City of Fitchburg

Stormwater Utility Maintenance Plan

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Primary Authors

Claudia Guy, P.E.	City of Fitchburg Environmental Engineer
Natalie McCraw	City of Fitchburg Environmental Engineering Intern

Contributors

Dakota Dorn	City of Fitchburg Environmental Engineering Technician / GIS Specialist
Johren Frydenlund	City of Fitchburg Parks and Forestry Maintenance Supervisor
Lonnie Tracy	City of Fitchburg Streets Employee
Mark Hodel	City of Fitchburg Streets Supervisor
Mike Bisbach, P.E.	Former City of Fitchburg Director of Public Works
Rick Eilertson, P.E.	AECOM Project Manager

Photos by Claudia Guy unless otherwise indicated.

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Cover Photo: City of Fitchburg Public Works crew works on replacing a failed culvert under Fitchrona Road.

Chapter 1. Introduction

Mission Statement

To provide quality stormwater services to the residents of the City of Fitchburg in a manner which protects human health, environmental health and property, and emphasizes sound management of fiscal and natural resources.

History and Financing of the Stormwater Utility

The City established a Stormwater Utility in 2002 (Chapter 40, Article V) to provide consistent funding for meeting the City's stormwater management needs. Billing rates are calculated based on the Stormwater Utility's operating and capital expenses. Generally, the rate for homes in the Urban Service Area is higher than the Rural Service Area, which reflects a higher cost to provide stormwater services to urban areas. The storm sewer system in the Urban Service Area includes manholes, curb inlets, storm sewer pipes, and stormwater ponds, all of which are generally not present in the Rural Service Area.

Billing rates are discussed in more detail in the City's Stormwater Utility Rate Study, which is available online here: http://www.fitchburgwi.gov/232/Stormwater-Financing.

Stormwater Management Responsibilities

The City of Fitchburg's Stormwater Utility maintains the City's stormwater system infrastructure, implements stormwater improvement projects, and meets regulatory requirements to protect our water resources.

The City's stormwater infrastructure is located on City properties, within City easements and within the City rights-of-way. In urban areas, the public stormwater system primarily consists of storm inlets, manholes, storm sewers, greenways, ponds, rain gardens, bioretention basins and infiltration basins. In rural areas, the public stormwater system consists primarily of roadside ditches and roadway culverts. The Public Works Department operates and maintains this system to convey storm water to natural drainage ways, where possible, based on natural topography. Public Works staff maintain not only the City's stormwater infrastructure, but they perform many other maintenance activities, such as fixing pot holes, putting up street signs that have fallen, fixing water main breaks, and plowing snow, to name a few. **Therefore, the timing of activities discussed in this plan may shift due competing priorities, financial resources, and staff capacity limitations**.

To meet the requirements of the Federal Clean Water Act, the Wisconsin Department of Natural Resources developed a Discharge Permit Program to reduce adverse impacts to water quality in our lakes and streams from urban sources of stormwater runoff. One goal of the Stormwater Utility is to meet the requirements of this permit, thus improving water

quality for the residents of Fitchburg. The permit requires that the City have a stormwater management program in place that includes the following components:

- Public Education and Outreach
- Public Involvement and Participation
- Illicit Discharge Detection and Elimination
- Construction Site Pollution Control
- Post-Construction Site Storm Water Management
- Municipal Pollution Prevention

A large portion of the City is located in the Rock River watershed, which is an impaired waterway with a Total Maximum Daily Load (TMDL) established by the Environmental Protection Agency (EPA). As such, the City is required to meet requirements related to the river's impairments (i.e., phosphorous and total suspended solids).

Private Property Owner Responsibilities

In general, stormwater facilities that accept "public" water (such as runoff from precipitation that fell directly on a City road or property) are considered public facilities that are maintained by the City. Stormwater facilities that accept "private" water (i.e., runoff from precipitation that fell on private properties) are considered private facilities that are maintained by the private property owner(s).

Property owners in Fitchburg are responsible for the installation, maintenance and repair of any private storm sewers (including drain tiles) on their property, as well as driveway culverts. **Figure 1-1** illustrates the division of public versus private responsibilities for maintenance of driveway culverts.

Private storm sewers occasionally extend from within private property in order to connect to the public storm sewer system in the City's right-of-way. Private storm sewers shall remain private until the point at which it connects to the public storm sewer system, and shall be maintained privately up to and including the connection point with public infrastructure.

Please note, private connections from single-family homes to the City's storm sewer system are typically not allowed because connections introduce more potential points of failure to the system and reduce infiltration on private lots (which increases the potential for downstream flooding). Connections may be allowed for extenuating circumstances, such as a sump pump that runs continuously throughout the year causing algae growth on the sidewalk during summer months and ice buildup during winter months. If a connection is allowed, the property owner is responsible for installing and maintaining the

private storm sewer up to and including the connection point to the City's storm sewer infrastructure (see **Figure 1-2**).

If more than one property needs to connect to the same public storm structure, the City typically will not allow multiple holes to be drilled into the structure, as it weakens the structure (and may not be possible due to space limitations). As such, the City reserves the right to allow a connection to private storm within the right-of-way. For single-family homes, the shared pipe (including the connection point) will be considered public and will be maintained by the City. For non-single family homes, the shared pipe shall remain private and will be privately maintained.

