

Downspout Disconnection: Best Practice Implementation in Milwaukee



“...any attempted solution to basement flooding will need to substantially address... private property sources.” City of Milwaukee Flooding Study Task Force, 2011

*Prepared for BUS600
Topics on Sustainable Business Practice*

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December 2011

Background

On a normal day Milwaukee Metropolitan Sewerage District (MMSD) treats 50 to 80 million gallons of water. The South Shore and Jones Island plants' capacities are 300 million gallons each per day. If needed the Jones Island facility can implement a blending treatment process of up to 20% of the water to at least partially treat a total 360 million gallons.

However, during significant rainfall events, Milwaukee's water infrastructure cannot process the volume of storm water runoff and sewage it receives. In order to prevent basement back-ups and street flooding, the city must sometimes choose to release untreated sewage from a number of its 153 sewage overflow points and may also discharge only partially treated water from the Jones Island facility into Lake Michigan.

MMSD has undertaken many projects to address the problem. Initiatives include infrastructure improvements such as the three Tunnel projects with a combined storage of over 500 million gallons. MMSD has also been able to create significant storage above-ground. The \$95 million County Grounds project basin can contain up to 315 million gallons of water. Lands purchased through the Greenseams program have the capacity to hold 1.3 billion gallons of water. The City of Milwaukee and other partners within the watershed are actively addressing storm water management concerns on public land.

Action on residential property is now becoming a higher priority. According to the City of Milwaukee Flooding Study Task Force (FSTF), "Given that private property sources account for between 60% and 80% of the clear water that is entering and inundating sanitary sewer systems, any attempted solution to basement flooding will need to substantially address those private property sources."(Appendix A)

UW-Milwaukee's Urban Planning 810 students, who investigated a variety of ways to address the basement backup and street flooding problems, overwhelmingly recommended downspout disconnection to address private property sources. However, downspout disconnection is difficult to implement with historically low rates of participation from residential areas in Milwaukee. In one urban case study¹, a minimum of three contacts per household was required to achieve a significant adoption rate.

The Problem Identified

Given its limited resources—financial and human—how can the City of Milwaukee choose strategies to maximize contact with households and thus achieve high downspout disconnection rates?

Project Proposal

To achieve maximum disconnection, the City of Milwaukee cannot focus on a single route of communication or persuasion. Instead, the City must use a diverse portfolio of strategies that cover awareness, skill training, and implementation. We therefore recommend an inter-connected three component program, where households are proactively ushered from initial contact to disconnection. All components are designed so that the final step of that component is the first step of the subsequent. Essentially, at the end of each step, the individual is signed up for the next step.

Logistically, the City of Milwaukee will not be able to immediately implement all suggested strategies. Despite these limitations, we recommend the City should still chose strategies that cover each of the three critical areas: marketing, training and implementation.

1. Marketing

In the case of downspout disconnection, marketing is not brochures, direct mailing campaigns and email blasts. These strategies have provided lackluster results in other urban areas. While these strategies can be utilized in the "off-season" or for targeted areas, during the summer, marketing strategies should be focused on large-attendance events. This will result in a high rate of return (in interested households and their associated contact information) per hour or dollar spent. Also, all contact

¹ Toronto, <<http://www.toronto.ca/legdocs/2006/agendas/council/cc060925/pof7rpt/cl056.pdf>> p.5

information sheets should have a volunteer option check box, so that program organizers have a database of people to contact for help on manpower-intensive tasks, such as phone follow-up.

Timeframe: Since the project requires outdoor work, late spring, summer and early fall is the target season. Daylight time frames are recommended over evenings.

Venues: Milwaukee's summer festival events are well-attended. Examples include: Summerfest², various cultural festivals, Pride Fest, Brady Street Festival, Bastille Days, and Arts Lakefront.

Target audiences: child-friendly events (State Fair, Air and Water Show), or eco-friendly and water related events (Rock the Green, Gathering Waters) are obvious choices. However, the key to program success is reaching diverse audiences in as many neighborhoods as possible.

