

2016 INFLOW & INFILTRATION TASK FORCE REPORT



The vision of Metropolitan Council Environmental Services is to be a valued leader and partner in water sustainability

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Executive Summary

In early 2016, the Metropolitan Council appointed a Task Force of local community representatives to discuss and identify areas of improvement for the existing Metropolitan Council Environmental Services (MCES) Ongoing Inflow and Infiltration Program (Ongoing I/I Program) and the potential for future inflow and infiltration mitigation strategies for both public and private infrastructure. This Task Force, representing public works directors, city engineers, utility managers, finance directors, and city managers, met during the 2016 calendar year. This *2016 Inflow and Infiltration Task Force Report (Report)* is a summary of the discussions and recommendations made to the Metropolitan Council.

The Task Force focused its discussion around three assignments made by the Metropolitan Council (Council). The first assignment included review of the existing program, key elements of the program, mitigation activities undertaken in the regional, local and private wastewater collection systems, and system responses to wet weather.

The second assignment was to identify and discuss challenges of addressing private property inflow and infiltration sources. The Council's *Thrive 2040 Water Resources Policy Plan (Plan)* states that the Council will not provide additional capacity within its interceptor system for excessive I/I. The *Plan* requires that all communities served by the regional wastewater system include an I/I mitigation component, including a program for private property I/I mitigation, in their comprehensive wastewater plans, which are due in 2018. The Task Force recognized that very few communities in the Twin Cities metropolitan region have implemented a private property I/I mitigation program. The Task Force further recognized that public opposition, lack of public outreach and messaging, and inconsistent grant funding contribute to the difficulty of implementing private property I/I mitigation programs; strategies selected to address private property I/I will need to be tailored to the community and consider age and condition of service laterals, ownership and maintenance responsibilities, etc.

The third assignment was to identify and discuss options and opportunities for private property I/I mitigation. Based on challenges discussed and program strategies underway in the region or in other areas of the country, the Task Force identified some specific strategies to address the technical and financial challenges of private property I/I mitigation.

In summary, the Task Force recommended that MCES:

1. Continue the regional planning policy of balancing regional standards with the needs of local communities to tailor programs to their individual circumstances.
2. Develop a robust public outreach program that would include proper maintenance of wastewater collection systems, ownership of sanitary sewer service laterals, and impacts of excessive I/I during wet weather events.
3. Support efforts to secure funding for public and private I/I mitigation projects including State Bond and Clean Water Legacy Funds. Consider the provision of financial assistance through regional sources, such as a portion of the wastewater fee, to provide assistance to communities for private property I/I mitigation
4. Develop a model ordinance for a private property service lateral inspection program in conjunction with the League of Minnesota Cities, Metro Cities, and local communities.
5. Develop best practices for a private property service lateral inspection program in conjunction with the League of Minnesota Cities, Metro Cities, and local communities
6. Investigate the ability to develop master contracts held by MCES that could be used by communities for private property I/I inspections and service lateral repairs.
7. Design and implement a private property I/I mitigation demonstration project that would provide additional opportunity for measurement of impact on wastewater base and peak flows.
8. Review the peak hour factors used to develop I/I Goals at the time that the *2050 Water Resources Policy Plan* is prepared.

Introduction

Inflow and Infiltration (I/I) are terms that describe clear water, including stormwater and groundwater that enters wastewater collection systems. Inflow is typically stormwater that enters the wastewater system at point sources such as manhole covers, rain leaders, sump pumps, or foundation drains. The largest amount of inflow occurs during and shortly after rainfall events. Infiltration is typically groundwater that seeps into cracked or broken wastewater sewer mains or service laterals. Infiltration increases the base flow in the wastewater collection systems. Some of the major challenges in the region associated with I/I are shown below:

- I/I can result in public and environmental health concerns.
 - When the combined amount of wastewater and clear water exceed the system capacity, untreated wastewater can back up into the basements of buildings or discharge into lakes, streams, wetlands, or other areas. Often these outcomes are a result of limited system capacity at the local level.
- I/I is costly to communities and utility ratepayers.
 - The large regional pipes (interceptors) and wastewater treatment plants are designed for the wastewater needs of the region. Excessive I/I limits the available system capacity intended to accommodate the growth of the region and increases the wastewater treatment costs, charged to local communities.
- I/I wastes the region's valuable water resource
 - Clear water discharged to the wastewater system is removed from the natural hydrologic cycle and reduces groundwater recharge potential.

The Task Force met in 2016 to discuss the following assignments:

- Review the Metropolitan Council Ongoing I/I Program.
 - Discuss work accomplished by MCES and communities and observed wastewater flows. Identify opportunities for improving the Ongoing I/I Program to assist communities in mitigation of excessive I/I.
- Identify and discuss challenges of addressing private property I/I sources.
- Identify and discuss options and opportunities for private property I/I mitigation.

The Task Force discussion and recommendations were focused by utilization of the problem statement, as defined below:

The addition of excessive clear water (inflow and infiltration) into local and regional wastewater collection systems can create multiple problems for these systems, including basement backups, wastewater spills, and the excessive utilization of remaining pipe capacity reserved for future growth. Problems occur on both publicly owned as well as privately owned infrastructure, and metro governments are required to resolve local I/I problems. Operators of publicly owned systems typically have programs in place to provide ongoing inspections, repairs, and replacement of the public system. Private sewer service laterals represent a significant portion of the overall collection system but are often not part of public system inspection, replacement, or I/I mitigation programs. These service laterals tend to represent an unquantified and unresolved share of the I/I problem.

Formation of Task Force

The 2016 I/I Task Force was comprised of city officials and chaired by Metropolitan Council Member Sandy Rummel. The Task Force members included representatives with public works, wastewater utility, finance, or city manager experience, solicited with assistance of Metro Cities. The membership was diverse in terms of community size, geographic coverage, and experience with the I/I Program. The Task Force members were:

Task Force Chair

- **Sandy Rummel**, Council Member, District 11, Metropolitan Council

Task Force Members

- **Matt Saam**, Public Works Director, Apple Valley
- **Bob Cockriel**, Utilities Superintendent, Bloomington
- **Jesse Struve**, City Engineer, Brooklyn Park
- **Paul Oehme**, Director of Public Works, Chanhassen
- **Kory Jorgensen**, Utility Operations Supervisor, Coon Rapids
- **Russ Matthys**, Public Works Director, Eagan
- **Chad Millner**, Engineering Director, Edina
- **Bert Tracy**, Public Works Maintenance Manager, Golden Valley
- **Brian Wagstrom**, Director of Public Works, Minnetonka
- **Eric Hoversten**, City Manager, Mound
- **Lisa Cerney**, Director of Surface Water and Sewers, Minneapolis
 - *Represented by Katrina Kessler, Kelly Moriarity, Kelly MacIntyre*
- **Bruce Hanson**, Public Works Superintendent, Newport
- **Jason Ziemer**, City Manager, North St. Paul
- **Luke Fischer**, Administrative Services Director, Plymouth
- **Bruce Elder**, Sewer Utility Manager, Saint Paul
- **Mark Maloney**, Director of Public Works, Shoreview
- **Shelly Rueckert**, Finance Director, St. Anthony
- **Ross Beckwith**, Public Works Director, West St. Paul
 - *Represented by Darin Rezac*
- **Patricia Nauman**, Executive Director, Metro Cities

Metropolitan Council Representatives

- **Bryce Pickart**, Assistant General Manager, Technical Services
- **Jeannine Clancy**, Manager, Community Programs
- **Kyle Colvin**, Assistant Manager, Engineering Planning
- **Marcus Bush**, Principal Engineer, Community Programs
- **Angela Mazur**, Senior Administrative Specialist

Background, History, and Milestones

Metropolitan Council Environmental Services (MCES) serves roughly three million residents in 109 communities. These communities discharge wastewater to the infrastructure owned and operated by MCES known as the Metropolitan Disposal System (MDS) shown in Figure 1. The MDS conveys wastewater from communities to one of the eight MCES treatment plants. The largest system conveys wastewater flow to the Metro Wastewater Treatment Plant (WWTP) and serves 65 communities. Smaller systems convey flow to plants in Shakopee (Blue Lake), Eagan (Seneca), Empire, Stillwater (St. Croix Valley), Hastings, Eagles Point, and East Bethel. Figure 1 shows the September 2016 condition rating of MCES interceptors, as described later in this report. Unrated portions shown on Figure 1 are typically pressurized, recently rehabilitated, or recently constructed sections of piping.

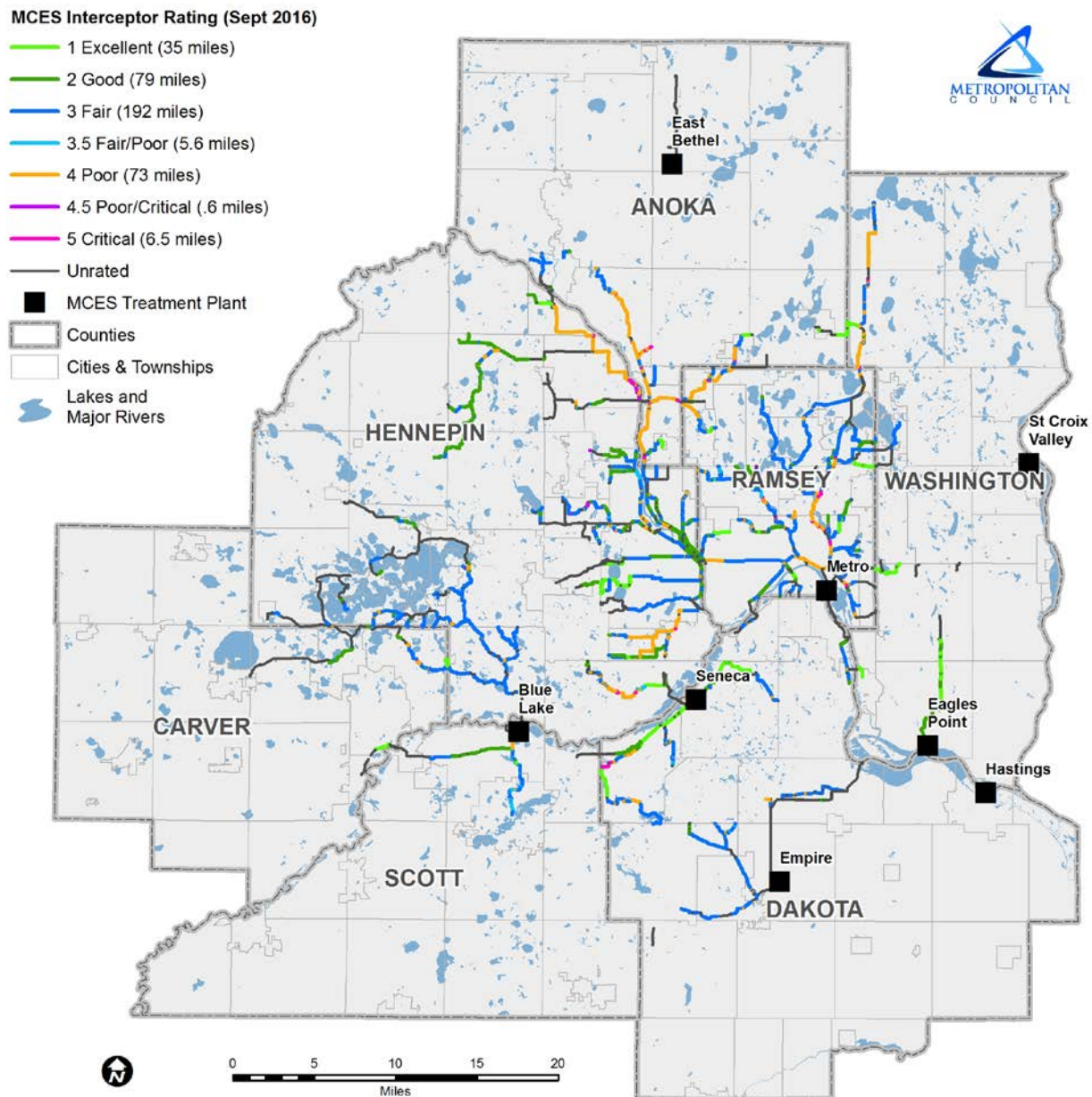


Figure 1: MCES Interceptor Rating

Communities own and operate local wastewater collection systems that connect to the MDS through local sewers, which extend wastewater service to end users such as residents, commercial establishments, industry, and public agencies. MCES is a wholesaler of the regional services that bills each community for wastewater flow into the MDS. The communities charge the end users, or ratepayers, for the wastewater service through fees typically based on metered wastewater use.

To preserve the reliability and sustainability of the regional wastewater system, continuous maintenance of the infrastructure is required on the MDS and the upstream municipal infrastructure. The I/I Program was developed and adapted over time to capacity and fiscal constraints, federal and state regulations, regional needs, community feedback, task force discussions, and economic conditions. Table 1 identifies milestones in the I/I Program history.

Table 1: Program History

Date	Milestone
2000-2002	MCES Interceptor Master Plan developed; Capacity constraints of interceptors due to high flow volumes of I/I identified in hydraulic model
2003-2004	I/I Task Force 1: Established I/I Surcharge Program
May 2005	I/I Mitigation Program included in <i>2030 Water Resources Management Policy Plan</i>
Fall 2005	47 communities exceeded I/I goals during a significant rain event
2007	First year of community I/I work plan assignments
2009-2010	I/I Task Force 2: Established Ongoing I/I Program
April-June 2014	42 communities exceeded I/I goals during a significant rain event
2015	I/I Mitigation Program included in <i>2040 Water Resources Policy Plan</i>
2016	I/I Task Force 3

Interceptor Master Plan

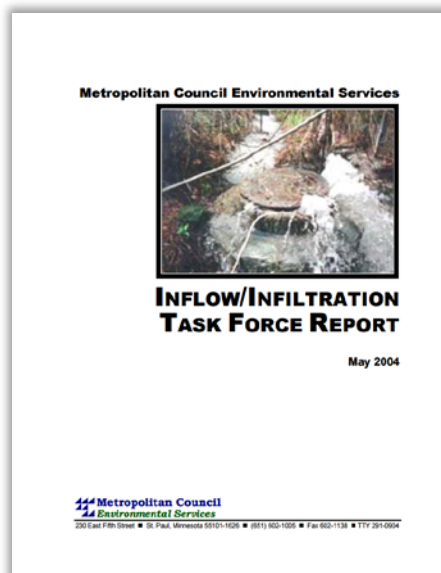
MCES completed a comprehensive master planning study for the interceptor system in December 2002. One of the significant findings of the study was that groundwater and rainfall runoff entered wastewater collection systems at rates that consumed wastewater system capacity intended to serve future development and growth.

The master planning study provided an opportunity to examine the long-range implications of continuing to tolerate the current levels of I/I with projected development in the region. The study identified practical limitations to expanding the system, including the high cost of relief sewers, larger pump stations, and larger treatment facilities. The study led staff to conclude that the most viable option for long-term service to the region was to mitigate I/I sources that contribute to excessive flows. Staff suggested the formation of the first I/I Task Force, representing the communities served, to evaluate and recommend a course of action to mitigate I/I sources.

Task Force 1 – Inflow/Infiltration Task Force

Based on the recommendations of the Interceptor Master Plan, the first I/I Task Force of community public works directors, city engineers, city managers, and finance directors met in 2003 and 2004. The 2004 Task Force concluded that:

- The capacity of regional wastewater conveyance and treatment facilities is exceeded during significant rainfalls because of excessive I/I.
- Overloaded wastewater conveyance and treatment facilities result in unacceptable conditions such as private property damage, spills, and sanitary sewer overflows.
- MCES, as the regional wastewater utility and National Pollutant Discharge Elimination System (NPDES) permittee, must take action to reduce the risk of overloading the regional wastewater facilities.
- It is not feasible to enlarge MCES facilities to accommodate all of the I/I from tributary communities.
- MCES has a fiduciary responsibility to not expend funds to convey and treat clear water from illegal connections associated with private property sources such as sump pumps and rain leaders.
- The MCES design allowance (based on the Ten State Standards) for I/I in the interceptor system is reasonable as many local communities meet this standard.



Based on the Task Force conclusions, MCES developed an I/I Mitigation Program. A summary of this program, referred to as the Surcharge Program, is included in Appendix B.

In fall 2005, a significant rain event occurred in the region that resulted in 47 communities exceeding their I/I Goal peak flows. Based on the program guidelines, these communities were given the option of working on I/I mitigation activities or paying a surcharge that could be used for I/I mitigation within the surcharged community. With one exception, all local communities chose to perform I/I mitigation work. Council staff worked with the surcharged community, which identified and mitigated the I/I source, allowing funds to be returned to the community upon completion of the work.

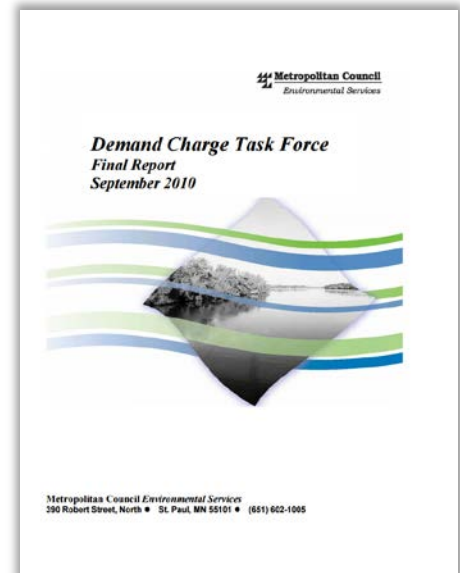
Task Force 2 – Demand Charge Task Force

The Council's *2030 Water Resources Management Policy Plan* called for the implementation of a wastewater demand charge in 2013 for communities with excessive I/I. The intent of the demand charge was to help fund the cost of providing storage of excessive I/I to avoid overloading downstream facilities. In 2009, the Council appointed a Demand Charge Task Force to develop recommendations for the program, including specific features and a 2013 implementation date. The Task Force sought a balanced approach to foster continued progress for I/I mitigation and recommendations for the next phase of the program, including implementing an ongoing program rather than a demand charge. As a result, MCES developed an Ongoing I/I Program, with the following goals:

- Effective in achieving I/I policy goals
- Equitable among served communities
- Defensible using measured flow data
- Fiscally responsible: consistent with cost of service and other policies, accounts for regional economics
- Reasonable, uniform rules and procedures
- Flexible, to deal with uncertainties and change
- Understandable

Based on the Task Force conclusions, MCES developed an Ongoing I/I Program. A summary of this program is included in Appendix B. *The Program Year 2018 Ongoing Inflow and Infiltration Program Procedure Manual* is included in Appendix C.

In spring 2014, much higher than normal rainfall resulted in saturated soils and elevated surface water features. Those factors, combined with the precipitation received in June 2014, resulted in 46 communities exceeding their I/I Goal peak flows and subsequently participating in work plans. Communities had four years to complete work plan assignments.



2016 Inflow & Infiltration Task Force

Ongoing I/I Program Review

The 2016 Task Force reviewed information regarding I/I mitigation work performed and regional flow observations since the implementation of the I/I Program. Typical I/I sources from public and private infrastructure are shown on Figure 2.

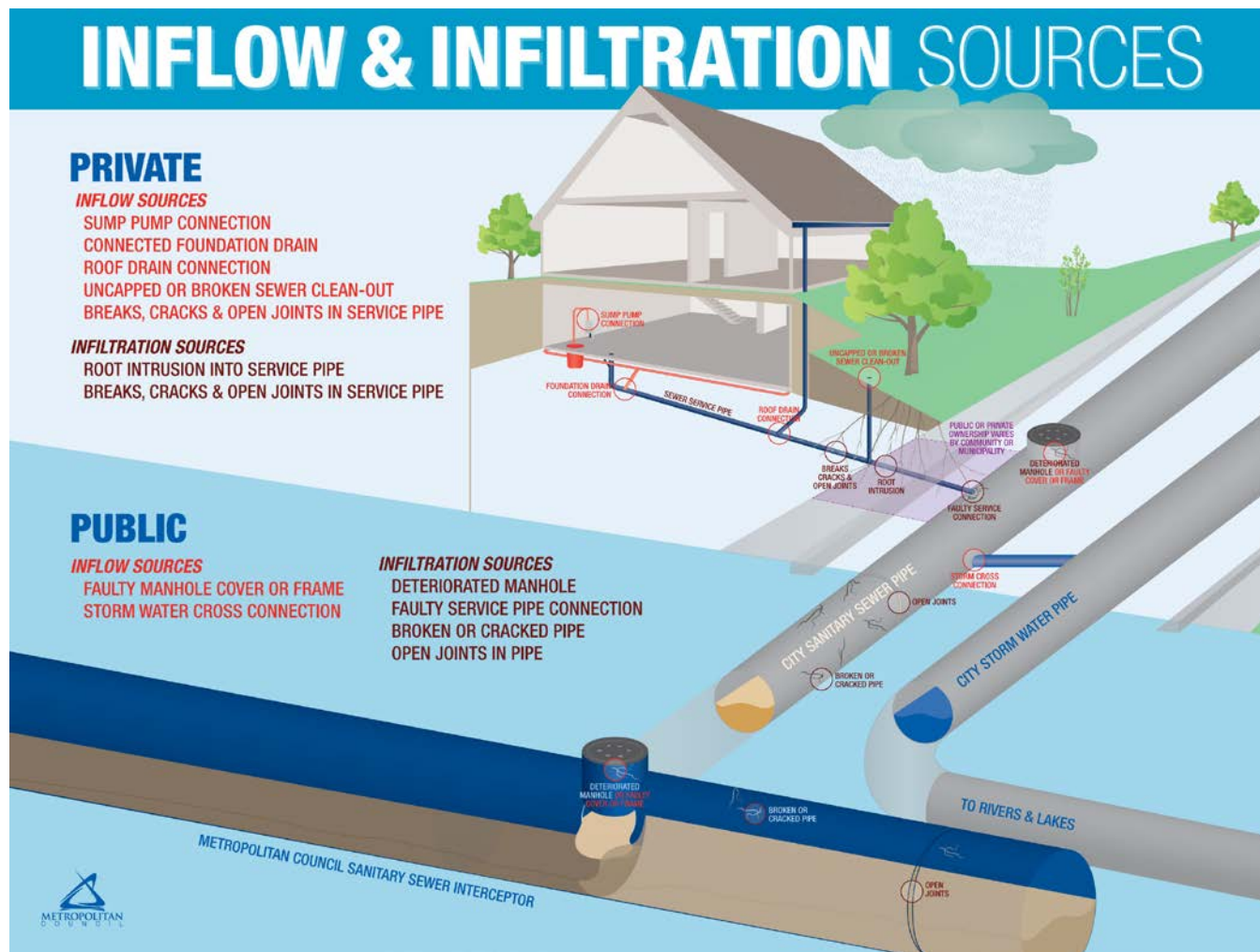


Figure 2: Inflow and Infiltration Sources

Mitigation of I/I in Municipal Systems

Each municipal wastewater system served by the MDS collects wastewater from homes and businesses and conveys it to the MCES interceptors or treatment plants. In total, there are an estimated 5,000 miles of local sewer mains operated and maintained by the local communities of the region. Municipal sewer systems are susceptible to inflow through leaking manhole covers and to infiltration through cracks and joints in the laterals, and may require repair or replacement.