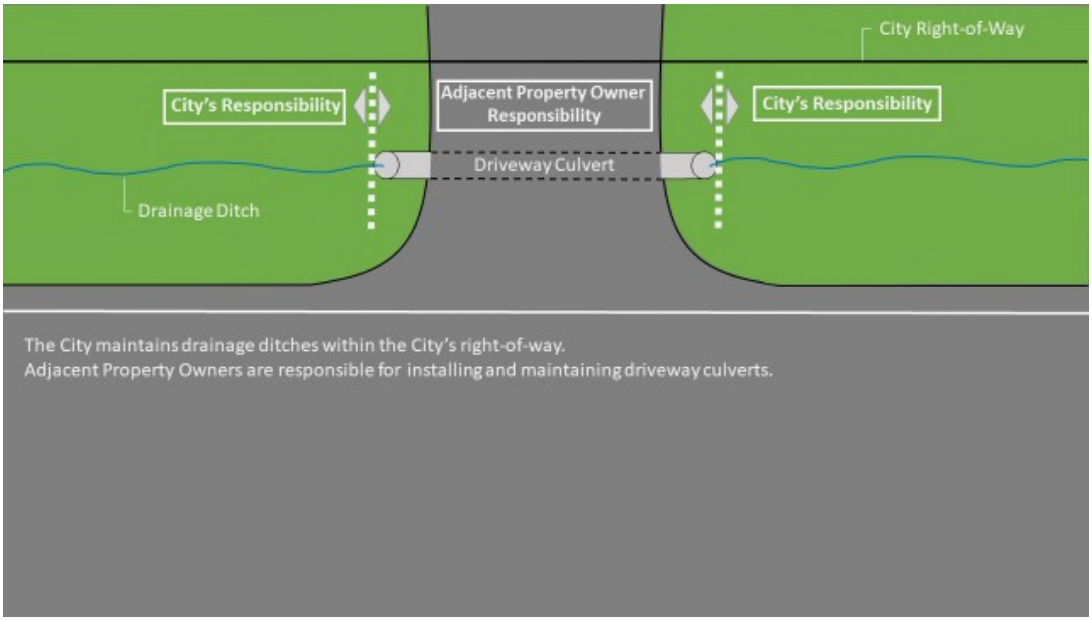


Figure 1-1. Public and Private Responsibilities (Street with Ditches)

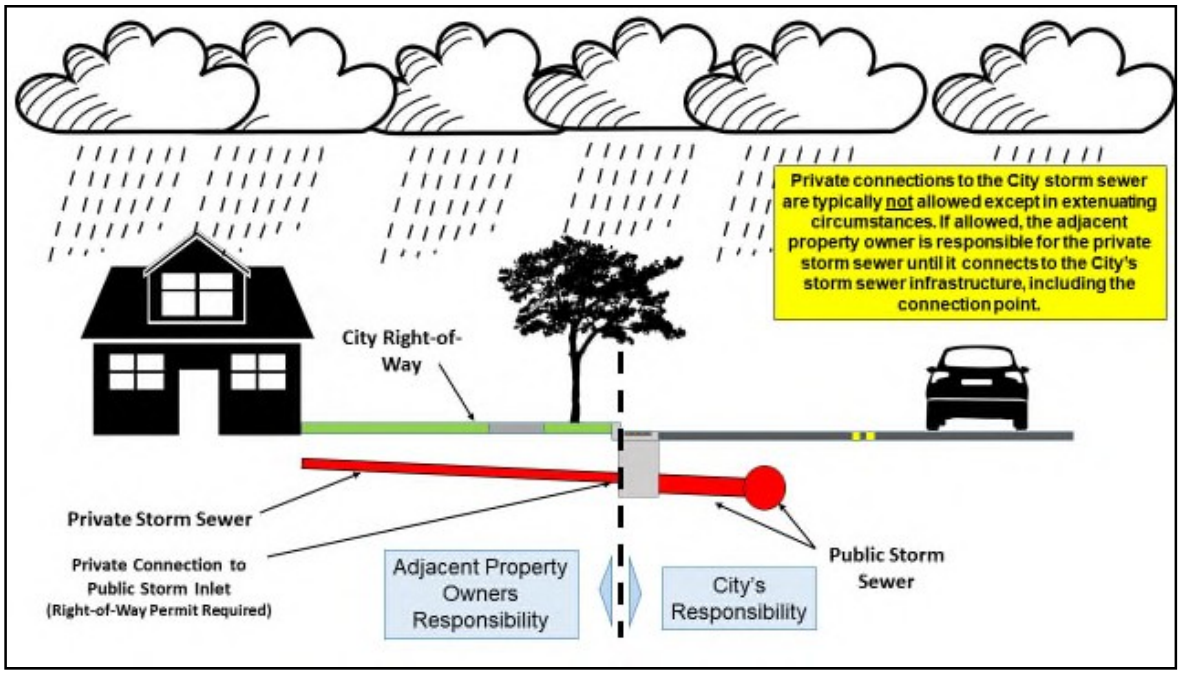


Figure 1-2. Public and Private Responsibilities (Street with Curb and Gutter)

Chapter 2. Plan Overview

The purpose of this plan is to outline a rough schedule of typical maintenance performed by the City's Stormwater Utility. Maintenance activities that are anticipated to occur once a year or more are shown in **Table 2-1**, and maintenance activities that are anticipated to occur once every few years are shown in **Table 2-2**. **The timing of all maintenance activities may shift, be delayed, or omitted due competing priorities, financial resources, and staff capacity limitations.**

Table 2-1. Annual Maintenance Activities

Activity Description	Rough Frequency	Chapter of Report
Inlet, culvert, and outfall repair	As-needed	Chapter 3
Ditch Cleaning	As-needed	Chapter 3
Pond Inspection	Annually	Chapter 4
Mowing of Roadside Ditches	2x/year (Spring and Fall)	Chapter 5
Mowing of Ponds and Greenways	2x/year (Spring/Summer and Fall/Winter)	Chapter 5
Inspection to determine need for replacement of Rain Gardens, Bioretention and Infiltration Basins	1x/year	Chapter 6
Sediment Removal from Sumps	1x/year (Spring)	Chapter 7
Replacement of Oil Skimmer Pouches	2x/year (Spring and Fall) *(Evaluating required frequency)*	Chapter 8
Illicit Discharge Inspections	Annually	Chapter 9
Street Sweeping	Year-round	Chapter 11
Capital Improvement Projects	Annually	Chapter 13
Oversight of Maintenance of Private Stormwater Facilities	Annually (reports due by end of year)	Chapter 14