Children-focused marketing: for events with family attendance, children friendly programs are a great way to get families to stop and listen. Fairs are hectic, and parents will jump on the opportunity to give their children something to do while they take a break. While children are occupied, booth attendants can talk with adults, get their contact information, and sign them up for a disconnection workshop. Several sample family focused booth activities are included in the appendix (Appendix B).

Other options: the City of Milwaukee can team up with our suggested partner groups to sponsor a "Stop Flooding in Milwaukee" day at the fair. Rather than host a separate event, which would be cost prohibitive, the coalition could work with fair planners to "brand" a certain fair day under this cause.

The City of Milwaukee can learn from other cities when using cold marketing techniques. Newspaper and cold-emails had a low rate of return compared to billboards and direct mailings. In this case, we recommend billboards as the more cost-effective option, except in target areas, where mailings would be worth the investment.

2. Skills Training Programs

Downspout disconnection is not a "one-size fits all" solution. The size of the lot, the permeability of the soil, the amount of impermeable surfaces, the roof area from which water is being collected, and the age of the existing system are all factors that influence storm water management. Helping homeowners find the disconnection method that works best for their property and lifestyle is important. This is why we recommend a tiered educational program approach. The most intensive training would target municipal engineers and other related government employees who could get involved in the downspout disconnect program including the internships, train-the-trainer, and general public programs which would be progressively less comprehensive.

Program content

Following a model from the City of Pittsburgh we recommend an education campaign aimed at municipal engineers and other related government employees. These professional development workshops will feature presentations focusing on specific regulations (e.g. Chapter 25 plumbing and drainage) and compliance issues residents might face, as well as information on how to disconnect downspouts and install rain barrels. The primary purpose of this training is to provide employees with sufficient knowledge and skills to competently provide interns and trainers with practical information.

Individuals participating in the internship or train-the-trainer programs will receive information about the regulatory and technical aspects of downspout disconnection, but in less detail than the City employees. The main training purpose will be to model how to effectively conduct a downspout disconnection program for the general public. Program content for interns, trainers, and the general public will include a description of the benefits of downspout disconnection, viewing of a step by step downspout disconnection video, and then an opportunity to perform a simulated downspout disconnection

Instruction in all sessions will cover downspout disconnection basics including:

² application link <<http://vep4vusd.org/uploads/SFBoothApp2011.pdf>>

- determining parameters of the existing storm water management system
- determining supplies needed: A or B elbow requirements, extension pieces, and cap size;
- tips for completing the job such as
 - Firmly hold the downspout to prevent it being dropped into the drain tile
 - Crimp downspout edges before connecting additional pieces
 - Fit pieces together to avoid leaks;
- and addressing safety concerns.

Hosting Skill Training Workshops

We recommend the City partner with various groups within the watershed to create and host these programs. Possible parties include: those currently selling rain barrels³, those who have received Wisconsin Environmental Education Board grants⁴, the City of Milwaukee Parks Department, the County Parks Department (e.g., Wehr Nature Center), the UW-Extension Master Gardener's program, and the Milwaukee Environmental Consortium which includes many groups concerned about sustainability issues. By partnering with these groups the City creates a network of interested individuals that can serve in an advisory capacity as the programs are designed, implemented, and evaluated. In addition these institutions may be willing to sponsor workshops or staff to become downspout disconnection trainers, reducing the City's direct costs. Other cities, such as Pittsburgh, have had success with this model.

Individuals to serve as the initial trainers for the train-the-trainer model can be obtained through the Milwaukee Metropolitan Sewage District's Speakers Bureau. Although this topic does not appear on the web list, a spokesperson indicated speakers would be available. Strategic hosting of two or three sessions should result in a sufficient cohort of trained individuals who will then serve as the long-term trainers for the public education programs. At the conclusion of each public program, participants could be asked whether they would be interested in becoming trainers in their neighborhood. The train-the-trainer model would thus be taken to the next level.

Mini-workshops (5-10 minutes in duration) can be offered alongside awareness events at targeted venues. A table top display to draw attention, a continuously looping PowerPoint or video to demonstrate the disconnection process, and activities to occupy young children (e.g., Stormie™ coloring sheets⁵, information about the pumpkin contest) while their guardians are occupied with the training can provide an introduction to storm water management and downspout disconnection to people of various ages.

