# Residential Sewer Lateral Maintenance Program Analysis for the City of Milwaukee

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## *Foreword*

Students in the master of public affairs program in the Robert M. La Follette School of Public Affairs at the University of Wisconsin–Madison produced this report for the City of Milwaukee's Department of Administration's Budget and Management Division. The opinions and judgments presented in the report do not represent the views, official or unofficial, of the La Follette School or of the clients for whom the students prepared the report.

The authors are enrolled in the Public Affairs Workshop, Domestic Issues, the capstone course in their graduate program. The La Follette School offers a two-year graduate program leading to a master of public affairs or a master of international public affairs degree. The workshop provides practical experience applying the tools of analysis acquired during three semesters of coursework to actual issues clients face in the public, nongovernmental, and private sectors. Students work in teams to produce carefully crafted policy reports that meet high professional standards within the timeframe of a single academic semester. The reports are research-based, analytical, and when appropriate, evaluative.

This report would not have been possible without the encouragement and leadership of the City of Milwaukee's dedicated employees. The report also benefited greatly from the support of the staff of the La Follette School. In particular, Outreach Director Terry Shelton contributed logistical and practical support. Karen Faster, La Follette publications director, and Alice Honeywell, senior editor emerita, edited the report, and Karen oversaw production of the final bound document.

This report was generated primarily for the educational benefit of its student authors, and the purpose of the project was to improve their analytical skills by applying them to an issue with a substantial policy or management component. This culminating experience is the ideal equivalent of the thesis for the La Follette School degrees in public affairs.

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Assistant Professor of Public Affairs and Political Science
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## *Executive Summary*

The City of Milwaukee is interested in developing a long-term program that would encourage residential property owners to maintain private property sanitary sewer laterals. This report analyzes three program alternatives and recommends an insurance program that will encourage residential sewer lateral maintenance while meeting Milwaukee's public policy goals.

Sewer laterals are the underground pipes that connect a residence or business to the main sewer line. In Milwaukee, as in many cities in the United States, maintenance of sewer laterals is the responsibility of private property owners. Poorly maintained sewer laterals contribute to the infiltration and inflow (I/I) of storm water or groundwater into the Milwaukee's dedicated sanitary sewer system, which can cause the system to overflow. The discharge of sewer overflow into residential basements and surrounding waters negatively affects the environment and public health, and it also violates state and federal regulations. As cities throughout the United States struggle to address problems of I/I, municipal programs to encourage and assist residential private property owners in maintaining private sewer laterals are growing in popularity.

Our research aimed to identify innovative residential sewer lateral programs and assess which programs are feasible for Milwaukee. Following a broad Internet search and literature review, we identified and contacted 78 cities with a brief telephone survey. The purpose of this survey was to understand the varying municipal approaches to residential sewer lateral programs. As a result, we identified three key components of sewer lateral maintenance programs: 1) funding mechanism; 2) eligibility and assistance criteria; and 3) implementation strategy.

We conducted a second in-depth telephone survey with 13 cities, which were selected based on diversity of program type, innovation, and geographic similarity to Milwaukee. We gathered detailed information about each municipal program in order to analyze how the components of the residential sewer lateral maintenance program met Milwaukee's policy goals of affordability, political feasibility, and effectiveness.

This report identifies three residential sewer lateral maintenance programs for the city of Milwaukee: 1) the status quo; 2) an insurance program; and 3) a loan program. Based on an analysis of the program components and policy goals, we recommend that Milwaukee implement an insurance program. An insurance program is the most affordable, politically feasible, and effective long-term solution to encourage the maintenance of residential sewer laterals and to ensure the reduction of I/I in Milwaukee.

Furthermore, our research identified a limited, short-term funding source through the Milwaukee Metropolitan Sewerage District for programs that aim to reduce private property I/I. This funding is not available to capitalize a citywide maintenance program; however, we recommend Milwaukee take advantage of this funding opportunity by implementing a targeted program in high I/I areas to supplement the insurance program.

## *List of Abbreviations*

| | |
|---|---|
| CDBG | Community Development Block Grants |
| CMOM | Capacity Assurance, Management, Operations, and Maintenance |
| I/I | Infiltration and Inflow |
| MMSD | Milwaukee Metropolitan Sewerage District |
| SSO | Sanitary Sewer Overflow |
| USEPA | U.S. Environmental Protection Agency |
| USHUD | U.S. States Housing and Urban Development |
| WDNR | State of Wisconsin Department of Natural Resources |
| WERF | Water Environment Research Foundation |

## *Glossary*

**Capacity Assurance, Management, Operations, and Maintenance (CMOM)**: a regulatory program established by the U.S. Environmental Protection Agency that requires owners of sanitary sewer treatment and storage facilities to better manage, operate, and maintain collection systems.

**Clear water**: relatively clean water, such as groundwater or storm water, which does not require treatment at a wastewater treatment facility.

**Combined Sewer System**: a sewer system that collects and transports both storm water and sewage in a single pipe network.

**Faulty (Sewer Lateral):** damaged, cracked, leaking, or broken sewer lateral.

**Infiltration and Inflow (I/I)**: infiltration is the excess water that seeps or flows into old or damaged collection systems from the surrounding soil. Inflow describes additional unwanted water, such as rainwater or snow thaws, that enter collection systems from above ground. I/I describes the overall problem of extra wastewater in the system.

**Maintenance (of Sewer Lateral)**: the inspection, repair, and/or replacement of sewer laterals.

**Milwaukee Metropolitan Sewerage District (MMSD)**: a regional government agency that provides water reclamation and flood management for 28 communities in the greater Milwaukee area.

**Sanitary Sewer Overflow (SSO)**: discharges of storm water and sewage into area water systems.

**Separated Sewer System**: a sewer system that collects and transports storm water and sewage in separate networks of pipes. (Sometimes referred to as a "dedicated sanitary sewer system.")

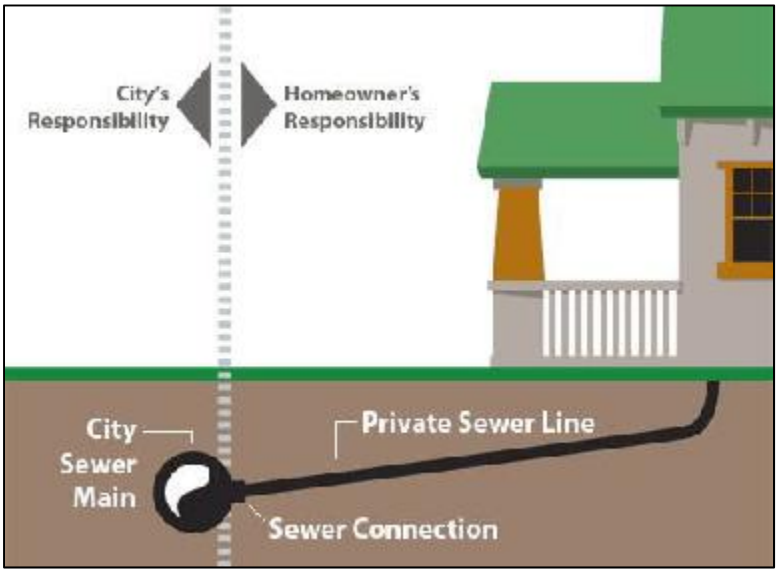
**Sewer lateral**: the underground pipe that connects a residence or business to the main sewer line.

**Sewer Maintenance Fund**: a city of Milwaukee general fund used primarily for the maintenance of public sewer mains and for limited emergency private sewer lateral testing. Created with storm water and sewer maintenance fees on water utility bills.

## *Introduction*

Sewer laterals are the underground pipes that connect a residence or business to the main sewer line. In the City of Milwaukee (hereafter referred to as Milwaukee), as in most cities in the United States, private property owners are responsible for sewer laterals. Milwaukee defines the sewer lateral as the private sewer line from the main sewer connections to the property foundation (Milwaukee Code of Ordinances, §12-15). Figure 1 depicts the distinction between public and private ownership of sewer laterals. The distinction of ownership is important when it concerns responsibility for maintenance of the sewer lateral. Milwaukee is responsible for providing regular inspections and repairs on the public portion of the sewer system. However, the maintenance (defined as inspection and repair, including replacement) of faulty private laterals is the responsibility of the private property owner (hereafter referred to as property owner).

Figure 1 – City of Milwaukee Definition of Sewer Lateral Ownership




*Source: City of South Milwaukee Wastewater Treatment Facility, n.d.*

Milwaukee has no regular maintenance program for the private portion of the sewer lateral system. Instead, the city often discovers faulty private sewer laterals when investigating acute problems, such as sewer system back-ups or pavement sink holes (Jaber and Thur, 2010). Faulty sewer laterals can be caused by a range of factors including the quality of material used for the lateral, the initial construction of the lateral, soil movement, intrusion of tree roots, or damage caused to pipes during maintenance (Water Environment Research Foundation [WERF], 2006). In addition, property owners have little incentive to maintain leak-free sanitary laterals for several reasons: limited financial assistance to cover the costs of lateral maintenance; a lack of education regarding owner responsibilities; and, in the absence of a sewer backup, difficulty identifying direct benefits of investing in maintenance (Gonwa, Simmons, and Schultz, 2004).

Upon discovery of a faulty sewer lateral, Milwaukee requires subsequent rehabilitation of the lateral (Milwaukee Code of Ordinances, §12-15). Maintenance on the

private sewer lateral, on average, costs property owners in Milwaukee around $5,000 but, depending on the length of the lateral, can vary by several thousands of dollars (Gonwa et al., 2004; Jaber and Thur, 2010). Without a regular inspection program, officials find it difficult to identify lateral problems until a major event occurs, such as the discharge of storm water and sewerage into area water systems (known as sanitary sewer overflows [SSO]) or a sewage backup into a property owner's home.

When private property sewer laterals fail, they also impose significant costs on the public (WERF, 2006; Gonwa et al., 2004). Deteriorating and leaky sewer laterals are a contributing factor to the overflow of the sewer systems with groundwater and storm water (otherwise known as "clear" water). Inflow and infiltration (I/I) is the term used to describe the ways that clear water enters into dedicated sanitary sewer systems (Metropolitan Council, 2009a). Infiltration is the excess water that seeps or flows into old or damaged collection systems from the surrounding soil. Inflow describes additional unwanted water, such as rainwater or snow thaws, that enter collection systems from above ground. The presence of I/I can overwhelm the system and cause overflows to be pumped into surrounding rivers and lakes. This discharge of sewer overflow has negative effects on the environment and public health and violates state and federal regulations (Metropolitan Council, 2009b; WERF, 2006). Private property sewer laterals are not the only source of I/I; however, studies have shown that efforts to reduce I/I significantly cannot be effective unless private sewer laterals are addressed (WERF, 2006; WERF, 2009).

Research indicates that I/I is a multi-sourced problem and that residential sewer laterals are only one part of this problem, but Milwaukee has specifically requested that we research and offer recommendations to implement a citywide residential sewer lateral maintenance program.[1] Following our recommendation would result in a program to encourage residential sewer maintenance but it would not address other causes of I/I.[2]

Within this paper, we first establish the premise for and the importance of exploring residential property sewer lateral maintenance program alternatives for Milwaukee. We then present our research methodologies and findings. Using these findings and the program goals derived from conversations with our clients, we explain how Milwaukee handles private property lateral failures and assess how this status quo meets the derived program goals. We continue our analysis by offering two long-term, citywide program alternatives that Milwaukee could consider—an insurance program and a loan program. In addition, we describe a short-term supplemental funding program, the Milwaukee Metropolitan Sewerage District Private Property I/I Reduction Program. We conclude by making a program recommendation with implementation strategies.

## Research Question

Which program should the city of Milwaukee implement to encourage residential property owners to maintain private property sanitary sewer laterals?

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[1] MMSD maintains a "separated" and a "combined" sewer system. This research and recommendation is for the separated sewer system in Milwaukee, not the combined sewer system.

[2] See Appendix A for expanded research on I/I and a discussion of the relationship between private property sewer laterals and I/I.

