy Park Dr	Minnesota Wire & Cable	Yes	Minnesota Wire
MNRNE385Q	2020	Energy Park Dr	Larkin Industries Inc	Yes	Michael S. and Lynnette Larkin
MNR0534MX	2058	Energy Park Dr	Cemstone Products - Midway	No	Cemstone Products Co.
MNRNE3CT7	1280	Energy Pk Dr	GLS Co	Yes	GLS Co
MNRNE3CHV	139	Eva St	Rexam Beverage Can Co - St Paul	Yes	Rexam BCNA Corp
MNRNE38HM	314	Eva St	US Postal Service - St Paul Vehicle Main	Yes	Us Postal Service/Fac Svc Office
MNRNE3CLC	274	Fillmore Ave E	Vomela Specialty Co	Yes	Vomela Specialty Co
MNR053C3X	403	Fillmore Ave E	Americraft Carton Inc	No	Americraft Carton, Inc

List of Industrial Stormwater Permit Holders
Obtained from MPCA Industrial Stormwater Permit database on 9/11/2017

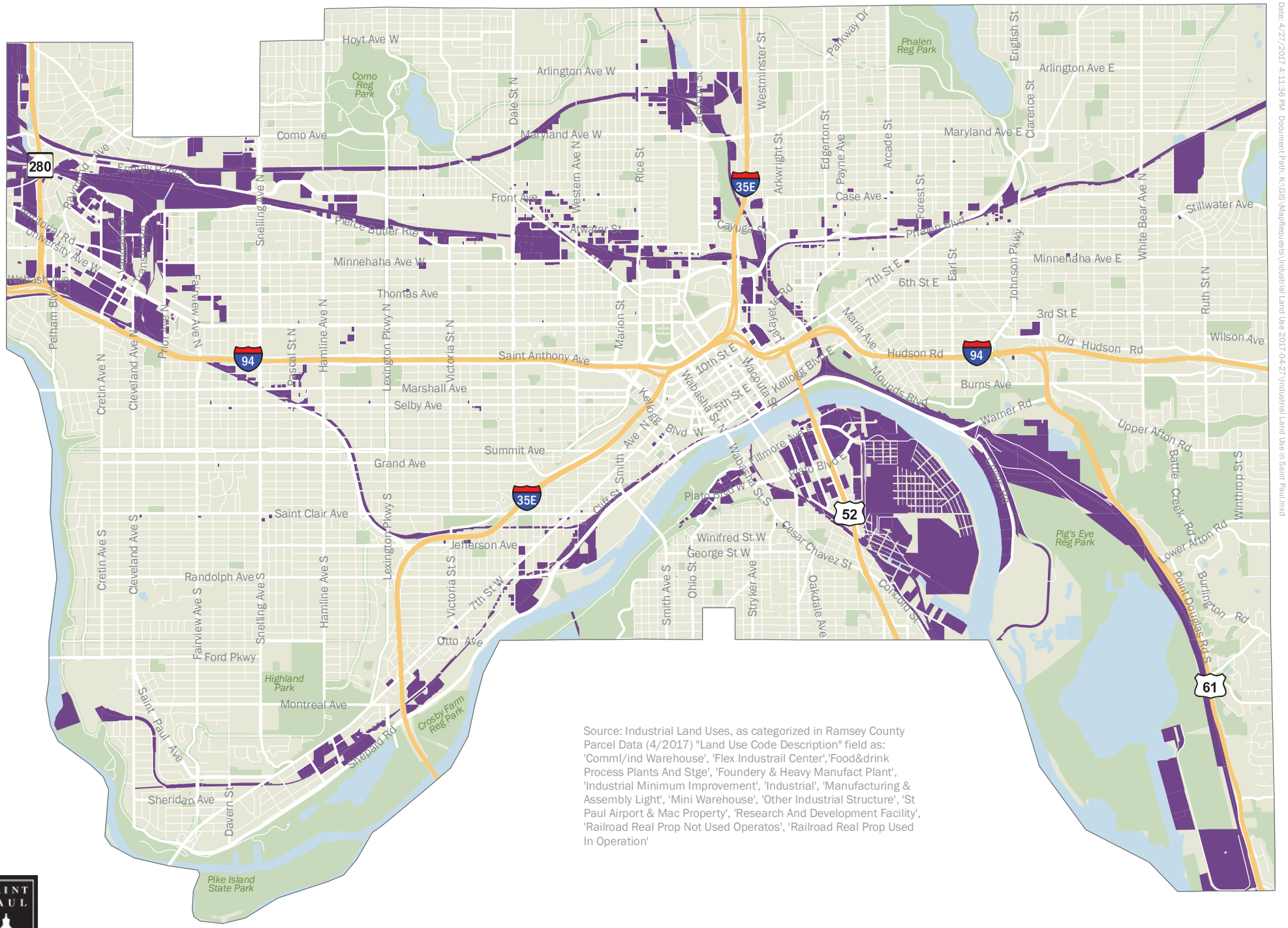
Permit site number shown on City Permit Location Maps	Address Number	Street Address	Facility Name	Does MPCA Consider Site No Exposure ?	Owner Name
MNRNE3845	410	Fillmore Ave E	3M - Bldg 76	Yes	3M Company
MNR053D66	90	Fish Hatchery Rd	Dayton's Bluff Yard	No	BNSF Railway Co
MNRNE3CYW	181	Florida St	Aero Systems Engineering, Inc.-Florida Street Oper	Yes	Aero Systems Engineering, Inc.-Florida Street Oper
MNR0539Q8	867	Forest St	Northern Iron of St Paul LLC	No	Northern Iron Corp
MNRNE3CWV	432	Front Ave	AAA Metal Finishing Inc.	Yes	Raul F. Rivas
MNRNE3BJ9	2124	Gilbert Ave	J&D Custom Plating Inc	Yes	J & D Plating
MNRNE3CLJ	1265	Grey Fox Rd	Smiths Medical ASD Inc - St Paul	Yes	Smiths Medical ASD
MNRNE39Y8	431	Griggs St N	Rayven Inc	Yes	Ingalls Family Partnership
MNR0533X5	781	Hubbard Ave	Marshall Concrete Products Inc	No	Flittie Ready Mix Inc
MNRNE39HN	1457	Iglehart Ave	Loes Enterprises Inc	Yes	Loes Enterprises Inc
MNRNE3BHP	1605	Iglehart Ave	Co-Operative Plating Co	Yes	Co-operative Plating Co
MNRNE3D5L	2565	Kasota Ave	A-1 Recycling Inc	Yes	A-1 Recycling Inc
MNR053C7S	76	Kellogg Blvd W	District Energy St Paul Inc-Hans O Nyman	No	District Energy St Paul Inc
MNR0533YF	465	Kenny Rd	Metro Manufacturing Inc	No	JAMES FOX
MNR0539H9	465	Kenny Rd	Metro Manufacturing Inc	No	JAMES FOX