Each community may choose projects that vary in approach, type, and cost to mitigate I/I. Mitigation projects are eligible for work plan credits if they meet the requirements of the following four types of work, as described in Appendix C: I/I Study, Public Facility Improvement, Private Property Improvement, or Public Staff Cost.

Table 2: Community Credits

The initial I/I Program began in program year 2007 based on flow data collected from 2004 through 2006. Since that time, 49 communities have participated in work plan assignments, with a combined total of \$157 million of reported local I/I mitigation work, as shown on Table 2.

Metro Cities advocated for state bond funds to assist with public infrastructure grants for I/I mitigation. A total of \$9 million in grants was secured between 2010 and 2015 and administered by MCES. Seventy-seven communities in the region that reached or exceeded 80% of their respective I/I Goals were eligible to receive grants up to 50 percent of the cost of qualifying I/I mitigation activities related to the municipal wastewater collection systems.

Year	Total I/I Credits
2007	\$ 37,850,500
2008	\$ 12,651,600
2009	\$ 33,370,700
2010	\$ 11,190,400
2011	\$ 9,460,500
2012	\$ 7,133,800
2013	\$ 12,931,900
2014	\$ 20,888,800
2015	\$ 11,036,200
TOTAL	\$ 156,514,400

Mitigation of I/I in MCES Interceptors

The MCES wastewater collection system includes 610 miles of interceptors, 60 lift stations, 200 flow meters, and over 7,000 manholes. The interceptor system collects and transports wastewater from each metershed connected to the MDS to one of eight treatment facilities. The MDS handles roughly 250 million gallons of wastewater daily and has an asset value of approximately \$6.7 billion.

Similar to the municipal systems, the MDS infrastructure is susceptible to I/I and may require repair or replacement to ensure reliable service to the region now and in the future. To mitigate I/I in the regional systems, MCES initiated the following capital and maintenance initiatives:

- Routine inspections completed to rate the condition of all gravity interceptors in accordance with the Pipeline Assessment and Certification Program (PACP) and the National Association of Sewer Service Companies (NASSCO). Figure 1 includes the PACP condition rating for the MCES Interceptor System.
- Between 2007 and 2015, MCES completed \$205 million in maintenance projects to reduce inflow and infiltration into the system. The I/I mitigation portion of these capital projects would be roughly \$88 million.
- Dedicated ongoing MCES resources to I/I mitigation in the interceptor system, including repair of manholes or replacement of manhole covers. The MCES Capital Improvement Program (CIP) includes \$100 million in interceptor-related investments through year 2030.

Results and Trends: Regional Flow Observations

Success of the I/I Program can be measured in reduced base flow from less infiltration and reduced peak flow from less inflow.

Since the inception of the I/I Program, total volume of wastewater treated by the regional system has decreased while precipitation has increased and growth in the region has continued. Figure 3 shows the yearly wastewater flow calculated by MCES for the regional Municipal Wastewater Charges (MWC) and the yearly rainfall data recorded by the National Oceanic and Atmospheric Administration (NOAA) for Hennepin County for monitoring years 2005 through 2016.

The total amount of wastewater flow reduced from 95 billion gallons per year (BGY) in 2005 to 86 BGY in 2015. The trend line for regional flows indicates an average annual reduction of 615 million gallons of wastewater per year (MGY). Over the same period, annual rainfall and regional population increased. This flow reduction can be attributed to I/I mitigation and water conservation.

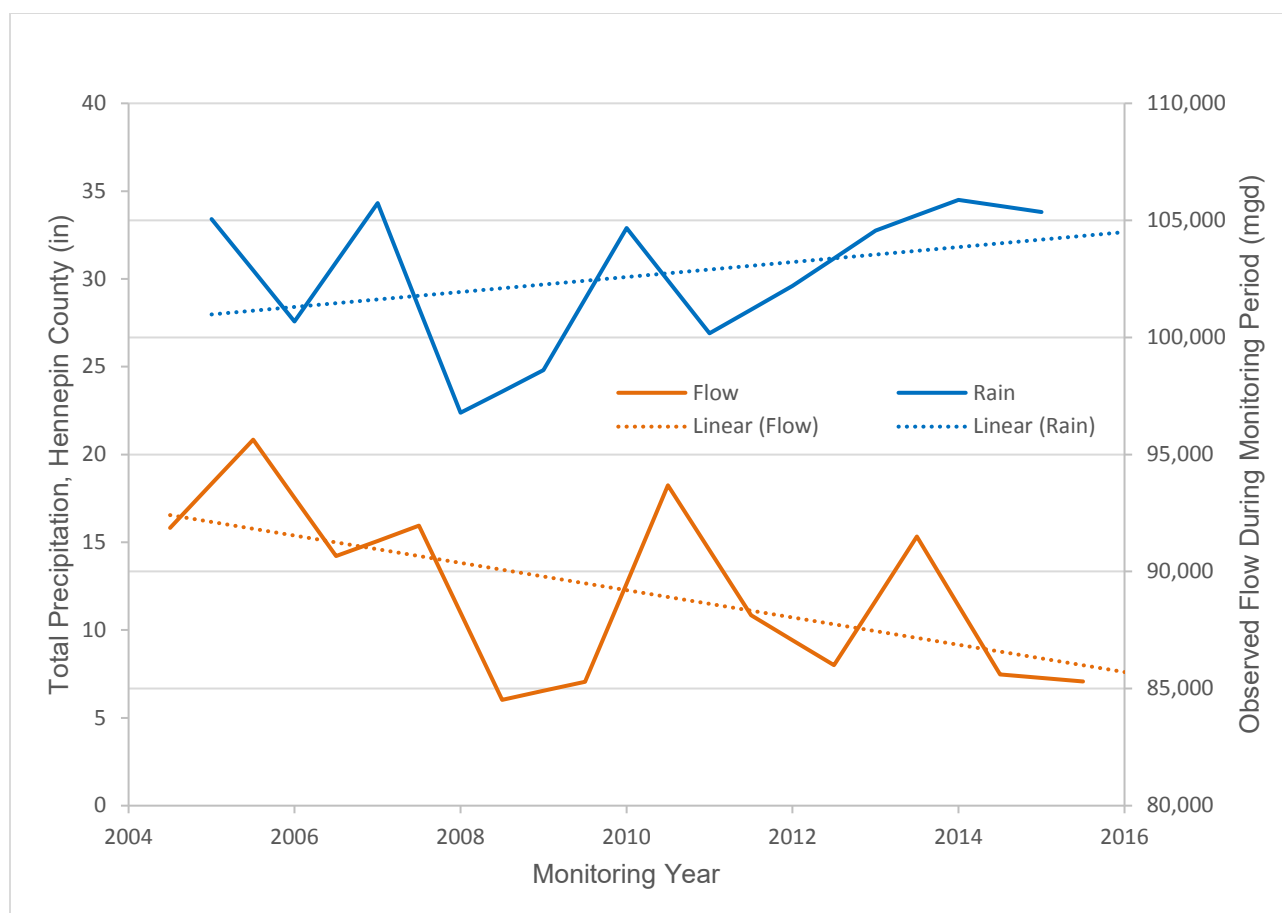


Figure 3: Regional Flow and Rainfall

The majority of work plan assignments of the I/I Program resulted from two wet weather events. These events occurred in October 2005 and June 2014. No two storms are identical and soil moisture can vary due to preceding rainfall events, referred to as antecedent conditions. However, these events illustrate the reduction in flow volumes prior to and after implementation of I/I work plans in 2007. Table 3 indicates that the 2014 rainfall event was of greater precipitation amount and was preceded by higher antecedent conditions, yet the wastewater treatment plants received lower peak flow volumes than the 2005 rainfall event.

Table 3: Wet Weather Flow Reduction

	2005	2014	Difference
Regional Precipitation (in) ¹	6.6	10.8	+62%
Annual Precipitation (in) ²	32.2	37.7	+17%
Metersheds Goals Exceeded	50	49	< 1%
<i>Peak Daily Flow³</i>			
Metropolitan Plant (St Paul)	449.6	420.9	-6%
Blue Lake (Shakopee)	92.8	70.9	-24%
<i>Peak Hourly Flow^{3,4}</i>			
Metropolitan Plant (St Paul)	633.4	559.9	-12%

¹ Average total rainfall over the region that occurred September 19- October 4, 2005 and June 1- June 19, 2014.

² Average total rainfall over the region that occurred in the 12 months preceding the event.

³ Flow in million gallons per day (mgd)

⁴ Peak Hourly Flow during events exceeded the capacity of Blue Lake Plant meters.

Ongoing I/I Program Changes

The Task Force reviewed two proposed modifications to the Ongoing I/I Program and concurred with recommended changes to the program schedule and I/I Goal calculation.

Schedule

For program year 2019 and beyond, the flow-monitoring period will change to be consistent with the period used for flow allocation to compute the municipal wastewater charges. Adjustments to key dates and deadlines are included in Table 4 below:

Table 4: Ongoing Program Schedule Changes

Procedure	2017 Program Date/Deadline	2018 Program Date/Deadline	2019 Program Date/Deadline
MCES sends I/I Goal to each Community.	June 30, 2015	June 30, 2016	Oct 31, 2016
MCES monitors flow volumes from each metershed and notifies each Community of flows great than 80% of I/I Goal.	July 1, 2015 – Jun 30, 2016	July 1, 2016 – Dec 31, 2016	2017 Calendar Year
MCES sends Work Plan assignments to each Community.	July 30, 2016	Mar 1, 2017	Mar 1, 2018
Community sends I/I Program Community Response Form or appeals to MCES.	Sep 30, 2015	Sep 30, 2018	Sep 30, 2018
MCES accepts Program Community Response Form for each Community.	Nov 30, 2015	Nov 30, 2018	Nov 30, 2018
Community completes mitigation work or chooses surcharge.	2017 – 2020 Calendar Years	2018 – 2021 Calendar Years	2019 – 2022 Calendar Years
Community sends Reduction Work Verification Form to MCES.	March 31, Annually	March 31, Annually	March 31, Annually

Peak Hour Factor and I/I Goal Calculation

The interceptor system and treatment facilities that comprise the MDS are designed to convey generated wastewater flow, including daily and seasonal variations and an acceptable level of I/I. The wastewater flow variations are accounted for in sewer design by the peak hour factor. A basis for the design includes an average residential, commercial, and industrial flow estimated at 100 gallons per capita per day. Regional data indicate that actual average flow is approximately 85 gallons per capita per day. To account for the lower regional average flow per capita, the design flow variation factors were adjusted upward (divided by 0.85), which reflects available capacity for I/I. The updated peak hour factors are included in Appendix A of the *2040 Water Resources Policy Plan*. The Task force recommended further evaluation of that the peak hour factors during the preparation of the *2050 Water Resources Policy Plan*.

Since the updated peaking factors account for water conservation, the Task Force recognized the need to revise the formula used to determine each metershed I/I Goal to eliminate a credit for water conservation. The I/I Goal is the maximum peak hourly flow each metershed may discharge to the regional wastewater system. The I/I Goal is calculated each program year based on metershed population growth, average flow data from the previous 10 years, and the peak hour factor. Exceedance of the I/I Goal peak flow results in a work plan assignment, expressed in dollars, which is estimated by MCES for communities to mitigate excessive I/I from the local collection system.

Private Property I/I Mitigation in the Region

Upstream of the regional and local systems, there is an estimated 7,500 miles of private service laterals connected to roughly one million private properties. As with the public infrastructure, private service laterals are susceptible to I/I and may require repair or replacement. Sumps pumps and drains are also point sources of clear water that enter the wastewater collection system. Based on information from the Water Environment Foundation, one sump pump can add up to 7,200 gallons of clear water into the wastewater collection system in 24 hours – the equivalent of 40 homes.

Characteristics of Buildings and Development

Table 5: Age of Structures in the Region

According to the 2016 County Parcel data sets received by the Council, the region contains roughly 400,000 structures built before 1970, of which roughly 300,000 were built before 1960. Increased infiltration is more likely in older infrastructure, especially private service laterals constructed from clay pipe. Nearly one-third of all structures connected to the MDS, and the associated private service laterals, are over 50 years old. The number of structures built before the start of each year are shown in Table 5.

Developed Before	Number of Structures
1960	293,000
1970	380,000
1980	483,000
1990	612,000
2000	732,000
2010	848,000
2016	917,000

Increased inflow during storm events can be directly associated with roof drains and foundation drains that are connected to local sewer mains. Subsoil drains are also a source for infiltration during and after rainfall events. The State Board of Health adopted the Minnesota Plumbing Code in 1933. The 1969 revision to the plumbing code included a provision that storm water shall not be drained into sewers intended for sanitary sewer. The revision required that roof drains discharge to a separate storm water or a combined sewer system. The subsequent 2015 revision to the plumbing code required that subsoil perimeter drains discharge to a storm drain, approved watercourse, or street curb or gutter. In some communities and for some property owners, efforts to separate stormwater from wastewater collection systems predated the rule change in 2015. Even though the plumbing code requires that stormwater from private property be discharged elsewhere, there may be instances in which roof drains, area drains, sump pumps, and other point sources are illicitly connected to local sewer mains.

Existing Policies and Statutes

The Task Force discussed several policies and statutes related to private property I/I, including:

- Minnesota Statute 471.342 gives authority to cities to establish an I/I prevention program and provide loans and grants to property owners to assist the owners in financing the cost of abating inflow and infiltration from their properties. Furthermore, cities are authorized to finance the program with federal, state, private, or city funds, including sanitary or storm sewer utility funds, fees, and charges.
- Minnesota Department of Labor and Industry Rules 7560.050 requires that after December 31, 2005, an operator of a sewage or water facility, at a minimum, shall locate that portion of the service lateral within a public right-of-way installed after that date up to the point where the service lateral first leaves the public right-of-way.
- Ownership of private sewer service laterals is generally defined by city ordinances in each community. In some communities, private property owners own and maintain the service lateral from the building connection point to the sanitary sewer service main. Other communities assign the ownership of the lateral from the building connection point to the right of way line. There does not appear to be a community in the region in which the entire service lateral is considered public property.

Existing Private Property Mitigation

The Task Force discussed existing private property I/I mitigation programs within the region. These included programs in Eagan, Golden Valley, Minneapolis, St. Anthony, Saint Paul, and West St. Paul. Each community developed a program based on evaluation of its collection system and intends to remove I/I sources including private service laterals, sump pumps, foundation drains, roof drains, and area drains.

The Task Force shared information about public outreach including flyers in utility bills, community newsletter stories, website content, public meetings, newspaper articles, press releases, appearances on community television programs, and meetings with real estate agents about point-of-sale programs. Emphasis on the environmental and long-term cost importance of the work was used in the public outreach programs to create buy-in from the public. Some cities also combined their I/I inspections with other municipal program such as water meter replacement. Members whose communities had implemented community outreach for private property I/I mitigation indicated it was successful, but recognized a continued objection from some property owners for a variety of reasons. Other problems encountered included homeowners reconnecting sump pumps after inspection.

Task Force members recognized the need for better public outreach, as well as enforcement strategies for private property I/I mitigation. Members also noted the frustration of not being able to resolve I/I solely with investment in the public system.

Task force members noted a number of potential challenges associated with private property I/I mitigation, including:

- **Existing Conditions** – A high rate of defective sewer laterals, including excessive tree root intrusion, cracked pipe, and drain tile connections.
- **Messaging and Public outreach** – Lack of public outreach connecting the relationship of excessive I/I to negative outcomes, such as sewer backups into private property or release of wastewater into rivers, lakes, and streams. Property owners may not recognize that they own their service laterals, let alone that they are responsible for maintaining them (out of sight, out of mind). Property owners who contribute to excessive I/I do not necessarily experience a direct impact or may not understand the impacts at a regional level.
- **Equity** – private property I/I mitigation programs need to be tailored to the conditions that exist in each community, therefore the approach will vary across the region, raising the question of fairness.
- **Staff Intensive** – Private property I/I mitigation programs are often staff intensive to administer, and require ongoing efforts to address recurrent risks, such as sump pump inspections.
- **Lack of consistent funding to assist property owners** – Securing adequate state funding to help private property owners with I/I mitigation activities is an ongoing effort. Consistent funding is important to help resolve the problem of private property I/I in communities across the metro area.
- **Opposition** – Objections to point-of-sale programs or others programs that require entry into a private property for inspection.
- **Measurement** – The impact of I/I mitigation efforts is generally realized over time. The measurement of I/I mitigation projects requires taking into account antecedent conditions at the time the wet weather event took place. Strategies to measure the results of for private property I/I mitigation have not been developed across the region.

Funding

Grant funding administered by MCES for private property I/I mitigation activities has been limited to a total of \$1.8 million over two funding cycles in the past. Eligible private property I/I mitigation activities included sewer lateral repair or replacement and/or disconnection of foundation drains. MCES administered the programs to assist private property owners, which included grants for a portion of the actual cost (up to a maximum grant of \$2,000) that was provided through communities to property owners.

Case Study

The Task Force received presentations and discussed materials related to private property I/I mitigation strategies and programs initiated in other regions and cities in the United States. A recent private property I/I mitigation program established in Milwaukee was a case study provided to the Task Force. The presentation was titled: "Milwaukee Municipal Sewage District (MMSD) PPII Program Story - Early Returns and Lessons Learned" and was presented by Brown & Caldwell. MMSD is a state-chartered, governmental agency providing regional wastewater conveyance, treatment, and disposal for 28 municipalities within a 411-square-mile planning area, located in five counties, with a service population of about 1 million residents. The MMSD private property I/I mitigation program presentation is included in Appendix D. A result of the Task Force discussions is a recommendation to conduct a demonstration project somewhere in the region.

Task Force Discussion

Given the challenges listed above, the Task Force discussed solutions to respond to specific challenges. Minutes from the Task Force meetings are included in Appendix E.

Topic: Policy to Establish a Private Property I/I Mitigation Program

Task Force members and MCES staff reviewed the following documents that cite requirements for a private property I/I mitigation program:

2040 Water Resources Policy Plan, adopted May 2015

All communities served by the regional wastewater system will include an I/I mitigation program in their comprehensive sewer plans, including a program to mitigate sources of I/I from private property

Local Planning Handbook, September 2015

The Metropolitan Land Planning Act requires that all incorporated cities, counties, and townships in the seven-county metropolitan region prepare a comprehensive plan and update that plan every ten years. MCES publishes the *Local Planning Handbook (Handbook)* to assist communities with meeting the requirements of the *Water Resources Policy Plan (Plan)*. The *Handbook* has established minimum requirements relative to private property I/I as part of the wastewater portion of the comprehensive plan update. Task Force members discussed the requirements of the *Plan*, *Handbook*, and the Waste Discharge Rules. They concluded that:

- The *Plan* clearly establishes the requirements for a private property I/I mitigation program.
- After reviewing the Waste Discharge Rules, Task Force members did not identify a need to revise the rules as they relate to I/I.
- A discussion should take place with MCES and local communities to further understand the minimum standards that will be required to be compliant with the *Handbook* as it relates to private property I/I mitigation. Task Force members recommended that this discussion take place in late 2016.

Topic: Financial Resources for Private Property I/I Mitigation

Private property owners, who are often unaware of their ownership of the service lateral, object to programs in which they are required to repair or replace the lateral. Many communities lack the financial resources to assist private property owners with repair costs.

Task Force members discussed the financial challenges associated with repair or replacement of sewer laterals and disconnection of foundation drains and sump pumps. Repair or replacement of sewer laterals typically costs around \$5,000 to \$7,000. However, in some situations, where the sewer lateral connects to the MCES interceptor system and is exceptionally deep, or when the service lateral is unusually long, costs of the repair can triple.

Reflecting on past private property grant programs, some Task Force members discussed the problems associated with a lack of consistent funding. Based on these discussion points, Task Force members made the following recommendations:

- Consider the provision of financial assistance through regional sources, such as a portion of the wastewater fee, to provide assistance to communities for private property I/I mitigation. See Minnesota Statute 471.342, which provides this authority to cities.
- Convene a work group consisting of community representatives, Metro Cities, and the League of Minnesota Cities to develop a program for use by communities that would allow property owners to assess the costs for replacement of sewer service laterals to property taxes. Investigate a funding model that would establish a source of revenue for future private property service lateral repairs.
- Support ongoing efforts by Metro Cities to seek private property I/I mitigation grants from the Clean Water Legacy Fund, and MCES staff should assist with the efforts of Metro Cities.
- The Task Force discussed setting aside a portion of the MWC on an annual basis that would be available for private property I/I mitigation. While members agreed to keep the idea on the list, some had reservations or were opposed to the idea. If this idea advances, design of the grant program would include input from local communities.

Topic: Technical Support for Private Property I/I Mitigation

The Task Force discussed ideas for technical support to help local communities develop private property I/I mitigation programs. The Task Force recommended that MCES:

- Develop a model ordinance for a private property sewer service lateral inspection program in conjunction with Metro Cities, the League of Minnesota Cities, and local communities. Model ordinances provide a reference point for communities, which can tailor the ordinance to fit their own circumstances.
- Develop a best practices toolkit for private property I/I inspection programs.
- Investigate the ability to develop master contracts held by MCES that could be used by communities for private property I/I inspections and service lateral repairs. Communities would have the option of using the inspection service on a fee basis. Community would be required to schedule the inspection and keep records of the inspection results.
- Provide technical assistance to communities on sub-metershed flow metering. These results will help in identifying strategy for private property I/I mitigation and public outreach.
- Develop a public outreach toolkit on the subject of private property I/I. The toolkit could be customized by the community for its own use and would include:
 - Why I/I is a public and environmental health, financial, and long-term capacity concern.
 - What property owners need to know to determine if their property has the potential for contributing to excessive I/I.
 - What options property owners have for repairing their sewer service lateral.

Task Force Recommendations

The Task Force recommended that MCES continue to work with local communities to:

1. Continue the regional planning policy of balancing regional standards with the needs of local communities to tailor programs to their individual circumstances.
2. Develop a robust public outreach program for I/I and wastewater system maintenance that would include target audiences such as elected officials, the real estate community, public works professionals, and the public. Topics would include proper maintenance of wastewater collection systems, ownership of sanitary sewer service laterals, and impacts of excessive I/I during wet weather events. Public information toolkits would be developed that could be customized for use by local communities.
3. Pursue consistent funding sources for public and private I/I projects.
 - a. Continue to advocate on behalf of metropolitan communities for State Bond Fund allocation for I/I mitigation in the local collection system.
 - b. Assist Metro Cities in advocating for funds from Clean Water Legacy or other state sources for private property I/I mitigation.
 - c. Consider the provision of financial assistance through regional sources, such as a portion of the wastewater fee, to provide assistance to communities for private property I/I mitigation
4. Develop a model ordinance for a private property sewer service lateral inspection program in conjunction with the League of Minnesota Cities, Metro Cities, and local communities.
5. Develop best practices for a private property I/I inspection program in conjunction with representatives from local communities and Metro Cities. The best practices toolkit would include inspection standards and training for community personnel using methods such as record keeping and performance standards for repair and rehabilitation of private service laterals.
6. Investigate the ability to develop master contracts held by MCES that could be used by communities for private property I/I inspections and service lateral repairs. Communities would have the option of using the inspection service on a fee basis. Community would be required to schedule the inspection and keep records of the inspection results.
7. Provide technical assistance to communities on sub-metershed flow metering to better quantify the impact of private property I/I mitigation. Design and implement a private property I/I mitigation demonstration project that would provide additional opportunity for measurement of impact on wastewater base and peak flows. These results will help in identifying strategy for private property I/I mitigation and public outreach.
8. Review the exceedance peak hour factors used to develop I/I goals currently in place at the time that the *2050 Water Resources Policy Plan* is prepared.