## Background

Milwaukee is responsible for 2,446 miles of public sewers, which connect to the Milwaukee Metropolitan Sewerage District (MMSD) system and sewer systems of surrounding communities (Milwaukee Budget Office, 2010).[3] Managing and maintaining these regionally integrated sewer systems requires coordination among various stakeholders. Three stakeholders play key roles in protecting public health, property, and the environment from sewage, flooding, erosion, and polluted runoff: the Wisconsin Department of Natural Resources (WDNR), the sewerage district, and the Milwaukee Department of Public Works By authority of the U.S. Environmental Protection Agency Clean Water Act, the WDNR issues permits to municipalities that include limitations and special conditions for controlling the amount of pollutants discharged by storm water and sewage systems (Wisconsin Department of Natural Resources [WDNR], 2009). Failure to comply with permitted use may result in WDNR issuing the municipality a fine.

MMSD is a regional government agency that provides water reclamation and flood management services for 28 communities in the greater Milwaukee area. In 2002, MMSD entered into an agreement with the WDNR to develop a Capacity Assurance, Management, Operations, and Maintenance Program (CMOM) and a private property I/I control program (Gonwa et al., 2004). CMOM is a regulation program established by the U.S. Environmental Protection Agency that requires owners of sanitary sewer treatment and storage facilities to better manage, operate, and maintain collection systems. CMOM principles are directed at reducing sanitary sewer overflows by formalizing the goals and objectives of an organization (regarding overflows) and the strategies and tactics that will be employed to achieve the goals (Milwaukee Metropolitan Sewerage District [MMSD], n.d.a).

MMSD owns and operates 411 square miles of tributary sewers and two wastewater treatment plants that serve the Milwaukee metro region (MMSD, 2010b). MMSD monitors the flow of tributary sewers and may establish fees due from a municipality for failure to manage I/I or peak flows as required by MMSD Rules (MMSD, 2010a). Milwaukee has received an unofficial warning from MMSD regarding I/I violations; once a written warning is received Milwaukee has two years to reduce I/I before being fined. The amount of the fine is unknown at this time (Jaber and Thur, 2010).

To assist municipalities with reducing I/I from private property sewer laterals, MMSD began a Private Property I/I Reduction Program on January 1, 2010 (MMSD, 2009). The program offers reimbursements to municipalities for private lateral repair, replacement, or rehabilitation. This program will be explained in more detail in the Program Components section of this report and in the Recommendation section as a supplemental financing source. This MMSD program is not sufficient to implement or sustain a long-term, citywide program; however,

[3] See Appendix B for additional background on Milwaukee, including revenue and expenditure and previous policies aimed at reducing I/I.

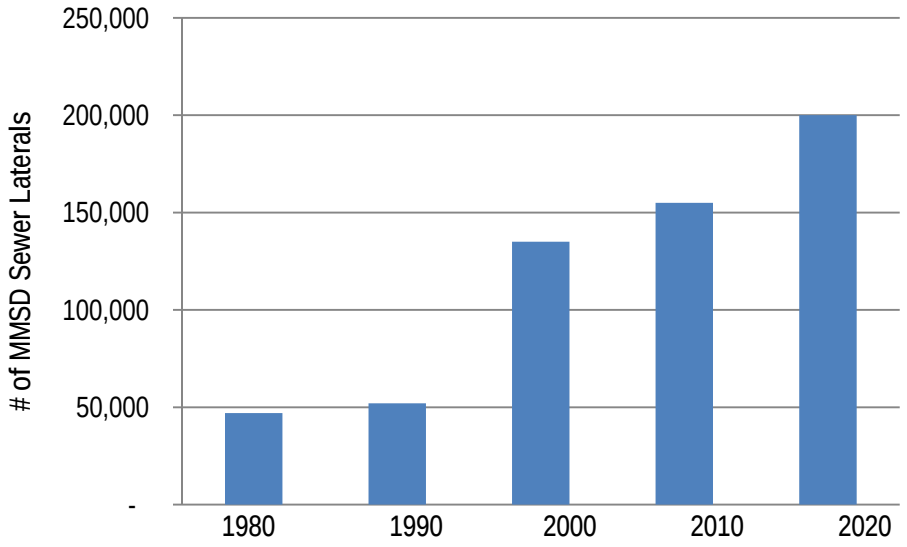
it can be used to in the short term to reimburse the costs of lateral repair in high volume I/I areas.

The Milwaukee Department of Public Works' Milwaukee Sewer Maintenance Division maintains and repairs the public sewer system within the city. This system connects to approximately 250,000 privately owned sewer laterals (Jaber, 2010, February 26), each of which is 30 to 100-plus feet long. Cracked, leaking, or broken laterals are a main source of private property I/I and in turn, SSOs (Gonwa et al., 2004). For instance, unusually heavy rainfall in June 2008 resulted in 3,383 complaints to the Milwaukee Department of Public Works call center regarding basement backups. In all but 47 cases, the Milwaukee Department of Public Works determined that the flow of the sewer main was satisfactory and that the problem must have been the result of a faulty private lateral and/or connection (Milwaukee Budget Office, 2010).

The main cause of faulty sewer laterals, and in turn I/I and SSOs, is aging infrastructure of the sewer system. Figure 2 shows that by 2020, MMSD estimates approximately 200,000 private laterals in the metro sewage area will be over 40 years old (Gonwa et al., 2004). The MMSD area serves approximately 1.1 million customers (MMSD, n.d.b). This suggests that approximately 18 percent of private laterals are expected to exceed 40 years of age by 2020. Within MMSD, Milwaukee estimates that it has approximately 250,000 sewer laterals, and about 60 percent of these laterals are residential (Jaber, 2010, March 5). While not a perfect predictor, and not accounting for age differences in various MMSD municipalities, these estimates suggest that approximately 27,000 residential sewer laterals in Milwaukee could be over 40 years old by 2020.[4]

[4] The estimation of 27,000 is not a perfect predictor of the number of aging laterals in Milwaukee. Circumstances such as age of infrastructure influence the age of the sewer laterals in a given jurisdiction. We do not have an estimate from Milwaukee or MMSD of the number of laterals specifically in Milwaukee that will approach the age of 40 by 2020. The number 27,000 residential sewer laterals is the calculation of 18 percent of 60 percent of total Milwaukee sewer laterals (250,000).

Figure 2 – Estimated Private Laterals > 40 years old in MMSD Service Area




*Source: Gonwa et al., 2004*

## *Research Approach and Methodology*

Milwaukee seeks a residential sewer lateral maintenance program that controls I/I while balancing other public policy considerations. To that end, Milwaukee officials asked our group to provide an overview of current residential sewer lateral maintenance programs in U.S. municipalities and to identify innovative residential sewer lateral maintenance programs.

In the final stage of our research we conducted a two-phase telephone survey of municipal sewer lateral maintenance programs and then investigated and analyzed the existing data and research. Our focus with the preliminary Internet and literature review was to provide a broad understanding of the available information on municipal policy approaches to residential sewer lateral maintenance programs.

Phase One of the survey consisted of a brief telephone interview of public works and sewer district personnel in 78 U.S. cities. The information gathered during this general search was taken into consideration when selecting cities to survey in Phase One, but it was not necessarily the deciding factor. Recognizing the possibility that some cities may have a policy or program but, for whatever reason, do not make it available on the city's website, other deciding factors were taken into consideration including demographic characteristics, age of city and sewer infrastructure, climate, population, and innovation in sewer lateral program. In identifying the targeted cities, we included all cities with 2008 estimated populations between 400,000 and 800,000 as comparisons of cities similar in size to Milwaukee (U.S. Census Bureau, 2008).

The first phase of the survey helped us classify the key components of sewer lateral programs. Of the 78 cities we attempted to contact, only 56 percent (44 cities) responded. Of these 44 cities, 55 percent (24 cities) had some sort of sewer lateral program and 45 percent did not. Using information gathered in the Phase I

survey, we categorized the surveyed cities by type of sewer lateral policy and selected a sample of cities representing these policy types for Phase Two. See Appendix C for a detailed description of the initial survey and of the results. Phase Two of the survey entailed an in-depth telephone survey with 13 U.S. cities.[5] The purpose of the second phase was to gather specific program examples from cities (listed below in Table 1 – Phase Two Telephone Survey Call List) with innovative or distinct sewer lateral programs and which could provide us an understanding of how different program alternatives and components could be used to meet the needs of Milwaukee. Our goal in selecting Phase Two cities was to create a representative sample of the diverse sewer lateral policy and program types. Through this process, we were able to narrow our initial survey pool of 78 cities down to a group of 13 cities located in nine different states.

Table 1 – Phase Two Telephone Survey Call List

| Municipality | State | Population | Program Type |
|---|---|---|---|
| San Mateo | California | 92,256 | Grant; Loan |
| Pacifica | California | 37,739 | Inspection; Grant |
| Atlanta | Georgia | 537,958 | Grant |
| Davenport | Iowa | 100,827 | Insurance |
| Saint Paul | Minnesota | 274,792 | Loan |
| Florissant | Missouri | 50,561 | Insurance |
| Pittsburgh | Pennsylvania | 310,037 | Insurance |
| Knoxville | Tennessee | 184,802 | Inspection; Loan |
| Bryan | Texas | 72,357 | Grant; Assessment |
| Fort Worth | Texas | 703,073 | Grant |
| Plano | Texas | 267,480 | Grant; CDBG |
| Racine | Wisconsin | 79,263 | Grant |
| Madison | Wisconsin | 224,625 | Grant |

*Source: Authors*

## *Research Findings*

Our research findings are derived from our review of literature on private property sewer I/I reduction programs (Gonwa et al., 2004; WERF, 2009; WERF, 2006) , the results of our two-phased city surveys, and conversations and information exchanges with our clients (Shambarger, 2010; Jaber and Thur, 2010; Finco 2010; Jaber, 2010, February 26). This section of the report outlines two elements that helped us arrive at our recommendation for a residential sewer

[5] See Appendix D for a detailed description of the in-depth survey and a summary of the results.

lateral maintenance program: the program components and Milwaukee's policy goals. The program components were used to craft and structure our program alternatives. These alternatives were analyzed based on three program goals in order to provide an appropriate recommendation for Milwaukee.

## Program Components

We found that a comprehensive residential sewer lateral maintenance program consists primarily of three elements: 1) funding mechanism; 2) eligibility and assistance criteria; and 3) implementation strategy. Figure 3 outlines these three components. Below we explain the three components in detail, and provide examples of each compiled from our literature research, city surveys, and conversations with Milwaukee and MMSD.

Figure 3 – Sewer Lateral Maintenance Program Components

1. Funding Mechanism
2. Eligibility and Assistance Criteria
    a. Type of maintenance eligible for assistance
    b. Type of financial assistance offered
    c. Eligibility to receive financial assistance
3. Implementation Strategy
    a. Inspection Responsibility
    b. Repair Responsibility
    c. Educational Campaign

*Source: Authors*

### Funding Mechanism

"Funding mechanism" refers to the upfront capital a city must have to create a program. The funding mechanism for a residential sewer lateral maintenance program determines the amount of financing assistance available for property owners, the time frame of the program, and the eligibility criteria for participation. Funding for a new residential sewer lateral maintenance program could be obtained through either self-generating means, such as fees and general fund revenue, or from outside resources. Examples of funding sources are outlined below.