Table 2-2. Maintenance Activities that Occur less than Once a Year

Activity Description	Rough Frequency	Next Anticipated	Chapter of Report
Wet Pond Depth Inspections	Every 5 years	2020, 2025	Chapter 4
Dredging Operations	As needed	As needed	Chapter 4
Controlled Burns	Every 3-4 years	Rolling timeline	Chapter 5
Stormwater Facility Signage Inspections	Every 3 years	2020, 2023	Chapter 10

Chapter 3: Infrastructure Maintenance

Background Information

Much of the City's stormwater infrastructure is designed to last more than 50 years. However, as infrastructure ages, it is necessary to repair or replace portions of infrastructure. As of the writing of this plan (2020), the public storm sewer system consists of 5,500 storm inlets and manholes, over 85 miles of gravity storm pipes, as well as storm ponds and ditches.

In urban areas, the City maintains storm inlets, storm sewer pipes, manholes, and culverts in City rights-of-way, City properties, and City easements. In rural areas, the City maintains ditches in the City right-of-way and culverts under City maintained streets. Driveway culverts are the adjacent property owner's responsibility. A map of the streets that the City maintains is available in **Appendix A**. Other streets are maintained by the DOT, Dane County, or privately.

Maintenance Activities

Inlet/Manhole Repair (Sinkholes). A sinkhole occurs when the ground underneath the road is washed away, and the road above collapses (see **Figure 3-1**). This often occurs near inlets or manholes where a leak has formed in the concrete structure. As water enters the compromised area, it can carry soil or other materials into the inlet which washes downstream. Sinkholes occur when the base under the road washes away to the point that it is no longer able to support the pavement.

Figure 3-1: Sinkhole in Roadway

If sinkholes are caused by a leak in the City's stormwater infrastructure, maintenance of the storm structure and the road above may be paid for by the Stormwater Utility. The repair includes sealing the leak in the stormwater structure and rebuilding that area of roadway. Sinkholes are repaired by Public Works staff on an as-needed basis.

Culvert Replacement. A culvert is a pipe that allows water to flow from one side of a road to the other side. Culverts can fail if they become crushed, misaligned, or form holes. **Figure 3-2** shows Public Works staff replacing a culvert under Fitchrona Road which had formed multiple holes leading to sinkholes and road safety concerns.

The City maintains culverts within the City's right-of-way, with the exception of driveway culverts. Driveway culverts are the property owner's responsibility. Stormwater infrastructures associated with County roads and DOT roads are the County and the

State's responsibilities, respectively. A map showing City, County and State roads is available in **Appendix A**.

Figure 3-2. Culvert Replacement under Fitchrona Road

Ditch Cleaning. Roadside ditches can fill in with sediment over time. The speed at which ditches fill in depends on a variety of factors, including the slope of the ditch (flatter ditches tend to fill more quickly), soil characteristics and vegetation coverage of the area flowing to the ditch. For example, a grassed lawn will release less sediment than an agricultural field that is being tilled. Public Works crews re-ditch roadside ditches on an as-needed basis to remove sediment buildup.

Outfall Repair. Outfalls are located where water flows from the City's underground storm sewer pipe network into greenways, streams, or natural waterbodies. An example of an outfall structure is shown in **Figure 3-3**. Public Works staff inspect roughly one third of all outfalls each year for illicit discharges or necessary repairs. This allows the City to keep up with needed repairs and also meets the MS4 requirement to perform an illicit discharge inspection on all major outfalls at least once every five years.

Outfall repairs may include replacing a grate that has fallen off, repairing cracked concrete, or replacing riprap around the outfall. Maintenance is carried out by Public Works staff as needed.

***Debris Clearing*.** The storm sewer system can become clogged by litter, tree branches, or other debris. Clogged structures can reduce the capacity of the storm sewer system and can lead to localized flooding. **Figures 3-3, 3-4, and 3-5** show structures which have been partially or fully clogged by debris. Areas that need to be cleared are typically identified during outfall and pond inspections (see **Chapters 4 and 9**), or based on resident input. Public Works crews work on clearing clogs as staff time allows.

Figure 3-3: Outfall Partially clogged by Litter

Figure 3-4: Infiltration Basin Outlet Structure clogged by Mulch and Dirt

Figure 3-5: Public Works staff clear tree Branches blocking an Outfall

<u>Maintenance and repair activities may shift, be delayed, or omitted due competing priorities, financial resources, and staff capacity limitations</u>.

Chapter 4: Ponds

Background Information

Stormwater ponds, or wet ponds, typically serve two functions: water quality and water quantity (flooding) control. During fair weather conditions, ponds typically have a permanent pool of water which provides water quality improvement by allowing solids to settle out of the water before continuing downstream. Above the permanent pool level is an area that allows for the temporary storage of water during rainy weather. Water is stored in the pond temporarily and released slowly via a release structure which has been designed to release water at a rate that mimics predevelopment conditions. This reduces erosive downstream velocities and reduces the potential for downstream flooding caused by development.