MNRNE399H	1457	Marshall Ave	Northwest Casting Inc	Yes	Mark Brudzinski and Chris Brudzinski
MNR053442	195	Minnehaha Ave E	St. Paul Transfer	No	Waste Management
MNR0537DN	195	Minnehaha Ave E	Strategic Materials Inc - Saint Paul Plant	No	Eric Fortin
MNR0534BX	198	Minnehaha Ave E	Apex Auto Parts & Radiators	No	Vince Reiter
MNR053B97	198	Minnehaha Ave E	Apex Auto Parts & Radiators	No	Vince Reiter
MNRNE39RP	888	Minnehaha Ave E	3M - Industrial Materials	Yes	3M Company
MNR0534MY	1520	Minnehaha Ave E	Cemstone Products - Minnehaha	No	Cemstone Products Co
MNR053B8H	195	Minnehaha Ave E Ste A	RRT LLC St Paul Transfer Suite A	No	Nicholas
MNR05353N	800	Mississippi St	East Metro Transit Facility - SW	No	Metro Transit
MNR053CP7	800	Mississippi St	East Metro Transit Facility	No	Metro Transit
MNR053CTB	218	N Pascal St	CROSSTOWN AUTO, INC	No	CLYDE PAYNE
MNR05355L	1102	N Snelling Ave	Student Transportation of America	No	First Student Inc
MNR0534CK	218	Pascal St N	Crosstown Auto Inc	No	Crosstown Auto Inc
MNRNE3BT2	650	Pelham Blvd Ste 100	NOVUS Inc	Yes	NOVUS Inc
MNR0534HV	945	Pierce Butler Rte	Lawrence Signs Inc	No	Walker Sign Holdings Inc
MNR053C4Q	945	Pierce Butler Rte	Walker Sign Holdings Inc	No	Walker Sign Holdings Inc
MNR0533XH	1305	Pierce Butler Rte	Pierce Recycling and Transfer Facility	No	Veit Companies Inc
MNR053C2X	1305	Pierce Butler Rte	Pierce Recycling and Transfer Facility	No	Veit Companies Inc
MNRNE37ZB	1319	Pierce Butler Rte	Twin City Metal Fab Inc	Yes	Jim Klibane
MNR05352N	1701	Pierce Butler Rte	BNSF Midway Hub Center	No	BNSF Railway Company
MNR053BF3	1701	Pierce Butler Rte	BNSF Midway Hub Center	No	BNSF Railway Company
MNR053C77	2160	Pigs Eye Lake Rd	Hoffman Pigs Eye Maintenance Facility	No	Union Pacific Railroad
MNR0534FC	2165	Pigs Eye Lake Rd	Environmental Wood Supply LLC	No	Environmental Wood Supply LLC
MNR053C7Q	2165	Pigs Eye Lake Rd	Environmental Wood Supply LLC	No	Environmental Wood Supply LLC
MNR0537Y2	345	Plato Blvd E	529 Limited Partnership LLP Brown & Bigelow Bldg	No	528 Limited Partnership