**MMSD Private Property I/I Reduction Program Funds**: This MMSD program reimburses municipalities that create and implement approved private property I/I reduction programs (MMSD, 2009). The purpose of this program is to create an incentive for municipalities served by MMSD to partner in the effort to address private property I/I sources (MMSD, 2009) and to encourage municipalities to explore innovative methods of addressing private property I/I (Simmons, 2010). All projects completed within the program require a 25 percent match from and upfront funding by municipalities; MMSD prohibits municipalities from drawing funds in advance by offering funds on a reimbursement basis only (MMSD, 2009). Municipalities have until December 31, 2014, to complete private property I/I reduction programs and request reimbursement. Municipalities cannot exceed reimbursement requests for the amount allocated for the current year; however, municipalities can request prior year allocations if those allocations were unused. Private lateral replacement, repair, or rehabilitation, where it is being performed primarily to reduce private property I/I, is one use eligible for reimbursement.[6]

MMSD's 2010 Capital Budget includes $1 million in funding per year for five years, for the Private Property I/I Reduction Program; $364,153 of the $1 million is set aside for Milwaukee (MMSD, 2010a). This funding alone is not sufficient to implement a citywide program. Given estimates that lateral repair costs $5,100 per site on average, Milwaukee would only be able to fund maintenance on approximately 70 laterals each year using this funding (Gonwa et al., 2004). Even though the funding is currently scheduled to run through 2014, the MMSD Commission can change or eliminate program funding at any time. Currently no municipalities have submitted programs to MMSD for approval (Simmons, 2010).

**Sewer and Storm water Fees**: Many cities use fees on water or sewer utility bills to generate revenue for the creation of many residential sewer lateral maintenance programs, especially insurance programs. Pacifica, California, reallocated revenue from sewer fees to fund a $170,000 sewer lateral program (Martinez, 2010). Similarly, Davenport, Iowa, raised monthly sewer fees to fund an insurance program. Property owners needing a lateral replacement pay a $500 deductible, and the city of Davenport covers the remaining cost, up to $10,000 (O'Dean, 2010).

Pittsburgh, Pennsylvania, created a new revenue stream by charging private property owners a recurring fee on water bills. This fee is designated solely for a lateral repair and replacement insurance program. Pittsburgh charges a $5 monthly fee to assist residential property owners in paying for lateral repairs and replacements. Pittsburgh property owners can choose to opt out of the insurance program, but are ineligible for assistance if they do so (Obermeier, 2010).

**Bonds or Notes**: General obligation bonds are backed by a government guarantee to use taxing authority to repay the debt and generally have lower interest rates and reserve fund requirements Voter approval is frequently required for general obligation bonds (U.S. Environmental Protection Agency [USEPA], 2007).[7]

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[6] See Appendix E for the complete list of classification of work eligibility (MMSD, 2009).

[7] Local governments use special assessment bonds to finance specific infrastructure improvements in limited, identified areas. Special taxes, charges, or fees back the bonds (USEPA, 2007). Charges are related to obtained

Bonds can be useful in providing one-time start-up funds to initiate a program, such as a special assessment loan program for homeowners, similar to a program in St. Paul, Minnesota (Lemke, 2010).[8]

**Community Development Block Grant Funds:** The federal Community Development Block Grant (CDBG) program provides annual grants to eligible cities for maintaining quality housing and a sustainable living environment. Among the many approved uses of CDBG funds are the rehabilitation of residential and non-residential structures and improvements to water and sewage facilities (U.S. Housing and Urban Development [USHUD], 2009). We identified three Texas cities (Corpus Christi, El Paso, and Plano) in our initial survey phase that use CDBG funds to assist low- and moderate-income residential property owners with sewer lateral maintenance. Plano uses a CDBG to fund its emergency home repair grant program. This program provides assistance to low- and moderate-income property owners in need of emergency repairs to their plumbing, electrical, or mechanical systems. Depending on the property owner's financial status, the assistance provided is either in the form of a grant or low-interest loan. Plano's program is not solely a sewer lateral maintenance program, but repairs to private sewer laterals are a qualified use of program funding (Herke, 2010).

**Federal Environmental Grants**: Knoxville, Tennessee, is using U.S. Environmental Protection Agency grant funding to implement a comprehensive I/I reduction program. Under the umbrella of I/I reduction, Knoxville is implementing districtwide smoke testing of private laterals and providing financial assistance for lateral maintenance (Preseley, 2010).

**Property Taxes and Assessments**: Real estate property taxes are an ad valorem tax, charged to property owners as a percent of assessed value of real estate. Property taxes generally provide municipalities with a steady source of income that is less affected by economic downturns (USEPA, 2007). Florissant, Missouri, and Racine, Wisconsin, fund sewer lateral programs with fees on property tax bills (City of Florissant, n.d.; City of Racine, n.d.).

**Other Funding Resources**: The cities of San Mateo and Pacifica in California were being fined hundreds of thousands of dollars by the state for sewage overflow. Under the Supplemental Environmental Program created by the California Water Board, both cities were offered the opportunity to pay half of the fine to the state, and to use the other half of the fine to create a sewer lateral maintenance program. Both cities, however, had to divert additional funds from elsewhere in their operating budget to fund an overall program (Costa-Batis, 2010; Martinez, 2010).

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benefits received only by those in the bond district. A problem with issuing bonds for the purpose of a residential sewer lateral maintenance program may be the potential loss of tax-exempt status (Gonwa et al., 2004).

[8] Special assessments are surcharges placed on a property for a limited time and in a defined area (WERF, 2006). Property owners paying the special assessment charges receive an improvement not enjoyed by those outside the assessment area. Special assessment districts generally are authorized by local ordinance, and assessed charges cannot exceed the benefits being received by the assessed property owners (USEPA, 2007). Payment of a special assessment can be set up to require immediate payment or to allow property owners to defer payment over time.

## Eligibility and Assistance Criteria

Eligibility and assistance criteria refer to the financial assistance that a city offers property owners to assist with the cost of sewer lateral maintenance. Cities can assist property owners in a variety of ways, including grants and loans. In our research, we found that cities with a residential sewer lateral maintenance program considered three issues regarding eligibility and assistance: 1) what maintenance is eligible for assistance; 2) the type of assistance available; and 3) who is eligible to receive assistance. Examples of these criteria are outlined below.

**Type of Maintenance Eligible for Assistance**: A number of factors affect the maintenance eligible for assistance, including the following: the definition of the sewer lateral, the type of maintenance, and the portion of the lateral eligible for maintenance. Davenport defines the private sewer lateral as the section of the lateral four feet away from the foundation of the house to the main sewer connection (O'Dean, 2010). Additionally, options for type of maintenance include spot or full repair, and spot or full replacement. A sewer lateral can also be lined as a means of repair, but this is often not an option with failed clay laterals (Finco, 2010). Finally, the portion of the lateral eligible for maintenance assistance varies. The Florissant Lateral Replacement Program covers the portion of the residential sewer lateral that runs from the main sewer line up to within five feet of the residential dwelling unit (City of Florissant, n.d.). Conversely, Racine and Madison offer assistance for maintenance of only the part of the private sewer lateral in the public-right-of-way (City of Racine, n.d.; Daley, 2010).

**Type of Financial Assistance Offered**: For programs that offer financial assistance to property owners, there are two main types of assistance: 1) grants and 2) loans. Grants offered to property owners are monies the city is not expected to recoup. Many grant programs, like the programs in Portland, Oregon, and Plano are designed to assist income-eligible property owners (Dexter, 2010; Herke, 2010). Insurance programs are an innovative type of grant program, where a small fee is required for eligibility. The second type of financial assistance commonly offered to property owners is a subsidized loan. Within loan programs, there are several considerations, including whether to cap the loan amount, the interest rate, the payback period, and the mechanism for receiving payments. Regarding the latter, most municipalities issue a special assessment on the property owner's property tax bill, often putting a lien on the house until the loan is paid off. For example, St. Paul offers a Sewer Utility Assessment Program. Through this program, the city finances the repair cost upfront and allows repayment of the loan through property taxes over a twenty-year period (Lemke, 2010).

**Eligibility to Receive Financial Assistance**: Finally, in terms of financial assistance, programs vary based on who is determined to be eligible for the assistance offered by the program. We encountered four variations in eligibility determination: open, income-based, targeted neighborhood, and property type. In Florissant and Pittsburgh, all property owners are mandated to pay a recurring

fee on their water bill and are thus eligible for the program (City of Florissant, n.d.; Obermeier, 2010). Pittsburgh residents can "opt out" of the program and choose not to pay the fee, but they then become ineligible (Obermeier, 2010). In St. Paul and Bryan, Texas, where the cities offer a special assessment and loan program respectively, all property owners are eligible if they are current on their property taxes and have a good credit history (Lemke, 2010; Jurica, 2010).

Some cities only offer financial assistance to low- or moderate-income residents. For example, both Bryan and Plano offer grants to low-income property owners in need of lateral replacements (Jurica, 2010; Herke, 2010). Plano's grant program is unique in that it is fully funded by a CDBG (Herke, 2010). Additionally, some cities target sewer lateral programs in neighborhoods identified as experiencing I/I problems. Knoxville is smoke-testing entire neighborhoods and offering assistance to property owners in those areas (Preseley, 2010). Knoxville and Olympia, Washington, offer zero interest loans to income-eligible property owners (Preseley, 2010; Utter, 2010).

## Implementation Strategy

The implementation strategy for a residential sewer lateral maintenance program involves the management of the initial inspection and repair of the sewer lateral. Issues of responsibility for the maintenance of the private sewer lateral include performing the maintenance and paying for the work. As in Milwaukee, most municipal ordinances make it the responsibility of property owners to repair or replace private sewer laterals from the foundation to the main sewer connection. In our research, we found that while most cities do not change the responsibility clause in their ordinances, some cities do take responsibility for the maintenance of the private sewer lateral, if the property owner is participating in a municipal lateral maintenance program. Alternatively, some cities take responsibility for maintenance of the lateral located only within the public-right-of-way. Most residential sewer lateral maintenance programs ease the burden on property owners and attempt to increase participation in the program by including a public outreach and/or educational campaign. Examples of these strategies are outlined below.

**Inspection Responsibility**: The first aspect of implementation that cities must consider is who is responsible for both performing and paying for the inspections. Three methods of inspection are available to investigate private sewer laterals: smoke, dye and video inspections.[9] In most cities, property owners are responsible for hiring a private contractor to perform video inspections. Many municipalities, including Milwaukee, will perform dye inspections, but typically only in response to a complaint or basement backup. Only a handful of cities, such as Knoxville, perform proactive inspections in an attempt to identify faulty sewer laterals and perform large-scale smoke tests of entire neighborhoods or districts (Preseley, 2010).

Our research suggests that programs that pay for video inspection of a private sewer lateral are increasing in popularity. Florissant requires property owners to pay for the initial inspection, but if the property owner qualifies for the city's

[9] See Appendix F for more detailed information on the three inspection methods.

lateral replacement program, the inspection fee is reimbursed (City of Florissant, n.d.). Alternatively, property owners in Pacifica must undergo a city inspection, paid in full by the city, in order to qualify for the lateral replacement program (Martinez, 2010).

**Repair Responsibility**: The second aspect of implementation is determining who has the responsibility for performing and paying for the maintenance of the sewer lateral. We did not find any city that repaired a private sewer lateral themselves; if the city did take some responsibility for the repair, then they required that the sewer lateral repair be contracted out to licensed contractors. Some cities, including San Mateo, St. Paul, Pittsburgh, and Pacifica, provide property owners with a list of approved contractors to ease the burden of hiring a private contractor (Costa-Batis, 2010; Lemke, 2010; Obermeier, 2010; Martinez, 2010). Pacifica designed a bid process to identify "recommended contractors" for property owners, inviting 18 plumbing contractors to bid based on price per foot of pipe and price per square foot of pavement/curb (all other costs were included in foot or square foot pricing). Pacifica chose the four lowest bids. When a property owner is approved for a grant in Pacifica he or she is given a list with the four recommended contractors. The property owner must get at least one bid from a city- recommended contractor, but can hire any contractor he or she wishes (Martinez, 2010).

Paying for the repair is the final component of implementation. In order to ensure that the work needed to maintain the private sewer lateral is properly done, some cities, including Plano, Bryan, and Florissant, take responsibility by hiring the private contractor themselves and paying them directly (Herke, 2010; Jurica, 2010; City of Florissant, n.d.). Once the property owner has been approved to receive financial assistance through the sewer lateral programs, the cities are responsible for ensuring that it happens. Other cities, including Pacifica, San Mateo, and St. Paul, require that the property owner him- or herself hire the contractor and submit evidence to the city that the repair was done and paid in full in order to receive financing from the city (Martinez, 2010; Costa-Batis, 2010; Ackerman, 2010).