The Task Force approved this Report on October 14, 2016.

Appendix A

Definitions and References

Appendix A: Abbreviations, Definitions, and References

ABBREVIATIONS & DEFINITIONS

CCTV: Closed circuit television – a technique used to inspect the inside of pipes

CPI-U: Consumer Price Index—Urban as published by the U.S. Department of Labor (see web site: <http://www.bls.gov/cpi/>).

Demand Charge: A demand charge is the amount that MCES may charge a community for the cost of excess capacity needed in the MDS for those communities that have not met their inflow and infiltration goals(s), if the community has not been implementing an effective I/I reduction program in the determination of the Council, or if regulations and/or regulatory permits require MCES action to ensure regulatory compliance. The charge is not a penalty; it will include the cost of wastewater storage facilities and/or other improvements necessary to avoid overloading MCES conveyance and treatment facilities, plus the appropriate service availability charges for use of MCES conveyance and treatment facilities. See *Water Resources Management Policy Plan*, page 28.

Exceedance peak hour flow (PHF): A meter's peak hour flow that exceeds the metershed's I/I goal, adjusted, if applicable, for I/I into MCES interceptors.

Exceedance Rate: The charge per mgd of excessive I/I. MCES initially set this rate as \$350,000 per million gallons per day (mgd) for the 2007 program year (see p. 11 of *Preliminary Inflow/Infiltration Surcharge Program*, October 2005). MCES updates the exceedance rate annually, adjusting for inflation as measured by the CPI-U. MCES reserves the right to increase the rate beyond inflation if MCES is subject to regulatory costs related to I/I. The 2018 program year rate is \$421,000/mgd of exceedance.

Excess I/I: I/I that results in wet weather flows that exceed MCES' established I/I goal for the metershed, adjusted, where appropriate, for I/I into MCES interceptors.

Excessive I/I Event: A wet weather time period when excessive I/I occurs within the MDS.

gpm: Gallons per minute

I/I: Inflow and infiltration is that component of sanitary sewage flow that originates from clear water connections, e.g., sump pumps and foundation drains, stormwater entering manholes and groundwater entering through pipe joints and cracks. It is water that would normally not require any type of treatment. However, once it co-mingles with sanitary wastewater it cannot be separated, and must be treated along with the sanitary wastewater.

I/I Goal: The I/I goal is the maximum allowed peak hourly flow limit for each metershed; product of the previous ten-year average daily flow and the standard peaking factor adopted by the Metropolitan Council.

IITC: The Inflow/Infiltration Total Cost associated with an exceedance event.

I/I Tool Box: An MCES guide book of tools and resources to assist communities planning and implementing inflow and infiltration reduction programs. (See the Council website:

[http://www.metrocouncil.org/Wastewater-Water/Funding-Finance/Rates-Charges/MCES-Inflow-and-Infiltration-\(I-I\)-Program/I-I-Tool-Box-References.aspx](http://www.metrocouncil.org/Wastewater-Water/Funding-Finance/Rates-Charges/MCES-Inflow-and-Infiltration-(I-I)-Program/I-I-Tool-Box-References.aspx)

Infiltration: The seepage of groundwater into sewer pipes through cracks or joints in the pipes.

Inflow: Inflow is typically flow from a single point, such as discharge from sump pumps and foundation drains, or storm water entering openings in the sewer access covers.

Look-back Period: Two year time period for I/I reduction work eligibility as defined in Appendix D: Community Response to Maximum Excessive I/I Notification, Table D-3. Work performed in look-back period cannot be credited to previous exceedances as mitigation work.

MDS: Metropolitan Disposal System; wastewater facilities owned and operated by the Metropolitan Council.

mgd: Million gallons per day

Max Excessive I/I Peak Flow Event: An event in which the rate of flow measured for a metershed exceeds the metershed's I/I goal and also is greater than previous exceedances measured during the program year.

Metershed: The area tributary to an MCES flow meter. Some communities have multiple metersheds.

MWC: Municipal Wastewater Charge

SAC: Sewer Availability Charge is a charge to Customer Communities for the reserved capacity costs of the Metropolitan Disposal System. Allocating future costs is authorized by Minnesota Statutes section 473.517 subdivision 3. This fee is assessed based upon the estimated maximum potential daily wastewater flow usage at individual properties and collected at the time of building permit.

SAC Shift: Pursuant to M.S. 473.517 subd 3(b), some of the SAC requirement may need to be temporarily 'shifted' from SAC to the municipal wastewater charges. This authority will sunset in 2015.

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Surcharge: A dollar amount billed to a community equal to the IITC.

WWTP: Wastewater Treatment Plant

REFERENCES

Demand Charge Task Force Report

http://www.metrocouncil.org/Wastewater-Water/Publications-And-Resources/DemandChargeTaskForce_Final-Report_September-2010.aspx

I/I Toolbox

[http://www.metrocouncil.org/Wastewater-Water/Funding-Finance/Rates-Charges/MCES-Inflow-and-Infiltration-\(I-I\)-Program/I-I-Tool-Box-References.aspx](http://www.metrocouncil.org/Wastewater-Water/Funding-Finance/Rates-Charges/MCES-Inflow-and-Infiltration-(I-I)-Program/I-I-Tool-Box-References.aspx)

Water Resources Management Policy Plan

<http://www.metrocouncil.org/Wastewater-Water/Planning/Water-Resources-Management-Policy-Plan.aspx>

Appendix B

Previous Task Force Reports

I/I Task Force Report – May 2004

Demand Charge Task Force Report – September 2010

Please contact i.i@metc.state.mn.us if you would like a copy of an earlier task force report.

Appendix C

Program Year 2018 Ongoing I/I Program Procedure Manual



***Program Year 2018
Ongoing Inflow & Infiltration Program
Procedure Manual***





Metropolitan Council Members

Chair:

Adam Duininck

Council Members:

Katie Rodriguez	District 1	Edward Reynoso	District 9
Lona Schreiber	District 2	Marie McCarthy	District 10
Jennifer Munt	District 3	Sandy Rummel	District 11
Deb Barber	District 4	Harry Melander	District 12
Steve Elkins	District 5	Richard Kramer	District 13
Gail Dorfman	District 6	Jon Commers	District 14
Gary Cunningham	District 7	Steven T. Chávez	District 15
Cara Letofsky	District 8	Wendy Wulff	District 16

Council Regional Administrator

Wes Kooistra

General Manager, Environmental Services Division

Leisa Thompson

The mission of the Metropolitan Council is to develop, in cooperation with local communities, a comprehensive regional planning framework, focusing on wastewater, transportation, parks and aviation systems, that guide the efficient growth of the metropolitan area. The Council operates wastewater and transit services and administers housing and other grant programs.

General Phone	651-602-1000
TTY	651-291-0904
Metro Info Line	651-602-1140
Council Web site	www.metrocouncil.org

Revised 06/20/16

**Ongoing Infiltration/Inflow Reduction Program
2018 Program Year Procedure Manual
Table of Contents**

Metropolitan Council Members

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3 Program Roles and Responsibilities	3
4 Procedures	4

Appendices

- A: Abbreviations, Definitions, and References
- B: I/I Goals
- C: Excessive I/I Determination, Notification, and Estimate of
 I/I Mitigation Cost
- D: Community Response to Maximum Excessive I/I Notification
- E: Program Cap
- F: Appeal Processes

Forms

- 2018 I/I Program Year Community Response Form
- I/I Mitigation Work Documentation Form (Document will be available to community January 1st of monitoring year.)

1. Contact List

Please direct questions and other requests for information to the following:

For general I/I information, flow data determinations, and flow events information:

Environmental Services – Technical Services, Community Programs

	E-Mail	Phone
Jeannine Clancy Manager, Community Programs	jeannine.clancy@metc.state.mn.us	(651) 602-1210
Michael Nguyen Engineer	michael.nguyen@metc.state.mn.us	(651) 602-1503

For financial information:

Environmental Services – Finance & Revenue

	E-Mail	Phone
Ned Smith Director, Finance & Revenue	ned.smith@metc.state.mn.us	(651) 602-1162
John Atkins MCES Budget Manager	john.atkins@metc.state.mn.us	(651) 602-1020
Dan Schueller Rates & Financial Analyst	dan.schueller@metc.state.mn.us	(651) 602-1624

For meters and interceptor system information:

Environmental Services, Operations, Interceptor Services

	E-Mail	Phone
Pat Payne Manager, Interceptor Maintenance	pat.payne@metc.state.mn.us	(651) 602-4319
Tim Keegan Business Unit Manager	timothy.keegan@metc.state.mn.us	(651) 602-4024

2. Background and Authority

The Metropolitan Council (Council) appointed a task force that met in 2003/2004 to address the impacts of excess infiltration/inflow (I/I) on the regional sanitary sewer system by developing recommendations for an I/I reduction program. The I/I Task Force estimated that the cost to store, convey, and treat excess I/I was in the \$900 million range while the cost for source removal was in the \$150 million range. The Task Force recommended a program to mitigate excess I/I rather than increase system capacity.

The Council's existing I/I program focuses on source removal. This approach was affirmed by the Council's Demand Charge Task Force which met in 2009/2010 and reviewed goals for the ongoing I/I program, including a possible demand charge. This Task Force recommended that the Council:

- (a) Implement an ongoing program similar to the existing program rather than implement a demand charge.
- (b) Use its discretion to institute a demand charge in cases where a community is not meeting its I/I goal or if necessitated to ensure regulatory compliance. The Task Force's recommendations were incorporated into Council policy. This procedures manual reflects that policy.

I/I program procedures are adopted by the Council pursuant to Minnesota Statutes (M.S.), chapter 473, including section 473.145-146 and section 473.858, and the MCES' Waste Discharge Rules, and are declared to be necessary for the efficient, economic, and safe operation of the regional sanitary sewer system and for protection of the health, safety, and general welfare of the public in the metropolitan region. MCES' policy regarding I/I is contained in the *2040 Water Resources Policy*, adopted by the Metropolitan Council in May, 2015 and amended to reflect the Demand Charge Task Force recommendations. I/I policies are:

- The Council will not provide additional capacity within its interceptor system to serve excessive inflow and infiltration.
- The Council will establish inflow and infiltration goals for all communities discharging wastewater to the regional wastewater system. Communities that have excessive inflow and infiltration in their sanitary sewer systems will be required to eliminate the excessive inflow and infiltration within a reasonable time period.

The Council reserves the right to modify the Ongoing I/I Reduction Program in response to new regulations or changes in existing regulations imposed on the Council by regulatory agencies.

3. Program Roles and Responsibilities

MCES will:

1. Establish metershed I/I goals.
2. On a monthly basis, correspond with individual communities regarding:
 - a. Exceedance events that occur within their communities.
 - b. Meter response when the peak flow is within 80% of the metershed's I/I goal
3. Work to identify and eliminate excess I/I in MCES' interceptors.
4. Provide technical assistance to communities by:
 - a. Maintaining a I/I Tool Box (at www.metrocouncil.org) that explains the Council's I/I program and information resources for communities.
 - b. Providing general information on a case-by-case basis to communities regarding I/I, and strategies to mitigate I/I.
5. Upon request, meet with communities to explain the program or to review a community's I/I work plan and implementation schedule for eligibility.
6. Ensure timely communications with communities.
7. Implement, manage, and assess the program.

Local communities will:

1. Continue maintenance programs for local sanitary systems.
2. Create I/I mitigation plans for local systems. Work cooperatively with nearby communities to develop an I/I mitigation plan for flow entering the community from another community or from public property not controlled by the community.
3. Work with MCES to identify any MCES system problems contributing to I/I peak flows within their geographic area.
4. Manage local I/I reduction programs to meet the community's I/I goals.
5. Be responsible for eliminating excess I/I. MCES assumes no liability for the effectiveness of the methods or approach selected by the community for I/I mitigation. Moreover, MCES makes no representation that the work plan assignment is sufficient to solve the community's excess I/I problem(s).

NOTE: I/I mitigation plans are required of all communities as part of each community's comprehensive sewer plan regardless of whether the community has previously experienced an I/I exceedance.

4. Procedures

Program procedures are summarized in Table 4-1 and apply to all communities whether or not they previously exceeded I/I goals. See the listed appendices for additional information. Key dates and time periods for the 2018 Program Year are shown in Table 4-2.

Table 4-1 Procedures

Item	Procedures	Additional Information
I/I Goals	• Distributed in June 2016 to communities on an annual basis prior to the beginning of the monitoring period in July 2016 • Determined on metershed basis • Expressed as allowable peak hour flow (PHF) • Allowable PHF = (10-year rolling average daily flow for metershed + adjustment for growth + allowance for water conservation and I/I mitigation) x (MCES standard peaking factor)	Appendix B
Excessive I/I Determination, Notification, and Estimate of Mitigation Cost	• Excessive I/I: the measured maximum peak flow, in mgd, above a metershed's I/I goal adjusted, where appropriate, for I/I into MCES interceptors • MCES sends monthly letter to communities that exceed I/I goal • At end of monitoring period, (December 31, 2016) MCES estimates exceeding communities' I/I mitigation cost based on \$421,000/mgd of maximum exceedance • MCES makes no representation that the estimate or any correspondence relating thereto is sufficient to solve a community's excess I/I problem	Appendix C
Community Response to Maximum Excessive I/I Notification	• Community options: ○ Pay mitigation amount directly to MCES as a surcharge or ○ Perform I/I mitigation work (subject to eligibility) to value of estimated mitigation cost • If community chooses surcharge: ○ Community indicates "Chooses Surcharge" on <i>2018 I/I Program Community Response Form</i> (see Appendix D) and submits form	Appendix D

Item	Procedures	Additional Information
	○ MCES annualizes the estimated I/I mitigation cost over the 4-year period and bills proportionately on a monthly basis ● If community chooses to perform I/I mitigation work: ○ Community indicates “Chooses Mitigation Work” on <i>2018 I/I Program Community Response Form</i> (see Appendix D), completes remainder of form, and submits it ○ MCES reviews and responds to community re: proposed work eligibility (see eligibility requirements in Appendix D) ○ Community has up to 4 years to complete work; and the community may apply for credit under the look-back period (see Appendix D) ○ On an annual basis, during the 4-year implementation period (or until the estimated I/I mitigation cost value is reached), community submits <i>I/I Mitigation Work Verification Form</i> (see Appendix D) showing actual costs for I/I mitigation activities ● If, during 4-year I/I surcharge or mitigation period, another exceedance greater than the initial exceedance occurs: ○ MCES estimates new mitigation cost based on the incremental exceedance ○ New, incremental mitigation cost is added to the previous estimated cost ○ Community again chooses surcharge or mitigation work for value of new, incremental cost ● At end of 4-year period, program “resets”: exceeding I/I goal results in new excessive I/I notification, estimate of maximum exceedance mitigation cost, and community response	
Program Cap	● Previously capped communities: ○ Continue to implement their previously estimated I/I mitigation work as needed in the 2018 Ongoing Program year	Appendix E

Item	Procedures	Additional Information
	○ If capped community with unfinished mitigation work exceeds its I/I goal in 2018 monitoring period and exceedance is above previous maximum event then new exceedance will be incremental ○ New mitigation cost will be calculated on the incremental peak; ○ Ongoing Program requirements will apply to incremental peak ● Ongoing Program: ○ If community's annualized estimated I/I mitigation cost exceeds 25% of its annual municipal wastewater charge then community may request program cap ○ Community's annualized mitigation cost capped at 25% increase in annual wastewater charges; cap does not change the total mitigation cost, but rather defers some cost to later years	
Appeal	● Appeal process recognizes unusual or unique conditions on a case-by-case basis ● Community may appeal: ○ Standard allowance for water conservation and I/I mitigation ○ Peak flow associated with an exceedance ○ Estimated I/I mitigation work ○ Eligibility of proposed I/I mitigation activities ○ Mitigation time period in cases where significant I/I source investigations have not successfully located I/I sources ● During appeal process, MCES will treat disputed item based on community's claim; upon completion of appeal, MCES will reconcile disputed item to reflect appeal decision	Appendix F

Table 4-2 Ongoing I/I 2018 Program Year – Key Dates and Time Periods

Item	Dates
MCES sends community I/I reduction goals	No later than June 30, 2016
MCES flow monitoring	July 1, 2016 – December 31, 2016
MCES sends notification of exceedance	Month following exceedance
MCES sends notification of max. peak event and I/I workplan assignment cost for 2018 program year	March 1, 2017
Surcharge billing or I/I mitigation work implementation period	January 1, 2018 – December 31, 2021
Look back period for I/I reduction work (if requested by community)	January 1, 2016 – December 31, 2017 See Table D-3
Community sends <i>2018 I/I Program Community Response Form</i> (and any supporting documentation)	By September 30, 2017
MCES completes review and acknowledge to community's <i>2018 I/I Program Community Response Form</i>	By December 31, 2017
MCES bills a surcharge in response to: • a community that exceeded but did not notify MCES of its response • a community that exceeded and requested a surcharge	By January 31, 2018
Community sends <i>I/I Reduction Work Verification Form</i> (and any supporting documentation)	By March 31, 2019 and by March 31 of each successive year in the 4-year implementation period until the mitigation cost value is reached

Appendix A: Abbreviations, Definitions, and References

ABBREVIATIONS & DEFINITIONS

CCTV: Closed circuit television – a technique used to inspect the inside of pipes

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IITC: The Inflow/Infiltration Total Cost associated with an exceedance event.

I/I Tool Box: An MCES guide book of tools and resources to assist communities planning and implementing inflow and infiltration reduction programs. (See the Council website:

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REFERENCES

Demand Charge Task Force Report

http://www.metrocouncil.org/Wastewater-Water/Publications-And-Resources/DemandChargeTaskForce_Final-Report_September-2010.aspx

I/I Toolbox

[http://www.metrocouncil.org/Wastewater-Water/Funding-Finance/Rates-Charges/MCES-Inflow-and-Infiltration-\(I-I\)-Program/I-I-Tool-Box-References.aspx](http://www.metrocouncil.org/Wastewater-Water/Funding-Finance/Rates-Charges/MCES-Inflow-and-Infiltration-(I-I)-Program/I-I-Tool-Box-References.aspx)

Water Resources Management Policy Plan

<http://www.metrocouncil.org/Wastewater-Water/Planning/2040-Water-Resources-Policy-Plan.aspx>

Appendix B: I/I Goals

- Goals determined on a metershed basis
- Expressed as an allowable PHF
- Allowable PHF = (10-year rolling average daily flow for metershed + adjustment for growth + allowance for water conservation and I/I mitigation) x (MCES standard peaking factor)
- 10-year rolling average daily flow calculation:
 - Previously, the I/I Program used a metershed's 3-year rolling ADF to determine the base flow for I/I goals. The Ongoing Program uses a 10-year rolling ADF to normalize the effects of precipitation (drought and wet periods).
 - 2018 Program's 10-year rolling ADFs were calculated using flows from 2005 to 2014. Where flow data were not available for this time period or other anomalies existed adjustments were made on a case-by-case basis.
- Adjustment for growth: wastewater related to 50% of metershed's growth over 10-year was added to the 10-year ADF to account for growth during the period
- Allowance for water conservation and I/I mitigation: standard allowance of 10% of the 10-year ADF was added to the 10-year ADF to account for water conservation and I/I mitigation
- MCES' standard peaking factors define an allowable, non-excessive level of I/I and are shown in Table B-1.

Table B-1 MCES Standard Peaking Factors

Average Flow (mgd)	Peaking Factor		Average Flow (mgd)	Peaking Factor
0.00 - 0.11	4.0		1.90 - 2.29	2.8
0.12 - 0.18	3.9		2.30 - 2.89	2.7
0.19 - 0.23	3.8		2.90 - 3.49	2.6
0.24 - 0.29	3.7		3.50 - 4.19	2.5
0.30 - 0.39	3.6		4.20 - 5.09	2.4
0.40 - 0.49	3.5		5.10 - 6.39	2.3
0.50 - 0.64	3.4		6.40 - 7.99	2.2
0.65 - 0.79	3.3		8.00 - 10.39	2.1
0.80 - 0.99	3.2		10.4 - 13.49	2.0
1.00 - 1.19	3.1		13.5 - 17.99	1.9
1.20 - 1.49	3.0		18.0 - 29.99	1.8
1.50 - 1.89	2.9		over 30.00	1.7

Appendix C: Excessive I/I Determination, Notification, and Estimate of I/I Mitigation Cost

I/I into MCES Interceptors

- Where applicable, measured PHF is adjusted by subtracting an estimate of I/I into MCES interceptors in metershed
- First 30% of an exceedance PHF: entirely community's responsibility
- Remaining 70%: split between community and MCES as shown in the example in Table C-1
- Estimated I/I mitigation cost calculated on the community-related I/I

Table C-1 Example Calculation of I/I into MCES Interceptors

Community Sewers in Metershed, in.dia-mi	MCES Interceptor in Metershed, in.dia-mi	Exceedance PHF, mgd	Community I/I, mgd	MCES Interceptor I/I, mgd
4,000	400	5.00	$[0.3 \times 5.00 \text{ mgd}] + [(0.7 \times 5.00 \text{ mgd}) \times (4,000/4,400)] = 4.68 \text{ mgd}$	$(0.7 \times 5.00 \text{ mgd}) \times (400/4,400) = 0.32 \text{ mgd}$

Excessive I/I Determination & Notification

- Excessive I/I value is the maximum peak flow for an hour even though the unit is expressed as mgd
- MCES sends monthly letter to communities that exceed or reaches 80% of I/I goal
- Letter includes: date of the exceedance and flow chart showing the peak flow in relationship to the I/I reduction goal for the community's metershed.
- Community should review the flow data and determine if the peak event represents a new maximum exceedance flow for the community. If it's a new maximum peak, the community can either accept the exceedance event as described, understanding it will be used to determine a new estimate of I/I mitigation cost, or it can appeal the exceedance flow.

