

# **Improving Storm Water Management: A Case Study in Best Management Practices**

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## **I. INTRODUCTION**

### **A. Improving Stormwater Management Practices**

The purpose of the collaboration between the Environmental Policy Clinic (Clinic) and the City of Minnetonka (Minnetonka) is to improve Minnetonka's stormwater management in an effort to preserve water quality. Minnetonka specifically asked the Clinic to study the issue of illicit discharge – essentially, non-permitted, non-authorized discharges into the storm sewer – in the hopes that better understanding would help the city address the issue. The Clinic conducted a thorough audit of Minnetonka's current stormwater regulations, as well as case studies of stormwater management practices and challenges in Minnetonka's neighboring cities and cities across the United States. From this audit and these case studies, the clinic formulated policy recommendations, and outlined challenges faced by similarly situated cities.

## **II. CHALLENGES IN STORMWATER MANAGEMENT**

Case studies show cities face several challenges in stormwater management. Issues range from lack of public awareness, to lack of internal communication, to ordinance confusion, and a host of other concerns. Understanding what these issues are, and where they come from, is vital to improving stormwater management.

### **A. Lack of Public Awareness**

Cities repeatedly cite lack of public awareness as a key contributor – if not *the* key contributor – to illicit discharge. “I don't think it's a legislative issue, or a permit issue, we're at a place where it's about public education and knowing where the storm sewer goes,” said Woodberry Environmental Resources Coordinator Sharon Doucette. “We need to get them to care enough to make the right choices.”

Lack of public awareness of illicit discharge generally takes one of two forms:

1. people are not aware of the impact of their specific activities;
2. people are not aware of their impact on the stormwater system, generally.

### **A1. Illicit dischargers who are not aware of the impact of specific activities**

People who fall into this category differ from their neighbors, who are not aware of the issues generally, in that they're aware that you can't just dump into the street noxious substances like paint, battery acid, and radiator fluid. Case studies suggest this represents the bulk of illicit discharge sources nationally, and locally. People in this category are aware that substances discharged into the stormwater system eventually wind up, untreated, in a lake or a river somewhere. This group is generally characterized as innocent, well-meaning and under-informed. This category is under-informed in the sense that, most don't know that a specific activity – like raking leaves or yard trimmings into the gutter, not collecting animal feces, and heavy use of de-icing minerals qualifies as an illicit discharge and is harmful to the stormwater system and the lakes and streams it flows into.

“What we find is mostly a lot of one-time dumping kind of issues, spills, etc.,” Doucette said. “We have the ability to do an administrative citation (\$50-100). We use it sparingly. It doesn't really seem like the penalty is worth it.”

### **A2. Illicit dischargers who are not aware of their impact, generally**

This group is characterized by an indifference to unauthorized dumping, either because the individual is unaware of the issue of illicit discharge altogether, or he or she knows better but doesn't care. Case studies indicated this group tends to be rarer than the group of illicit dischargers who are unaware of the impact of a specific activity.

“It's not really an issue,” Eden Prairie Environmental Coordinator Leslie Strovring said. “We've only had a couple times where we've had problems.”

## **B. Lack of internal communication**

Several cities indicated their stormwater management efforts suffer from a lack of internal communication among municipal staff, employees and contractors. Case studies indicate that internal communication failures stem from several sources, including:

1. Lack of awareness
2. Apathy toward the issue
3. Resource constraints
4. Poor planning

### **B1. Lack of awareness**

This mirrors the public awareness problem in that employees may mean well, but don't recognize either the impact of specific activities or the importance of effective stormwater management generally.

### **B2. Apathy toward the issue**

Some case studies indicated cities' stormwater management struggled against employee apathy. For example, one Minnesota city uses its public works staff to help monitor for potential illicit discharge while conducting routine maintenance. The program calls for the public works staff to alert the environmental department immediately if it sees anything "really suspicious," and to make a list of certain conditions (stains, groundwater running where it shouldn't, etc.) for environmental staff to follow up on in the dry season.

In the case study, the second step – listing and sharing the notes – has fallen off, and "part of it is a reluctance of public works staff to give us the list of water running."