Finally, we recommend a downspout disconnection component be incorporated into existing storm water management educational programs taking place within the watershed. Any programs focused on rain barrel installation, rain gardens, green roofs, or infiltration reduction should include a brief downspout disconnection portion. At a minimum, information about upcoming workshops should be shared and contact information for potential downspout disconnection workshop participants should be collected.

During the summer, we recommend a minimum of one training event a week at a high traffic area. That way, when a household contact is made, they can be signed up for a training workshop within the week.

3. Implementation

Creating awareness and skill training is important, but the effort cannot end there. Even if many people come to workshops, read the brochures, and see the emails there is no guarantee they take the final step and perform the disconnection. Programs in other cities found little significant change in rates of

³ <http://v3.mmsd.com/rbdistributors.aspx>

⁴ <http://cnrapps.uwsp.edu/weeb/Organizations.aspx>

⁵ http://www.lowellma.gov/depts/engineering/stormwater-1/stormy_coloringbook.pdf

disconnection despite their attempts to spread awareness using educational tools. The only voluntary program with significant implementation rates that we found was a door to door campaign in Toronto in 2006, with adoption rates of 60%. However, homes required up to three visits to follow through with disconnection, which was cost-prohibitive and resulted in the program being canceled, and replaced by a mandatory program. We therefore recommend an approach attempting to contact attendees through a step by step program, with home visits as a late-summer last resort neighborhood sweep.

1. Take down home addresses, phone numbers, and email addresses of all contacts at any program, especially education program attendees.
2. Email immediately following the event or program with a standardized email providing next steps for disconnection.
3. Send a confirmation email or survey out two to four weeks later.
4. Record disconnections as successes
5. Phone calls a week later to those who do not respond or who confirm they have not disconnected.
6. Record disconnections as successes
7. At the end of the summer, do neighborhood sweeps. Visit the homes of those attendees who still have not disconnected or have been unavailable. Bring downspout disconnection kits valued at around 15 dollars for residents to purchase and other education materials.

A comprehensive follow up program as suggested above could take a significant amount of manpower depending on the numbers of program attendance, which is why we recommend an internship program for the Milwaukee sustainability or public works office to carry out these tasks. This would allow relatively inexpensive labor to carry out these steps to contact attendees.

There are options the City can pursue to offset the cost of program materials and intern salaries. Many grants are available to fund this project, including Urban Waters Small Grants from the EPA and grants from the Wisconsin Environmental Education Board. These sources of funding as well as other grants could potentially pay for the entire program.

Source	Deadline	Amount
EPA : National Student Sustainability Design Competition	Dec. 22, 2011	\$15,000 \$90,000
NSF: Informal Science Grant	Jan. 12, 2012	\$1,200,000
AmeriCorps Grant	Jan. 18, 2012	\$50,000
EPA: Urban Waters Small Grant	Jan.23.2012	\$60,000
Wisconsin Environmental Education Board	Feb.11, 2012	\$10,000

A chart with cost estimates for our recommendations is included as Appendix C. Depending on staffing choices made by the client, all of our recommendations could be implemented within the confines of the majority of these grant options.

Cautionary Statement

Many of the solutions provided by our group to encourage disconnection have been attempted before in various ways by different cities. These programs were often found to be relatively ineffective in either number of citizens reached or cost-effectiveness (Appendix D). We believe our proposal, which incorporates many different tactics cities have tried before, as well as some new strategies integrated to

provide a more comprehensive solution, will be more effective than other programs. However, this history of limited success is something to be aware of.

This is why we suggest the City investigate mandatory disconnection. According to our research on ordinances in the other 27 municipalities in MMSD's watershed (Appendix E), there's ample precedent to make disconnection mandatory. In fact, the City of Milwaukee is significantly behind most municipalities in this respect. Our research shows this is the only certain way to increase numbers of disconnections to desired levels, despite challenges such as small lot sizes, lot grading and political hurdles. If the City does institute mandatory disconnection, and provides for an implementation period, the marketing and training programs described above could be used as foundational tools to educate residents on how to comply with the new ordinance.