Estimated I/I Mitigation Cost of Maximum Exceedance in Monitoring Period

- Estimated I/I mitigation unit cost for 2018: \$421,000/mgd of exceedance.
- MCES updates the unit cost annually, adjusting for inflation as measured by Consumer Price Index-Urban
- Using Table C-1 example and assuming exceedance is maximum for monitoring period, community's estimated I/I mitigation cost is:
 $(4.68 \text{ mgd}) \times (\$421,000/\text{mgd}) = \$1,970,280$

Appendix D: Community Response to Maximum Excessive I/I Notification

- In response to maximum excessive I/I notification, community has choice of surcharge or mitigation as described in Table D-1
- I/I mitigation work must meet requirements in Table D-2
- Look-back period: Communities may request that work performed during a defined “look-back period” be counted as mitigation work (subject to eligibility requirements)
 - Table D-3 defines the 2018 Program year look-back period
 - Work performed in a look-back period cannot be credited to previous exceedances
 - MCES encourages communities to submit I/I mitigation work documentation annually to receive feedback about whether I/I reduction work meets eligibility requirements

Table D-1 Surcharge and Mitigation Options

Option	Description
Surcharge	In response to maximum excessive I/I notification a community chooses to pay the estimated I/I mitigation cost directly as a surcharge: • Community indicates “Chooses Surcharge” on <i>2018 I/I Program Community Response Form</i> (see below) and submits form • MCES annualizes the estimated I/I mitigation cost over the 4-year period and bills proportionately on a monthly basis
Credit	In response to excessive I/I notification a community chooses to perform I/I mitigation work: • Community indicates “Chooses Mitigation Work” on <i>2018 I/I Program Community Response Form</i> (see below), completes remainder of form, and submits it • MCES reviews and responds to community re: proposed work eligibility (see eligibility requirements below) • Community has up to 4 years to complete work • Annually in 4-year implementation period (or until the estimated I/I mitigation cost value is reached), community submits <i>I/I Mitigation Work Documentation Form</i> (see below) showing actual costs for I/I mitigation activities

Table D-2 I/I Reduction Work Eligibility

Type of Work	Eligible Amount
1. I/I Study a. Temporary flow monitoring b. Field investigation for inflow sources c. CCTV inspection d. System modeling e. System analysis and work prioritization f. Cost estimating of reduction program g. New Supervisory Control And Data Acquisition (SCADA) system. For use in data analysis and investigation of I/I	Yes; full cost up to 20% of total estimated I/I reduction work eligible without pre-approval; costs above 20% require pre-approval.
2. Public Facility Improvements a. Eliminate storm sewer cross connections b. Eliminate yard drains and drain tile connections c. Replace maintenance hole (MH) covers that have drain holes with sealed covers d. Install watertight MH covers in areas vulnerable to high water levels e. Provide chimney seals and MH sealing f. Raise MH in areas where surface water ponds g. Move MHs out of wetlands; realign sewer h. Place drain tile behind curbs to provide a discharge point <u>dedicated</u> for building sumps, foundation drains, and rain leaders	Yes; Full
3. Public Facility Improvements a. Pipe lining b. Line replacement c. Installation of new storm sewers that convey redirected flow from building sumps, foundation drains, and rain leaders <u>in addition to</u> other surface water d. Drainage improvements that eliminate indirect inflow sources	a. and b. Yes; partial (50%); see note 1 below c. Yes; 50% d. Yes; 10% All costs a. thru d. must be pre-approved
4. Private Property Improvements a. Inspection costs for looking for sump pumps, drain tile, yard drains and rain leaders connected to the sanitary sewer b. TV inspection of service laterals c. Disconnect sump pumps, drain tile, area drains, and rain leaders from the sanitary sewer system d. Repair or replace broken service laterals e. 25% credit of private property work subtotal may be added to private property work improvements in recognition of staff time (see I/I Program Year Community Response Form, Part B)	Yes; Full at reasonable, actual costs or standard costs per note 2, below.
5. Public Staff Costs	Yes; Full for reasonable, verifiable, direct costs solely related to work, including engineering services. No administrative costs. a. Public staff, municipal b. Public staff, non-municipal c. Engineering services

Notes:

Allowed if the work is identified in the communities' annual I/I reduction plan and data support the expenditures by clearly indicating a peak rainfall response (examples of data include CCTV inspection reports or temporary flow monitoring (ideally during storm events)). Standard costs: \$150 per dwelling for sump pump disconnections; \$3,000 per building for foundation drain disconnections; \$100 per single family dwelling for rain leader disconnections; \$3,000 per commercial dwelling for rain leader disconnections; \$5,000 per repair for service lateral repairs).

Table D-3 2018 Program Year Look-back Period

Monitoring Period during which Exceedance Event Occurs	Exceedance Billing Year	Look-Back Period
July 1, 2016 – Dec. 31, 2016	Jan. 1, 2018 – Dec. 31, 2018	January 1, 2016 – December 31, 2017

Appendix E: Program Cap

- Previously capped communities:
 - Continue to implement their previously estimated I/I mitigation work as needed in the 2018 Ongoing Program year.
 - If capped community with unfinished mitigation work exceeds its I/I goal in 2017 monitoring period and exceedance is above previous maximum event then new exceedance will be incremental
 - New mitigation cost will be calculated on the incremental peak; Ongoing Program requirements will apply to incremental peak
 - Community may request extension of incremental peak's mitigation period via an Ongoing Program Cap (see below)
 - Upon completion of previous phase cap and any incremental I/I mitigation work, program resets: I/I mitigation work on next exceedance, if any, determined on full amount of exceedance
- Ongoing Program:
 - If community's annualized estimated I/I mitigation cost exceeds 25% of its annual adjusted municipal wastewater charge (MWC) then community may request program cap
 - Adjusted MWC: community's MWC adjusted to reflect any amount of annual SAC transfer shifted to MWC as permitted by legislation (473.517 subd.3b).
 - Community's annualized mitigation cost capped at 25% increase in annual wastewater charges; cap does not change the total mitigation cost, but defers some cost to later years
 - See Table E-1 for example

Table E-1 Ongoing Program Cap Examples

Conditions: Full exceedance in 2015, incremental exceedance in 2017; cap = 25%

Measurement Period (period is mid-year to mid-year)	Exceedance Event	Total I/I Reduction Work Required, \$	Bill Year	Estimate of Annual I/I Reduction Work Required, \$	Annual Municipal Wastewater Charge with Annual 3% Inflation*, \$	Annual I/I Reduction Work Required, as Limited by Cap, \$	Impact of Cap, \$	Cumulative Deferral, \$
Jan. – June, 2013			2014		1,190,000			
2013-2014			2015		1,230,000			
2014-2015			2016		1,270,000			
July, 2015- June, 2016	x	1,500,000	2017	375,000	1,310,000	327,500	(47,500)	47,500
July – Dec. 2016			2018	375,000	1,350,000	337,500	(37,500)	85,000
Jan.- Dec. 2017	x	250,000	2019	437,500	1,390,000	347,500	(90,000)	175,000
2018			2020	437,500	1,430,000	357,500	(80,000)	255,000
2019			2021	62,500	1,470,000	317,500	255,000	0
2020			2022	62,500	1,510,000	62,500	0	0
2021			2023	0	1,560,000		0	0
2022			2024	0	1,610,000		0	0
2023			2025	0	1,660,000		0	0
2024			2026	0	1,710,000		0	0
2025			2027	0	1,760,000		0	0
2026			2028	0	1,810,000		0	0
Total		1,750,000		1,750,000		1,750,000		

* Municipal Wastewater Charge (MWC) will be reduced to exclude any SAC shift which increases MWC in that billing year.

Appendix F: Appeal Processes

Item to be Appealed	Timeframe & Method for Community Appeal	Timeframe for MCES Response	Other Appeal Requirements
Allowance for water conservation and previous I/I mitigation	Written letter 60 days from receipt of I/I goal notification	Written letter 60 days from receipt of community's appeal	Documentation signed by licensed PE detailing technical basis for appeal
Peak flow from an exceedance event	Written letter 60 days from receipt of exceedance notification letter	Written letter 60 days from receipt of community's appeal	Community's appeal letter must document: (1) Excessive I/I being out of community's control, or (2) Excessive I/I being caused by extenuating circumstances
Estimated I/I mitigation cost	Written letter 60 days from receipt of I/I mitigation cost letter	Written letter by December 31, 2017	Community's appeal letter must justify appeal based on: (1) I/I reduction activities are underway in excess of the amount required (2) The value of the I/I reduction activities is more than necessary (3) The value of the I/I reduction activities exceeds 25% of the community's municipal wastewater charge
Eligibility of proposed I/I reduction activities	Written letter 60 days from receipt of eligibility determination letter	Written letter 60 days from receipt of community's appeal	Community's appeal letter must contain detailed supporting information such as CCTV inspection reports or temporary flow monitoring (ideally during storm events)
Extension or deferral of the I/I mitigation period for a defined period of time	Written letter 60 days from receipt of I/I mitigation cost letter	Written letter by December 31, 2017	In its appeal letter, community must submit a report by a licensed PE documenting: • What steps were taken to locate I/I source • Inability to locate I/I source • Proposed extension or deferral time period and rationale for time period • What steps will be taken to locate source

2018 I/I Program Year Community Response Form

This form is to be completed by communities that received an exceedance notification for Program year 2017. If a community chooses to be billed a surcharge, it must complete Part A. If a community chooses to perform mitigation work, it must complete Parts A and B. Send completed form and any supporting documentation to:

Mail: Michael Nguyen
Engineer, Technical Services
390 N. Robert Street
St. Paul, MN 55101

Fax:
Attn: Engineering Services
(651) 602-1030

Email: michael.nguyen@metc.state.mn.us

Part A: ☐ Community chooses I/I Surcharge

☐ Community chooses I/I Mitigation Work

Community Name: _____

Mailing Address: _____

Part B: 2018 I/I Mitigation Work Plan Value: \$ _____

1. **Public Facility Work:** Attach detailed description of the 2018 I/I reduction work. Include work completed in 2016 & 2016 look back period. Itemize type of work to be completed in 2018 on public sanitary sewer system and estimated or actual costs. MCES may request additional documentation to verify actual or planned expenditures. Include the percent of each project that is related to I/I mitigation.

Summary of Costs (attach additional pages as needed): _____

Public Facility SUBTOTAL (B1) = \$ _____

2. **Private Property Work:** Attach detailed description of community's inspection program for broken service laterals and illegal connections of sump pumps or passive drain tile(s). Complete number & value of work as indicated.

_____ **Sump pump disconnections:** \$150 per dwelling = \$ _____

_____ **Foundation drain disconnections:** \$3,000 per building = \$ _____

_____ **Rain leader disconnections:** \$100 per single family dwelling = \$ _____

_____ **Rain leader disconnections:** \$3,000 per commercial dwelling = \$ _____

_____ **Service lateral repairs:** \$5,000 per repair = \$ _____

_____ **Other:** (Describe in designated space below) = \$ _____

Private Property SUBTOTAL (B2,) = \$ _____

_____ **Allowance for staff time allotted for private property I/I mitigation coordination:**
(0.25 x the subtotal proposed for private property mitigation) **(B2₂)** = \$ _____

Describe Other Work: _____

TOTAL proposed for 2018: \$ _____
(B1) + (B2₁) + (B2₂)

TOTAL Proposed Look back (2015- 2016): \$ _____
I/I work done between 1/1/15 and 12/31/16

Name of City or Township Official / Title:

Signature of City or Township Official:

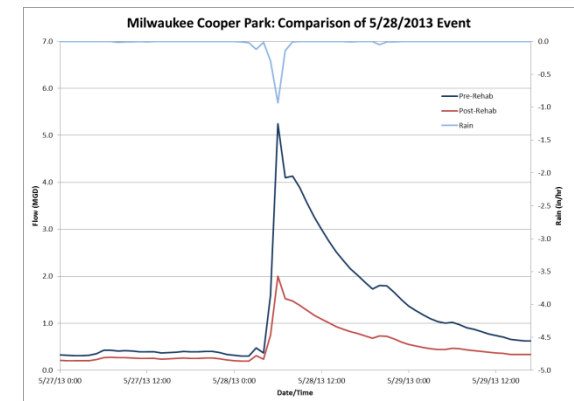
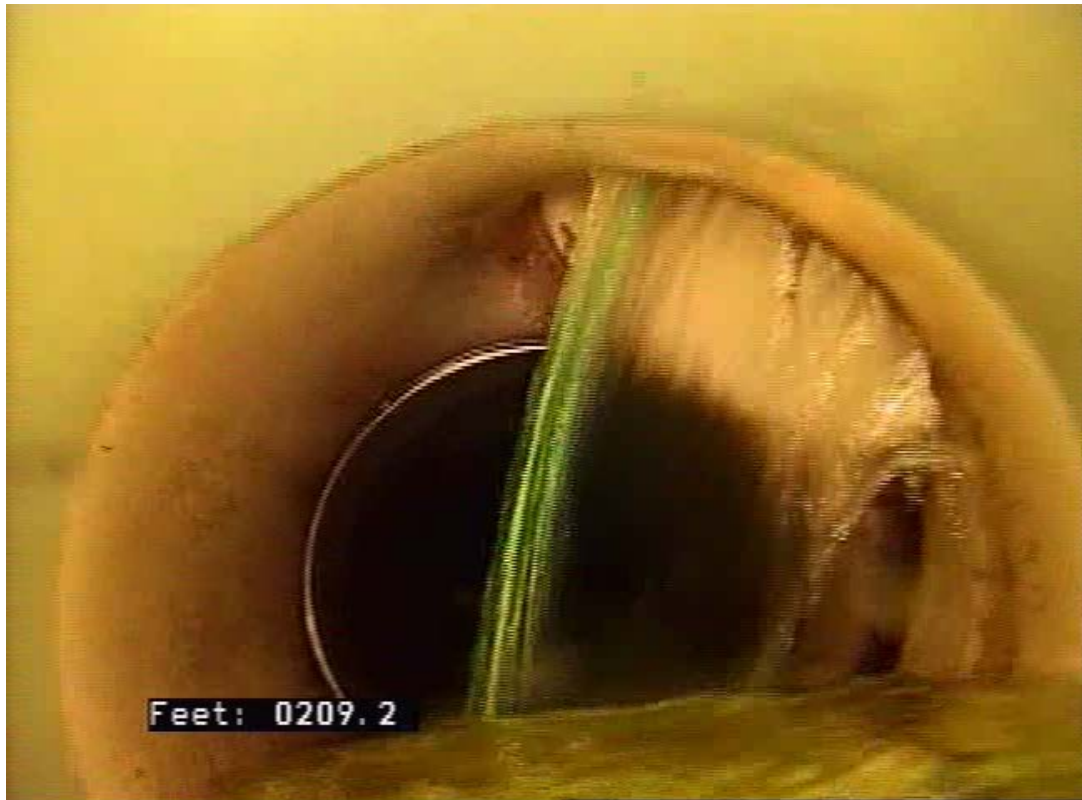
Date Signed: _____

Phone #: _____

Appendix D
PPII Case Studies

MCES I/I Task Force Meeting #2

Milwaukee MSD PPII Program Story Early Returns and Lessons Learned



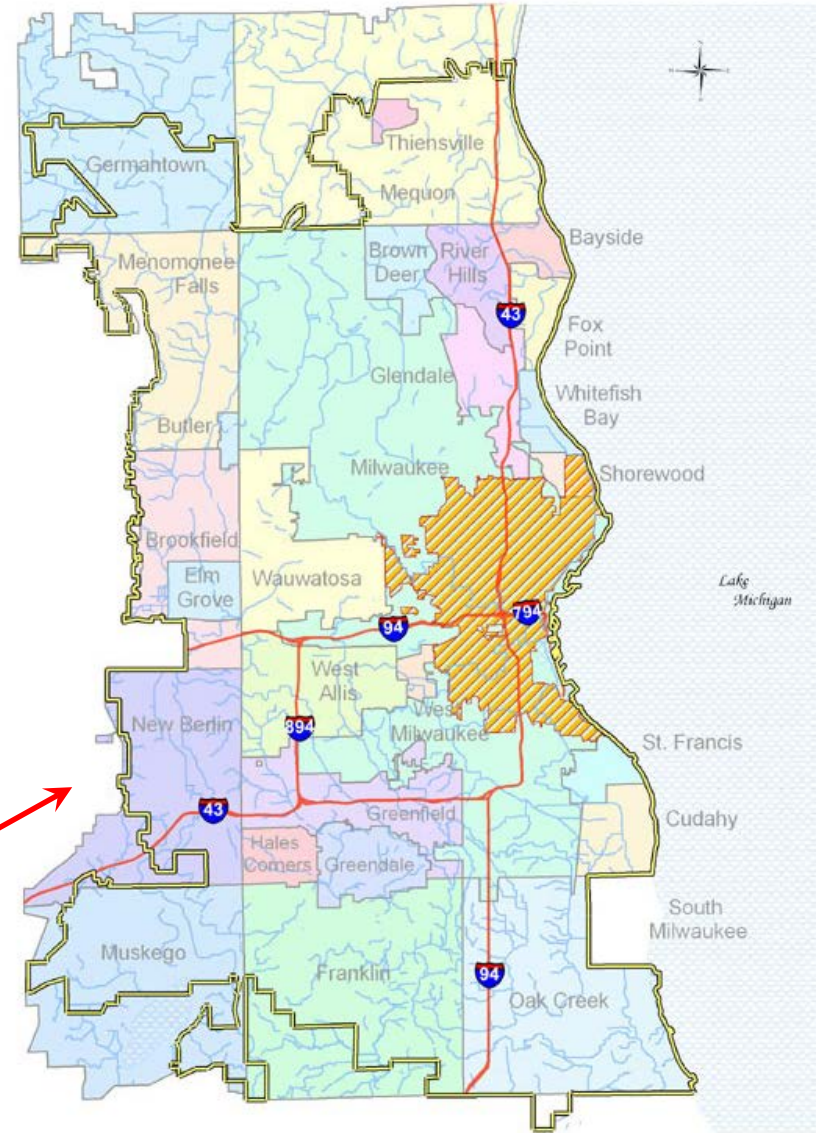
Presentation Overview

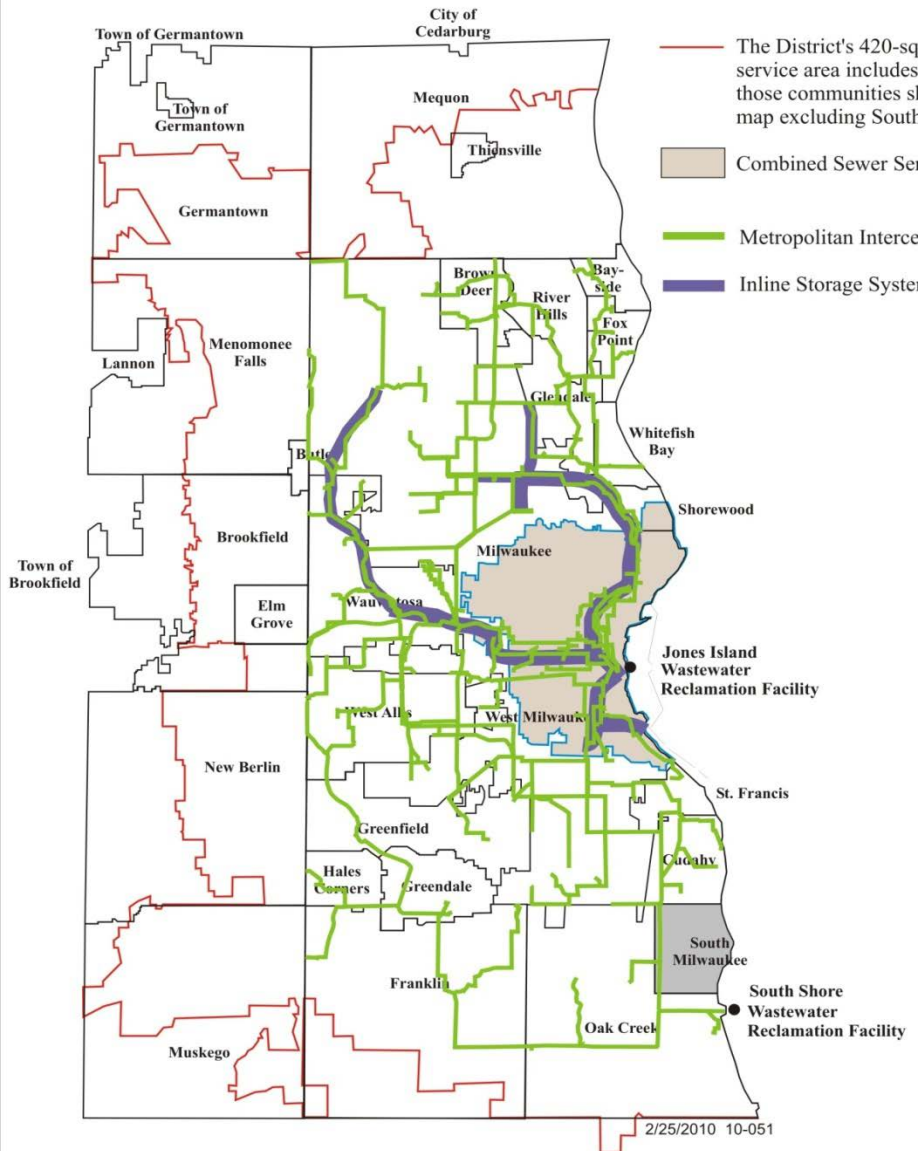
- Introduction: What is MMSD?
- Program Summary
- Are we getting anywhere? Effectiveness Evaluations
- The road ahead
- Questions?



What is MMSD?

- WI State Chartered Agency
- Water Reclamation
- Flood Management
- 1.1 Million Residents
- 28 Municipalities
- 411 Square Miles





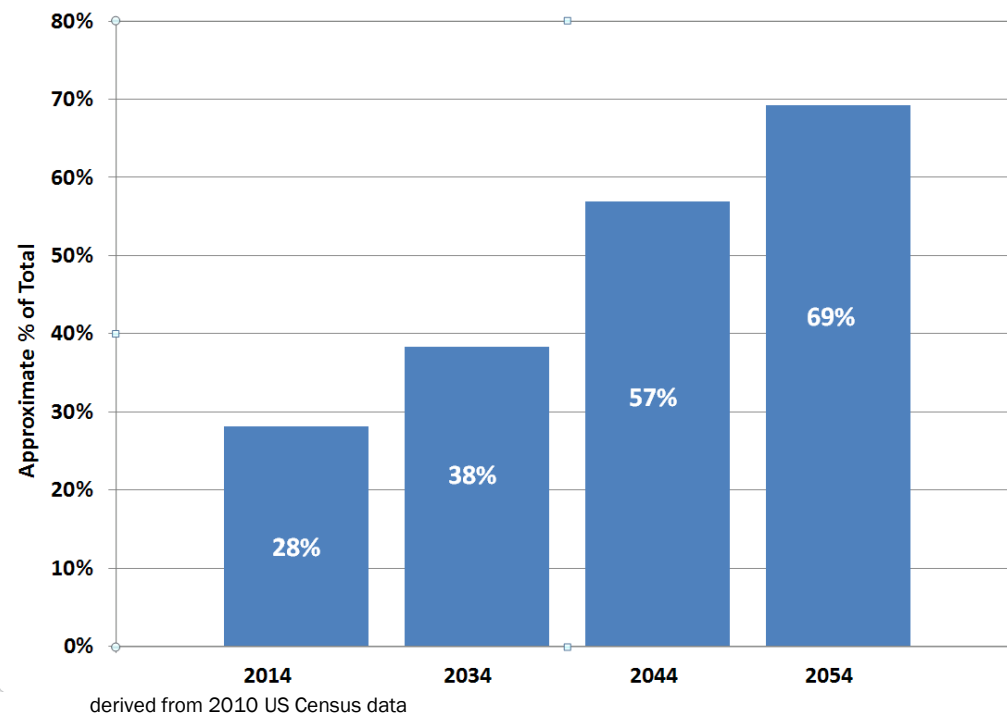
300 Miles
MMSD Sewers

3,000 Miles
Municipal Owned Sewers

3,000 Miles
Private Laterals



- ### Estimated Laterals Age 75+ Years



MMSD's Private Property I/I (PPII) Reduction Program

- Established in response to widespread sewer backups in July 2010 severe storms
- Each community has an allocated amount of PPII funds for use on qualifying activities
- PPII Contracts
 - Lateral inspection
 - Engineering
 - Public Outreach
 - Construction

\$\$\$\$

How to best use
the money?