### **B3. Resource constraints**

Part of the breakdown of interdepartmental cooperation is a strain on resources, case studies indicate. In an era of increasingly tightened budgets, municipalities have continually asked staff to do more with less, and it's unlikely this will change much in the near future.

Stormwater management concerns can take a backseat when city departments prioritize their respective responsibilities according to their own departmental mission. Using the example of the public works staff in the preceding example, it just may be the case that the monitoring, notation and communication of potential illicit discharges is generally beyond what the average employee has time for in his or her eight-hour day. Moreover, funding for public stormwater education efforts is also limited by city budgets, forcing municipalities to seek creative solutions to distribute their message.

#### **B4. Poor planning**

City staffers at the policymaking level have also shown a lack of prioritization of stormwater management in municipal planning. Overbuilt plots and oversized roads increase impervious surface coverage and put greater strain on the stormwater system, often with little benefit. For example, one case study indicated that when cities design and build roads, staffers solicit input exclusively from public safety officials. The case study indicated that this frequently results in a recommendation that roads be built wide enough to accommodate two fire engines driving side-by-side, ignoring factors like traffic and population density, which may allow for reduced road width.

#### **C. Ordinance problems**

Case studies indicate that issues with ordinances and municipal code may help contribute to public confusion, ignorance and apathy towards stormwater management concerns. Issues with ordinances and municipal code tend to stem from the fact that the city's legal tools for stormwater management are de-centralized, and often spread across much of the city code. Some case studies also suffer from the general statutory-drafting issues such as vague, conflicting or duplicative language. Part of this probably stems from the relative newness of MS4 permitting

requirements, especially among smaller cities, as well as the evolving requirements of MS4 permits.

#### **D. Additional factors**

Other factors play into the public and municipal challenges to stormwater management, including permitting duplicity, and MS4 permitting requirement changes by the Minnesota Pollution Control Agency.

##### **D1. Permitting duplicity**

Currently, developers building in the overlapping jurisdiction of the City of Minnetonka and the Nine Mile Creek Watershed District are required to satisfy two sets of stormwater management requirements in order to obtain building permits. While the two sets of requirements is not an impediment to stormwater quality *per se*, streamlining the process through a memorandum of understanding, or joint powers agreement, would increase efficiency and potentially lower transactional costs for developers.

##### **D2. MPCA changes**

Because the MPCA is updating the requirements of the MS4 permit program, it's difficult to address specifically what cities must do moving forward to adequately address illicit discharge and to implement a satisfactory stormwater management plan. Still, it's evident the MPCA wants cities to take on a more proactive approach, and as a result the agency is pushing MS4 permitting rules to address that approach.

“[The new permit] compares with 2006, but it'll be more prescriptive,” said MPCA Pollution Control Specialist Dan Miller. The 2006 permitting requirements, Miller explains, called for cities to develop plans focusing more on education. By updated permit's “more prescriptive” approach, Miller explains the agency wants to see stormwater management plans



that account for “inspections, maintenance activities, and tracking,” in order for the agency to be “a little more clear that these are the steps to implement on a base level.”

As Minnetonka is aware, Minnesota cities raised serious issues with the draft permit MPCA unveiled for 2012. And, while the agency may not ultimately promulgate rules as prescriptive as it prefers, it’s at least signaled intent to move toward this standard, for which cities should take notice.

### **III. BEST PRACTICES**

Based on the case studies, the clinic identified best practices implemented by Minnetonka’s metro-area sister cities and progressive cities nationwide.

#### **A. Only Rain Down the Drain Hotline, Spill Response Hotlines**

Several of the case studies employed a hotline for residents to report suspicious activity. Seattle advertisements prompted residents to report violations, reminding them that “stormdrains are for stormwater only.” Eden Prairie said most of its illicit discharge detection is complaint-based, and the city website provides a list of environmental issues relating to stormwater, a contact form, and hotline to call.