List of Industrial Stormwater Permit Holders
Obtained from MPCA Industrial Stormwater Permit database on 9/11/2017

Permit site number shown on City Permit Location Maps	Address Number	Street Address	Facility Name	Does MPCA Consider Site No Exposure ?	Owner Name
MNR053BCV	345	Plato Blvd E	528 Limited Partnership LLP Brown & Bigelow B1	No	528 Limited Partnership
MNR0537V4	875	Prior Ave	E-Z Recycling	No	Chris Reinhardt
MNR053BJL	875	Prior Ave	E-Z Recycling	No	Chris Reinhardt
MNRNE3CQ3	698	Prior Ave N	Graphic Finishers of America	Yes	Tom McCullough
MNRNE39LD	155	Randolph Ave	Former High Bridge Coal Generating Facility	Yes	Northern States Power Compant d/b/a Xcel Energy
MNR0534FN	1061	Red Rock Rd	Gavilon Grain LLC dba Peavey Co Red Rock	No	Gavilon Grain, LLC
MNR0538JV	1061	Red Rock Rd	Gavilon Grain LLC dba Peavey Co Red Rock	No	Gavilon Grain, LLC
MNR0534L9	1303	Red Rock Rd	AMG - Alliance LLC	No	AMG Alliance LLC
MNR0536K3	1303	Red Rock Rd	AMG Resources	No	AMG Resources Corp
MNR0537DC	1303	Red Rock Rd	Upper River Services- Pigs Eye	No	Upper River Services, LLC
MNR0538TV	1303	Red Rock Rd	Upper River Services- Pigs Eye	No	Upper River Services, LLC
MNR053CSG	1303	Red Rock Rd	AMG Resources	No	AMG Resources
MNR05352V	1359	Red Rock Rd	Barton Enterprises Inc	No	Commercial Asphalt Co
MNR053BWL	1359	Red Rock Rd	Barton Enterprises Inc	No	Commercial Asphalt Co
MNR053425	1425	Red Rock Rd	Hawkins Water Treatment Group - Red Rock	No	Hawkins, Inc.
MNR053BDW	1425	Red Rock Rd	Hawkins Water Treatment Group - Red Rock	No	Hawkins, Inc.
MNR0534WY	1678	Red Rock Rd	Gerdau Ameristeel US Inc - Saint Paul Mill	No	Gerdau Ameristeel US Inc.
MNR0539XY	1678	Red Rock Rd	Gerdau Ameristeel US Inc - Saint Paul Mill	No	Gerdau Ameristeel US Inc.
MNR0533SN	754	Rice St	Ace Auto Parts & Salvage Co Inc	No	Barb Weyandt
MNR0539QD	754	Rice St	Ace Auto Parts & Salvage Co Inc	No	Barb Weyandt
MNRNE39DF	1101	Rice St	Racy Printing	Yes	Racy Printing Inc
MNR053B2L	91	Ridder Cir	Semple Recycling & Crushing LLC	No	Doboszenski and Son Inc
MNRNE3CYJ	1742	Selby Ave	Atma-Sphere	Yes	Atma-Sphere
MNR0535GG	1999	Shepard Rd Ste A	Johnson Brothers Liquor Co	No	Johnson Brothers Liquor Co
MNR053BK9	1999	Shepard Rd Ste A	Johnson Brothers Liquor Co	No	Johnson Brothers Liquor Co
MNR05352D	1000	Shop Rd	Canadian Pacific Railway - St Paul Yard	No	Canadian Pacific Railway
MNR053C2P	1000	Shop Rd	Canadian Pacific Railway - St Paul Yard	No	Canadian Pacific Railway
MNR0537DD	40	State St	Upper River Services LLC	No	Upper River Services, Upper River Services, LLC
MNR0538TX	40	State St	Upper River Services LLC	No	Upper River Services, Upper River Services, LLC
MNR0537JK	51	State St	Pier Foundry & Pattern Shop	No	Matt Grilz
MNR0538N3	51	State St	Pier Foundry & Pattern Shop	No	Matt Grilz
MNRNE3929	355	State St	Viking Drill & Tool Inc	Yes	Viking Drill & Tool, Inc
MNRNE38YF	878	Stryker Ave	Palindrome dba Nomadic Press	Yes	Palindrome dba Nomadic Press
MNR0537JB	228	Sycamore St W	Atlas U-Pull LLC	No	79th Street Center Partnership LLP
MNR053CSY	228	Sycamore St W	Atlas U Pull	No	Atlas U Pull
MNR05352J	845	Terrace Ct	Univar USA Inc - Saint Paul Facility	No	Univar Usa Inc. - St. Paul
MNRNE396Q	2299	Territorial Rd	Arrow	Yes	Arrow
MNRNE38GQ	1332	Thomas Ave	Peak Printing	Yes	Norman Greg Inc
MNR053CYP	391	Topping St	Otto Packaging Midwest LLC	No	Otto Packaging Midwest LLC
MNRNE37SH	5000	Township Pkwy Ste A	Med-Tech Center	Yes	The Spearman Group LLC