MMSD Private Property Inflow and Infiltration Program

(February 2011, July 2012, December 2013)

- \$62M Program budget 2010-2020
- District Contracts:
 - Lateral CCTV contractor
 - Engineering consultant support
 - Public outreach consultant support
- Funding distribution to municipalities by property tax equalized value
- Voluntary participation
- CS or SS areas
- Encouraged to focus on non-compliant metersheds
- Flexibility in completing work
 - District contracts
 - Municipal procured
 - Property owner procured



Basement Connection x Milwaukee Metropolitan S x

www.mmsd.com/rulesandregs/private-property-i-and-i

RULES
FORMS
DENTIST OFFICES & MERCURY
COMMUNITY EXCHANGE
MANUALS
PRIVATE PROPERTY I & I

PRIVATE PROPERTY I/I

MMSD PPI/I Summit 2.0 Announcement

District Policy Documents

- [Policy Document](#)
- [2013 PPI/I Guidelines](#)
- [2013 PPI/I Classification of Work Table](#)
- [2013 Work Plan Template / Checklist](#)
- [2015 Municipal Allocations](#)

Work Plan / Project Resources

- [Engineering Contract](#)
- [Public Outreach](#)
- [Inspection Contract](#)
- [Property Inspection SOP](#)

Bid Tabs

- [Milwaukee Lateral Rehab](#)
- [Wauwatosa Lateral Rehab](#)
- [River Hills & Bayside Lateral Rehab](#)
- [West Milwaukee Lateral Rehab](#)
- [Franklin Lateral Rehab](#)
- [Glendale Lateral Rehab](#)
- [Foundation Drain Disconnect](#)
- [Investigative](#)
- [Other](#)

Municipal Policy Examples

- [Bayside Policy](#)
- [Brookfield Policy](#)
- [Fox Point Policy](#)
- [Greenfield Policy](#)
- [Muskego Policy](#)

Research Library / Links

- [Milwaukee Flooding Study Task Force](#)
- [Milwaukee Attorney Legal Opinion](#)

Basement Connection x Milwaukee Metropolitan S x

basementconnection.mmsd.com

HOME | PRIVATE PROPERTY PROGRAM | WHAT'S A LATERAL | WHAT'S A FOUNDATION DRAIN | PREPARING FOR A FLOOD | CONTACT US

BASEMENT CONNECTION

flood relief for a better night's sleep



HEAR US ON THE RADIO

THE PRIVATE PROPERTY PROGRAM

SEE HOW WE ARE ALL CONNECTED

CONTACT BASEMENT CONNECTION

Your basement. The foundation of your home. The storer of your things. Your extra square footage of living space. And, ultimately, the big giant hole underground that you want most desperately to stay dry when it rains. Funny thing is, the dryness of your basement could depend on your neighbors. We're all connected by sewer pipes. If you own a home, you own a sewer pipe. And, most of us don't maintain that pipe until there's a problem. So, you have a lot more in common with your neighbors than you thought you did after that last block party.

SEE FOR YOURSELF

AS SEEN ON TV

Reducing The Risk ...

Reducing The Risk of Basement Backups - YT.mov
Reducing the risk of basement backups takes community-wide solutions, time and money. Although improvements will not guarantee an end to basement backups, homeowners can be confident that doing nothing will increase the risk over time.

Reducing Flood Risks at Home.mov
There are some simple things you can do at home to reduce the risk of water damage and flooding in your basement.

Proper grading around your home.mov
One of the simplest things you can do to reduce the risk of water damage in your home is to make sure the soil next to your home is pitched, or sloped, away from the basement...

1/3 Sewer Late...

Sewer Laterals Overview - Bill Graffin, MMSD
Sewer Laterals Overview with Bill Graffin from MMSD
[fullscreen view](#)

2/3 Sewer Late...

Sewer Lateral Cleanout & Inspection with Master Plumber Justin Castleman
Sewer Lateral Cleanout & Inspection with Master Plumber Justin Castleman
[fullscreen view](#)

3/3 Broken Se...

Broken Sewer Laterals with Bill Graffin, MMSD
Broken Sewer Laterals with Bill Graffin, MMSD
[fullscreen view](#)

Laterals Schmaterials
Lateral is a fancy word for a pipe. But it's a very important pipe that takes that water you use inside your home out to the municipal sewer line. If you own a home, you own a sewer. Which means that you're responsible for maintaining and repairing it.

Hidden underneath your basement
Did you know that there are pipes underneath your basement walls? Yep, they're called foundation drains. Without them, you'd likely have ground water covering your basement floor. If your home was built after 1954, you have a sump pump to move water up and out. If your home is older than that, you most likely have a foundation drain connected

MMSD's PPI/I Program: \$62M Program Structure

Funding Year	\$ (M)
SBMP	\$ 2
2010	\$ 1
2011	\$ 8
2012	\$ 8
2013	\$ 8
2014	\$ 5
2015	\$ 5
2016	\$ 5
2017	\$ 5
2018	\$ 5
2019	\$ 5
2020	\$ 5
	\$ 62

Budgeted:



Projected:



Note: The 2016 Capital Budget 6-Year Forecast Included an Additional \$5 million for PPII in 2021.

5 Years In – Significant Progress Made

Activity Type	Total to Date (Feb 2016)
Workplans	61
Municipalities	25
Planning and Policy	14
Investigative	49
Construction	52
Construction properties	6,300
Investigation properties	9,700
Total funds committed	\$22.5M

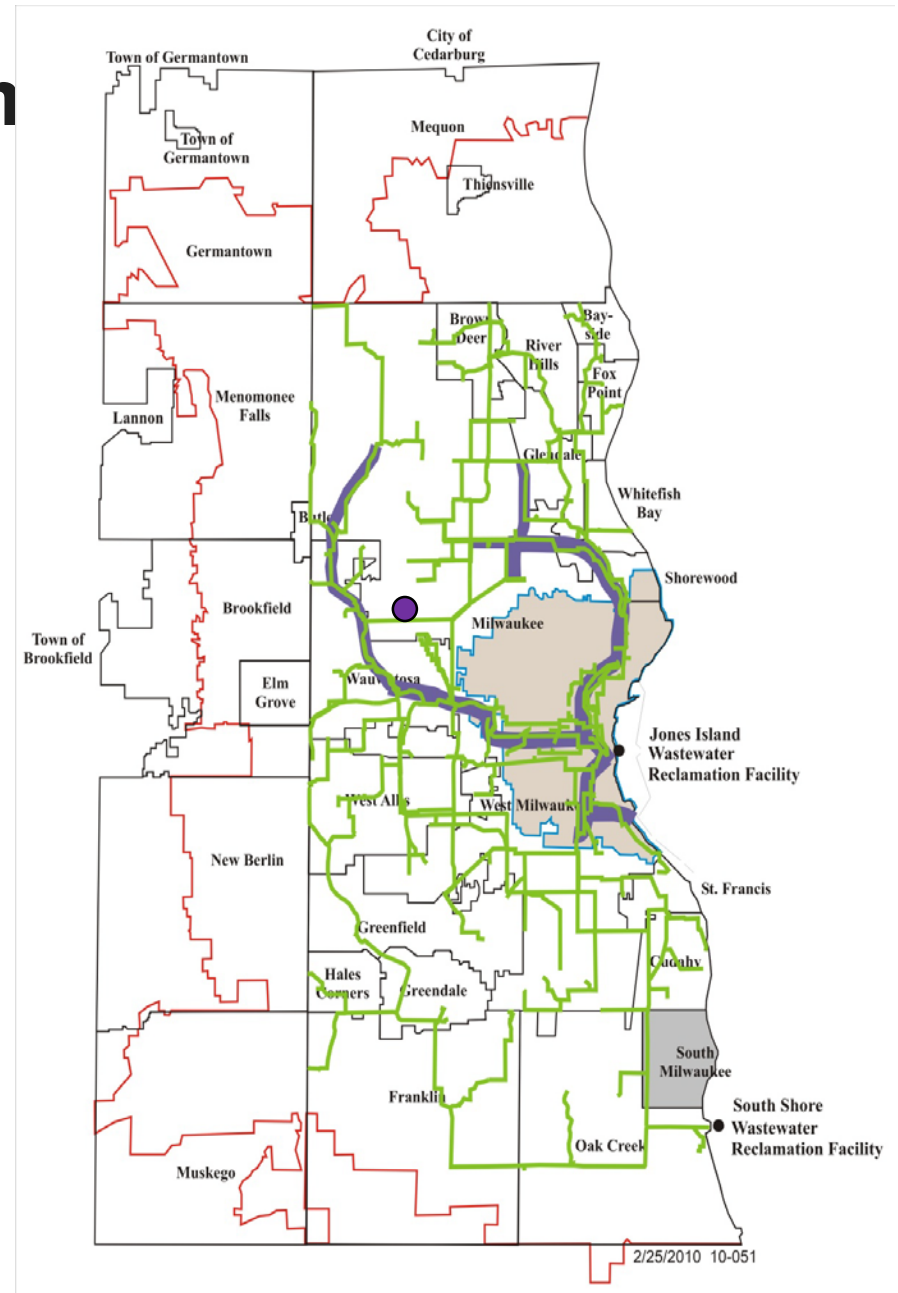
Notes: \$40 million is currently available to municipalities.
MMSD Commission is considering approval of additional \$500k of work plans in March 2016 meetings.

Completed/ In Progress	Work Type
2,000	Lateral CIPP
12	Lateral Replacement
3,000	Lateral Grout
400	Foundation Drain Disconnect
10	Other



Example Flow Evaluation

- Milwaukee Cooper Park



Milwaukee Cooper Park

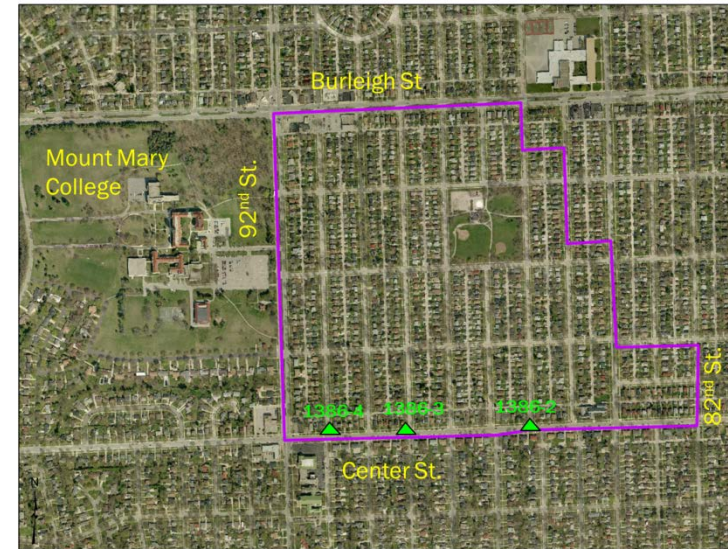
Public Property Work

- 18,500 LF of Sanitary Sewer Main CIPP Lined
- 60 LF of Sanitary Sewer Main Replaced
- 82 Manholes Spray-on Lined
- \$594,000 Construction Cost

164-acre area 563
total properties

Private Property Work

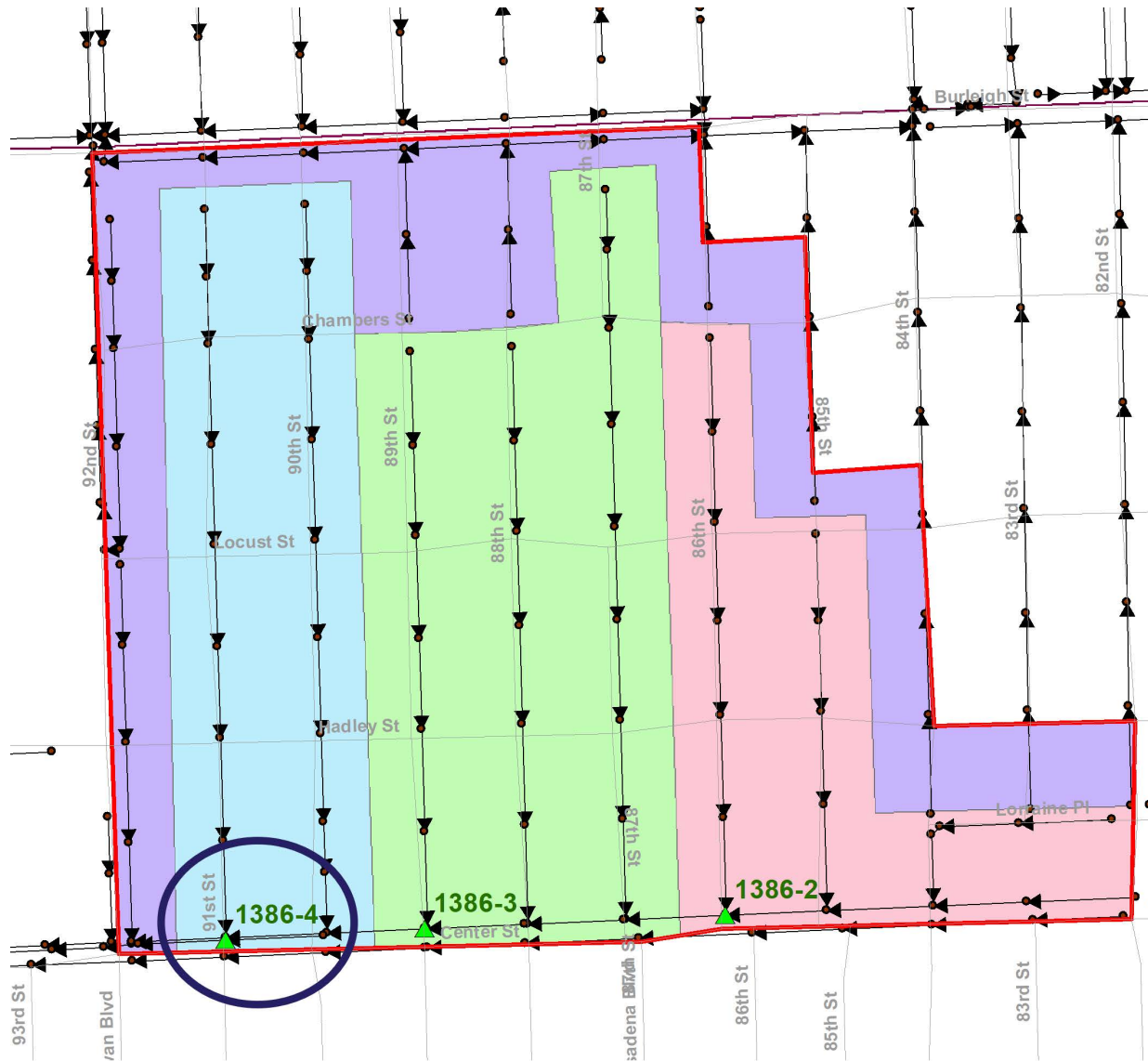
- 526 Laterals CIPP Lined (93%)
- \$3.8 Million Construction Cost
- \$7,250 per lateral – Program pays 100%
- Survey – 95% favorable opinion of project