#### **B. Programs and Policies to Increase Onsite Retention of Stormwater**

The case studies provided an array of examples of programs that cities have used to encourage residents and businesses to increase onsite retention of stormwater. Although not directly related to illicit discharge, these programs address some of the awareness and education issues discussed above, as they encourage residents to actively participate in the stormwater management process and think about how their actions affect water quality.

Portland, OR allows residents the opportunity to reduce their stormwater utility fee by up to 30% in exchange for reducing runoff from their property through modifications and

improvements. This is done through the city's Clean River Rewards Program. To assist residents in these efforts, the city maintains an informational page on its website that includes technical assistance, flexible funding options, and information on educational workshops that are regularly held by the city.

A number of cities including Chicago, IL operate or have operated downspout disconnection programs. Downspouts generally transfer rainwater from roofs to the stormwater system, and the runoff that they carry collects pollutants from roofs and other impervious surfaces before being discharged into water bodies. Disconnecting downspouts increases onsite retention of stormwater and reduces pollution associated with runoff. Chicago maintains an informational page on its website, instructional videos and brochures, and discounts for disconnection materials to encourage disconnection. The city notes that there are legal and land use issues that need to be considered before downspout disconnection occurs, because increasing water onsite can create erosion and property damage risks if not done properly.

In addition to reducing runoff from private property, reducing runoff from public property and rights-of-way is another approach that cities adopt to address runoff. Because these projects are often "high-visibility" projects, they are also a way through which cities can increase public awareness of stormwater management issues. The property is also easier to upgrade from a legal perspective because it is already largely under the city's control.

Seattle, WA has included green stormwater infrastructure requirements (GSI) in its stormwater code. All development projects are required to implement GSI "to the maximum extent feasible," constrained by things like physical limitations, engineering practicality, and finances. These constraints are obviously vague but the inclusion of the requirements in the stormwater code ensures that at least some GSI is incorporated into all new development.

Seattle's Natural Drainage System (NDS) also addresses modification of rights-of-way infrastructure. It demonstrates how coordination between different city departments can improve stormwater management, as residents and public officials were incorporated into all infrastructure modification planning. An example of the difficulties that can arise in this area came up during our meeting with NMCWD, when it was mentioned that many municipalities require streets to be wide enough to fit two fire trucks at one time. This width was probably unnecessary from a safety perspective but it is an example of the concerns that need to be addressed in any infrastructure modification plans. In Seattle's case, the concerns of emergency personnel were expressed during the planning phase for many of these projects and Seattle worked closely with them to design projects that were effective at managing stormwater and addressing those safety concerns.

Residents have also been included throughout the planning process. Infrastructure improvements such as rain gardens or landscaped areas along roads are aesthetically attractive and are usually appreciated by residents after they are implemented. Seattle has also emphasized the importance of focusing on long-term planning and finances when creating these projects. Although they require funds upfront, the NDS projects usually have lower long-term maintenance and environmental cleanup costs so they cost the city less than traditional infrastructure over longer time horizons. The EPA, for example, estimates that narrowing streets by even four feet can save more than \$35,000 in paving costs alone (assuming a cost of ~\$15/yard for paving costs), apart from the environmental benefits of reduced impervious surface area. If Minnetonka is interested in narrowing its streets, it may want to look at its parking requirements—many cities have parking requirements for new development that require too much parking and limit flexibility for developers.

### **C. Illicit Discharge Detection Programs**

Illicit discharge is a stormwater issue throughout the country and several cities have developed proactive detection and elimination programs to deal with the issue. These programs usually involve regular sampling of a city's water bodies and stormwater system, data collection and storage, and enforcement and elimination power in the event that an illicit discharge is detected. Some of these programs act together with specific ordinances addressing illicit discharge, but other cities do not have illicit discharge ordinances and instead define and address it in their stormwater management plan.