List of Industrial Stormwater Permit Holders
Obtained from MPCA Industrial Stormwater Permit database on 9/11/2017

Permit site number shown on City Permit Location Maps	Address Number	Street Address	Facility Name	Does MPCA Consider Site No Exposure ?	Owner Name
MNR053C8P	858	Transfer Rd	Lubrication Technologies & Partners LLC	No	Lube-Tech & Partners LLC
MNR053CZP	1351	Trout Brook Cicrle	TCC Materials St Paul	No	TCC Materials
MNR0534JH	1351	Troutbrook Cir	Twin City Concrete Products Co - Saint Paul	No	TCC Materials
MNR053485	355	University Ave E	Metals Reduction Co	No	Regions Hospital
MNRNE3BMR	2447	University Ave W	Design Press	Yes	Terry Fleischhacker
MNRNE3D2B	2575	University Ave W Ste 180	Synovis Life Technologies Inc - Sub of Baxter Intl	Yes	Synovis LIfe Technologies, Synovis Life Technologies
MNRNE38PD	708	Vandalia St	E & L Bindery	Yes	Jeffrey Dahlin
MNRNE38TH	1396	W 7th St	Insty Prints	Yes	Bastian/Elm
MNR05349J	2020	W 7th St	Custom Rock	No	John Fallenstein
MNR053CH9	2020	W 7th St	Custom Rock	No	John Fallenstein
MNR053BMF	2140	W 7th St	Pearson's Candy Company	No	Pearson's Candy Holdings LLC
MNR0534F8	954	W Minnehaha Ave	St Paul Brass & Aluminum Foundry	No	St Paul Brass & Aluminum Foundry
MNR05396V	954	W Minnehaha Ave	St Paul Brass & Aluminum Foundry	No	St Paul Brass & Aluminum Foundry
MNRNE39YL	2635	W University Ave	Protatek International Inc	Yes	CSM
MNRNE3BMT	2635	W University Ave	Protatek International Inc	Yes	CSM
MNR0536KB	318	W Water St	Twin City Refuse Recycling & Transfer	No	Twin City Refuse & Recycling Inc
MNR053BRV	318	W Water St	Twin City Refuse Recycling & Transfer	No	Twin City Refuse & Recycling Inc
MNRNE39RR	42	Water St W	3M Company Building 75	Yes	3M Co
MNR0534KQ	268	Water St W	J&L Wire Cloth Co Inc	No	J & L Wire Cloth Co Inc
MNR053BSQ	268	Water St W	J&L Wire Cloth Co Inc	No	J & L Wire Cloth Co Inc
MNRNE3CDW	1050	Westgate Dr	Impressions Inc - St Paul	Yes	Impressions Inc
MNRNE39LQ	530	Wheeler St N	Western Graphics	Yes	Western Graphics
MNR05377R	550	Wheeler St N	Huot Manufacturing Co	No	Huot Manufacturing Co
MNR0538H2	550	Wheeler St N	Huot Manufacturing Co	No	Huot Manufacturing Co
MNRNE38YP	4835	White Bear Pkwy	Trane St. Paul	Yes	Trane US Inc.
MNRNE39C9	1125	Willow Lake Blvd	Dynamic Air	Yes	Dynamic Air Inc.
MNRNE394C	1200	Willow Lake Blvd	HB Fuller Co - Willow Lake	Yes	H.B. Fuller Co.
MNR053DJC	2313	Wycliff St	Precision Coatings Inc	No	Precision Coating Inc