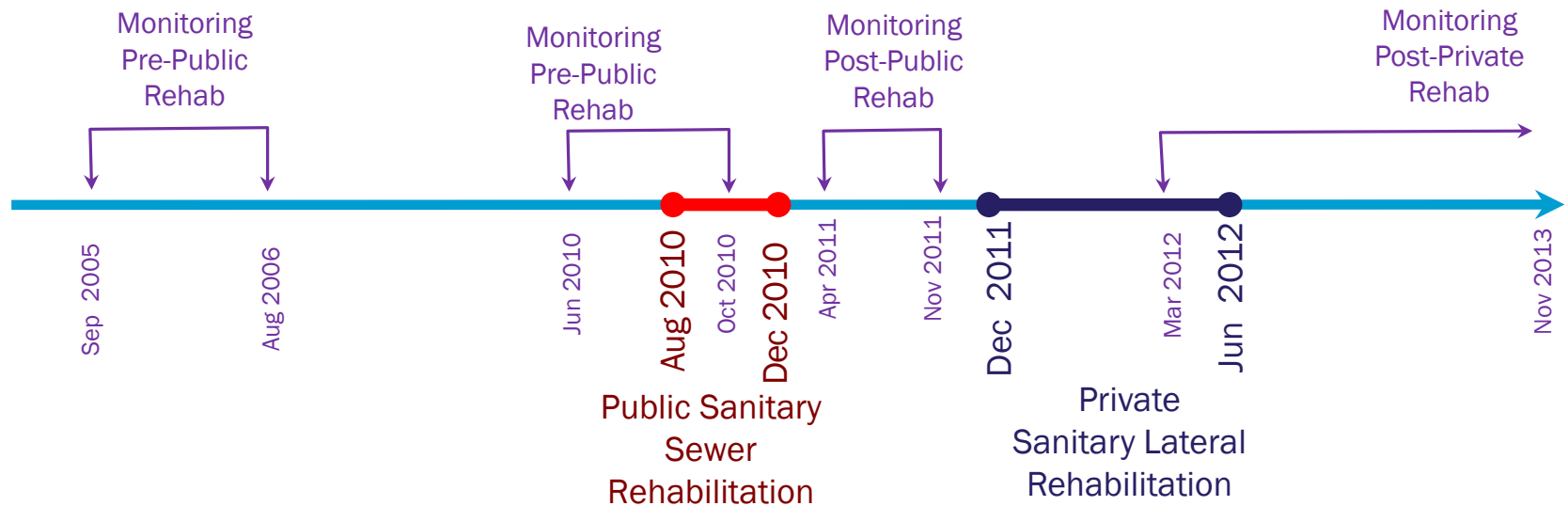
Bottom Line

Total Construction Cost of \$4.4 Million for Both Phases

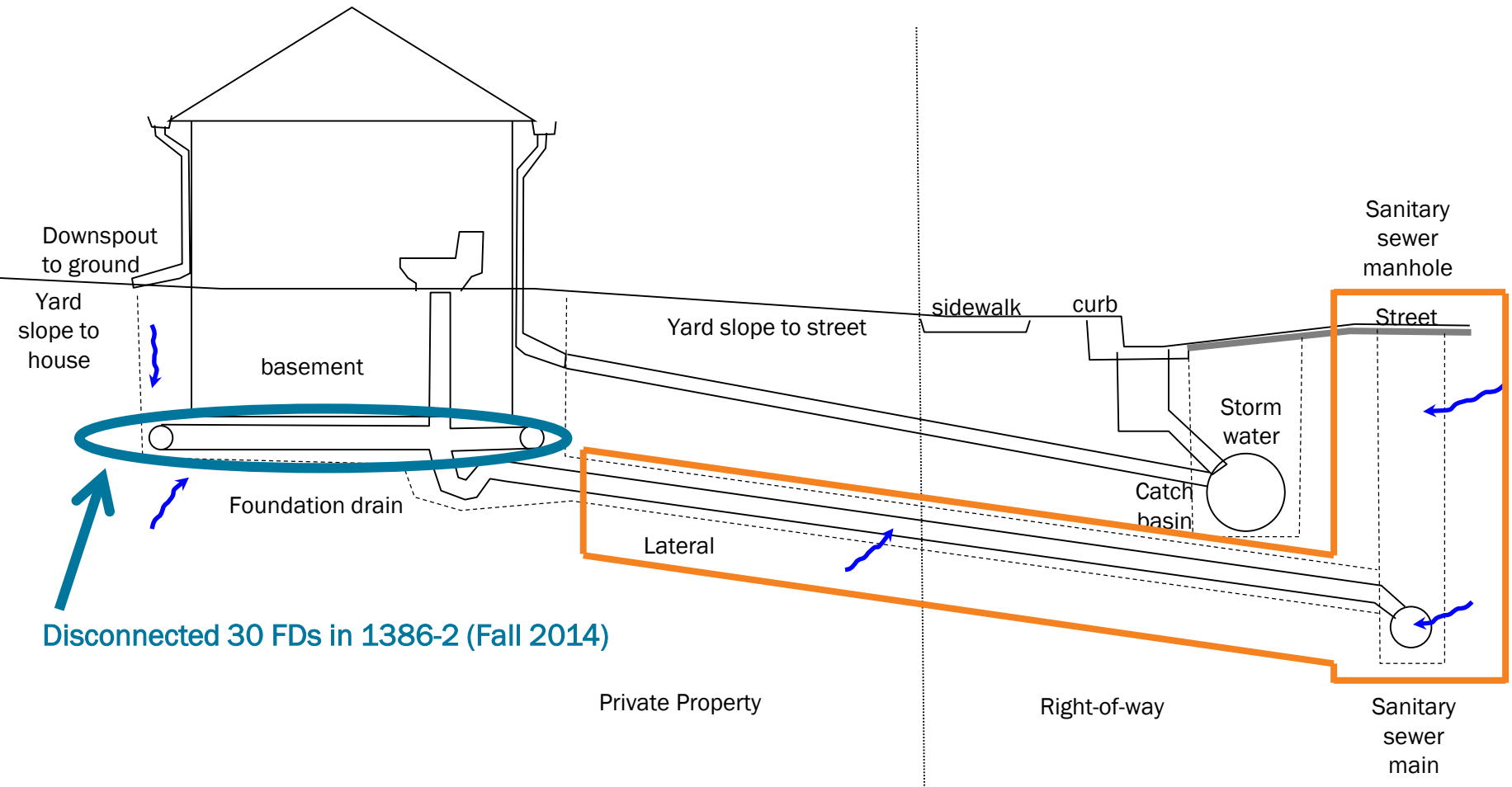
Milwaukee Cooper Park Meter Basins



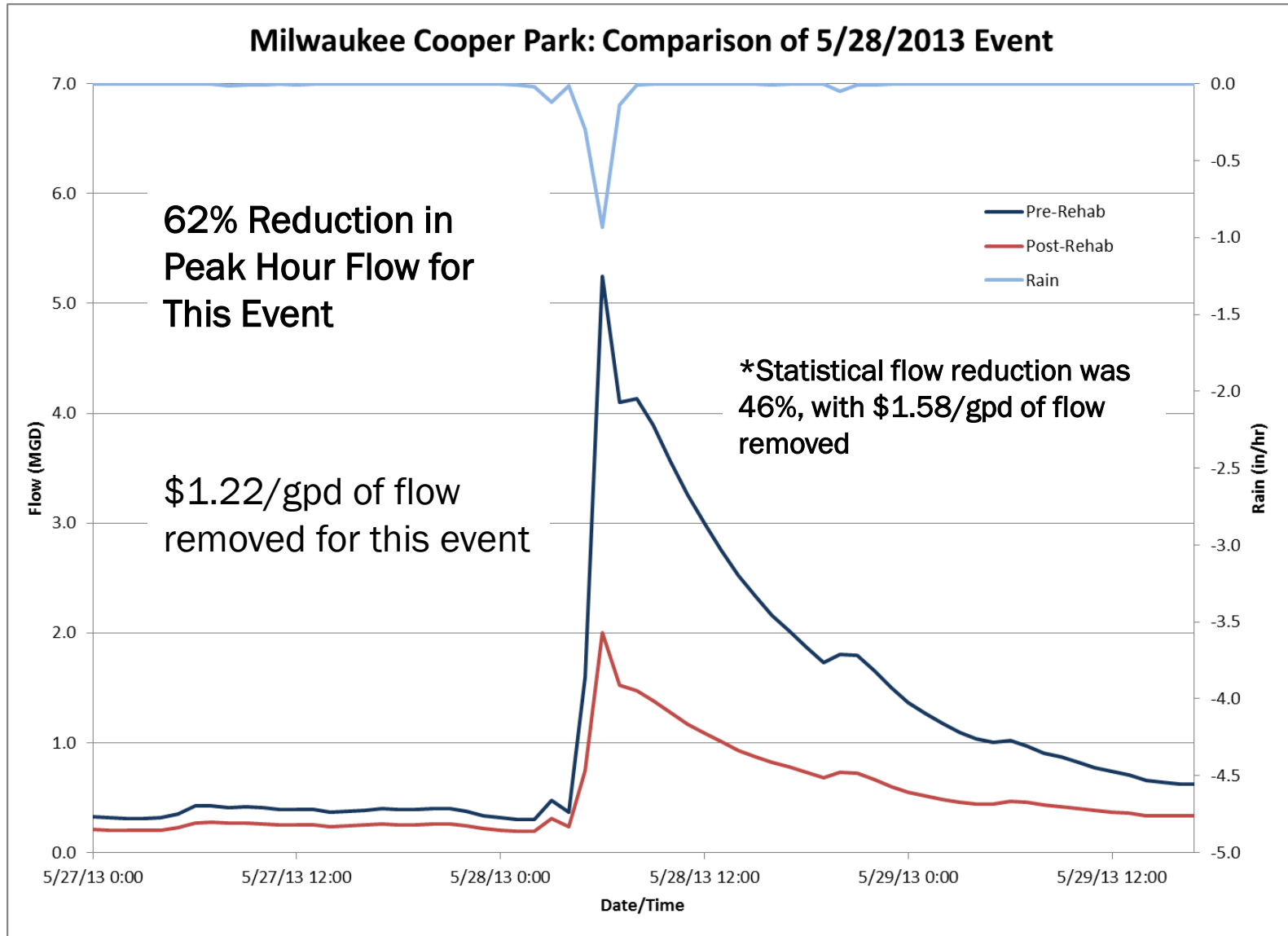
Milwaukee Cooper Park: Rehab Timeline



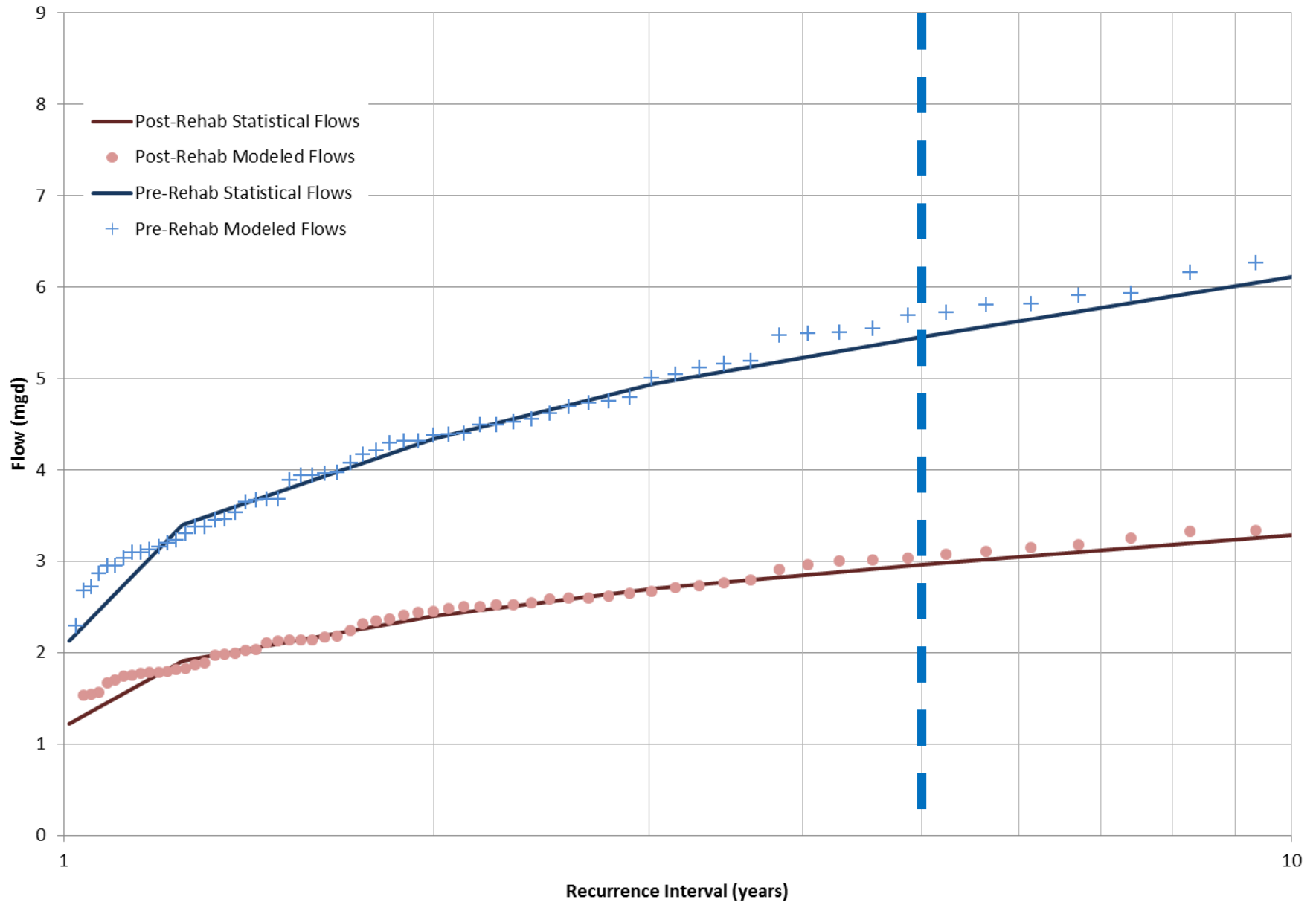
Milwaukee Cooper Park: Extent of Sewer Rehab



Simulated Flow Change in 5-Year Flow Event



Milwaukee Cooper Park: Comparison of Pre- and Post-Rehab Peak Hour Flows



Milwaukee Cooper Park: Flows Reduction Summary: Total Flow and I/I Only

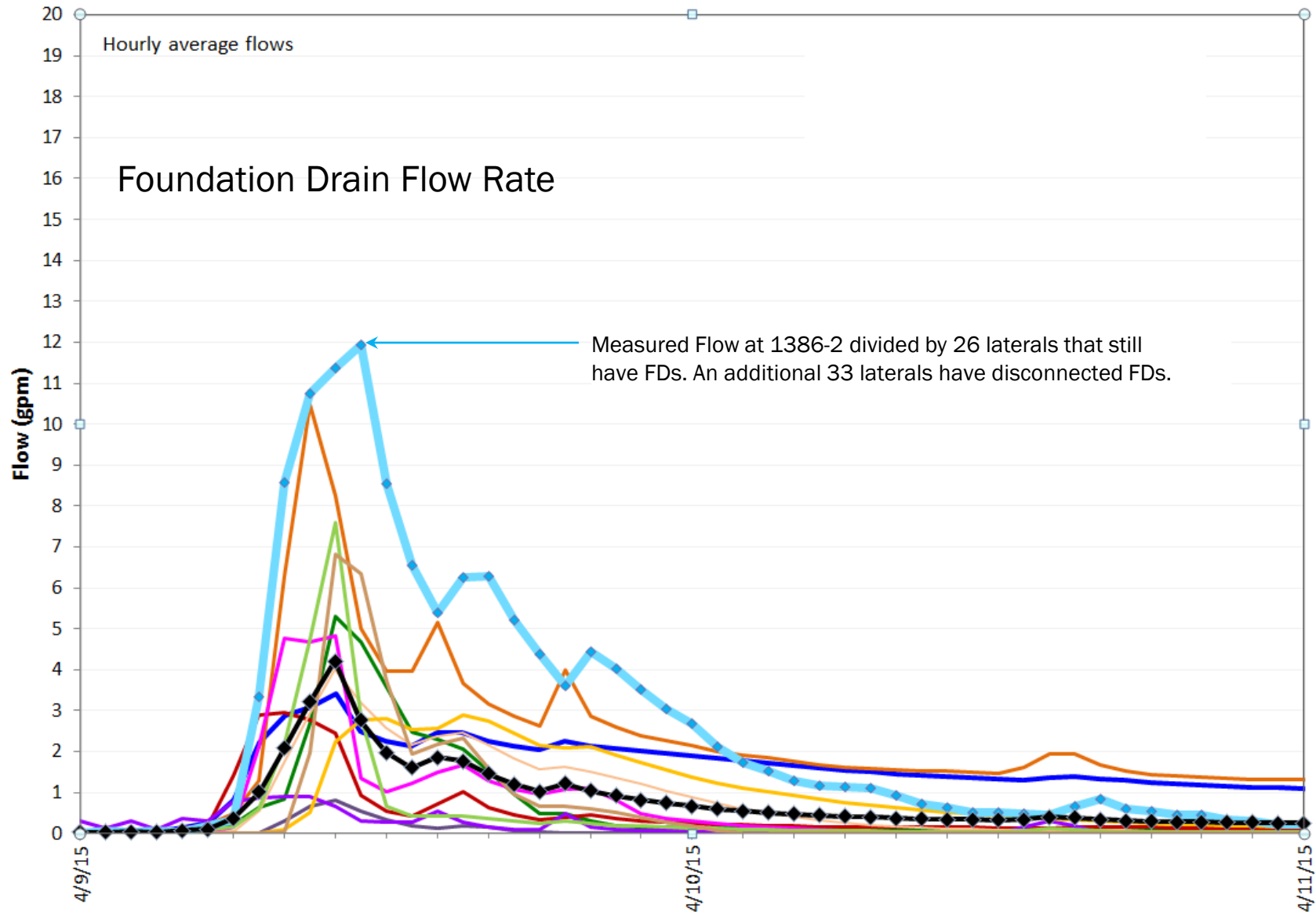
Evaluation of Flow Reduction for Milwaukee Cooper Park

Annual Probability	Return Period (year)	Peak Hour Flow (mgd)			Peak Day Flow (mgd)		
		Pre-rehab	Post-rehab	Reduction	Pre-rehab	Post-rehab	Reduction
0.5	2	4.34	2.39	45%	2.34	1.30	44%
0.2	5	5.45	2.96	46%	3.03	1.65	45%
0.1	10	6.11	3.28	46%	3.46	1.87	46%

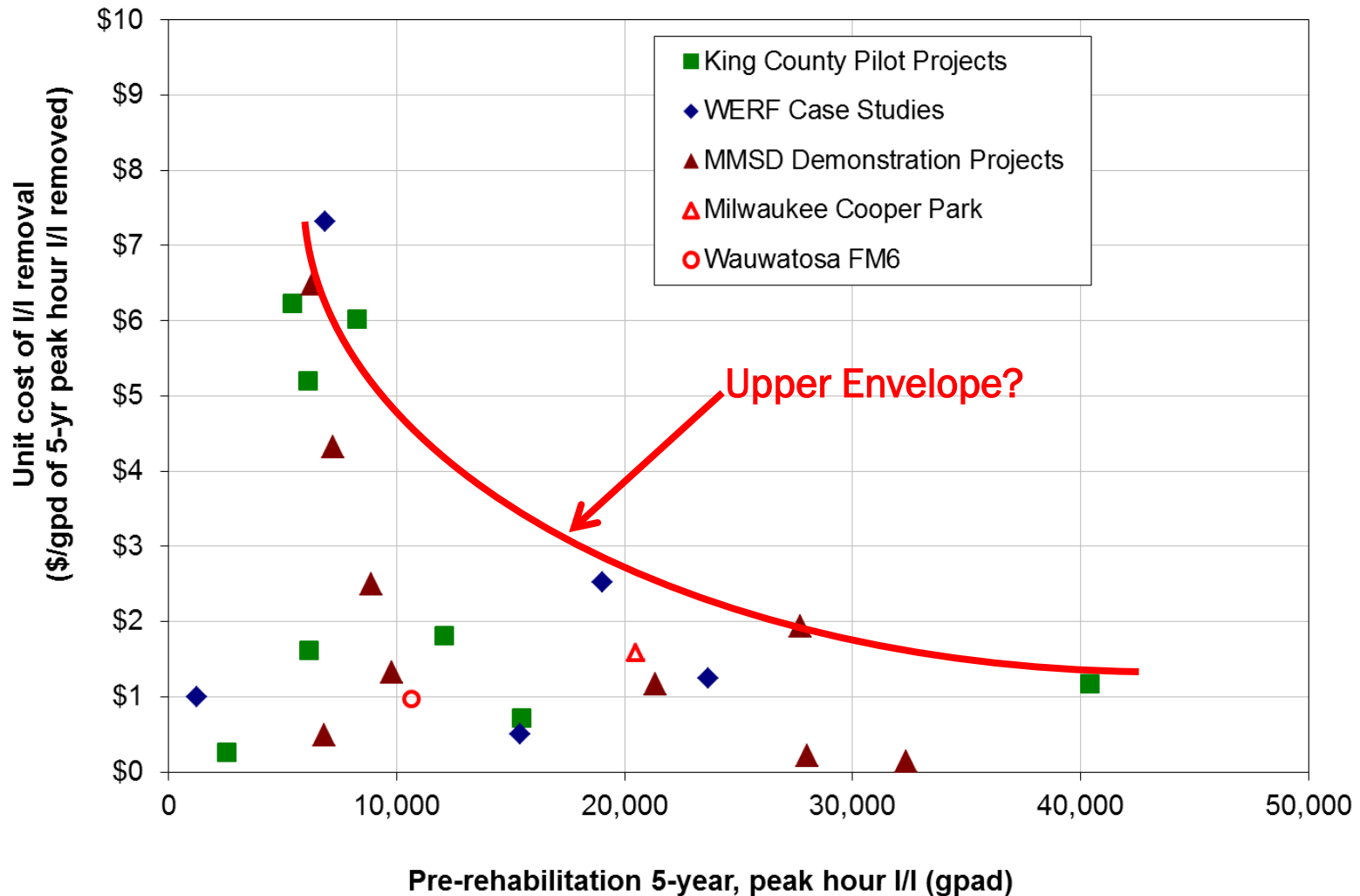
Evaluation of I/I Reduction for Milwaukee Cooper Park

Annual Probability	Return Period (year)	Peak Hour I/I (mgd)			Peak Day I/I (mgd)		
		Pre-rehab	Post-rehab	Reduction	Pre-rehab	Post-rehab	Reduction
0.5	2	4.21	2.27	46%	2.21	1.17	47%
0.2	5	5.32	2.83	47%	2.90	1.53	47%
0.1	10	5.98	3.14	47%	3.34	1.75	48%

Comparison of Sump Pump Monitoring and Downstream Residual Flow Conditions



I/I Project Results Provide Insight into Unit Cost of I/I Reduction



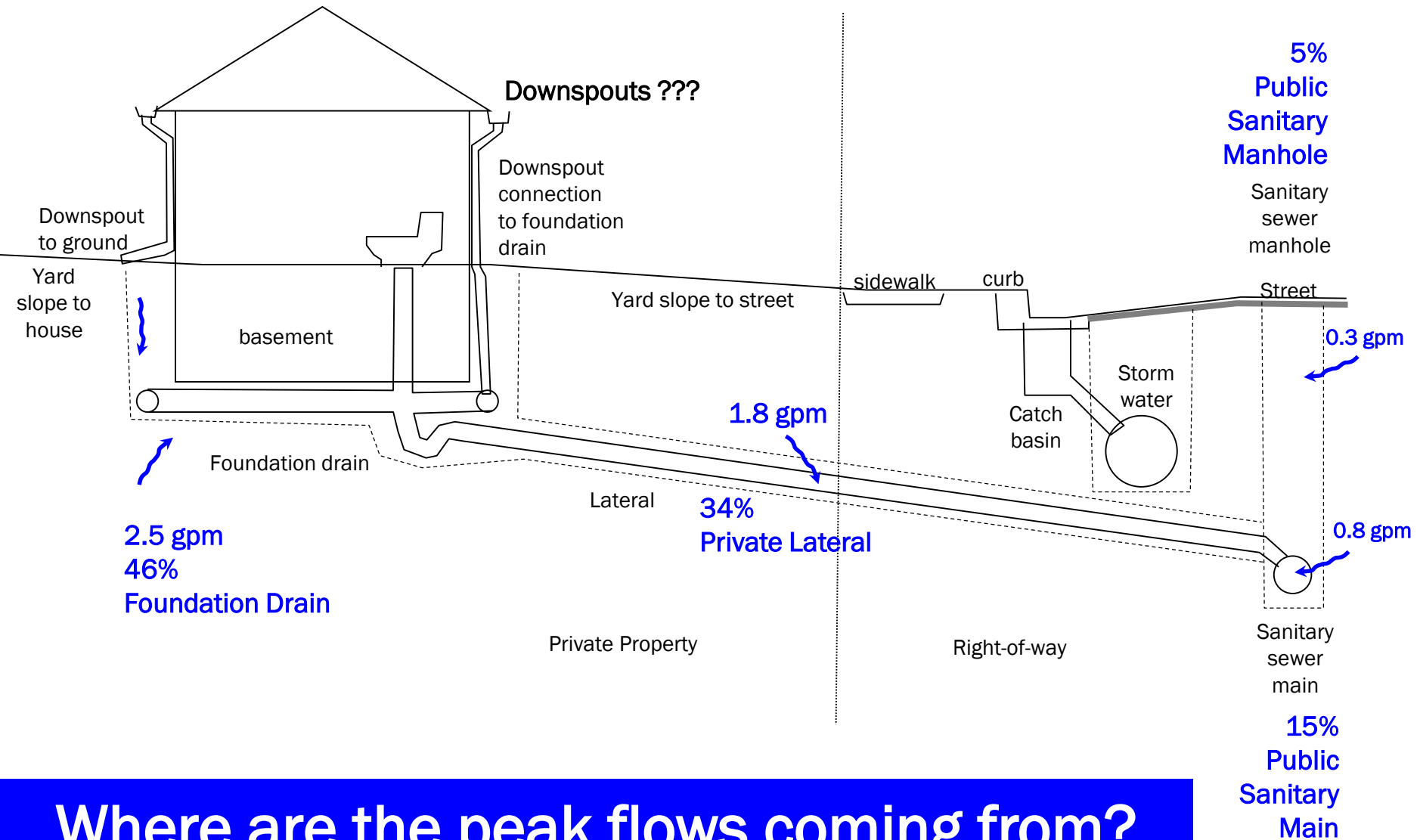
Looking to the Future of MMSD Program

- Continuing Work on Existing Program
- Funds Committed Through 2020: \$62 million
- Hosted PPII Summit 2.0 on October 15, 2015
 - Lessons Learned
 - Discuss Future Direction
- Exploring How PPII Can Support Future MMSD Vision for SSO and Basement Backup Reduction

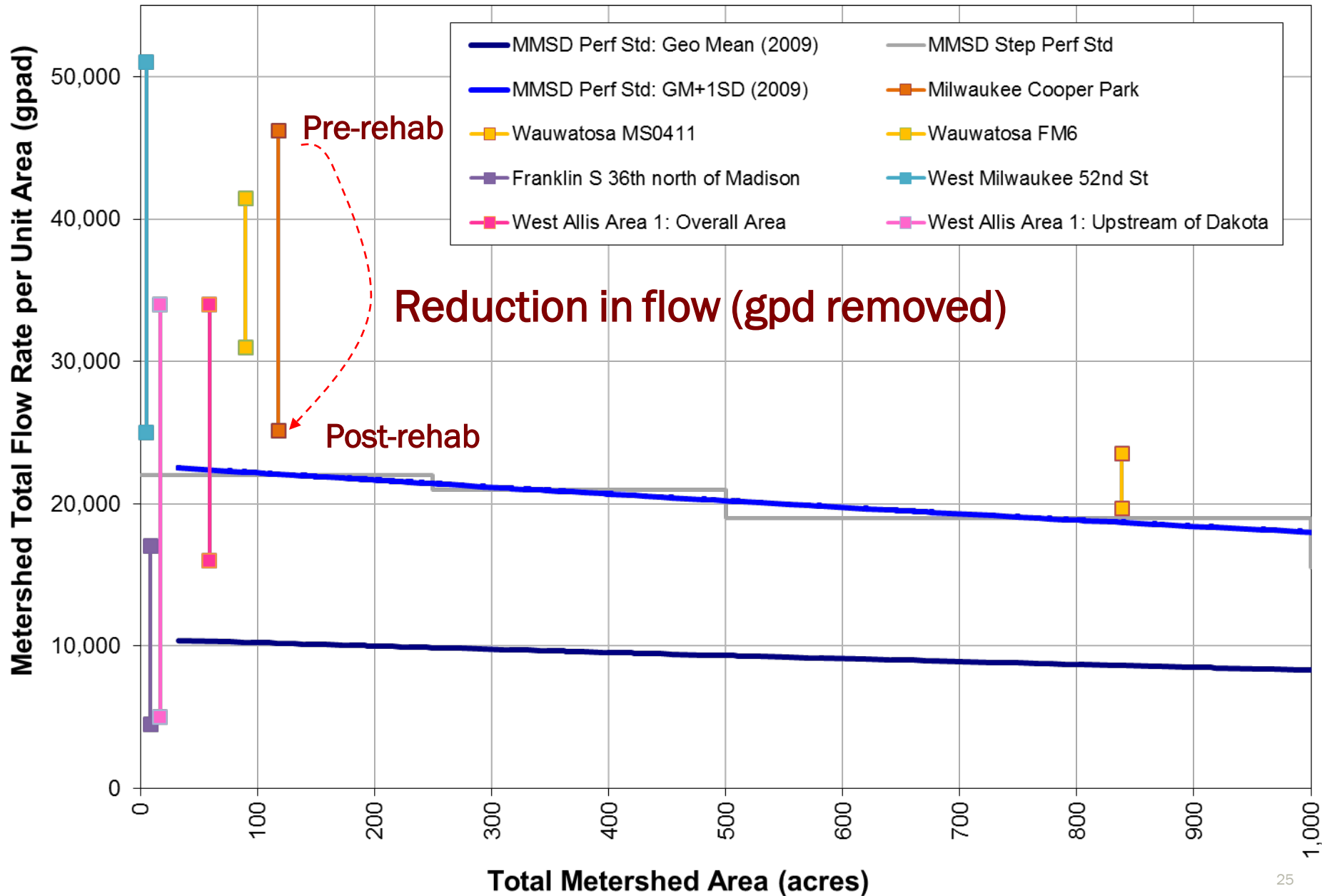
Flow Monitoring for I/I Evaluations

1. Monitor before and after rehab
2. Capture 5 high quality wet weather events for each period
 - a. Events 1-inch or greater
 - b. Same seasons
 - c. Rain data correlates well to flow data
3. Use the same type of monitoring device before and after rehab
4. Designate a control meter
5. At least 2-block meter tributary area (10 acres)
6. Rehab enough of the monitored area

Typical Infiltration/Inflow Sources: Metershed Averages Before Rehab



PPII Evaluated Areas



General I/I Evaluation Conclusions

1. Comprehensive rehabilitation leads to high I/I reduction
2. Just rehabilitating laterals may lead to a moderate reduction
3. Influence of groundwater on foundation drains varies by area
4. Some rehabilitated areas have large amounts of remaining I/I
5. Sometimes I/I reduction may be evident but not quantifiable

Closing Thoughts

Top Three Considerations for Addressing PPI

- **Emphasize Public Outreach**
 - No program can be successful without enough buy-in
 - High participation is needed to improve chances of demonstrating success
 - Connect community benefit to the actions being taken
- **Fix the Right Things**
 - Understand what sources should get the highest priority. They might not be the easiest to get at.
 - Some programs have focused on fixing thing right, but targeted the wrong sources
- **Prove the Cost-Effectiveness**
 - Gather enough of the right data to support the analysis
 - Be in a position to say how much flow reduction resulted from program expenditures

Appendix E

Task Force Meeting Minutes

Inflow/Infiltration Task Force

Meeting #1
February 11, 2016
1:30-3:30 p.m.