Portland, OR has a very effective Illicit Discharge Elimination Program (IDEP). Through IDEP, the city prioritizes and regularly samples MS4 outfalls to identify, investigate, and eliminate illicit discharges. The city samples 101 areas along its waterways "3x per dry season (June-September), twice per event", testing for conductivity, pH, temperature, copper, iron, zinc, fecal coliform, and residual chlorine. IDEP is incorporated into Portland's stormwater management plan under its "Illicit Discharges Controls" BMP category. Illicit Discharge is defined in the stormwater management plan to include illicit connections to the MS4, illegal dumpings, and emergency spills. Portland also includes exceptions to this definition, basically non-stormwater discharges to the MS4 that are not considered to be an illicit discharge. This includes things like discharges from emergency fire-fighting, street washing, air conditioning condensate, car washing, and diverted stream flows. The exceptions fall under four categories: Agency Process Waters, Single Site Behaviors, Building Discharges, and Natural Waters. As part of implementing its IDEP program, Portland sets measurable goals in its stormwater management plan, including sampling of all MS4 outfalls at least once annually during dry

weather, inspecting priority outfalls a minimum of three times per year, and maintaining its 24-hr spill response hotline. If illicit discharge is detected, the city's enforcement options include "written warnings, written citations, cease and desist work orders, administrative reviews, voluntary compliance agreements, penalties, termination of permits, and summary abatement by the Bureau of Environmental Services. The city's code includes a chapter on "storm system discharges" where it defines illicit discharge in a similar manner to the stormwater management plan, prohibits illicit discharges, and defines the city's enforcement powers against illicit discharges.

Seattle, WA's Illicit Discharge Detection and Elimination Program (IDDE) is at least as comprehensive as Portland's and is similar in its setup, with regular sampling, increased sampling for priority areas, data collection and storage, and administrative and enforcement powers against illicit discharges. Seattle's definition of illicit discharge is the same as Portland's—illicit connections, illegal dumping, and spills—and also includes a list of exceptions to the definition (i.e. non-stormwater discharges to the MS4 that are permissible) that is similar to Portland's. The city has a complaint hotline, a spill response program, and a business and stormwater facility inspection program, from which it collects data and identifies illicit discharges from these sources. The database that is created allows Seattle to document where most of its discharges are coming from so that it can improve the accuracy of its IDDE program. The city's complaint hotline is available 24 hours per day, publicly listed, and is complemented by a web form through which citizens can also report illicit discharges.

The IDDE program includes a "Field Screening and Source Tracing" program through which the city;

- (1) Prioritizes locations for sampling;

- (2) Performs “field characterizations” at those locations through sampling and other procedures;
- (3) Uses trigger values in its sampling that initiate source tracing efforts including additional sampling, dye testing, business inspections, and/or filming of piped systems.

Once a source of illicit discharge is identified through field screening and source tracing, investigation, entry, and enforcement powers are used to eliminate the source. The idea behind Seattle’s “characterization” system for its outfalls is to determine what a normal, dry-weather flow is like for a given location and use that as a baseline for further investigation when the flow deviates too far from that standard. Outfalls are given priority based on size, number of connections, and quality of the water body that it discharges into.

#### **D. Illicit Discharge Ordinances, Model Ordinances**

Illicit discharge ordinances are described by the EPA as “essential” elements of illicit discharge detection and elimination programs because they grant inspection and enforcement authority to city officials. Minnetonka does appear to have many of the required investigative and enforcement powers needed to combat illicit discharge; however, a new ordinance that defines illicit discharge, prohibits it, and incorporates those powers by reference may be of huge assistance to Minnetonka as it attempts to address illicit discharge and meet the new MPCA permit requirements. Fort Worth, TX’s illicit discharge ordinance is attached to this report; it is described by the EPA as an effective ordinance that is a good model for other communities to follow and adapt to their own needs. A model ordinance from the EPA is also attached.

As discussed in the cases of Portland and Seattle, definitions of illicit discharge usually:

1. Define illicit discharge as a non-permitted discharge into the MS4 that is not composed entirely of stormwater, and include the categories of illicit connections to the MS4, illegal dumping into the MS4, and emergency spills;
2. Prohibit all illicit discharge;
3. Include a specific list of exceptions—activities that fit the description of illicit discharge but are not in fact prohibited. The clearest examples are “agency process waters” such as water from firefighting or from street washing that discharge into the MS4.