Source: Industrial Land Uses, as categorized in Ramsey County Parcel Data (4/2017) "Land Use Code Description" field as: 'Comml/ind Warehouse', 'Flex Industrail Center','Food&drink Process Plants And Stge', 'Foundery & Heavy Manufact Plant', 'Industrial Minimum Improvement', 'Industrial', 'Manufacturing & Assembly Light', 'Mini Warehouse', 'Other Industrial Structure', 'St Paul Airport & Mac Property', 'Research And Development Facility', 'Railroad Real Prop Not Used Operatos', 'Railroad Real Prop Used In Operation'

Industrial Land Use in Saint Paul

Industrial Land Use - April 2017
Parks
Water Bodies

0 0.5 1 2 Miles

Pollutant Source Locations
Stormwater Modeling
Volume Reduction Inventory
2010 RSVP Stormwater Study
City of St. Paul, MN

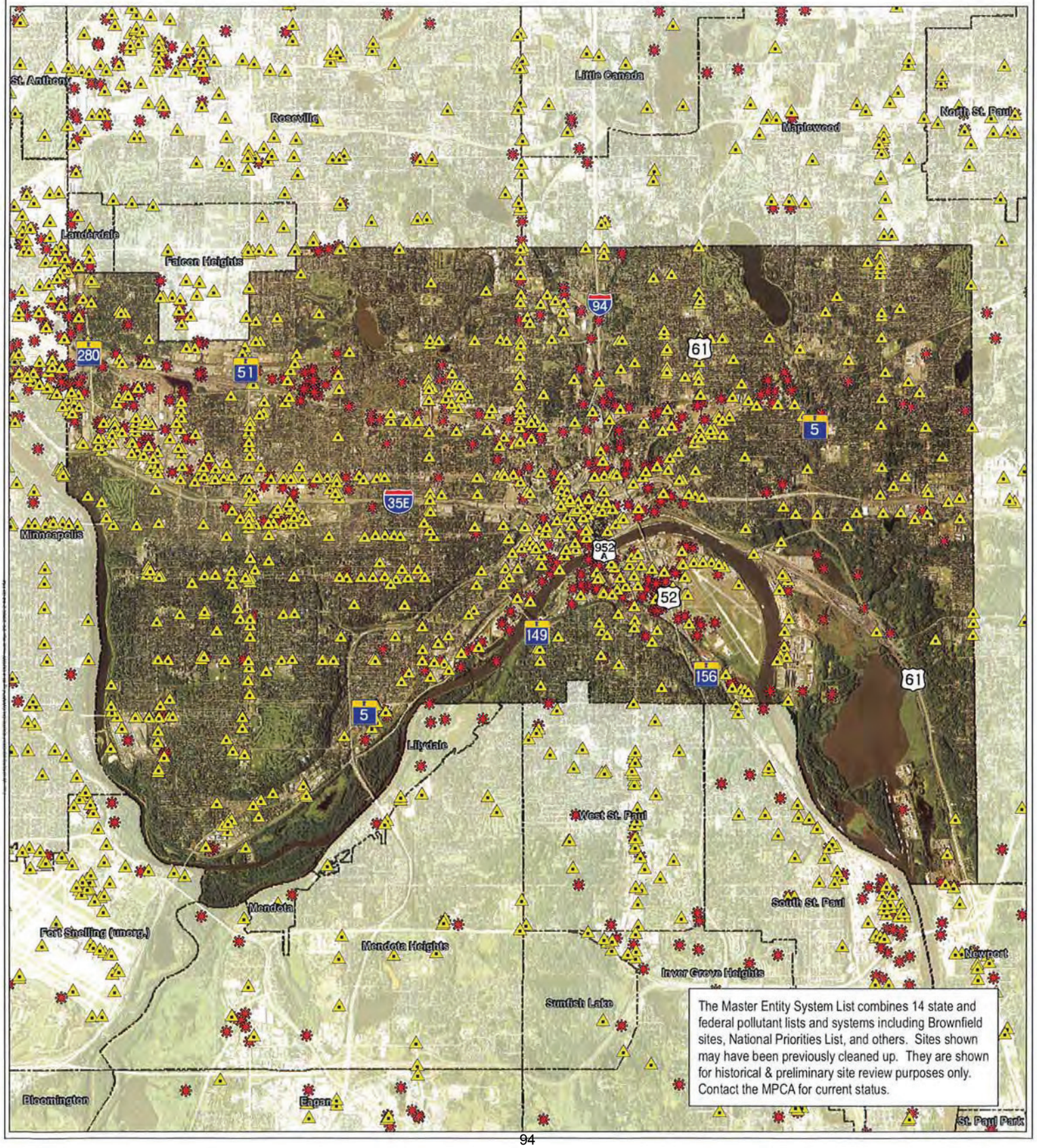
Legend

- Leaking Underground Storage Tank
- Pollution Source Locations

N
W E
S

0 7,500 15,000 Feet

WSB & Associates, Inc.



The Master Entity System List combines 14 state and federal pollutant lists and systems including Brownfield sites, National Priorities List, and others. Sites shown may have been previously cleaned up. They are shown for historical & preliminary site review purposes only. Contact the MPCA for current status.

701 Xenia Avenue South | Suite 300 | Minneapolis, MN 55416 | (763) 541-4800

Memorandum

To: ***Patrick Murphy, City of Saint Paul***

From: ***Linnea Henkels, WSB***
Stephanie Hatten, WSB

Date: ***May 15, 2018***

Re: ***WSB Project No. 01610-100***

The following memo discusses the annual total phosphorus (TP) removals for two newly constructed stormwater best management practices (BMPs) located within the City of Saint Paul. The two BMPs are a Continuous Deflective Separation (CDS) hydrodynamic separator and infiltration trench and were constructed in 2017. Discharge from both BMPs is eventually routed into Como Lake.

Methodology

The P8 modeling determined the removals for the infiltration trench and SHSAM was used to calculate the removals for the CDS structure. The SHSAM modeling was done by Wenck Associates for Capitol Region Watershed District (CRWD).