**Educational Campaign:** Most cities that offer financial assistance for private sewer lateral maintenance implement an education or outreach campaign to raise awareness about: 1) the responsibility of property owners to maintain sewer laterals; 2) the environmental and public health risks associated with I/I; and 3) the financing available to assist property owners. The most popular forms of outreach are web pages, fliers and other printed publications, and local media coverage (newspapers). Knoxville and San Mateo use door hangers to inform residents of their comprehensive I/I program and upcoming smoke tests (Preseley, 2010; Costa-Batis, 2010; City of San Mateo, n.d.; City of Knoxville, n.d.).

## Program Goals

While the program components play an essential role in crafting the residential sewer lateral maintenance program alternatives, our recommendation is based

on how well the chosen program meets Milwaukee's goals. We identified three main goals for a Milwaukee residential sewer lateral maintenance program: 1) affordability; 2) political feasibility; and 3) effectiveness. We developed these goals from conversations and information exchanges with our clients (Shambarger, 2010; Jaber and Thur, 2010; Finco 2010; Jaber, 2010, February 26). It is important to note that a long-term result of the program should be I/I reduction. We do not identify this as a goal of the program, but rather as an outcome relative to the success of any program. A program that achieves affordability, political feasibility, and effectiveness should ultimately contribute to total I/I reduction.

### Affordability

Affordability must be achieved from both Milwaukee's perspective and the property owners' perspective. First, from the government's perspective, cost-effectiveness is essential. Milwaukee cannot fund a new program with its existing revenues. Although Milwaukee could increase its sewer fee rates or create new revenue streams, the new revenues needed to fund a residential sewer lateral maintenance program must be viewed in the context of other funding pressures on the Sewer Maintenance Fund and city finances (Shambarger, 2010). Thus, any program recommendation must be self-funded or secured with external funding. The amount of funding secured will help determine major elements of a residential sewer lateral maintenance program such as eligibility criteria, time frame of program, and portion of lateral eligible for maintenance. Cost-effective use of funding would provide for the maximum number of lateral repairs possible and, in turn, reduce I/I and the likelihood of a fine.

Second, a residential sewer lateral maintenance program must be affordable for property owners. In the Milwaukee area, sewer lateral inspection and repair costs an average of $300 and $5,100 per property, respectively (Gonwa et al., 2004), making this responsibility cost-prohibitive to many property owners. To put this number in context, the 2009 median assessed value for a single-family residential property in Milwaukee was $119,100 (Milwaukee Assessor's Office, n.d.). In many cases, the cost of lateral maintenance relative to the assessed value of the home prohibits property owners from making repairs or replacements. When creating a funding mechanism for a residential sewer lateral maintenance program, policy makers must be conscious of the impact of fees and taxes on property owners. In addition, policy makers must be aware of current economic trends, including barriers to affordability such as tax delinquency. Designing a funding mechanism with the goal of affordability for property owners is more apt to increase program participation and effectiveness.

### Political Feasibility

A residential sewer lateral maintenance program must consider feasibility barriers, largely centered on the legal and political environments. For example, some policy alternatives and funding mechanisms may require a change in state law or city ordinances in order to be enacted. Private ownership of laterals presents legal issues related to public funding of private property improvements. State constitutional provisions, known as the public purpose doctrine, require that public funding not be used for private purposes; however, what constitutes public

or private use is unclear (WERF, 2009, 2006). Court rulings indicate that overall community benefit is a justification for public funding of private property improvements, and often defer to the judgment of municipalities initiating such programs (WERF, 2009). Since programs are judged on an individual basis, ensuring the legality of a program funded in part or full by public money is important.

Likewise, lateral conditions and the necessary repair actions vary across Milwaukee, which is likely to raise concerns of equal access to benefits of a maintenance program. Private property factors, such as age of infrastructure and type of material used, influence the likelihood of lateral failure because older infrastructure is more likely to have a failed sewer lateral (Gonwa et al., 2004). Program funding mechanisms that affect all property owners but benefit only a portion, such as those in areas of older infrastructure, raise issues of benefit equity. If using a sewer maintenance fund or similar citywide funding mechanism, a politically feasible program will be one in which property owners are eligible for direct benefits based on money paid into the fund.

Public health and environmental benefits that may result from a residential sewer lateral maintenance program, including improved drinking, river, and lake water quality, may increase the feasibility of using public funds to address faulty private sewer laterals. Also, pressure from MMSD to reduce I/I, including the threat of a fine, should increase the political feasibility of creating a residential sewer lateral maintenance program in Milwaukee.

### Effectiveness

An important goal for a comprehensive residential sewer lateral maintenance program is effectiveness. An effective program will increase the number of private property lateral repairs and in turn reduce I/I. A well designed program can minimize burden on property owners by including a public education and outreach campaign. Additionally, a successful program will not add excessive administrative burdens on Milwaukee.

Participation in a residential sewer lateral maintenance program is more likely if issues of responsibility, such as the inspection of the sewer lateral, the selection of a contractor to perform the repair or replacement, and the assurance of the contractor's work being code-compliant, are clearly established and communicated to property owners. A clearly defined application process, minimal paperwork for property owners, and a list of approved contractors would ease the burden on property owners and ensure efficient implementation of lateral maintenance.

Any new program would place additional demands on Milwaukee agencies. Response to these administrative demands is bound to influence program effectiveness. Difficulty in program implementation could diminish the program capacity and ultimate effectiveness. An analysis for implementation regarding agency burden should consider the following factors: 1) administrative capacity, including the need to hire and train additional and current personnel; 2) availability of funds and time frame for implementing services; for example, considerations of cash flow management, budgeting and timing of fee revenue; and 3) time frame for contract development and bid processes if private contractors perform the work.

## *Program Alternatives*

This section describes and analyzes three program alternatives: the status quo, an insurance program, and a loan program. The program components for each alternative are detailed, referencing the funding mechanism, eligibility and assistance criteria, and implementation strategy for each program. We also analyze each alternative in relation to our three program goals: affordability, political feasibility, and effectiveness.

Furthermore, we outline a supplemental program, funded in the short term by MMSD reimbursements, to be implemented in combination with the status quo or either alternative. The funds provided by MMSD are insufficient for establishing a long-term policy solution for Milwaukee but could be used in the short term to augment the program alternative ultimately selected by the city.

### Status Quo

In Milwaukee, the property owner is responsible for sewer lateral maintenance from the building to the connection point with the sewer main. The city of Milwaukee generates funds to cover the costs of emergency testing of residential sewer laterals, and it offers limited financial assistance to property owners unable to finance sewer lateral repair (Milwaukee Department of Neighborhood Services [MDNS], 2006).

#### Program Components

Milwaukee residents currently pay two fees on their municipal water utility bill (the Water Works bill): the sewer maintenance fee and the storm water maintenance fee.[10] The money generated from these fees is placed in the Sewer Maintenance Fund, a general fund used primarily for the maintenance of the public sewer mains but also for limited emergency private lateral smoke and dye testing. Although Milwaukee does not regularly inspect private sewer laterals, they do perform emergency lateral testing when property owners complain of basement backups and potential faulty laterals (MMSD, n.d.a). This is paid for out of the Sewer Maintenance Fund and is no cost to the property owner.

Milwaukee does not require regular maintenance of private sewer laterals. However, if Milwaukee performs a smoke or dye test and suspects a faulty sewer lateral, they require the property owner to find a private contractor to undertake a full video inspection of the sewer lateral. Upon submission and analysis of the video, Milwaukee inspectors determine whether the sewer lateral needs repair and if so, issue an order.

To assist the owner with the burden of paying for the cost of repair, Milwaukee officials, under current policy, direct the property owner to a home equity loan program. If the property owner is unable to secure a home equity loan, he or she can turn to the Neighborhood Improvement Development Corporation for possible

[10] Together, these two fees in 2010 are estimated to generate a total of $73.8 million, $28.6 million in sewer maintenance fees and $22.3 million in storm water maintenance fees (MMSD, 2010a). See Appendix B for additional background on the city of Milwaukee including current expenditures and revenue.

assistance. The corporation has limited funding for programs that provide assistance for general property improvements made by income-eligible private property owners. One program, the Homeowners' Emergency Loan Program, replaces approximately two laterals per month.[11] Milwaukee's Essential Services Fund is also available to some homeowners as a "last resort" financing option for the cost of private sewer lateral maintenance. Approximately six private laterals are replaced per year from the Essential Services Fund (Greylak, 2010).

If the property owner is unable to secure financing through the Neighborhood Improvement Development Corporation or the Essential Services Fund and does not comply with the order issued by Milwaukee, or if the property owner cannot be determined or located, Milwaukee will make the necessary sewer lateral repairs and bill the property owner. If the property owner does not remit the entire payment within 45 days, the charge is placed on the owner's property tax bill as a special assessment (Milwaukee Code of Ordinances, §12-15). The assessed fee includes a six-year, 8.5 percent interest loan to cover the cost of the lateral replacement and a 25 percent administrative fee (Greylak, 2010).

### Analysis

**Affordability**: The status quo achieves affordability from Milwaukee's perspective; it is not affordable, however, from the property owner's perspective. Milwaukee's overall cost burden is limited because of its restrictive criteria for performing private lateral maintenance and minimal financial assistance to property owners. As a result, property owners must incur the cost of both private lateral inspection and repair, averaging $300 and $5,100, respectively (Gonwa et al., 2004).

The city incurs costs when the maintenance of a private sewer lateral is added to the property tax roll and that property owner defaults on property taxes. In addition, the lack of a lateral maintenance program arguably prevents the maintenance of faulty residential sewer laterals, which leads to further I/I and future sanity system overflows that carry environment and public health costs and possibly a monetary fine.

**Political Feasibility**: The status quo is politically feasible because it is already in place. It presents no legal issues or legislative changes, and it requires no additional municipal resources. Milwaukee is likely, eventually, to be fined by MMSD for high I/I levels into the sewer system. There is no evidence to suggest that these levels will diminish under the status quo. Further, public pressure to address SSOs and decrease this public health risk may further decrease the political feasibility of the status quo.

**Effectiveness**: The status quo is not effective at maintaining private residential sewer laterals or at decreasing I/I. Milwaukee incurs no new burden on staff or resources by maintaining this current policy. However, the current system is not sustainable; Milwaukee's sanitary sewer system continues to suffer from I/I and, as a result, faces potential fines from MMSD. Additionally, property owners have little incentive to maintain private laterals because they are tasked with full

[11] Another program is the Targeted Investment Neighborhood Home Rehabilitation Loan (Sayers, 2010).

responsibility for finding a contractor for inspection and repair and for the associated financial costs. The increasing severity of I/I and the high cost burden on property owners limits the effectiveness of the status quo.

## Alternative 1: Insurance Program

The first alternative that Milwaukee could consider is an insurance program similar to the program enacted by the city of Davenport. With this program, property owners would pay a flat monthly fee whose funds would be diverted to the program. Then, when a residential sewer lateral fails, Milwaukee would pay for the maintenance of the lateral from these funds.

### Program Components

The insurance program alternative would be self-funded with an increase to the monthly storm water fee. The funds generated from this flat-fee increase would serve as a premium for the insurance program.[12] Additional funding would be provided by a fixed deductible paid by the property owner.[13] If an initial infusion of cash is required to start the program, Milwaukee may be able to borrow funds from the current Sewer Maintenance Fund and replace those funds with generated revenue from the program.

Under this alternative, Milwaukee Department of Neighborhood Services would continue to perform emergency smoke or dye inspections of private property sewer laterals following complaints of sewage backups and public health risks. Milwaukee would develop a list of approved contractors for video inspections to property owners. If the initial inspection requires a video test, the property owner must hire a private contractor from the approved list and submit the video to Milwaukee Department of Neighborhood Services. This video test would be paid for initially by the property owner; however, if repair is necessary, the property owner could put the cost of this test toward his or her deductible. If the video reveals a faulty lateral, Milwaukee Department of Neighborhood Services would issue an order for repair and the property owner would be responsible for hiring a private contractor from the approved list.