Conclusion

Many cities have attempted to increase participation of residents in disconnecting their downspouts, and most have been unsuccessful. We have taken what they learned and tried to expand our program outside the usual tactics focusing on our interlocking three step plan and train-the-trainer model coupled with co-sponsorship. Our program is low in material cost, but will require increased manpower which is why we recommend an internship program with a part or full time employee's supervision to help organize the project. We designed the program to maximize disconnection rates, and thus decrease the impact of private storm water sources on the City of Milwaukee.

Appendices

Appendix A

Excerpted Recommendations from the City of Milwaukee Flooding Study Task Force Final Report

- The City should evaluate its experiences with existing green infrastructure improvements and develop policies to incorporate future green infrastructure into development, re-development and street construction efforts. The green infrastructure policies should give priority to areas with flooding problems. Examples of green technologies include rain barrels, cisterns, rain gardens, green roofs, storm drain restrictors, porous pavement, median and roadside bio-retention projects, catch basin retrofits, storm water planters, vacant lot bio-retention, increased tree canopy, and downspout disconnection.
- The City should work with Milwaukee Metropolitan Sewerage District (MMSD) and the State of Wisconsin to evaluate the feasibility of revising city building codes and zoning ordinances to incorporate greater protections for homes from backwater incidents. These changes could include requiring downspout disconnection; the disconnection of foundation drains; the rehabilitation or replacement of faulty sewer laterals; and a requirement for hung plumbing for newly constructed properties with basements in critical backwater areas.
- MMSD and the City should evaluate the combined sewer area to consider the establishment of targeted zones where a mandatory downspout disconnection program may be implemented. This policy should establish reasonable standards for exempting properties, such as unreasonably small lot sizes, or minimal front or side setbacks.
- The City and MMSD should continue their efforts to better educate the public on the causes and effects of sewer and flooding issues and the remedies at hand. Other partnerships, such as with the City of Milwaukee Public Information Division should be established to create educational pamphlets and articles for Aldermanic newsletters and the City’s web site, as well as creating opportunities for City/MMSD representatives to make presentations at town hall and neighborhood meetings. Early education should focus on the interrelationships between the public and private portions of the sanitary sewer system and low cost improvements like properly grading properties, use of rain-barrels and construction of private property rain gardens.

Appendix B

Sample Family-focused Booth Activities

1. Hand out pumpkin seeds for a “Pumpkin Growing Contest”, stapled to a child-friendly flier with a City email address to which children can send a picture of their pumpkins and a few sentences on how they used water from their downspout for the water-intensive crop and other uses.
2. A short “sing-along” program with kids that interns write and implement. Include recognizable nursery rhymes, but with a “disconnection” theme. For example:
“The Itsy Bitsy Spider Disconnects her Downspout”
The itsy bitsy spider disconnects her downspout
Out comes the rain and makes the garden sprout!
Out comes the sun and shines on all Milwaukee,
and the itsy bitsy spider says, “why don’t you join me?”
3. Other “fun” events created by interns with color, music, and seating space to occupy kids while an intern talks to parents.

Appendix C

Our Expense Estimates

Element	Cost	notes
Part to full-time project coordinator	starting salary	Optional- at the client’s discretion. Alternative would be a trusted lead intern
Marketing/Awareness	Booth at ~15 events	