Table 1 contains the drainage area inputs that were used for each BMP.

Table 1*: Drainage Areas by BMP*

BMP	Total Area [ac]	Percent Impervious [%]
Wheelock Parkway Infiltration Trench	4.6	40
Wheelock Parkway CDS Structure*	15.2	62

(*) Note that the proposed CDS structure will only treat a portion of stormwater runoff generated from the 15.2 acre. Flow from the 36” pipe in Wheelock will be diverted to the CDS by a one-foot weir and 18” pipe. Flow begins to bypass the CDS when the water depth in the 36” pipe exceeds one foot. The peak flow the CDS will treat is about 8.0 CFS. (per the City’s XPSWMM model).

CDS Analysis

Per Wenck Associates’ CDS analysis, the total annual TSS removal is about 580 pounds per year under optimal conditions. A conversion involving the following assumptions allowed the TP removals to be calculated:

- 315 TSS: 1 TP (Ratio of EMCs for residential streets)
- 2.22 TP: 1 Non-soluble Phosphorus

P8 Analysis

An event mean concentration (EMC) of 0.3 [mg/L of TP] (the default value for the program) was assumed for the subwatersheds draining to the infiltration trench. **Table 2** lists design inputs that were used for the P8 model.

***Table 2**: P8 Inputs for the Infiltration Trench*

Item	Input
Precipitation File	Msp_4989.pcp
Temperature File	Msp_4889.tem
Particle File	nurp50.p8p
Drainage Area [ac]	4.6
Impervious Percentage [%]	76
CN	81
Precipitation (in/year)	22.80
Total Years	40.52

Removals

Table 3 contains the annual TP removals by BMP. The P8 model directly calculates TP removals which are reported below. The SHSAM calculator only reports total suspended solids (TSS) removals. A conversion involving the following assumptions allowed the TP removals to be calculated.

- 315 TSS: 1 TP (Ratio of EMCs for residential streets)
- 2.22 TP: 1 Non-soluble Phosphorus

***Table 3**: Annual TP Removals by BMP*

BMP	TP [lbs/yr]
Wheelock Parkway Infiltration Trench	3.7
Wheelock Parkway CDS Structure	1.84