Upon completion of repair, the contractor would be required to submit a certification of completed work and a bill to Milwaukee. Milwaukee would cover the full cost of sewer lateral repair and assess the remaining amount of the deductible on the property owner's next Water Works bill.

Every residential property owner in the city who is current on his or her Water Works bill would be eligible for the program. Furthermore, the cost of repair to any portion of the private sewer lateral, from the building to the connection of the sewer main, would be covered by program.

To educate property owners about the new program and to encourage participation, Milwaukee would need to institute a public education and outreach campaign.

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[12] Milwaukee would need to determine budgetary procedures to ensure the monies remained in the fund and were allocated specifically for the residential sewer lateral maintenance insurance program.

[13] As an example, the city of Davenport enacted a $5 monthly premium fee and a $500 deductible (O'Dean, 2010). Milwaukee would want to consider a more in-depth cost analysis to determine what amounts would be appropriate to generate program revenue.

## Analysis

**Affordability**: From both Milwaukee's perspective and the private property owners', this program would be very affordable. By increasing storm water fees, the program would become self-funded. Though the private property owner will experience an increase in monthly charges whose benefits may not appear immediately, over the long-term this program would prove to be cost effective for the property owner. As an example, if the increased quarterly storm water fee were $5, the property owner would pay $20 a year. Over the course of a 30-year mortgage, the property owner would pay $600 in fees, plus the deductible of $500. Under this program, if the lateral failed once during the 30-year mortgage, the maintenance would cost, on average, $5,100 (Gonwa et al., 2004).[14]

Conversely, Milwaukee would no longer face as great a financial risk as it currently does when paying for the cost of a sewer lateral repair for an absent or uncooperative property owner. The cost of repair would come out of the generated funds for the program; however, if the Water Works Bill for the given property owner is not current, then Milwaukee would potentially lose the cost of the deductible and the increased storm water fee.

**Political Feasibility**: Support for the program is likely to be high from both Milwaukee's perspective and the property owners' because of the program's potential benefits. The number one indicator of the benefit of the program would be increased maintenance of residential sewer laterals resulting in reduced I/I. For Milwaukee, this reduction of I/I would likely lead to the avoidance of fines from MMSD. The property owner would see more tangible results from the reduction of I/I, such as decreased basement backups and SSOs.

Despite these benefits, however, this program raises issues of equity. All property owners would be required to pay into the program and be eligible for its benefits; however, certain private sewer laterals will be in greater need of repair than others. Individual private property factors, such as age of sewer lateral construction, influence the likelihood of finding a faulty sewer lateral, and it is the older infrastructure that is more likely to fail (Gonwa et al., 2004). A flat-fee program-funding mechanism used in this alternative would affect all property owners but likely benefit only those in areas of older infrastructure.

Additionally, under this alternative, Milwaukee would need to decide which residential private properties would be eligible for the program. Allowing only single-family residential properties to participate in the program as opposed to multi-family units, or requiring that the property be owner-occupied, would also raise issues of equity in terms of access and assistance. Decisions on these issues would most likely affect not only the political feasibility of enacting the program but also its effectiveness if it were enacted.

Finally, because there are legal issues surrounding the use of public funds for private property repair, City Council support may be necessary in order to enact the program. In addition, a vote may be required to increase the storm water fee.

[14] See Appendix G for a further breakdown of a cost estimate.

**Effectiveness**: The mandatory increase of the storm water fee to pay for the program may encourage property owners to participate in the program and take advantage of money they have already invested. Although property owners may have to pay for the video test up front, any further costs for repair would be underwritten by Milwaukee or assessed on the Water Works bill. The decision on whether or not to fully repair the lateral would not depend on the property owner's ability to front thousands of dollars in repair costs; this responsibility would rest with the city of Milwaukee, which would have the funds available.

Furthermore, this alternative would help ease the burden for the property owner. Besides being affordable for property owners, the program would help to put responsibility for maintenance on both Milwaukee and the property owner. Milwaukee would take care of the final payment of repair and assess the deductible on the property owner's Water Works bill. However, the property owner would still be responsible for paying for the initial video test and contacting the private contractor for both the testing and repair of the lateral. Though Milwaukee Department of Neighborhood Services would issue orders that the property owner repair the lateral, without enforcement some property owners may be deterred by the responsibility needed to ensure completion of repair. Milwaukee's development of a private contractor list would help property owners initiate the repair process. Additionally, a strong and targeted public education campaign that emphasizes the program's benefits could help to counter noncompliance.

Milwaukee could experience an increased burden for administering the program. Developing new staff positions, tracking the success of the program, and working with private contractors with increasing regularity may put more pressure on the agency administering the program. If the workload were to increase for both Milwaukee and the private contractor sector, however, more jobs might be created.

## Alternative 2: Loan Program

The second option for a program is a revolving, low-interest loan fund program to assist residential property owners in financing sewer lateral maintenance. As loans were repaid, the money would be returned to the revolving loan fund to make additional loans, thus generating capital for administering the program in the future.[15]

### Program Components

The funding mechanism to establish a loan program for sewer lateral maintenance would be a bond, note, or allocation from the Sewer Maintenance Fund. Loans would be granted to eligible property owners. As repayments were made, funds would become available for new loans to additional property owners. The interest paid by revolving loan fund-borrowers would support program administration so that the fund's capital base would remain intact.

[15] This alternative is loosely based on elements of the loan programs offered in Racine, Portland, Olympia, and Knoxville.

The maintenance of the entire private sewer lateral would be eligible under this program. Property owners would have the opportunity to take on a low-interest loan for the entire assessed cost for repair of the faulty private lateral; loans with a maximum 4 percent interest with a six-year payback period would be granted to property owners on a first-come, first-served basis. In an effort to ensure that the loan is repaid, only property owners not delinquent on their property tax bill would be eligible for this program.

Under this alternative, inspection of residential sewer laterals would be voluntary for property owners throughout Milwaukee. The Milwaukee Department of Neighborhood Services would continue to perform emergency dye inspections of private sewer laterals following complaints of sewage backups and public health risks. Property owners would be responsible for hiring a contractor from a list of approved contractors developed by Milwaukee to perform video inspections and would submit a tape to Milwaukee for review. If the tape revealed a faulty lateral, property owners would be responsible for hiring a contractor for repair. This contractor would also be selected from a list of approved contractors developed by Milwaukee. If the property owner completed the maintenance with a program loan, the contractor would be required to submit a certification of completed work and a bill to Milwaukee for the cost of repair; it would be the responsibility of the city to set up the loan payment reschedule with the property owner, either on the property tax bill or the Water Works bill.

To educate property owners about the new program and to encourage participation, Milwaukee would also institute a public education and outreach campaign.

### Analysis

**Affordability**: It is unclear how affordable this alternative would be, from both Milwaukee's perspective and the property owners'. The main challenge with establishing a revolving loan fund would be securing up-front capital. Reallocating funds from the Sewer Maintenance Fund is a possibility, but might be politically difficult because demand for these dollars would have to be weighed against other city services. Affordability of a revolving loan fund would be much higher if Milwaukee were able to secure a federal grant, similar to the American Recovery and Reinvestment Act grant money recently distributed for energy loan programs (U.S. Department of Energy, 2009).[16] Milwaukee might need to partner with a bank to establish initial capital with a low-interest bank loan. Over the long term, the city would have few costs to incur other than increased administrative burden. However, the success of the loan program would depend on the number of loans made and the rate of repayment.

For homeowners, this alternative would provide a low-interest funding mechanism that was previously unavailable to some. A maximum interest rate of 4 percent would ensure some affordability, but the loan itself could still be a burden for low-income property owners.

Milwaukee would still face a financial risk when paying for the cost of a sewer lateral repair for an absent or uncooperative property owner.

[16] We were unable to locate federal grant money available for private property I/I reduction.

**Political Feasibility**: In a citywide loan program, private costs and benefits are balanced with public costs and benefits. Property owners would undoubtedly be reluctant to pay more than they currently are to fund the program, so the burden would need to be taken on by the city by reallocating current fees or the finding and administering a federal grant. Property owners would thus see no additional cost to this program, but they would see benefits. Additionally, by offering loans instead of grants, and assuming the loan fund could keep pace with demand, this alternative would not be assailed for using public monies for private matters.

The city of Milwaukee would need to decide which residential private properties would be eligible for the program. Allowing only single-family residential properties to participate in the program or requiring that the property be owner-occupied would also raise issues of equity in terms of access and assistance. These decisions would affect not only the political feasibility of the program but also its effectiveness.

**Effectiveness**: It is difficult to assess whether the availability of a low-interest loan would provide enough incentive for property owners to initiate sewer lateral repairs. The provision of a recommended private contractor list would ease the burden on homeowners to initiate the repair process, but the ultimate responsibility to contact the private contractor for both inspection and repair of the sewer lateral would lie with the property owner and could limit participation in the program. Additionally, with monetary assistance offered in the form of only a loan, property owners would still face a large financial burden under this alternative. Though property owners would be automatically eligible for the program, they would have no money invested in the program and would have the opportunity for only a small benefit in the form of a low-interest loan. A strong and targeted public education campaign that emphasizes the program's benefits as compared with the status quo could help to counter this potential obstacle.

If the loan program were established and then grew, Milwaukee could experience an increased burden for administering the program. This could require an increase in costs to fund new staff positions, track the success of the program, and work with private contractors at an increased rate. As the workload increased for both Milwaukee and the private contractor sector, more jobs would most likely be created.

## Supplemental MMSD-funded program

To develop a comprehensive, long-term residential sewer lateral maintenance program, Milwaukee needs a long-term, reliable funding source. The funding available from MMSD is limited, but it provides Milwaukee with the opportunity to create a supplemental, short-term program to target I/I. Funds from MMSD cannot be used to fund a program initially, such as the revolving loan fund, but instead would be available in the form of reimbursement. The program requires a 25 percent match of funds by Milwaukee or residents for residential sewer lateral maintenance. MMSD would not reimburse for funds spent on lateral inspections; however, anything spent on lateral inspections (dye, smoke, and video) that led

to sewer lateral repair resulting in I/I reduction would be counted toward the 25 percent match.

Depending on the alternative program chosen, an MMSD-funded supplemental program would offer Milwaukee an opportunity to implement a more proactive approach to target high I/I areas. For instance, Milwaukee could establish a targeted smoke inspection schedule and issue orders for video inspections and lateral maintenance in specific neighborhoods. MMSD funding could then be used to offset maintenance costs, potentially in the form of grants, for residents in those specific neighborhoods, ensuring greater participation in the program and a greater decrease in citywide I/I. Over the five years that funding would be projected to be available, Milwaukee could roll out this targeted inspection program to neighborhoods to manage the funds and direct educational outreach. Because it would be a supplemental program, the long-term program alternative would still be available for property owners in non-targeted I/I areas.

## Recommendation

Based on the analysis of each alternative for a residential sewer lateral maintenance program, we recommend Milwaukee implement Alternative 1, the Insurance Program. This alternative offers the greatest overall affordability, political feasibility, and effective long-term solution to Milwaukee's current problem with I/I.

The insurance program is more affordable than the status quo and the loan program for both Milwaukee and property owners because it is self-funded, has low start up costs, and spreads the financial burden of lateral repair across all residential property owners. The financial burden on the property owner is limited to the increased storm water fee on his or her Water Works bill and the deductible. Under the status quo and the proposed alternative loan program, most property owners would be responsible for the full cost of repair. Furthermore, the increased administrative costs to run the insurance program would be similar to the loan program, yet with less initial capital needed to fund the program. Under the status quo, the potential fine incurred from MMSD is unknown, as is the cost of further environmental damage and public health risk with current levels of I/I.

The insurance program is also politically feasible. The funding mechanism for this program, an increase in the storm water fee, is an incremental change from the status quo. The insurance program strikes a fair and equitable balance between taxpayer and the program's beneficiaries because everyone who pays for the program is eligible to benefit, as long as his or her water utility bill is fully paid.