St. Croix Room
League of MN Cities
145 University Ave. West
Saint Paul, MN 55103

Members Present:

Matt Saam, Apple Valley
Bob Cockriel, Bloomington
Kory Jorgensen, Coon Rapids
Russ Matthys, Eagan
Chad Millner, Edina
Bert Tracy, Golden Valley

Eric Hoversten, Mound
Jason Ziemer, North St. Paul
Bruce Elder, Saint Paul
Lisa Cerney, Minneapolis
Paul Oehme, Chanhassen
Mark Maloney, Shoreview

Patty Nauman, Metro Cities
Sandy Rummel, Metropolitan Council
Shelly Rueckert, St. Anthony
Brian Wagstrom, Minnetonka

Members Absent:

Jesse Struve, Brooklyn Park
Luke Fischer, Plymouth

Ross Beckwith, West St. Paul

Bruce Hanson, Newport

Metropolitan Council Staff Present:

Bryce Pickart
Jeannine Clancy
Kyle Colvin

Deborah Manning
Rebecca Fabunmi
Angela Mazur

Ryan Vial
Tim Keegan

Other Attendees:

Kelly Moriarity, Minneapolis

Darin Rezac, West St. Paul

Meeting Notes:

1. Welcome, introductions, and task force assignment

Sandy Rummel welcomed members to the meeting and thanked Patty Nauman for her help. Task Force members introduced themselves. Sandy presented slides describing the Task Force's assignment, composition, and agenda, and explained that agendas for meetings 2-4 would be based on member input, so anyone with agenda ideas should send them to Jeannine Clancy. Jeannine will pick a couple of task force members to run the agenda draft by ahead of the meetings, as that worked well for the Master Water Supply Plan Community Technical Work Group in 2015. She explained that the goal is to focus on conversation instead of presentations.

2. MCES I/I program goals and milestones

Bryce Pickart presented I/I program milestones since the original Task Force in 2003-2004. He said that the program has worked well from the start, and that MCES wants to have a collaborative program and do what's best for everyone. He mentioned the controversial potential 2013 demand charge in the original I/I program, which was discussed in a second Task Force in 2009-2010. The second Task Force resulted in changes to the ongoing I/I program to make it workable, fair, and equitable. This Task Force is the next step in continuing to improve the program, as it is still part of the most recently adopted Water Resource Policy Plan. Bryce reviewed the I/I program goal areas: public health, water quality and avoiding high costs to convey and treat excessive wet weather flow, since it is less expensive to deal with it at the source than to build additional infrastructure.

3. Key elements of Council ongoing I/I mitigation program

Kyle Colvin introduced the key elements of the I/I Program, giving an overview of how peak flow threshold (goals) are established by metershed, and the adjustments that are made to this number, based on recommendations from the second Task Force, to account for growth, water conservation, and the presence of regional interceptors within a metershed. He talked about MCES's preventative maintenance and routine calibration of meters, and the meter facility improvement program, which includes installing new meters, improving meters in areas where growth/flow is increasing, and upsizing meters if needed to ensure accuracy.

Kyle then demonstrated how an exceedance is measured, showing examples with meter and rainfall data and explaining some of the steps taken to validate the data, such as reviewing the location of the rainfall and comparing it with the location of the excess flow, examining flow profiles before and after the event, and inspecting the meter when there are anomalies. He clarified that even though multiple exceedances may be apparent on the graph, the program only focuses on the largest one.

Moving on to work plan calculation, Kyle explained that work plans are based on the maximum exceedance in the period from July 1 to June 30 of the following year, and that there is a provision that if a community's work plan exceeds 25% of its municipal wastewater charge, the surcharge will be capped at that 25% and the community is given extra time to complete the work. This affects around four cities currently.

4. How MCES is addressing I/I in the regional system

Bryce gave some background on MCES's ongoing investment in condition assessment and maintenance of its regional wastewater system. He discussed the inspection program for gravity sewers using closed-circuit TV inspection and deep tunnels using contractors who have the specialized equipment, then described the condition rating system used.

5. What are communities doing to address I/I?

Tim Keegan thanked the communities for their I/I reduction efforts, which have enabled MCES to spend more time focusing on preventive maintenance. He requested that if communities notice problems with MCES's infrastructure when they're out doing work, to please let MCES know.

Tim discussed the current focus on manholes, with the I/I mitigation crew inventorying condition, replacing lids, doing minor grouting, and involving contractors for bigger work. He said that thanks to communities' I/I work and MCES's preventive maintenance, there aren't the spill and overflow issues there used to be.

Jeannine talked about the investments made by communities participating in the program; so far there has been \$145 million of effort toward I/I mitigation on the public side. There are 38 active work plan assignments after the 2015 program. MCES has also been working with Metro Cities to obtain Clean Water Legacy Fund money for cities working on private property I/I mitigation. Jeannine explained that the totals she gave don't reflect the actual work done, just the assistance level.

6. Results – how do we know that the I/I program is working?

Kyle presented charts showing the downward trend in average system flow over time, since base flow has been reduced due to factors like water conservation and I/I mitigation work. He explained that the decrease occurred despite the 145,000 additional residential connections during the time period depicted in the chart. He then compared the number of metersheds with exceedances from the 10/4/05 and 6/19/14 wet weather events, contrasting the amount of precipitation in the preceding days and months. The 2014 event had greater precipitation in both the preceding twenty days and the preceding twelve months, and had more connections in

the system, but had a nearly identical number of metersheds with exceedances. Even though there were a similar number of exceedances, the amount of flow was less.

Bryce added that one of the main goals of the I/I program is to be efficient and avoid building additional capacity to handle excessive I/I, and it has been successful in this regard so far. The work the communities have done has made a difference, helping make enough progress to avoid spending money explicitly to convey extra I/I. Bryce then presented his cost analysis of prevention (\$150 million) vs. adding system capacity (\$900 million to \$3 billion), demonstrating that it's still cost-effective to prevent I/I at the source for all but a few specific situations, which can be discussed as they're encountered.

7. Discussion

Sandy asked whether attendees who were part of previous task forces wanted to add anything. One member commented that communities without I/I problems may be concerned by the amount of money MCES is spending on it, but it's important to explain that money spent there would have been spent in any case to fix pipes: the work will probably produce I/I benefits, but it's asset management work, not just I/I work.

The group moved on to discussion question 1: **What would the Task Force like to know about the program in order to make recommendations?**

A member commented that the existing [bond money] grant program, while beneficial, has onerous record-keeping requirements, and asked that it be streamlined if there's a way to do so. Patty Nauman explained that because this is money Metro Cities has secured from the legislature, changing the record-keeping requirements may need to be done at the state level, but that it could be a good thing to discuss. Jeannine thought there might be a disparity between how much record-keeping is required for these funds vs. others from the state, such as those for transportation.

Other members commented on messaging challenges related to the different places communities are on their understanding of I/I. Differences in which parts of the pipe cities are responsible for were also mentioned; some cities accept more responsibility than others, and this can affect how they approach I/I, and what tools are needed to pursue the problem beyond the right-of-way.

Referring to the portion of the presentation that showed the I/I program reducing flow, but not the overall number of exceedances, a member asked if the data showed that cities with a problem still have a problem, but that it's outside the right-of-way. He felt that because it's such a politically sensitive topic, data is needed to help cities make a case that they must get to the other side of the property line to effectively address the problem in its entirety. Other members added that half or more of their systems were private, and that their experience shows that cities can take care of the issue in the right-of-way and still not fix the whole problem. They said that they need help from MCES to explain to councils that the private system does need to be corrected. Members understand that putting off the issue will negatively impact their communities, but councils are reluctant to be the first to take on the problem, and are difficult to convince.

Recent plumbing code changes were discussed; members thought there was a possibility that communities may be responsible for doing inspections on properties related to these changes, and that this might provide an opportunity to assess problems related to I/I as well. Some problems, such as improperly directing excess water into drains to deal with wet basements, may be apparent in a surface inspection.

Patty asked whether cities are likely to continue to be able to avoid surcharges with the credit-eligible I/I work if private property I/I is not dealt with, and Kyle replied that for some communities, there may not be enough left on the public side to address all their excess I/I. A member pointed out that this may lead communities to make poor choices about which work to do next, because councils will prefer to authorize the work that is creditable, regardless of whether it's the next best dollar to spend to mitigate I/I. He predicted that if this is not addressed, in the future cities will do work that may not be the best from an I-I perspective to get credit against their work plans, and will then start requesting that other types of work be made eligible for the credit. The problem of discovery was also brought up; cities cannot address private property I/I problems until they know they have them, and there is a financial disincentive for homeowners to do so. Therefore, a selling point of some kind is needed for homeowners, who are likely to prefer a raise in rates over time, which will have a smaller individual financial impact, even though that's not the right approach.

In response to a question of what prompted the Task Force's discussions, Patty clarified that Metro Cities supports periodic examination and revision of the I/I program as a general concept, but also that everyone here is aware of the challenges surrounding private property I/I mitigation, and of the need to find solutions. She explained that while Metro Cities has received funds for this before, they're very difficult to come by, and are getting more difficult to secure as time goes on, so examination of other potentially workable funding sources is needed. There is legislative opposition to using public funds for private property issues, even though it happens in other areas, and opposition from rural legislators to spending these funds in the metro area.

Some cities have received money for private lateral repairs in the past, but the availability of these funds is inconsistent, which causes problems with homeowners. Patty explained that since those funds are not statutory, there is unlikely to be consistent funding from that source.

Members discussed the potential of making I/I mitigation a point-of-sale requirement at the state level, reasoning that the issue is statewide rather than municipal, and that point-of-sale may be perceived as less onerous because there's money there at the time of the transaction. Other areas where the state has disclosure requirements, such as the presence of asbestos or lead paint, or the requirement to inspect septic systems, were compared to a potential certificate of water-worthiness for I/I. Some members viewed this as letting the market solve the problem -- a less aggressive way of addressing the issue, and one which could sidestep some of the common objections, such as the controversy over using public money for private property I/I mitigation. It could protect buyers from being surprised by future I/I problems, but would add an additional burden on sellers.

Five or six of the communities present already had some kind of point-of-sale inspection process, though results were mixed. One member whose community already inspects homes at point-of-sale said that about 90% of the homes they inspect fail, for a wide variety of reasons, such as root growth, cracked pipe, and drain tile connections. Not every community will have all of these problems, but they if they pursue point-of-sale inspections, they should be prepared for this, and older cities are likely to have more problems than newer ones. Another member whose community's private property I/I problems are primarily from sump pumps raised the issue of homeowners changing their sump pump connections back to the old problematic condition even after they've been corrected, and thought point-of-sale inspections could be a good way to find out whether this has happened. Others agreed that this was common, and added that it caused problems because city councils thought the money spent to fix the problem had done so permanently.

The group moved on to discussion question 2: **What about the program is working for you on a local level? What isn't working?**

The group emphasized the need for and importance of ongoing, continuous education, both for officials and the public. Everyone needs to understand that many of the problems are in private systems, and that it can be beyond cities' control to be able to address deficiencies. Education is needed to explain why problems that exist on private property have public health consequences that are felt more broadly, and an argument could be made that they're being felt in an inequitable, unfair way.

Acknowledging the many different audiences and tailoring messaging for all of them was also discussed. This might include communities with different standards over which part of the pipe is the city's responsibility, as well as differing levels of trust between stakeholders based on the source of the message.

Comparing private property I/I's eventual and inevitable public impact to past efforts to convince the public to recycle, a member pointed out that the message need not be only about compliance, but could also be presented as an ethical issue through ongoing education. He thought that funds spent on public education or advertisements could be a good way to change views on why I/I mitigation is necessary, and could make the issue less politically sensitive in the long run. Communities that have already done private property I/I work agreed that education was an important part of the process, and said that while exactly what they did may not work for others, it's a starting point. Eagan and Golden Valley agreed to share their existing educational materials with the group.

One member suggested looking into new partnerships with other organizations whose goals are related, such as watersheds, who are concerned about water quality. Other partners may not face the same challenges in using funds to mitigate issues on private property, and if we educate them about how I/I also impacts their area of interest, we could potentially build partnerships.

Sandy asked if there were other comments on where to go from here, and a member asked whether forward trend analysis has been done. He was curious about the predicted impact of anticipated population growth on the frequency of discharge, basement flooding, crises, etc. Bryce said that MCES has looked at its system capacity analysis on an ongoing basis, and that so far the progress made seems to be enough to keep ahead of growth. He added that if we continue the program and make progress, that will likely still be true, but it will become more difficult to make progress as we go on. Jeannine pointed out factors other than growth that may have an impact, such as wetter weather and more rain events, and asked if there was specific information cities are looking for to help garner/sustain support from their councils.

Sandy asked the group how they thought we could bring cities that haven't experienced many I/I issues in to work on challenges, and members thought that messaging about good asset management and risks associated aging infrastructure with that sometimes resonates more. It also better explains that while the work will help the I/I problem, it's work that needs to be done anyway for other reasons. However, members also wanted MCES to keep in mind that each community will have different costs to deal with similar issues, and that that needs to be part of the discussion. Bryce agreed that the reason for the I/I program was to help people recognize that I/I mitigation is part of good maintenance and asset management, and added that each community needs to frame that in way that's most effective and compelling for them.

Sandy thanked the meeting attendees for participating, and the meeting was adjourned at 3:30 p.m.

Inflow/Infiltration Task Force

Meeting #2
March 18, 2016
8:00 - 10:00 a.m.

Room LLA
Metropolitan Council
390 Robert St. N.
Saint Paul, MN 55101

Members Present:

Sandy Rummel, Metropolitan Council
Patty Nauman, Metro Cities
Mark Maloney, Shoreview
Bert Tracy, Golden Valley
Shelly Rueckert, St. Anthony
Paul Oehme, Chanhassen

Lisa Cerney, Minneapolis
Chad Millner, Edina
Eric Hoversten, Mound
Luke Fischer, Plymouth
Matt Saam, Apple Valley
Darin Rezac, West St. Paul

Russ Matthys, Eagan
Kory Jorgensen, Coon Rapids
Jason Ziemer, North St. Paul
Jesse Struve, Brooklyn Park
Bob Cockriel, Bloomington

Members Absent:

Brian Wagstrom, Minnetonka
Ross Beckwith, West St. Paul

Bruce Elder, Saint Paul

Bruce Hanson, Newport

Metropolitan Council Staff Present:

Bryce Pickart
Jeannine Clancy
Kyle Colvin

Tim Keegan
Deb Manning
Anna Bessel

Ryan Vial
Michael Nguyen
Angela Mazur

Other Attendees:

Andy Lukas, Brown & Caldwell

Kelly MacIntyre, Minneapolis

Jeff Oliver, Golden Valley

Meeting Purpose:

To review existing regional private property I/I mitigation programs. Hear about private property I/I mitigation strategies being undertaken by other regional wastewater agencies. Begin identifying potential options for addressing local political, financial, and technical issues related to private property I/I mitigation programs.

Meeting Notes:

Sandy welcomed the meeting attendees. After introductions, Sandy and Jeannine walked through the agenda and asked that any comments on the minutes from the 2/11/16 meeting be emailed to Angela.

Kyle began the presentation, which addressed questions brought up at the previous meeting. Maps depicting the age of the housing stock in the area were shown. He noted that since the maps were created using county parcel data, and since the data doesn't include structures rebuilt on existing older service lines or never-connected service lines built as streets were constructed, the counts given were probably lower than the real number. In response to a question about how the counts compared to the total number of structures, Bryce estimated that it was around a third of the ≈ 1.2 million structures.

Recent changes to the plumbing code were discussed. Kyle explained that the 2015 change was not triggered by a specific event, but was rather the result of changes that had been pending for almost a decade. Not all members were aware of the change. In addition, there is the possibility that language in the code may conflict with current PCA requirements, suggesting that there is a need to coordinate between agencies on this topic.

Jeannine presented slides on septic systems, another topic about which the Task Force had requested more information. Point-of-sale requirements and available funding for private septic system work were discussed. Members asked why current programs target septic systems but not private sewer laterals, when work on both addresses similar water quality issues; one member thought that the perception that septic systems inherently fail sooner than sewers may contribute to this. A previous report to the Legislature prepared by the MPCA on liability for septic systems was brought up; more education on the similar liability due to I/I may be needed. Jeannine requested that any additional information for the spreadsheet of existing private property I/I mitigation programs be sent to her.

Andy Lukas from Brown and Caldwell presented information on private property I/I work in the Milwaukee area. He described Milwaukee Metropolitan Sewerage District (MMSD), a regional, state-chartered entity responsible for water reclamation and flood management and its WWTP and interceptor infrastructure, and some of the problems it has with inadequate capacity, legacy foundation drain connections, and aging laterals. Based on estimates done in 2010/2011, if nothing has changed by 2054, 69% of the laterals in that area will be over 75 years old. He said that while this was something people were aware of, they didn't appreciate the extent of the problem until they had this data.

While MMSD had a private property I/I program before 2010, it was poorly utilized. Two significant storms in 2010, which caused widespread basement backups and sinkholes, prompted the development of a new program. In response to questions about why they decided on a regional program, Andy said that the district saw it as an opportunity to eliminate one of the barriers communities were facing in addressing this problem.

Members had several questions on funding. Andy explained that in general, the money communities had available for the I/I projects is proportionate to what they paid into the MMSD capital budget. Billing for the capital budget is based on tax base of each community. Within Milwaukee county, funds come from property taxes; outside the county, communities decide how they want to be reimbursed by their taxpayers for the service. The I/I program isn't a new fee or a line-item on the bills sent to communities; it was instead prioritized over other capital projects.

Participation in the program is voluntary, but if a community doesn't use its funds, the district can use them for other wet weather projects. Communities are each allocated their own money and are not competing with each other for funds. Communities may use the funds to cover the entire cost of non-illicit/prohibited connections, or up to 50% of the cost for illicit/prohibited connections. For the latter, communities could require homeowners to pay the rest, or use other community funds for the other 50%. Most of the early money has been spent on investigation and outreach, but they are entering a period of more construction. Many types of work have been done, including things like grouting the first ten feet of leaky laterals. Members who have found grouting ineffective in their communities asked about this, and Andy explained that that type of work was approved on a limited basis, and they will be following back up to check its durability and effectiveness.

Andy highlighted flexibility as an important part of MMSD's program. Projects are most often municipally-procured, but in some communities the participating homeowner procures the repairs. Other aspects of the program include outreach and education; there is a dedicated webpage which includes videos and other materials for homeowners.

Members asked what guidelines MMSD has to ensure consistency with lateral inspectors and contractors. Andy said that there are people reviewing standards, and he believes they're required to use PACP-compliant contractors. For actual construction work, MMSD reviews plans and provides comments. Full-time inspection during construction is required, as is a post-construction inspection.

There were questions about the program's participation requirements and how cities are approaching the problem. Andy explained that communities are encouraged, but not required, to participate, and that only a few communities are requiring their homeowners to do so. Most participating communities are bundling properties or neighborhoods together and getting reimbursed annually rather than doing them individually. He said that while MMSD regulates communities that discharge to their facilities to some degree, there's no requirement that everyone handle private property I/I the same way, and no requirement to prioritize non-compliant areas (although it is encouraged) if communities would rather do the work elsewhere. The program funds can be used on both combined and separate sewer systems' private property issues.

A member asked why a city would want someone else controlling their funds for this type of work, so long as the city already plans to spend that money wisely. Andy said that MMSD went this route because no one was spending money on private property I/I at the time. They tried to allow enough flexibility in the program that cities with fewer I/I problems, who might initially be more reluctant to participate in the program, could still use the funds for things like private drainage issues, because those could cause I/I problems downstream. A member asked about point-of-sale requirements, but as of 2015, it's illegal for Wisconsin cities to require a point-of-sale program.

Members asked whether keeping the water out of the sewer system was resulting in new problems from it going elsewhere, or requiring new public drainage infrastructure. Andy said that the funds from the program can be used to intercept, redirect, and convey this water, but that some cities are having challenges with this, and are having to decide whether they'd rather have temporary street flooding than basement backups. He said that typically there aren't larger-scale problems with flooding because the amount of water involved isn't large enough in most places for that to be a problem. Members discussed whether lag time between the peak of a storm and when sump pumps begin pumping could affect this; some thought it could shift most of the flow outside of the peak of a storm and mitigate the impact on flooding, and others didn't think there was much lag.

Andy next discussed data-gathering and effectiveness. He said that MMSD is working on building a better database to help with long-range planning efforts. They're trying to determine how much bigger the problem will be over the next few decades, and what the comparative costs are of raising the level of service to prevent backups vs. the costs of dealing with the consequences. They're gathering data to show whether the work done made a major impact in various areas, while acknowledging that some places with lots of work done are still going to be wetter and have more I/I due to local conditions. It has been clear so far that comprehensive rehabilitation – working on both public and private I/I – is important. Some specific data-gathering techniques were outlined, such as sump pump flow data. A member asked whether piezometers were used to look at groundwater levels, and Andy said that while they aren't, modeling techniques are used to take groundwater and soil saturation conditions into consideration. MMSD also provides a temporary monitoring team that can be deployed to projects.

A member noted that MMSD's program was launched off a visceral connection with the public – flooded basements. He pointed out that not having this problem might impact the success of such a program in some

places. Andy acknowledged that this was a factor; in Milwaukee, overflows get a fair amount of press. Jeannine commented that there were basement backups and wastewater releases into the environment here in 2014.

Bob Cockriel spoke briefly on responsibility for locating private laterals within the public right-of-way, discussing recent Minnesota Office of Pipeline Safety lobbying to make cities responsible for private laterals. He was not sure whether everyone understands there is a distinction between having responsibility for locating the laterals and having ownership/maintenance responsibilities, and wanted to be sure that efforts to provide funding or otherwise help home and property owners repair their private laterals within the right-of-way didn't muddy the waters on this topic.

Jeannine asked members to review the information in their meeting packets in preparation for the next meeting, and to bring ideas that they would like the task force to look into to help address the political, technical, and financial issues surrounding private property I/I mitigation.

A member asked how state law affects our ability in MN to use public money on private property. Bryce couldn't speak to how that affects municipalities, and said that for the Metropolitan Council, our statutory responsibility is a little murky; it is a matter of interpretation.