Once illicit discharges are defined and prohibited, enforcement and inspection powers are either created or incorporated by reference. As indicated in the audit, Minnetonka seems to have most or all of these powers already present in its code, so creating an illicit discharge ordinance should be easier for this reason.

#### **IV. SUGGESTIONS**

##### **A. Ordinance cleanup**

Although Minnetonka appears to have most or all of the powers it needs to address illicit discharge, it would be very helpful to add to the code a specific section or chapter addressing illicit discharge by defining and prohibiting it.

##### **B. Education program**

Most of the case studies indicated that more education is really the key to effective stormwater management. A strong education program relies on a range of approaches, working in concert. A vigorous education program for Minnetonka would, ideally, incorporate a stormwater-specific Web page, advertisements on electronic billboards, classroom visits, workplace posters, and storm drain medallions.

As it stands, there's not a central place on the city Web site for residents and developers to visit and look up stormwater issues. Ideally a Web page would define, and explain the importance of stormwater management, as well as list resources for residents to pitch in on the effort, and links for developers to quickly review requirements.

City billboards could help direct traffic to the page, and the issue, by running simple, catchy ads aimed at activities – like improper yard maintenance and animal waste cleanup. Additionally, similarly minded posters can be tailored to specific businesses (restaurants, auto shops, dry cleaners, etc.) and required to be displayed to employees (similar to minimum wage notices, and other federal requirements. Finally, Classroom visits could help enlist elementary children in spreading the word to them and their parents, and storm drain medallions (coming in a variety of materials and colors) also help to notify the public of the prevalence of the storm sewer system.

### **C. Watershed permitting uniformity**

Minnetonka already has some or all permitting authority for 3 of the 4 WSD's within its borders. It has permitting authority for projects within the Bassett Creek WSD, however Bassett Creek provides review and approval before the city issues permits. For Minnehaha Creek WSD, Minnetonka has permitting authority for projects requiring permits under erosion control, floodplain, and stormwater rules; permits for all other rules must be obtained from Minnehaha Creek. No permit applications need to be submitted to the Riley Purgatory Bluff Creek WSD, though Minnesota state agencies may need to be brought in depending on the specific project (e.g. for projects below the ordinary high water level). Nine Mile Creek WSD requires grading and land alteration permits for certain projects, and the WSD generally has independent permitting authority for construction and development within the WSD. For each project, the



WSD requires a grading and land alteration permit application, site grading plans, a stormwater management plan, and a final erosion control plan.

In order to create a “one-stop shop” permit for developers, Minnetonka would probably need to make sure that its permitting requirements are at least as strict as the strictest WSD. Because Minnetonka contains multiple WSD’s within its borders, this may not be ideal for the city if it wishes to maintain flexibility for itself and for developers. Of the WSD’s, Nine Mile Creek’s permitting authority seems to be the strictest and most independent. One thing that Minnetonka can definitely do to make the permitting process easier for developers is to make sure that the permitting requirements for both the city and the WSD’s are available and easily accessible from the city’s website. Scheduling, for example, can be complex and the deadlines are easy to miss. Bassett Creek WSD, for example, generally meets on the third Thursday of each month and plans must be submitted to the WSD by the last Friday of the month prior to the meeting date. Making sure that developers have easy access to this requirement and others can reduce unnecessary delays.

Another avenue Minnetonka can pursue is to open dialogue with the various WSD’s, particularly Nine Mile, about the various permit requirements and a move towards more uniformity. As far as natural resources and development are concerned, the city and the WSD have the same objectives in mind, seeking to protect those resources by encouraging sound and responsible development, and each entity has just gone about implementing those objectives differently. Once both sides realize that they have similar objectives in mind, discussions can move forward and perhaps the process can become streamlined.

## **V. APPENDIX**

### A. Case study cities

- Woodberry, MN
- Maple Grove, MN
- St. Louis Park, MN
- Eden Prairie, MN
- Portland, OR
- Seattle, WA
- Chicago, IL
- Santa Monica, CA
- Fort Worth, TX
- Wilmington, NC