The main challenge in the initial establishment of the insurance program is determining eligibility criteria. We recommend Milwaukee extend the insurance program to all residential property owners and place a $10,000 cap on the claim payment.[17] Extending the program to all property owners would ensure that long-term public costs and benefits are balanced.

The insurance program also proves to be more effective at increasing residential sewer lateral repairs than either the status quo or the loan program. With greater participation from residents, the insurance program is more likely to decrease environmental risks associated with I/I and increase overall public health as a result of greater participation from property owners.

The effectiveness of the insurance program also assumes that claims filed will not exceed available program funds. Based on an analysis using the average cost of video inspection and lateral replacement, no more than approximately 517 claims would be filed and paid each year.[18] Comparatively, using a maintenance cost range of $2,000-$6,000 to more accurately reflect the range of repair and replacement costs, the insurance program could fund 450-1200 lateral maintenance projects. Milwaukee should regularly review program performance and adjust eligibility criteria and fees.

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[17] Alternatively, Milwaukee could limit the program by property type; for example, one- to six-unit residential buildings. This would limit the revenue available for the program.

[18] See Appendix G for cost analysis of the insurance program, based on 2010 labor costs and storm water fees.

## Education Campaign

We recommend that Milwaukee implement a public outreach campaign to inform property owners of their responsibilities regarding sewer laterals, raise awareness of public health and environmental risks associated with faulty laterals, and communicate with them about the availability of financial assistance. A flier should be available on-line, distributed at property point-of-sales, and at booths at summer festivals and other public events.[19] As a cost-saving measure, Milwaukee could consider hiring college interns to implement an education campaign. A creative campaign might be the easiest way to increase lateral repair.

## MMSD Supplemental Program

In addition to creating an insurance program, we recommend that Milwaukee establish a supplemental program specifically targeting high I/I neighborhoods with the use of MMSD Private Property I/I Reduction Program funds. This supplemental program has two goals: 1) to increase maintenance of private sewer laterals in high I/I areas, and 2) to establish a more accurate estimate of the number of private sewer laterals in need of maintenance in Milwaukee.

First, in an effort to increase maintenance of private sewer laterals, Milwaukee should proactively schedule and implement large-scale smoke tests in identified high I/I neighborhoods. Milwaukee would need to implement a residential notification program prior to all smoke testing. Smoke testing is not eligible for MMSD reimbursement, but it does count toward Milwaukee's required 25 percent match.

If smoke testing indicates that a further video inspection of the private sewer lateral is needed, the city should issue orders and pay for the cost of inspections in these neighborhoods with money generated from the insurance program. This would decrease the financial burden on property owners significantly and ease the potential tensions of a targeted inspection act. Finally, this program would help ensure that the private sewer laterals most in need of repair would be fixed and provide an aggressive approach to I/I reduction in Milwaukee. Similar to the process of repair outlined in the insurance program, repair costs in targeted I/I areas would be billed to Milwaukee by the private contractor. These costs, however, would then be reimbursed by MMSD, with any program expenditures from the insurance program counting toward the required 25 percent match.

Receiving MMSD reimbursements for sewer lateral maintenance would increase the number of lateral repairs Milwaukee would be able to fund annually. For instance, the annual funding set-aside for Milwaukee is $364,153 (MMSD, 2009). Using the $5,100 average cost of lateral repair, this allocation could reimburse approximately 70 repairs per year. It is possible that the need for repairs in the targeted I/I area will be greater than the allocated MMSD funding reimbursement. For example, one high I/I area bordered by Cleveland and Oklahoma Avenues on the north and south, respectively, and 43rd and 49th streets on the east

[19] See Appendix H for a sample education brochure from Knoxville. The brochure outlines program goals and procedures for property owners as well as builds awareness for the program (City of Knoxville, n.d.).

and west, respectively, contains approximately 580 residential parcels with buildings more than 40 years old.[20] If smoke inspections indicate that the maintenance need is greater than the MMSD funding reimbursement, Milwaukee might want to prioritize maintenance of the most severe lateral failures with the MMSD funding allocation.

The second goal of the targeted I/I inspection program requires accurate data collection and continuous program evaluation. This supplemental program offers Milwaukee an opportunity to estimate a baseline measurement of sewer lateral failure rates. This measurement would be extremely valuable when establishing the eligibility criteria for the insurance program, or any long-term citywide policy or program. Since Milwaukee currently does not regularly inspect private sewer laterals, data does not exist to estimate the immediate demand for financial assistance for residential sewer lateral maintenance. Based on the data gathered during large-scale smoke testing, Milwaukee could adjust or establish eligibility criteria for the insurance program. As a cost-saving measure, Milwaukee could consider hiring college interns to collect and analyze data.

## Conclusion

Milwaukee faces an important decision in how to improve maintenance of residential sanitary sewer laterals and ultimately decrease I/I. Milwaukee is not alone in this challenge; as our research has shown, residential sewer lateral maintenance programs are being created in municipalities throughout the United States. We recommend Milwaukee implement an insurance program as a long-term policy to maintain private sewer laterals. An insurance program not only assists property owners in financing maintenance of laterals, but has the potential to improve environmental and public health and the overall quality of life in Milwaukee. The availability of MMSD reimbursement funding is an opportunity of which Milwaukee should take advantage. Coupled with an insurance program, a targeted inspection and repair program in high I/I areas is likely to result in a decrease in both I/I and associated fines.

[20] See Appendix I for a map of this area.

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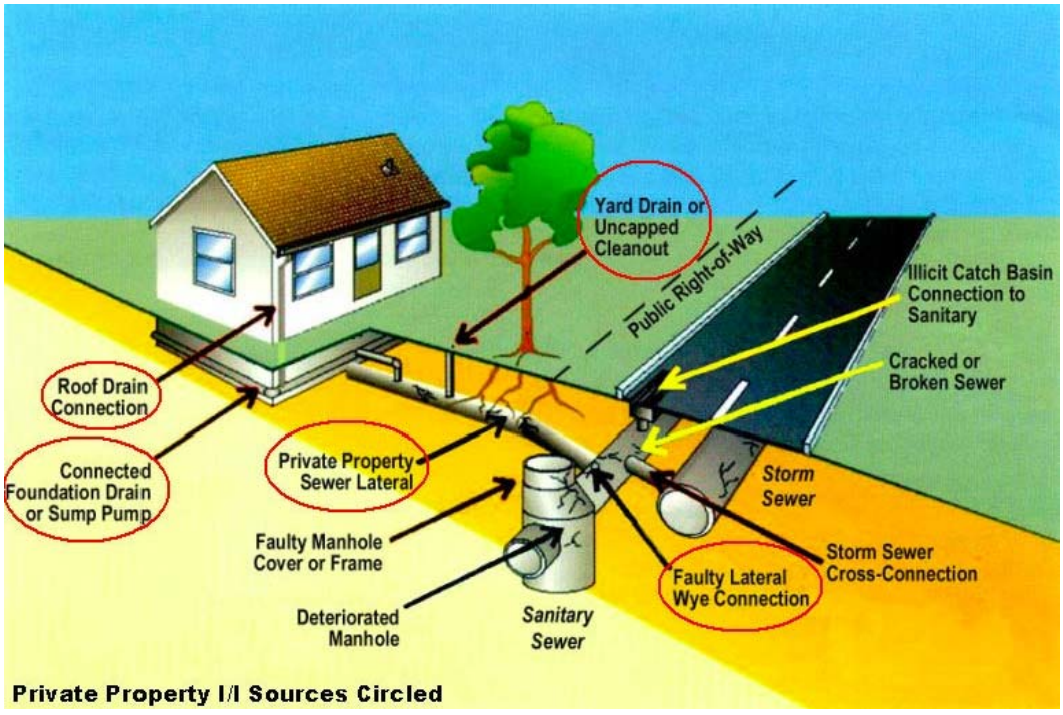
## *Appendix A: Private Property Sewer Laterals and I/I*

A number of factors can contribute to I/I, both in the publicly and privately owned portions of the sewer system. The city of Milwaukee Department of Public Works (DPW) has already identified most publicly owned problem areas, including cracks or leaks in sanitary sewer mains, manholes, and cross connections (Jaber and Thur, 2010). Estimates on the level of I/I attributable to private property portions of the sewer system vary across the country and by study. However, a 2004 study by the Milwaukee Metropolitan Sewerage District (MMSD) determined that a "statistically significant correlation exists between factors related to private property and collection system deficiencies. The correlation indicates that defects on private property contribute to overflows, backups, and sewer surcharging." The MMSD study determined that private sources contributed 59 percent of the total I/I (Gonwa et al., 2004).

Within private property I/I, residential sewer laterals are only one portion of problem. Figure 4 identifies other sources of I/I, including illegally connected foundation drains, roof drains and downspouts, sump pumps, yard drains and cleanouts, bad connections with the sewer main, or excess flow from basement floor drains (Gonwa et al., 2004).

Figure 4 – Private Property Sources of I/I




*Source: Gonwa et al., 2004*

The MMSD study indicated that private laterals comprise 47 percent of the total sewer system, while 53 percent is publicly owned (Gonwa et al., 2004). However, estimates of the portion of I/I attributable to the private sector of the sewer system and the portion attributable to private property sewer laterals range widely. In 2006, the WERF issued a comprehensive report on rehabilitation of

private sewer laterals. They surveyed 58 municipalities from across the country on their wastewater collection systems and asked the agencies to estimate how much private sewer laterals contributed to I/I. Estimates ranged drastically from 7 percent to 80 percent; the average estimate of I/I contribution from private laterals was 24 percent (WERF, 2006).

## *Appendix B: City of Milwaukee Background*

### Current Revenue and Expenditures

The table below details various statistics on Milwaukee's sewer system and associated revenues and expenditures.

Table 2 – City of Milwaukee Background, Revenue, and Expenditures

| Sewer System Statistics | |
|---|---|
| *Amount* | *Description* |
| 2,446 | Miles of Public Sewers Maintained by City |
| 250,000 | Estimated Total Number of Laterals in City |
| 142,578 | Residential Accounts for Water Service |
| 19,080 | Commercial Accounts for Water Service |
| 1,578 | Industrial Accounts for Water Service |
| 1.2 | Multiplier for Laterals Per Residential Account |
| 5-6 | Laterals Replaced Annually via Essential Services Fund |
| $5,100 | Estimated Average Cost of Lateral Replacements |
| $300 | Estimated Average Cost of Lateral TV Inspection |
| **Lateral Inspection Statistics** | |
| *Amount* | *Description* |
| 2 | Number of DNS Lateral Plumbing Inspectors |
| $59,984 | Annual Plumbing Inspector Salary |
| 5-10 | Number of Inspections Per Day (Field Only) |
| 4 | Approximate Number of Hours per House (Includes Admin) |
| **Sewer Maintenance Fund Statistics** | |
| *Amount* | *Description* |
| $1.17 | 2010 Sewer Maintenance Fee (per 100 cubic feet of water) |
| $28.6 million | 2010 Revenue from Sewer Maintenance Fee |
| $56 | 2010 Annual Residential Storm Water Fee |
| $22.3 million | 2010 Annual Revenue from Storm Water Fee |
| $73.8 million | Total 2010 Sewer Maintenance Fund |
| $12.2 million | Transferred from Sewer Maintenance Fund to General Fund for other DPW Services (tree/street care) |

*Sources: Milwaukee Budget Office, 2010; Greylak, 2010; Gonwa et al., 2004, Finco, 2010; Jenkins, 2010; Jaber, 2010, February 26; Jaber, 2010, March 5*

## Previous Policies and Incentive Programs

City I/I reduction programs to date have not focused specifically on private property sewer laterals. In 2005, Milwaukee offered a voluntary Downspout Disconnection Incentive Program to 3,000 property owners in the combined sewer area. Only 152 downspouts were disconnected through the program (Milwaukee Department of Public Works, 2010). The Sewer Maintenance Division also previously considered a pilot project with Milwaukee Housing Authority to disconnect foundation drains, but the project failed because the drains were damaged beyond repair (Jaber, 2010, March 5).