By design, sediment accumulates in stormwater ponds, and eventually it must be removed to maintain efficiency. This sediment consists of solid and semi-solid wastes which is present in the water for many reasons including, but not limited to, the following:

- Litter and yard waste
- Natural leaf and branch litter
- Construction sediments
- Asphalt grit
- Soil loss from surrounding open areas

According to DNR guidance, ponds provide optimum water quality benefit (i.e., settling of solids) when the pond is at least three feet deep. To maintain this benefit, dredging, or the removal of sediments and debris from the bottom of ponds, should be scheduled when the average depth of the permanent pool reaches 3.5 feet or less. The permanent pool is defined as the depth of water between the bottom of the pond and the lowest opening on the outlet device. The frequency of dredging is dependent on many factors including the rate of shoreline erosion, the amount of debris released by the surrounding community, and the amount of construction occurring within the pond's watershed (i.e., area draining to the pond).

A map of City-maintained ponds is included in **Appendix B-1**.

Maintenance Activities

Inspections. Public Works staff inspect ponds as often as annually, subject to availability of staff resources and competing priorities, to identify bank washouts and inlet/outlet devices in need of repair. Public Works staff will inspect ponds roughly once every five years to determine the depth of water at the center of the pond and ascertain if dredging is needed (see **Figure 4-1**).

Figure 4-1: Public Works Staff dig a Hole in the Ice to determine Depth of Water and Depth of Soft Sediment

Dredging Operations. Per DNR standards, dredging should be scheduled when the average depth of the permanent pool reaches 3.5 feet or less. This is because if water is less than 3 feet deep, settling of solids is impaired, and algae growth is encouraged. This activity requires some major cost items such as dewatering the pond, transporting sediment for off-site disposal, and re-vegetating areas that were disturbed in the process. Ponds that the City dredges are shown in **Appendix B-1**.

Sediment Testing. In order to ensure sediment is disposed of appropriately, sediment testing is to be done for ponds prior to dredging. NR 528 states that in order for accumulated sediment in stormwater ponds to be land applied, the sediment must be tested and under the following ceiling levels:

- Total Arsenic: 8 ppm
- Total Cadmium: 10 ppm
- Total Chromium: 100 ppm
- Total Lead: 250 ppm
- pH less than 5 or greater than 10 standard units
- Electrical Conductivity: 8 deciSiemens/meter (dS/m) at 25℃

Chapter 5: Vegetation Management

Background Information

The purpose of this chapter is to **generally** describe vegetation management performed by Public Works. A *Site-Specific Vegetation Management Plan for the Stormwater Utility* (anticipated to be published in 2021) will describe site-specific goals in more detail.

The City maintains publicly-owned ponds, greenways, rain gardens, bioretention and infiltration basins, all of which have vegetation that needs to be maintained. For new facilities, the City typically works with a qualified ecological consultant to establish the desired vegetation. If native vegetation is desired, this process typically includes an establishment period of three to five years of more intense vegetation management including herbicide applications, controlled burns and re-seeding as necessary.

After vegetation has been established, less maintenance is needed. For areas with native vegetation, the City relies on mowing, herbicide application, and periodic controlled burns (roughly every three to four years) to suppress weed growth. Fertilizers are not used on stormwater facilities, as the fertilizers can easily enter our waterways and promote algae growth.

The City mows areas that were not seeded with native vegetation roughly once or twice a year.

Native Vegetation

Native plants are those that occur naturally in the region in which they evolved. It is important to conserve these plants because they are the basis of the food chain in that region. They support insects which support local birds and other wildlife. Native plants are also adapted to local conditions, so they require less water, pesticides, and fertilizer.

From a stormwater perspective, native plants in Wisconsin are considered desirable because they offer water quality and quantity benefits. Native plants often have deep root systems that can create vertical channels through the soil, allowing water to penetrate deeper into the earth. By allowing more water to soak into the ground, native plants reduce the amount of water going downstream, which decreases the risk of downstream flooding potential. For example, according to the DNR[1], native vegetation used in rain gardens (as an example) captures 30% more water than a regular lawn and filters that water into the ground. This reduces the amount of water containing household fertilizers, pesticides, oils, and other contaminants coming from our roofs, lawns, driveways, or parking lots running into storm sewers.

1. “Rain Gardens: A beautiful way for you to reduce runoff pollution!” https://dnr.wi.gov/topic/stormwater/raingarden/

Controlled Burns

The suppression of fire over the course of human history has had many benefits, the most important one being human safety. Many native plant species, however, rely on periodic fires to ensure growth and survival. Since fire suppression is so common, these fire events have become less frequent resulting in hotter fires when they do occur due to the buildup of natural fire fuels in the environment.

Controlled burns are a tool used to preserve and sustain these native plants (see **Figures 5-1 and 5-2**). Burns help maintain the health of native plants, manage weeds and invasive plants, and restore nutrients to the soil.

Spring and fall are the two primary seasons for burning. Burn conditions may be appropriate according to many requirements regarding things like wind speed, wind direction, temperature, and humidity.

Figure 5-1. Trained Professionals Carry out Controlled Burn at McKee Farms Park

Figure 5-2. Area that has recently been burned

Maintenance Activities

Mowing. Public Works crews generally mow City-owned ponds, roadside ditches, and some greenways once in the spring and once in the fall. Mowing is a public safety measure to ensure visibility for drivers and help suppress woody growth in the ditches. Mowing may not be possible during wet years in areas where the ground is soft because mowing equipment may get stuck. The exact timing of mowing will depend on staff capacity. Depending on other projects throughout the City, it may not be possible to mow all areas on this schedule.

Ponds and greenways with **native vegetation** are generally not mowed on this schedule to allow for the buildup of natural fuels for the upcoming burn (every three to four years, as discussed above). Mowing in native areas may also be used as a weed suppression tool.

Brush Removal. Volunteer trees and brush may grow, especially in areas that are hard to mow due to soggy conditions. These obstacles may partially block stormwater outfalls

or impede flow in ditches and swales. If brush growth becomes dense, it may be necessary to use a forestry mower or other machinery to clear the brush (see **Figure 5-3**). Areas that require brush removal are typically identified during annual mowing operations.