Booth reservation at Summerfest	free for non-profits + \$80 sun canopy recommended rental	Example- event booth costs vary between events http://vep4vusd.org/uploads/SFBoothApp2011.pdf
Booth Reservation at Pride Fest	\$600-800	Example- event booth costs vary between events. http://pridefest.com/images/documents/2011%20vendor%20application.pdf
Mammoth Gold Pumpkin Seeds	\$29.99/11b sack	~2,000-3,000 seed/lb. price drops at 5lbs bulk www.edenbrothers.com/store/pumpkin_seeds_mammoth_gold.html
Paid lead intern	\$1,500-\$2,500/employee/summer	1 lead paid intern, college student
Unpaid interns	hiring costs, incidental costs	There is precedent for unpaid internships. 2-3 college or high school students.
Volunteers	free	from interested volunteer lists collected at events, email, target area direct mailings, billboards, etc.
Incidental costs	\$500	
Education/Skills Training	Minimum 1 training/week	
Disconnection sets for Programs	\$15 dollars/material set x attendance per workshop	Potential to reduce costs buying supplies in bulk, and/or get donations.
Paid Interns	\$1,500-2,500/employee/summer	1-2 paid interns are recommended
Unpaid Interns	Hiring and incidental costs	3 unpaid interns
Volunteers	free	from interested volunteer lists collected at events, email, target area direct mailings, billboards, etc.
Site Rental	\$100 site x 20 sites=\$2,000	Client can anticipate partnering host sites may contribute their facilities as free sites.
Incidental costs	\$500	
Implementation and Follow-up		
Paid Interns	\$1,500-2,500/employee/summer	1 paid intern is sufficient
Unpaid Interns	Hiring and incidental costs	2-3 unpaid interns
Volunteers	free	from interested volunteer lists collected at events, email, target area direct mailings, billboards, etc.
Incidental costs	\$500	Phone costs may be avoided if interns have unlimited-minutes phones to use for follow-up

Appendix D

Excerpt from Toronto Report after cancelling voluntary disconnection program:

“In developing the WWFMP, the expansion of the City’s existing voluntary downspout disconnection program was proposed to achieve a target disconnection rate of 40 percent for residential properties across the City, up from the estimated existing 15-20 percent disconnection rate, because higher uptake rates would require the implementation of a mandatory program. In the WWFMP, the

combined sewer service area was considered a first priority, wherein the 40 percent target disconnection rate was expected to be achieved within 10 years of implementation.

Past experience in administering the existing voluntary program has proven that it is difficult to achieve higher uptake rates. While the program has averaged about 2,300 disconnections per year over the last seven years, it’s been estimated that at this rate of disconnection, it would take 22 years to achieve the WWFMP disconnection target of 40 percent. Further, in the above-noted pilot project, within a targeted basement flooding prone area, an unprecedented level of effort by City staff canvassing residents has resulted in approximately 61 percent of the targeted 541 property owners agreeing to have their downspouts disconnected. This level of effort, where as many as three door-to-door visits were made to homes within the target neighborhood during the day, evenings and weekends to help ensure contact with the property owners, and for repeat consultations, is not sustainable across the City.”

“Options for Implementing a Mandatory Downspout Disconnection Program City-wide”, page 5
 <<http://www.toronto.ca/legdocs/2006/agendas/council/cc060925/pof7rpt/cl056.pdf>>

Appendix E

Ordinances of Surrounding Municipalities

MMSD service area municipalities	phone number	Disconnection possible?	Disconnection required?
City of Milwaukee	414-286-3361	yes	no
Bayside	414-351-8811	yes	yes
Brookfield	262-782-9650	yes	yes
Brown Deer	414-357-0120	yes	yes
Butler	262-783-2530	yes	no
Caddy Vista	414-762-7878	yes	yes
Cudahy	414-769-2213	yes	
Elm Grove	262-782-6700	yes	yes
Fox Point	414-351-8900		
Franklin	414-4252592	yes	yes
Germantown	262-250-4720	yes	yes
Glendale	414-228-1710	yes	yes
Greendale	414-423-2133	yes	no
Greenfield	414-761-5376	yes	yes
Hales Corner	414-529-6161	yes	yes
Menomonee Falls	262-532-4700	yes	
Mequon	262-242-3100	yes	yes
Muskego	262-679-4128	yes	yes
New Berlin	262-786-7086	yes	in certain areas
Oak Creek	414-768-6547	no	no
River Hills	414-352-0080	yes	
St. Francis	414-481-2300	yes	yes
Shorewood	414-847-2650	yes	no
Thiensville	262-242-3720	yes	yes
Wauwatosa	414-479-8932	yes	yes
West Allis	414-302-8379	yes	
West Milwaukee	414-645-6238	yes	no
Whitefish Bay	414-962-6690	yes	yes