### Downspout Disconnection Program Fact Sheet

FACT SHEET (Milwaukee Department of Public Works, 2010)
Background:

1. Until 2002, Milwaukee's Code of Ordinances required roof downspouts to be connected to combined or storm sewers. Therefore, the majority of properties in Milwaukee have their downspouts connected to sewer systems.
2. During heavy rain events, the water from roof runoff is a major portion of the flow in combined sewers.
3. Excess flow in combined sewers can cause basement backups and sewage overflows.

Project Definition:

1. An area served by combined sewers was chosen for implementing a downspout disconnection project.
2. The project area is bounded by North 36th Street, North 60th Street, West Vliet Street and West Locust Street.
3. Approximately 3,000 properties are within the project area.
4. The participation of property owners in the project was voluntary.

Public Outreach and Involvement Campaign:

1. Professional public outreach and involvement was used.
2. We distributed mailers and brochures, organized outreach events, and garnered property owner participation.
3. Letters were mailed to each property owner describing the project.
4. A press event was held to initiate the campaign.
5. Door-to-door efforts to solicit participation were conducted.
6. Two community outreach events were held with all property owners invited to attend.
7. The campaign was completed by the end of September 2005.

Participation:

1. 272 property owners said they were interested in the project.
2. 85 property owners consented to having 125 downspouts disconnected by Milwaukee. The disconnection work was completed by the end of January 2006.
3. 21 property owners disconnected 27 downspouts themselves and received a $50 per downspout rebate from Milwaukee.

The total cost of the project was approximately $80,000.

## *Appendix C: Phase One Telephone Survey*

The purpose of the Phase One telephone survey was to develop a broad overview of the types of policies currently used across the United States and to identify innovative policies and/or programs. We selected cities based on population, estimated age of city and sewer infrastructure, and climate. We created a list of 78 cities to contact for a brief policy identification telephone survey with relevant public works officials. Ultimately, we included all cities with 2008 estimated populations between 400,000 and 800,000 (United States Census Bureau, 2008) as well as additional cities that our initial Internet research indicated had lateral programs in place. Brief interviews were conducted with relevant public works professionals using a brief questionnaire.

### Questionnaire

Phase One's survey had six questions and aimed to identify municipal sewer lateral maintenance programs, whether programs included financial assistance for lateral maintenance and to establish a contact person who was willing to participate in a more in-depth Phase Two survey.

In hopes of identifying innovative programs, the survey also asked the question: "Are you aware of other cities with programs that you think are innovative or that you based your program off of?" The survey questions are listed below.

1) Name of Municipality:
2) Name of Contact:
3) Do you have a lateral inspection policy? Yes/No:
    a. If yes, what sort of program:
4) Do you have a sewer lateral replacement/maintenance/repair program? Yes/No:
    a. If yes, what sort of program:
5) If yes, would you be willing to answer more questions about your program (goals, implementation, successes and failures) at a later date?
    a. Email address:
    b. Phone Number:
    c. Other info:
6) Are you aware of other cities with programs that you think are innovative or that you based your program off of?
7) Other Notes:

### Results

A summary of Phase One results are shown below in Table 3. Of the 78 cities we attempted to contact, we were able to interview approximately 44. Of these, 24 had some sort of private property sewer lateral program, and 20 had no program. Additionally, we classified the results into the two identifiable major component categories of sewer lateral programs. For those cities with sewer

lateral programs, the table reports the what funding sources they use, what portions of the lateral their programs cover, what type of assistance is offered, who is eligible for assistance, and the number of cities that fell in each category.

Table 3 – Phase One Respondents — Summary of Program Components

| Funding – *The funding source used to fund the city's sewer lateral program* | | | | |
|---|---|---|---|---|
| Source | Water/Utility Fee | Property Tax | General Fund | CDBG/Other |
| | 6 | 2 | 8 | 8 |
| Assistance Type and Eligibility– *What portion of the lateral is covered, what type of assistance is provided, and who is eligible for assistance.* | | | | |
| What is Covered | Right of Way | Up To Foundation | Entire Lateral | Inspection |
| | 4 | 5 | 13 | 3* |
| Assistance Offered | Grant | Cap on Costs | Insurance | Loan |
| | 9 | 1 | 5 | 10 |
| Who is Eligible | Everyone | Opt-In | Income Based | Homeowners |
| | 2 | 1 | 11 | 12 |
| * Only includes inspections funded through the program, not routine inspections made by city | | | | |

*Source: Authors*

## *Appendix D: Phase Two Telephone Survey*

Our goal in selecting Phase Two cities was to create a representative sample of the diverse sewer lateral policy and program types. Using information gathered in the Phase I survey, we categorized the surveyed cities by type of sewer lateral policy and selected a sample of cities representing these policy types. The purpose of the second survey was to develop detailed knowledge of residential sewer lateral maintenance programs from which to assess policy options for Milwaukee. Through this process, we narrowed our initial survey pool of 78 cities to a group of 13 cities in nine states. Cities were selected based primarily on program type and innovativeness, and Wisconsin municipalities were selected to provide a geographic context.

### Questionnaire

The Phase Two questionnaire was structured to extract in-depth program information from each of the 13 municipalities. Specifically, we arranged our questions to address the program goals we derived from conversations and information exchanges with our clients (Shambarger, 2010; Jaber and Thur, 2010; Finco 2010; Jaber, 2010, February 26). The survey questions are listed below.

1. Name of Municipality:
2. Date of Interview:
3. Program Contact:
4. Brief description of sewer infrastructure:
    a. What % is separate sewer/storm water? What % combined?
    b. What is your definition of "sewer lateral?"
    c. What is the age of the infrastructure? Any data on condition of sewer infrastructure (ex. # residential sewer laterals, estimate of the how many might need repair, etc.)
5. Summary of Sewer Lateral Policy:
    a. Who is responsible for repairs/replacement (property owner or city)?:
    b. Who performs work?
    c. Do you offer financial assistance for maintenance and/or replacement?
    d. Do you have any unique aspects to your program?:
    e. How is a problem sewer lateral identified? Is inspection part of the program? If so, is inspection proactive/reactive, free/ cost to private property owner, etc?
    f. Is the program targeted toward problem areas? General policy? Or, is it both?
6. Legal Authority (i.e. ordinance):

7. How are you funding the program?:
8. When did you start your program?:
    a. How did you decide on the program/policy?:
    b. What were the goals/intended outcomes of your program/policy?:
    c. What were the barriers to getting this program started?
    d. What prompted adoption of your policy/program? What was the policy before this program was put into place?:
    e. What challenges in implementation have you seen?:
9. What has gone well/What hasn't gone well?:
    a. Has there been an increase in lateral repairs since starting the program?
    b. Has the program been widely used?
    c. Have you been able to respond to all requests?
    d. Has the program fit within the budget of Milwaukee? How much has the program cost Milwaukee annually?
10. Any outcome data? (ex. decreased flow from areas/reduced I/I, reduced incidences of sewer overflow, etc.)

## Results

A summary of Phase Two results are shown below in Table 4.

Table 4 – Phase Two Survey Results

| City | Program Type | Funding Source | Eligibility |
|---|---|---|---|
| Pacifica, CA | The city will inspect a homeowner's lateral if it is at least 10 years old, or there must be some legit basis to believe it's defective. If there is a problem, the city will reimburse the homeowner 20% of the cost ($1,000 max grant). The homeowner must use one of the city's four recommended contractors. | General Fund | Homeowner |
| San Mateo, CA | Homeowner is offered free lateral inspection (up to $250). If damage is found, city provides education to the homeowner about the damage, length and depth of lateral, cleanout valve, etc. Provides homeowner a list of city-approved contractors to do the repair. If income is less than $82,000, offers financial assistance = 50% of cost to repair. | General Fund | Homeowner |
| Atlanta, GA | Sewer lateral repair/replacement program run by Southwest Energy Assistance, a regional nonprofit, will fund repairs of sewer laterals for qualifying homeowners. | City and County Funds | Income Based |
| Davenport, IA | City created insurance program effective July 1, 2010, and will pay up to $10,000 cost of repair/ replacement (homeowner pays $500 deductible). | Sewer Fee | Homeowner |

| City | Program Type | Funding Source | Eligibility |
|---|---|---|---|
| St. Paul, MN | The city offers a 5% simple interest loan for full cost of repair to be put on their house (property bill) as an assessment for 20 years. | General Fund | Homeowner |
| Florissant, MO | The cost of lateral "spot" repair is paid for fully by city (unclear who pays for full replacement of a lateral). As part of the application to the program, private property owners must submit video and diagram of damaged lateral. If City Engineer approves application, then the city will be respon-sible for hiring contractor to go in and fix problem | Fee on Property Tax Bill | All Property Owners |
| Pittsburgh, PA | Pittsburgh Water and Sewer Authority started a policy Jan. 1, 2010, called the Utility Line Insurance Program. It is a $5/mo fee on your water/ sewer bill and covers water and sewer lateral lines. Residents can opt out of the program. | Fee on Water/ Sewer Bill | Homeowners Who Do Not Opt Out |
| Knoxville, TN | Knoxville offers grant and voluntary no-interest loan program to low-income property owners to make lateral repairs through the Pace 10 Residential program. | $4 million Federal Grant | Income Based |
| Bryant, TX | Bryant offers a grant to pay for full repair for those private property owners who qualify under HUD's low-income status – they chose to use 100% of the poverty line. For those not eligible for the grant, the city offers a 5% loan that is put on the property as an assessment, with a lien placed on the house until it is paid. | Utility Fees | Grant: Income Based, Loan: All Homeowners |
| Fort Worth, TX | In the Housing Division's Home-ownership Pro-grams, the Emergency Repair Program offers up to $5,000 for emergency repairs (which includes sewer laterals) for income-qualifying homeowners. | CDBG | Income Based |
| Plano, TX | Has a low-income assistance program funded by CDBG grants. Those not eligible for the grant program are eligible for 0% loans that are put on the property tax bill. | CDBG | Income Based |
| Madison, WI | Madison fixes the cost of repairs in the right of way and covers expenditures beyond the average repair cost ($4,500 currently). | General Fund | All Property Owners |
| Racine, WI | Has an insurance program. If the problem is in the right-of-way and not on private property, the City of Racine will reimburse the property owner the cost of investigating the problem and the cost of the required repairs. | Fee on Property Tax Bill | All Property Owners |

*Source: Authors*

## *Appendix E: Classification of MMSD I/I Program Eligibility*

Under the *Private Property Infiltration and Inflow Reduction Program*, MMSD will reimburse a municipality up to 75 percent of the cost of eligible work done by the municipality to reduce private property I/I. In general, eligible work will be only for work that directly reduces I/I that flows into the collection system from private property sources, such as private sewer laterals. The municipality is required to provide a funding match of no less than 25 percent of the funding allocation. Some activities that are not eligible for reimbursement may instead be used toward the municipalities' 25 percent match for other eligible work. Below is a list of work that is eligible for MMSD reimbursement, eligible toward the 25 percent municipal match, or not eligible for either reimbursement or toward a municipal match. The bulleted outline below is recreated from MMSD Private Property Infiltration and Inflow Reduction Program: Information, Guidelines, and Procedures – Appendix A (private property infiltration and inflow reduction program classification of work) (MMSD, 2010b).