Figure 5-3. Public Works Crews use a Forestry Mower to remove Willows in a Swale near E Cheryl and Lacy

Chapter 6: Replacement of Infiltration Devices

Background Information

Bioretention basins are landscaped depressions that clean stormwater and encourage infiltration. They are created with engineered soil designed to filter contaminants prior to infiltration. **Figure 6-1** shows a typical bioretention basin. Over time, a layer of sediment may collect on the surface of the basin, compromising its infiltrative rates. If water can no longer infiltrate, the basin has failed and sediment removal (or engineered soil replacement) should be scheduled.

Infiltration basins are similar to bioretention basins except that they have little to no engineered soil layer, and therefore water must be cleaned (typically via a wet pond) prior to entering the infiltration basin.

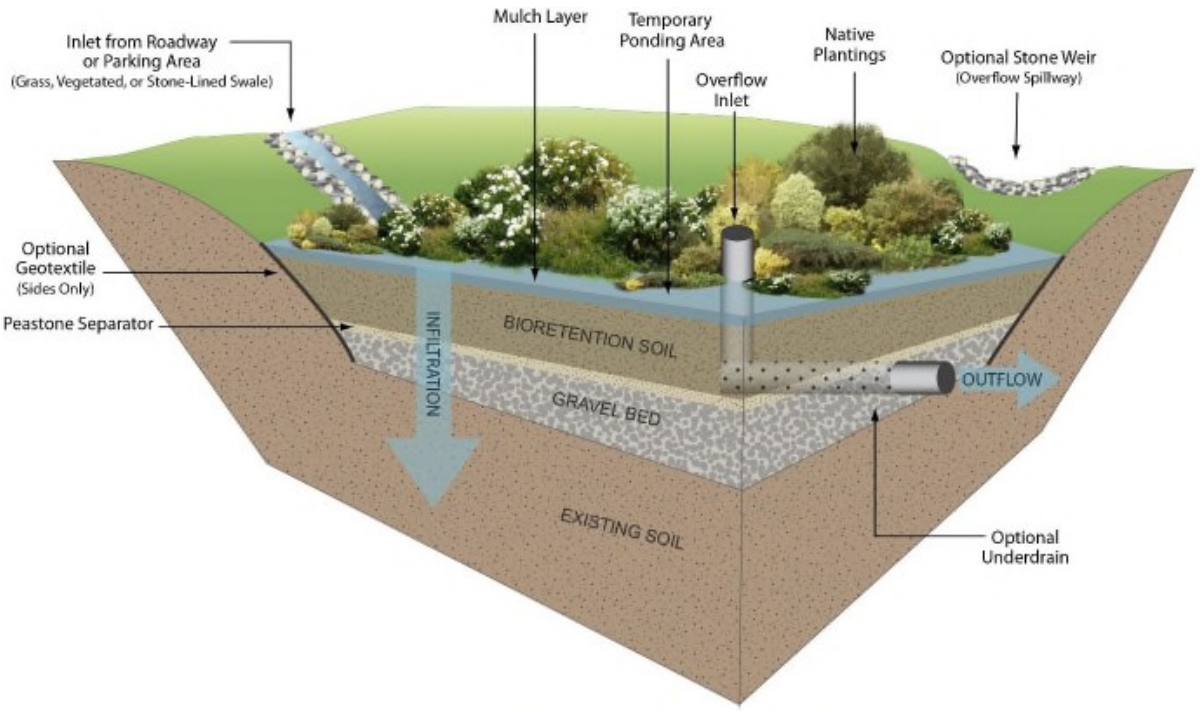


Figure from: https://megamanual.geosyntec.com/npsmanual/bioretentionareasandraingardens.aspx

Figure 6-1. Bioretention basins capture pollutants from impervious surfaces

Maintenance Activities

Inspection. Public Works staff generally inspect infiltration practices once a year, to determine if the engineered soil has become clogged (i.e., water is standing in the practice for weeks after a rain event).

Replacement. Infiltration practices filter water before allowing it to infiltrate into the ground. Over time, infiltration practices will clog because fine clays fill the pore spaces creating an impervious layer. How long it takes an infiltration basin to become clogged is based on many factors, including the size of the drainage areas and the native soils present in the drainage area.

If the infiltration practice becomes clogged, it will be necessary to remove the clogged soil and replace it with new soil (typically sand and compost) and plants. This type of maintenance is costly and would typically be paid for as a CIP project (see **Chapter 13**).

A map of infiltration practices throughout the City is available in **Appendix C**.

Chapter 7: Sediment Removal from Sumps

Background Information

Have you ever noticed how clean the roads look after it rains? This is because rain washes off dirt and grime that has accumulated on our roads, roofs, sidewalks, and parking lots. That runoff can carry dirt, household fertilizers, pesticides, oils, and other contaminants to our lakes and rivers, causing problems for human health, aquatic life, and aquatic vegetation.

To prevent pollution of our water resources, sediment removal facilities are constructed to clean runoff prior to releasing it to the environment. As discussed in **Chapter 4**, wet ponds are a common tool to filter solids out of stormwater, and removal of those solids takes place via periodic dredging operations. This chapter covers smaller practices called "sumps," where sediment is removed via a vacuum truck.