Bryce asked that members review the level of service survey in their packets, and send any comments or suggestions to Angela. He explained that the intent is to be sure MCES is on the right track, and on the same page as our customers.

Sandy thanked members for attending and thanked Andy for his presentation before adjourning the meeting at 10:00 a.m.

Inflow/Infiltration Task Force

Meeting #3

April 22, 2016

8:30 – 10:30 a.m.

St. Croix Room

League of MN Cities

145 University Ave. West

Saint Paul, MN 55103

Members Present:

Matt Saam, Apple Valley
Bob Cockriel, Bloomington
Kory Jorgensen, Coon Rapids
Russ Matthys, Eagan
Chad Millner, Edina
Bert Tracy, Golden Valley

Jason Ziemer, North St. Paul
Bruce Elder, Saint Paul
Lisa Cerney, Minneapolis
Paul Oehme, Chanhassen
Mark Maloney, Shoreview
Patty Nauman, Metro Cities

Sandy Rummel, Metropolitan Council
Shelly Rueckert, St. Anthony
Brian Wagstrom, Minnetonka
Darin Rezac, West St. Paul
Eric Hoversten, Mound

Members Absent:

Jesse Struve, Brooklyn Park
Luke Fischer, Plymouth

Ross Beckwith, West St. Paul

Bruce Hanson, Newport

Metropolitan Council Staff Present:

Bryce Pickart
Jeannine Clancy
Kyle Colvin

Deborah Manning
Rebecca Fabunmi
Angela Mazur

Ryan Vial
Tim Keegan

Other Attendees:

Kelly Moriarity, Minneapolis

Meeting Purpose:

To agree on a problem statement regarding private property I/I mitigation (PPIL), and to generate ideas to address technical, political, and financial challenges regarding PPIL.

Meeting Notes:

Sandy Rummel welcomed the meeting attendees. After introductions, she summarized the agenda and asked that any comments on the minutes from the 3/18/16 meeting be sent to Angela Mazur.

Andy Lukas gave a brief presentation on evaluating I/I mitigation effectiveness. He highlighted key considerations, such as whether it's cost-effective to reduce I/I system-wide, how to determine whether work done was worth the money spent, and where to draw the line on adding capacity vs. I/I mitigation. Andy discussed challenges Brown & Caldwell faced while developing a protocol for evaluation. Getting adequate data even for their case study evaluation was difficult; of 56 utilities with potential projects, only 15 had adequate data, of which 12 were willing to participate. Many projects didn't have pre-construction flow data or had inappropriate flow monitoring due to instruments being in the wrong place. Some utilities were unwilling to share data due to regulatory concerns or a lack of staff time.

For those communities with adequate data who shared it, Brown & Caldwell did a post-construction evaluation. They found there were challenges with comparing flow event data before and after rehabilitation. Just looking at the data did not always draw a clear picture of how much I/I reduction was

actually accomplished by the work. He showed some examples that didn't give a clear answer, and explained that this is why they prefer to use modeling: it can take into consideration different system responses depending on how wet the ground was to start. He described the calibration process for the model, and how once it was calibrated, they ran the long-term rain record through the model to get a simulated sewer flow history. Andy said this provided a statistical sense of how often they could expect flows of a certain magnitude, and gave them a better idea of how the system is likely to function over the long term. All of this resulted in a more representative view of how much I/I reduction was actually achieved with rehabilitation work.

Andy described how this method would be applied to provide better information in the Metropolitan Council Environmental services (MCES) service area: Brown & Caldwell will apply this method to four areas that have adequate data, three of which have had significant rehabilitation work done, and one which hasn't, which will serve as a control. They will figure in factors like growth, do some statistical analysis, and report on the findings. In response to a question about whether the model factors in physical degradation of the collection system, Andy explained that it doesn't; it assumes current system condition.

Moving on to the proposed problem statement, Sandy requested input from task force members. The group offered the following feedback:

- Focus on the technical.
- Don't assume what local elected officials think. Some have addressed the problem, and they rely on us to bring them viable solutions.
- Reword the last sentence so it doesn't insinuate that the benefits don't outweigh the challenges.
- Some communities in the region may not know the scope of the problem, or that they're contributing to it to some degree, and they should be made aware of this.
- Lack of education on the issue for both public and elected officials is a significant part of the problem.
- The public system was prioritized in many places, but there's a question of how far to go on the public side before beginning to deal with the private system.
- There's a need to help people understand that both systems have to be addressed to solve the problem, because the private system connects to the public system.
- It should leave room for different approaches by individual communities – no one-size-fits-all solution.

It was agreed that MCES staff would rework the problem statement based on this feedback and e-mail another draft to the task force members for consideration.

The task force spent some time talking about some of the ways different communities have addressed the problem so far, including public outreach and municipal inspection programs on private property. Many methods were used for public education: flyers in utility bills, town newsletter stories, website content, public meetings, newspaper articles, press releases, appearances on local television news programs, meetings with real estate agents about point-of-sale programs, etc. Emphasis on the environmental and long-term cost importance of the work was used to create buy-in from the public, and some cities combined their I/I inspections with other existing inspection programs, such as for water meters. Several communities offered to share materials they used during this process. Members whose communities had done this thought it was fairly successful, but that there will always be a few property owners who object for a variety

of reasons. Some of that resistance can be resolved with better communication, or by revising ordinances to allow fee authority or utility shut-off if inspections aren't allowed. Other problems encountered included homeowners reconnecting sump pumps after inspection, and the frustration of not being able to fix the problem overall even after having spent a lot of money on the public system.

Next, the group considered the PPII ideas for consideration table. Jeannine Clancy emphasized that this was not a proposal, just a list of possible approaches to use in determining what task force members would be interested in pursuing. The focus of the conversation was shifted to funding, which continues to be one of the largest concerns. Members acknowledged that MCES and Metro Cities have helped by finding funds to address I/I in public systems, but reiterated the need for the same to address PPII. Patty said that while requests for bonding money for public infrastructure have become more normalized, there are still significant difficulties securing funds for work on private property, especially from the Clean Water Fund. Various factors affect this, but in general, the lack of an income test, the idea of public money being made available to private property owners (even though this is done for other reasons), the focus on the metro area, and the perception of I/I as a bottomless pit of a problem are the biggest barriers. One member suggested looking into whether wording could be changed to acknowledge the private systems as ultimately being part of the public system to reduce some of the statutory barriers to how this work can be funded.

Members feel the inconsistency caused by not having a predictable source of funding makes developing sustainable programs very difficult, and can cause problems with public perception when cities are trying to balance scheduling work with not knowing when funds will run out. There is no guarantee funds will still be available by the time they write ordinances, get city council approval, etc. They also discussed the importance of having something to react to and use to persuade councils of the necessity of the work – whether that's the possibility of a surcharge or guidelines that direct attention to PPII.

Bryce Pickart referenced the statute in the meeting materials packet that gives cities authority to establish I/I mitigation programs. He said that if they wanted to discuss the Metropolitan Council providing a source of funding, that's viable; the funding would ultimately be coming from the cities, since the MCES's funds come from customers. Another possibility would be amending the statute to add statutorily defined sanitary districts in addition to cities, but MCES would be wary of editing statutes affecting its fundamental funding source.

Shelly Rueckert distributed a funding options table she developed to describe the pros and cons of various fee-based, assessment, and point-of-sale funding options for PPII. She suggested that presenting the work as a sustainability or environmental correction issue could help secure support for funding it. Other members thanked her for and said they found it helpful to have a city finance perspective on the options.

Members had questions about the "special assessment at repair" option, where corrective action is taken and paid for initially by the city, and then added as a special assessment to property tax over a number of years. Some cities have done this, but there are varying levels of comfort with it, and it requires cities to assume some risk. It was pointed out that the cost of doing the work now could be considerably lower than in the future, so that may be an incentive both to cities and property owners to address this sooner.

Another question had to do with what the law allows for cities who want to accumulate money through user fees to pay for work in the future vs. collecting money for a specific capital improvement project. This may be more of a political issue than a legal one; wording would need to be very specific so the funds collected are only for one thing. However, members thought that the availability of those funds could make levies in

subsequent years more difficult, as elected officials would be reluctant to do so if there was money already collected for something else.

Jeannine updated the group on West St. Paul's proposed Memorandum of Understanding (MOU), which will entail the city developing a point-of-sale program to address I/I while remaining sensitive to demographics which include many residents on a fixed income.

Sandy asked task force members to contact Jeannine with any additions to the next agenda. There was a request to start the next meeting with more discussion of the finance handout.

The meeting was adjourned at 10:30 a.m.

Inflow/Infiltration Task Force

Meeting #4
July 14, 2016
1:30 - 3:30 p.m.

St. Croix Room
League of MN Cities
145 University Ave. West
Saint Paul, MN 55103

Members Present:

Bob Cockriel, Bloomington
Kory Jorgensen, Coon Rapids
Russ Matthys, Eagan
Chad Millner, Edina
Bert Tracy, Golden Valley
Paul Oehme, Chanhassen

Patty Nauman, Metro Cities
Brian Wagstrom, Minnetonka
Darin Rezac, West St. Paul
Eric Hoversten, Mound
Luke Fischer, Plymouth

Bruce Elder, Saint Paul
Jesse Struve, Brooklyn Park
Katrina Kessler, Minneapolis
Kelly Moriarity, Minneapolis
Mark Maloney, Shoreview
Sandy Rummel, Metropolitan Council

Members Absent:

Matt Saam, Apple Valley
Shelly Rueckert, St. Anthony

Bruce Hanson, Newport

Jason Ziemer, North St. Paul

Metropolitan Council Staff Present:

Bryce Pickart
Jeannine Clancy
Kyle Colvin

Ryan Vial
Tim Keegan
Wayde Schroeder

Angela Mazur

Meeting Purpose:

To agree on a problem statement regarding private property I/I mitigation (PPII), and to generate ideas to address technical, political, and financial challenges regarding PPII.

Meeting Notes:

Sandy Rummel welcomed the attendees and introduced the agenda. There were no comments to Meeting #3's minutes. Jeannine Clancy presented the revised problem statement, which will be used to formulate the task force's final report. She discussed the revision process for the original problem statement, which took place between meetings three and four with a small group of Task Force members, and requested that those present read it and offer comments.

Problem statement feedback:

- There were questions about the "metro governments" wording; it was clarified that this was used instead of "cities" to include non-city entities like MCE's system.
- "Large unresolved problem" – is the problem large through all parts of the region?
- Members discussed a suggestion that wording be added about the need to develop a consistent regional approach and tools to quantify and resolve the problem
 - If this is done, "state" should be included, too, since state funds are sought for this
 - Some members thought this was more of a solution for the implementation plan than part of the problem statement
- Several members wanted to ensure PPII remains front and center in the statement

Jeannine began the policy options discussion with the I/I requirements laid out in the *Water Resources Policy Plan* and Waste Discharge Rules. Members agreed that these requirements met the need for direction that they discussed at previous Task Force meetings, and could be helpful when explaining to elected officials that a PPII program is necessary.

The group next discussed “Compliance with Minimum Requirements for Wastewater Plan Established in Local Planning Handbook.” Members asked whether the planning review process will check whether the I/I portion is included. Kyle Colvin confirmed that it would, and that the requirement applies to all communities. Task Force members were invited to a webinar the following week to discuss this process in more detail. Some communities planned to include information on their past I/I efforts in addition to plans going forward, which Kyle agreed would be helpful, along with discussing related ordinances and challenges associated with PPII. Members also discussed whether having minimum requirements would be worthwhile. Jeannine suggested that the Task Force recommend in its final report that the Council further define what compliance looks like.

Moving on to the finance and policy toolboxes, Jeannine reminded the group of a previously-discussed idea from Shelly Rueckert’s finance table, of a region-wide fund built over time. Patty Nauman said that Metro Cities will continue to advocate for money from the Clean Water Fund, and that she has heard the group’s feedback about the lack of predictability. She said that while the funds are difficult to get, they should be included in the conversation. Jeannine added that Metro Cities can always use support from the group when it seeks these funds.

Task Force Responses to Finance Options:

- Consistent funding is very important.
- Upfront options are not as helpful for cities that aren’t expanding
- “The more sources we can look into, the better.”
- MCES sets aside funds as part of wastewater fees (Might require legislation modifications; first opportunity would be in 2018.)
 - Potential perception of unfairness from communities that have already done a lot of I/I mitigation – those communities would want recognition of their efforts
 - Potential perception of unfairness from communities with aging infrastructure – diversity in age of infrastructure burdens some communities more than others
 - It’s “luck of the draw with where you’re located and when you were built.”
 - If the problem isn’t solved, the cost of increased capacity will eventually be passed on to all communities anyway
 - Economy of scale associated with using MCES plants and facilities, but it inherently limits autonomy.
 - Must be a blended approach – acknowledgement that work is occurring both on local and regional levels

One member pointed out that in some ways, this is not very different from what is being done now with the exceedances, work plans, and work credits – this just crosses the right-of-way. Explaining that we’re already doing this could be relevant in trying to present this to city councils.

Jeannine asked what strategies the group would be interested in MCES pursuing.

Policy Implementation Concept Options Presented and Task Force Response:

- Making MCES funds available through rate program (program specifics to be developed later by sub-group)
 - Not all members were comfortable with this
 - Education would be essential to make this idea palatable to some
 - Group would like to keep it on the list as a potential option, but unsure whether they would recommend adopting it
- Model ordinance development
 - Task Force would recommend pursuing
- Inspections program – inspections criteria, cities start at ground zero.
- Inspections program – best practices
 - Task Force would recommend pursuing
- Master Contract for inspections
 - Members asked whether this was limited to lateral service inspection. At this point, it would be, but repairs could be discussed.
- Performance standards
 - Task Force members had no objections to this
- Measurement
 - Task Force would recommend pursuing
- Public education
 - Could create a library of articles, customizable education resources, etc. like watershed management organizations have done. Members did not have any additions to the list.

A member suggested that it could be helpful for the League of Minnesota Cities to discuss developing ordinances with elected officials, so there was a dual approach rather than just public works staff trying to push the initiative uphill. This could include incorporating I/I into ongoing training and conferences. Patty asked how involved cities want the officials to be, and at what level of detail, and Task Force members clarified that they still expected groups like theirs would figure out how to solve the problem, but that there is a need for elected officials to understand the scope and importance of the problem, and that it's an ongoing process rather than something that will be finished soon.

Jeannine introduced the changes to the I/I program's calendar year, which is being switched from a July through June program year to a January through December program year. Bryce discussed the peaking factor change, which alters how water conservation credit is determined based on additional knowledge gained since this adjustment was first added after the previous I/I Task Force. He explained that it makes the goals a little less stringent, but while it would change the amount of some exceedances slightly, it doesn't have much impact on whether cities would or wouldn't have an exceedance in the first place. The adjustment for water conservation will be revisited when the 2050 Water Resources Policy Plan is developed.

Sandy asked what the next steps would be for the Task Force. Jeannine said that MCES staff will prepare a report including the information the Task Force reviewed its recommendations. The draft report will be sent to the group in mid-September for review, and the Task Force will meet again near the end of September. If the report is approved, it will be presented to the Environment Committee, after which the Task Force sub-groups would be set up. A member asked whether the minimum compliance requirements would be a sub-group, and Jeannine said it would be the recommendation that a group be convened to discuss that topic.

Sandy thanked everyone for participating in the meeting, and thanked staff for their efforts in putting together the list of policy ideas that reflected the discussion in previous Task Force meetings.

The meeting adjourned at 2:55 pm.

Inflow/Infiltration Task Force

Meeting #5
October 4, 2016
9-11 a.m.

St. Croix Room
League of MN Cities
145 University Ave. West
Saint Paul, MN 55103

Members Present:

Bob Cockriel, Bloomington	Mark Maloney, Shoreview	Luke Fischer, Plymouth
Kory Jorgensen, Coon Rapids	Patty Nauman, Metro Cities	Jesse Struve, Brooklyn Park
Chad Millner, Edina	Sandy Rummel, Metropolitan Council	Katrina Kessler, Minneapolis
Bert Tracy, Golden Valley	Eric Hoversten, Mound	Kelly Moriarity, Minneapolis

Members Absent:

Matt Saam, Apple Valley	Bruce Hanson, Newport	Brian Wagstrom, Minnetonka
Russ Matthys, Eagan	Bruce Elder, Saint Paul	Darin Rezac, West St. Paul
Jason Ziemer, North St. Paul	Paul Oehme, Chanhassen	
Ross Beckwith, West St. Paul	Shelly Rueckert, St. Anthony	

Metropolitan Council Staff Present:

Bryce Pickart	Steve Hack	Ryan Vial
Jeannine Clancy	Marcus Bush	Tim Keegan
Kyle Colvin	Angela Mazur	Wayde Schroeder

Meeting Notes:

Katrina Kessler and Bert Tracy began the meeting with an announcement that there will be a day devoted to I/I at the next annual MPCA Wastewater Operators and Collection Systems Conference starting 3/27/17, and suggested that task force members consider participating. Other sessions at the conference may also be on relevant topics, such as the condition assessment of pipes and asset management. Interested group members should let Katrina or Bert know and speaker sheets will be due in mid-November.

Sandy Rummel welcomed everyone and outlined the agenda. There were no changes to the previous meeting's notes. Jeannine Clancy introduced Marcus Bush, then directed everyone's attention to the summary of comments received on the draft I/I Task Force report. The group walked through the overall important points rather than reviewing each comment in detail.

Comment/Change #1: Patty Nauman recommended "regional communities" be changed to "local communities."

There were no objections.

Comment/Change #2: Revisions were requested to the problem statement regarding the use of the words "significant" and "unquantified" to describe the problem.

Members agreed that "significant" was accurate when used to describe the percentage of miles of pipe in the private system vs. the public system, but were divided on whether this accurately conveyed the severity of the problem, given the varying age and condition of pipes in different communities. Others were concerned that not describing the problem as significant would suggest that it's not important to solve.

The task force discussed this and decided on a revision that both described the problem as significant and clarified that it was, as yet, unquantified. They also decided to clarify that private lines are often not a part

of public inspection, replacement, or mitigation programs. Finally, minor revisions were made to wording (the removal of “As a result” and “over time”) to improve flow and make the statement more concise.

Comment/Change #3: A requested change would replace “A high rate of defective sewer laterals, including excessive tree root intrusion, cracked pipe, and drain tile connections” with “To date, there has not been a quantitative study of the problem, making it difficult to assess the impact of private lateral I/I in the system.”

Members discussed how the varying degrees of knowledge of the condition of a community’s private laterals should affect the wording in this section. The lack of quantitative study in many communities made some uncomfortable with a statement that would appear to apply to all communities, while other communities that had assessed their private system conditions felt it was an accurate description of the problem. There were concerns that a lack of specificity in describing the problem while at the same time emphasizing the need for study would encourage decision-makers to choose study instead of action in the near future, when both are needed. Some felt that the lack of analysis accompanying statements about the scope of the problem inhibited their ability to advocate for mitigation solutions with local decision-makers.

The group came to a consensus that if the heading and introduction of the section were changed to clarify that the problems described were representative of those found in some communities, and not necessarily applicable to all, the original wording was acceptable.

Comment/Change #4: An additional recommendation was suggested: “Design and implement a PPII demonstration project that would provide additional opportunities for measurement of impact of wastewater base and peak flows.”

Members had some of the same concerns about this recommendation that they had about comment #3, primarily that it could discourage action until further study has been completed. Some thought it sounded like an attempt to prove return on investment, and could create a requirement to come up with studies to prove things that are already known to those who have been working on I/I mitigation for years. Others thought having completed demonstration projects could be helpful in efforts to advocate for state funding or convince local decision-makers to support mitigation efforts. Task force members discussed the issue and decided that the concerns some had with this recommendation could be addressed by moving this it farther down in the list of existing recommendations.

Comment/Change #5: Delete or revise items 4C and 4D. Suggested revised wording: “Consider the provision of financial assistance through regional sources, such as a portion of the wastewater fee, to provide assistance to communities for PPII mitigation.”

There were several concerns expressed with this portion of the report. Metro Cities doesn’t have an existing policy that would address a request on the part of the Metropolitan Council to be granted authority use a portion of the wastewater fee for PPII mitigation, so Patty felt more specific information would be needed before she could advocate for it. One concern was what the impact might be on other projects funded through wastewater fees. She also felt that the lack of detail could encourage legislators to propose designs for a program, which might make it more difficult to design a program afterward that communities would find equitable and beneficial. Other task force members agreed this was a likely outcome.

MCES staff noted that this was an attempt to address the ongoing problem communities have with the lack of consistent funding for PPII mitigation, and that a program could be designed after the statutory authority

was received that would make this a feasible option. MCES staff were asked whether the wastewater fee was the only potential source for this option, and were told that while there may potentially be a very small portion of the Council's property tax levy that could be used for a demonstration project, the wastewater fee is the most likely source.

Other concerns about this change related to the difficulty of designing a program that adequately takes equity into account. While the eventual rise in fees if excessive I/I requires a system-wide increase in capacity would affect all communities, members were worried that communities without excessive I/I, and those which had already completed much of their I/I mitigation work, would feel they were not receiving a benefit. It was suggested that the Council's current flow model for rates would provide some protection to communities, as those without a large I/I problem would have a lower total proportion of flow, and thus lower rates. A member also suggested designing the program so funds could only be used for repairs and replacements that they as professional public works staffs know will fix a portion of the I/I problem.

One member offered the perspective that because the task force's goal is to provide technical recommendations, their recommendations did not necessarily have to be the final word in what was taken to the legislature: they're just being asked whether they would support the Council's attempting to seek broader funding sources, which could include a portion of the wastewater fee. Therefore, this could be interpreted as the task force advising the council that this is a topic on which further action, outside of the task force, should be taken. That further action could include convening a group of stakeholders to design the program. Members agreed that they wanted the Council to give them direction to help design a program, and that they wanted additional sources of funding pursued.

The group voted on this proposed change via a show of hands, and a clear majority supported the revised version, as opposed to leaving the language as it had been in the initial draft. Members wanted to recommend that the Council pursue the issue, but also make it as easy as possible for Metro Cities to help advocate on behalf of such a statutory change and program.

Comment/Change #6: Remove Recommendation 7, having to do with MCES investigate developing master contracts that could be used by communities for PPII inspections and service lateral repairs.

Members asked whether there was a cost associated with this, and MCES staff explained that while there is a cost for oversight, the inspections and repairs themselves would be paid for by the communities using them. The member who had submitted this change withdrew the request to remove the statement.

Jeannine outlined the next steps. The report would be revised with the changes discussed at the meeting and send back out to the group for review. If consensus could be reached to approve the revised report before 10/14, it could be presented to the Environment Committee on 10/25. Jeannine requested that any members who were available and interested in helping present the report let her know. Bryce Pickart briefly described the demonstration project mentioned in the recommendation added to the report, and said that in the interest of time, they would follow up with task force members to find out if anyone is interested in being one of the communities that would partner with MCES on this if funding could be found.

Kyle Colvin announced an upcoming community forum in early November to discuss minimum I/I requirements for comprehensive planning, a topic the group had discussed at earlier meetings, and invited task force members to attend. Further details would be sent to the group once a location was chosen.

Sandy thanked everyone for their participation and input. The meeting adjourned at 11:05 am.

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