**Work Eligible for District Reimbursement and Municipal Match**

- Private lateral replacement, repair, or rehabilitation (only in conformance w/ local definition of a private lateral), where replacement or rehabilitation is being performed primarily to reduce private property I/I
- Private property foundation drain disconnections, including sump pump installations
- Cleanout repair/rehab, where work is performed primarily to reduce private property I/I
- Storm water work that has a clear impact on the reduction or elimination of private property I/I
- Purchase and installation of glass block basement windows if it can be shown that building has experienced overland flow entering through basement windows

**Work Eligible for Municipal Match Only**

- I/I reduction work not related to private property
- Investigation and inspection work whose purpose is to identify and or quantify private property I/I
- Staff and consultant time to prepare private property I/I reports
- Direct in-kind staff time directed toward managing and reporting on private property I/I work
- I/I reduction work on the publicly owned main, if work is in conjunction with private property I/I efforts
- I/I reduction work on the public portion of a lateral sewer if work is in conjunction with private property I/I efforts
- Consultant time directly involved in private property I/I efforts
- Purchase and installation of private property sump pumps (either a new installation or an upgrade of existing sump pump)

**Ineligible Work**

- New lateral construction related to development
- Work on oil and grease separators
- Any work in combined sewer area
- Previously completed work
- Ongoing maintenance work
- Work performed or already required as part of court order
- Work done to eliminate illegal connections
- Indirect municipal staff time and/or administrative overhead
- Purchase and installation of backup generators to run sump pump during power outages
- Purchase of equipment (e.g. street sweepers, sewer cleaning equipment)

## *Appendix F: Sewer Lateral Inspection Methods*

A key element of sewer lateral maintenance programs is inspection of the sewer lateral. Three inspection methods exist to identify faulty sewer laterals. The first and most inexpensive method is smoke testing. Smoke testing is conducted from the right-of-way by placing a blower over a centrally located manhole and forcing non-toxic smoke-filled air through a sewer line. A crew of two or three workers can test 10,000 linear feet of sewer line in an eight-hour period. The cost is only a few dollars per foot for labor and materials (Superior Signal Co., Inc., n.d.). Using a 2010 salary rate for plumbing inspectors, we calculated that the labor cost for two city inspectors to perform smoke tests on 10,000 linear feet of sewer line would be approximately $464 (Milwaukee Budget Office, 2010).

The second inspection method is dye testing. Dye testing involves placing a non-staining water soluble dye tablet in the drain or downspout of the property and flushing it with water. The area is then examined for the appearance of traces of dyed water. Dye testing typically requires entry into the property and achieves the best results when combined with the third inspection method, video (TV) inspection (Finco, 2010).

Video inspection is performed by inserting a camera into the lateral from the property or sewer main. A crew of two people can perform video inspections on 10 to 20 laterals per day in a typical residential area (Schantz, n.d.). The average cost of a video inspection, the most expensive inspection method, is $300 per property (Gonwa et al., 2004).

## *Appendix G: Cost Analysis of Insurance Program*

The cost estimate (see Table 5) is based on several assumptions, including the average cost of video inspection and lateral replacement (Gonwa et al, 2004). Labor costs are based on four Plumbing Inspection hours, including staff time for program management, administrative work and viewing inspection videos (Finco, 2010). This is likely an over-estimate of labor costs, since Milwaukee might move program administration to the Neighborhood Improvement Development Corporation or an alternative agency. Based on these costs, and a $50,000 allocation for an educational campaign, an Inspection Program with a $5 quarterly fee could fund approximately 517 lateral replacements per year. All program costs qualify for the 25 percent match for MMSD PPI/I Reduction Program reimbursements.

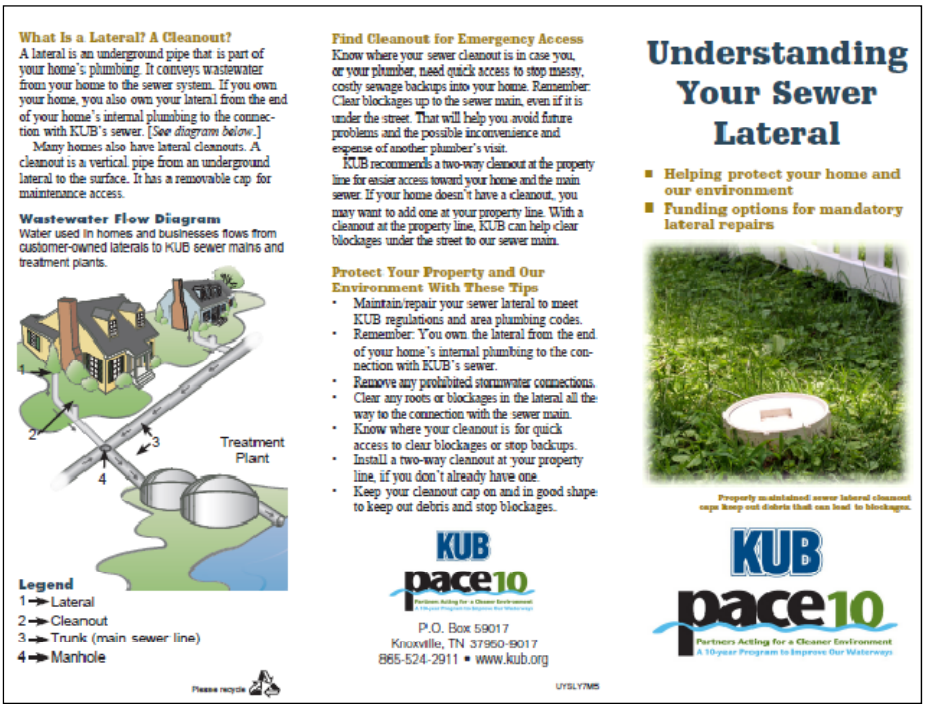
Table 5 – Cost Estimate for Insurance Program

| | |
|---|---|
| **Revenue** | |
| 142,578 | Residential Accounts for Water Service |
| $20 | Annual Fee for Insurance Program |
| $2,851,560 | Annual Revenue for Insurance Program |
| **Costs** | |
| $5,100 | Average Cost of Lateral Maintenance |
| $500 | Insurance Deductible |
| $300 | Average Cost of Lateral Video Inspection |
| $59,984 | Annual Plumbing Inspector Salary |
| $29 | Hourly Plumbing Inspector Salary |
| $50,000.00 | Education Campaign (Annually) |
| **Estimated Program Costs** | |
| $5,300 | Lateral Maintenance Cost (Labor) |
| $115.35 | Lateral Maintenance Cost (Administrative) |
| $5,415.35 | Total Lateral Maintenance Cost |
| **Estimated Possible Annual Replacements** | |
| 517 | Annual Lateral Replacements |

*Sources: Gonwa et al., 2004, Finco, 2010; Authors*

# *Appendix H: City of Knoxville Public Education Brochure*

Figure 5 – City of Knoxville Public Education Brochure



**What Is a Lateral? A Cleanout?**

A lateral is an underground pipe that is part of your home's plumbing. It conveys wastewater from your home to the sewer system. If you own your home, you also own your lateral from the end of your home's internal plumbing to the connection with KUB's sewer. [*See diagram below.*]

Many homes also have lateral cleanouts. A cleanout is a vertical pipe from an underground lateral to the surface. It has a removable cap for maintenance access.

**Wastewater Flow Diagram**

Water used in homes and businesses flows from customer-owned laterals to KUB sewer mains and treatment plants.



**Legend**

1 ➡ Lateral
2 ➡ Cleanout
3 ➡ Trunk (main sewer line)
4 ➡ Manhole

Please recycle

**Find Cleanout for Emergency Access**

Know where your sewer cleanout is in case you, or your plumber, need quick access to stop messy, costly sewage backups into your home. Remember: Clear blockages up to the sewer main, even if it is under the street. That will help you avoid future problems and the possible inconvenience and expense of another plumber's visit.

KUB recommends a two-way cleanout at the property line for easier access toward your home and the main sewer. If your home doesn't have a cleanout, you may want to add one at your property line. With a cleanout at the property line, KUB can help clear blockages under the street to our sewer main.

**Protect Your Property and Our Environment With These Tips**

- Maintain/repair your sewer lateral to meet KUB regulations and area plumbing codes.
- Remember: You own the lateral from the end of your home's internal plumbing to the connection with KUB's sewer.
- Remove any prohibited stormwater connections.
- Clear any roots or blockages in the lateral all the way to the connection with the sewer main.
- Know where your cleanout is for quick access to clear blockages or stop backups.
- Install a two-way cleanout at your property line, if you don't already have one.
- Keep your cleanout cap on and in good shape to keep out debris and stop blockages.

KUB pace10

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UYSLYTMS

# Understanding Your Sewer Lateral

- **Helping protect your home and our environment**
- **Funding options for mandatory lateral repairs**



Properly maintained sewer lateral cleanout caps keep out debris that can lead to blockages.

KUB pace10
Partners Acting for a Cleaner Environment
A 10-year Program to Improve Our Waterways

*Your sewer lateral is your property—from your home's plumbing to the connection with KUB's sewer—and maintaining it helps protect your home and our environment.*

KUB

If you own your home, you also own your sewer lateral: the underground pipe that connects your property to the sewer. You own the lateral from the end of your home's internal plumbing to the connection with KUB's sewer. [*See diagram.*] Under KUB regulations and area plumbing codes, you are responsible for maintaining your lateral, just like other pipes in your home.

We want you to understand why it is important to maintain your lateral to protect your property and our environment. We also know the expense of an unexpected repair can be a hardship.

This brochure includes information about laterals, the lateral program, and possible financial aid to help low-income homeowners make repairs.

**Federally Mandated Private Lateral Program (PLP)**

Maintaining laterals helps protect waterways by keeping out stormwater that can overload sewers and contribute to overflows.

KUB owns and maintains the wastewater system that transports wastewater to treatment plants. The City of Knoxville, or Knox County, manages the stormwater system to control rainfall runoff.

Under the PLP, regulators require KUB to

- Inspect private laterals and identify defects or prohibited connections, like roof downspouts, that direct stormwater to the wastewater system
- Inform property owners of any defects, the process to follow, and potential availability of financial aid
- Ensure owner corrects the problem in 120 days
- Terminate water service to the property if the problem isn't corrected in 120 days.

**PLP Notification and Enforcement**

As PACE 10 wastewater system inspections find lateral problems, KUB notifies the property owner.

**Initial Contact:** First Notice of Noncompliance includes a description of the defect, what to do, and information on possible financial assistance.

**30 Days:** First Notice of Violation and Termination of Service goes to all owners who do not complete work within 30 days. Gives owners 14 days to appeal to KUB. For owners working through the repair process, this notice is simply a reminder of the 120-day deadline to avoid water service termination at the property.

**90 Days:** Termination Notice states water service will be shut off at 120 days if work isn't finished.

**110 Days:** A doorhanger advises water service will be shut off in 10 days if lateral not repaired.

**119 Days:** KUB attempts final contact before shutting off water service.

**120 Days:** KUB turns off water service.

**Financial Assistance Information**

KUB funds a required grant* program and a voluntary no-interest loan program to help low-income homeowners make lateral repairs.

**For grant or loan applications, please call the Knoxville-Knox County Community Action Committee (CAC), 637-9073.**

*Please Note:* Approval is based on income, but not income alone. CAC adjusts for family size, medical expenses, and other qualifying factors.

**This project [Grant Program] was undertaken [by KUB] in conjunction with the settlement of a civil enforcement action taken by the United States for violations of the Clean Water Act.*

**Defective Laterals Are Bad for The Environment**

Broken laterals can allow tree roots or debris into the pipe, which may cause blockages, building backups, or overflows in the environment. And leaking pipes allow wastewater to reach groundwater or area waterways, which adds to water pollution.

**Keep Stormwater From Overloading Sewers**

Defects and prohibited connections also let stormwater into KUB sewers. That extra water costs more to treat, and it may overload the system, causing overflows. Prohibited connections include roof downspouts, groundwater sump pumps, foundation drains, and drains from window wells, driveways, etc.

Direct stormwater to storm sewers or drainage ditches, or let it soak into the ground.

**Remove Prohibited Connections**

KUB and City plumbing inspectors won't approve repairs if the lateral has prohibited connections. Prohibited connections are anything that directs stormwater to the sewer.

*City of Knoxville, n.d.*

## *Appendix I: Map of Example High I/I Area*

This map illustrates one area identified by MMSD and Milwaukee Department of Public Works as a high I/I area (Jaber, 2010, February 26). This high I/I area contains approximately 588 residential parcels constructed before 1970. Assuming these property owners have not maintained their sewer laterals, the laterals are over 40 years old and likely in need of repair or replacement (Gonwa et al., 2004). This area represents one of approximately twenty similar-sized predominately residential areas in Milwaukee that have been identified as high I/I.

Figure 6 – Map of Milwaukee High I/I Area


*Source: Map Milwaukee, 2010.*