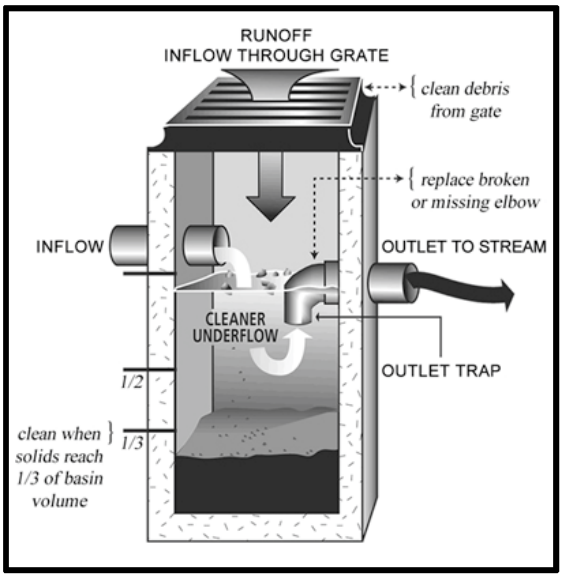


Figure from:
http://www.dejanaindustries.com/catchbasin.html

Figure 7-1. Storm Inlet with Sump[2]

Sumps

If a wet pond is not feasible, inlets may be built with sumps to remove dirt from runoff. If a storm inlet has a "sump," that means the bottom of the structure is at least 36 inches below the bottom of the outlet pipe (see **Figure 7-1**). This allows water to flow over a three-foot pool of water prior to exiting the structure, which allows large solids to fall out. Sediment must be removed from the sump to allow the facility to function as designed.

Maintenance Activities

Sediment Removal. Public Works crews remove sediment from sumps using a vacuum truck to pump out the accumulated solids (see **Figure 7-2**). A sump during and after sediment removal is shown in **Figures 7-3 and 7-4**. Currently (2020), there are 55 sumps on Lacy Road, which are generally cleaned once a year, typically in the spring. This schedule is subject to change based on field observations of how quickly the sumps fill with sediment.

Sediment removal from sumps (along with oil control replacement, see **Chapter 8**), typically takes two Public Works staff members one week to complete. A map of the sumps on Lacy is available in **Appendix D**.

Figure 7-2. Public Works crews remove sediment from Sumps on Lacy Road

Figures 7-3 and 7-4. Sump during and after Sediment Removal

Chapter 8: Oil Control

Background Information

As stormwater flows over driveways, streets and parking lots, it may pick up oil and grease that has leaked out of motor vehicles. Lacy Road has oil treatment devices in 55 inlets (see **Appendix D**) that absorb oil prior to releasing water downstream. The City uses products from a company called Flexstorm, or approved equal, to absorb this oil. The skimmer pouch (as shown in **Figure 8-1**) contains a white material that soaks up and collects oil. The pouch will change color as it collects oil, and when the device is black, it should be replaced. The skimmer pouches are attached to black inlet bags, which are connected to metal inlet frames. The inlet bag also removes sediment and other large contaminants.

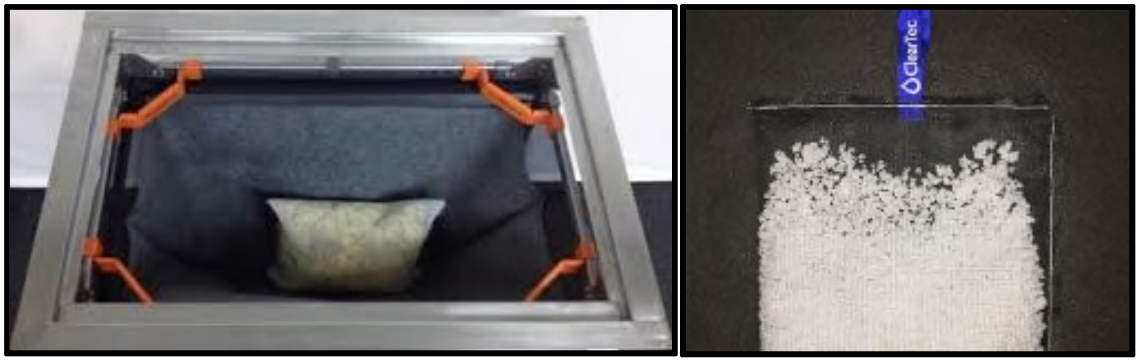


Figure 8-1: Oil skimmer pouch, inlet bag, and frame

Maintenance Activities

Oil Skimmer Pouch Replacement. The Oil Skimmer Pouch in each inlet should generally be replaced bi-annually, once in the spring and once in the late fall. This replacement schedule is subject to change based on field observations, but should not be less than once per year. When Oil Skimmer Pouches are new, they are white (see **Figure 8-1**) and turn dark grey/black when they need to be replaced.

Inlet Bag Cleaning. The inlet bags are to be cleaned with a vacuum truck annually, when the sumps are cleaned.

Inspection. Inlet bags and frames are generally inspected during sump cleaning operations. Inlet bags and frames should be replaced when damage is observed.

The Oil Skimmer Pouches, Inlet Frames, and bags can be ordered from First Supply (608-222-7799), or approved equal. 2019 prices are provided in **Table 8-1**.

Table 8-1. Oil Control Prices (2019)

Item	2019 Price
Flexstorm Rubberizer 12”x15” Skimmer Pouch	$68
R-3067 Casting Frame with Filter Bag	$535
Filter Bag only	$99

Chapter 9: Illicit Discharge Detection and Elimination

Background Information

An illicit discharge is any discharge to the City's storm sewer system, or municipal separate storm sewer system (MS4), that is not composed entirely of storm water, with the exception of certain allowable discharges such as water from hydrant flushing or water used for firefighting operations. Illicit discharges are illegal, and Public Works staff perform illicit discharge detection and elimination (IDDE) field screening to protect the environment and meet regulatory requirements for the City's MS4 Permit, available at: http://www.fitchburgwi.gov/233/Stormwater-Discharge-Permit.

IDDE entails visual observation of outfalls during dry weather to see if water is flowing when it is not raining outside. If water is observed, staff determine if the source is an allowable discharge (such as hydrant flushing) or an illegal discharge. If an illegal discharge is observed, staff work to identify the source of the discharge and follow up with the responsible parties.

Maintenance Activities

IDDE Inspections. The City has been divided into three zones, as shown in **Appendix E-1**. Each year, staff will conduct IDDE inspections in one zone (Zone 1 in 2019, Zone 2 in 2020, Zone 3 in 2021, etc.). Each outfall will be inspected at least once every three years, subject to staff availability and other competing priorities. After a baseline has been established, the City will review this plan and determine if certain areas warrant more or less frequent inspection.

IDDE inspections are conducted using a GIS app that displays a map of all stormwater outfalls in the City and allows the inspector to input data about each outfall. An example of the data collection form is included in **Figure 9-1**. If flowing water is observed, staff will use the flow chart shown in **Figure 9-2** to determine appropriate next steps. If it is appropriate to take samples, the Standard Operating Procedure available in **Appendix E-2** will be used.

If illicit discharges are observed by the public, contact the City's Environmental Engineer (Claudia Guy, 608-270-4262) to follow up on the illegal activity. Please provide date, time, and location of the release, suspected materials released, and identifying for the responsible party, if available, such as a license plate number.

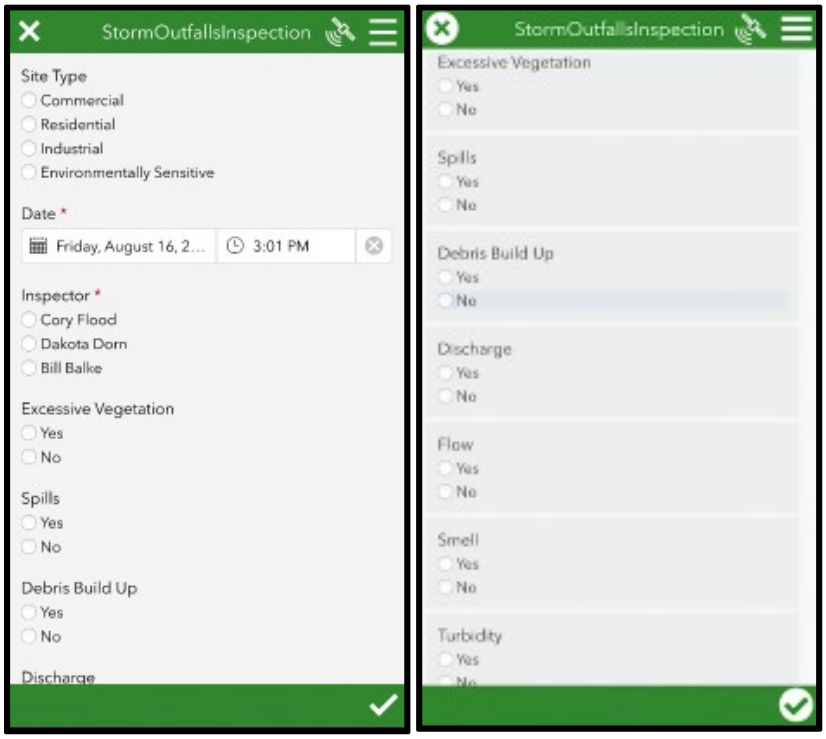


Figure 9-1. Screen Shots of Outfall Inspection Form

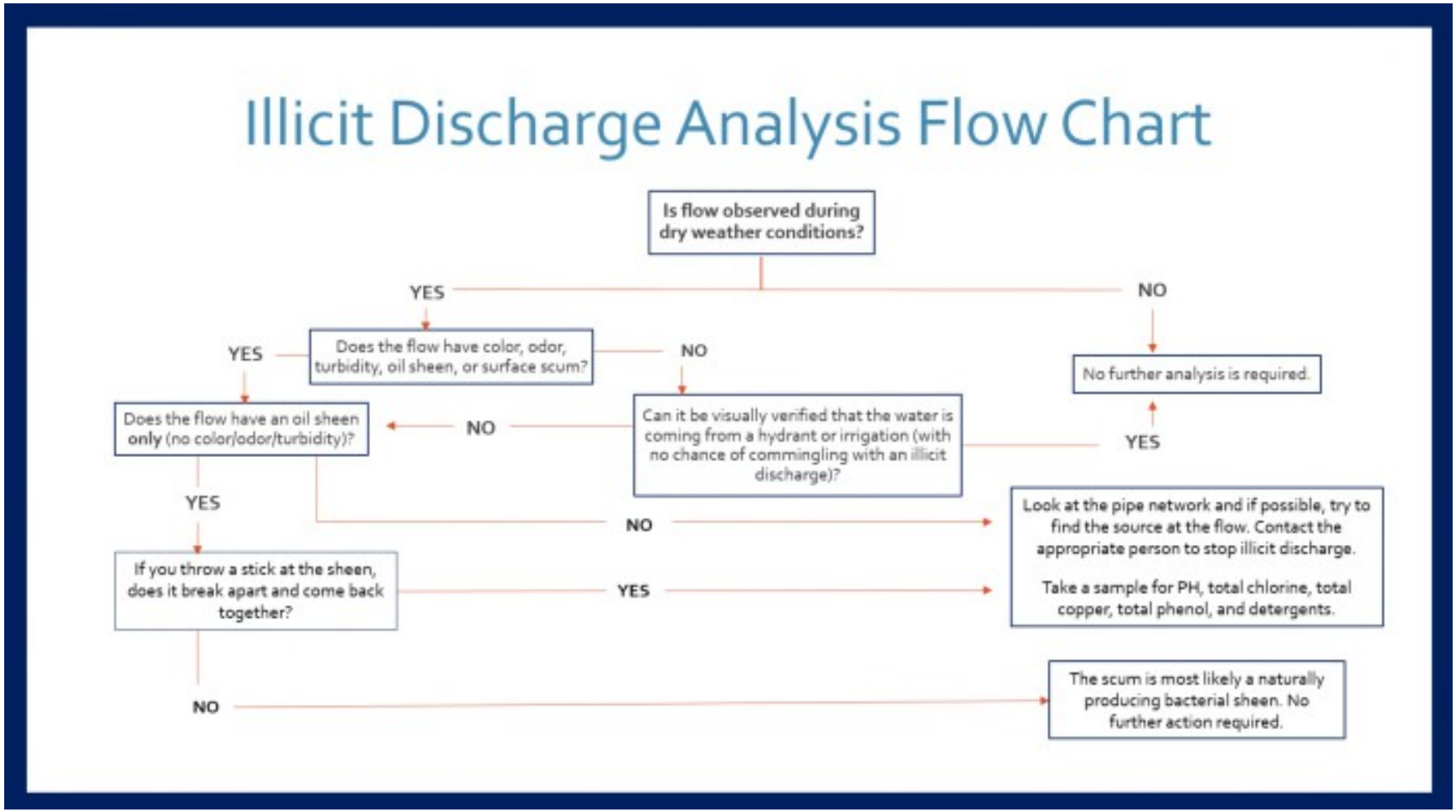


Figure 9-2. Illicit Discharge Analysis Flow Chart

Chapter 10: Stormwater Facility Signage

Background Information

Many stormwater facilities throughout the City have identification signs as well as informational signs. These signs are important to facilitate emergency response to these areas and provide public education opportunities.

Public Works upkeeps signage associated with stormwater infrastructure. Pond identification signs are typically constructed from treated wood (as shown in **Figure 10-1**), and informational signs are typically constructed from metal (as shown in **Figure 10-2**). A map of existing signs is included in **Appendix F**.

Maintenance Activities

Inspection. All stormwater signage is to be inspected approximately once every three years, to determine if maintenance is required. Maintenance may include painting, repair, or replacement.

Replacement and Upkeep. Wooden signs may require painting or replacement of wood as they age. Public Works staff can perform most repairs. Many of the informational signs can get faded from exposure to sunlight and the elements. These signs can be ordered and replaced by City staff.

Figure 10-1. Pond Identification Sign at Oak Meadow Pond

Figure 10-2. Informational Sign at McKee Farms Park

Chapter 11: Street Sweeping

Background Information

Street sweeping reduces the amount of pollution that reaches our natural waterbodies, and reduces the amount of debris on our roads. This is especially useful in the fall (when leaves are falling) and spring (after the snowmelt).

Maintenance Activities

Street Sweeping. As of 2020, the City owns one street sweeper (see **Figure 11-1**) which is operated year-round with a few exceptions. The street sweeper is taken out of commission for maintenance activities, during rainy, snowy or freezing weather, or due to competing priorities for staff time.

Figure 11-1. Street Sweeping Operations

Our Public Works driver starts at one end of the City and sweeps through all of the neighborhoods until he completes all streets; then he starts again. Since most dirt and leaves are located in the gutter, the driver needs to get the truck right next to the curb to effectively sweep up debris. For this reason, streets will be skipped if there are a lot of parked cars, trash bins or recycling bins blocking access to the curb when the street sweeper gets to that street. We recommend that residents place their trash and recycling bins in the terrace (on the grass right next to the curb) when possible.

When the City originally purchased its street sweeper, crews could get through the City in about 4 weeks. With the City's growth and the addition of new roads, this circulation time has increased to 8-10 weeks. The City anticipates purchasing an additional street sweeper in 2021.

Chapter 12: Flood Control and Pumping Operations

Background Information

During heavy rainfall events, portions of the City may experience street flooding. If flooding is anticipated to last more than a few hours, Public Works crews may put up signs and barricades to alert drivers of the flooding hazard, and police may be enlisted to help direct traffic.

If pumping is deemed beneficial, the Director of Public Works may direct crews to pump floodwaters to protect City roads or municipal buildings that are at risk. A pumping plan for the Hillside Heights pond is available in **Appendix G**. The pumping plan was approved by Common Council in Resolution R-11-20 and has been approved by the Wisconsin Department of Natural Resources as being authorized under section 1.5.2 of Fitchburg's Municipal Separate Storm Sewer System (MS4) permit.

Chapter 13: Capital Improvements

Background Information

Most maintenance activities for the Stormwater Utility are paid for using funds designated in the City's Operating Budget. For larger projects (such as pond dredging, the study/design/construction of new flood mitigation measures, or the construction of new stormwater infrastructure), projects must be paid for as a capital expense included in the Capital Improvement Plan (CIP). The CIP is approved through a rigorous process which starts early in the year, with official adoption occurring late in late summer or early fall. Generally, there are two public hearings to gather input from residents prior to CIP adoption.

Common Council ultimately decides which projects are included in the CIP. The best way to express support for a project is to reach out to a council member or members or attend a public hearing. The most recent CIP, as well as more information on the CIP process, can be found at the website below:

http://www.fitchburgwi.gov/176/Capital-Improvement-Plan

Past Operating Budgets can be found at the website below, and the current operating budget can be found by searching for "budget" in the search tool on Fitchburg's website:

http://www.fitchburgwi.gov/2234/Past-Budgets

For flooding concerns, the order in which projects are tackled generally reflects the severity and urgency of the issue. The following ranking system is recommended to use as a guideline when determining the priority of an issue. In this ranking system, the phrase "public water" means stormwater which originated on (i.e., precipitation that fell directly on) City right-of-way or a City parcel:

- **Rank 1 (most priority)** – Flooding of public or private primary structures (such as homes or office buildings), and long-term street flooding that results in road closures, where the issue is caused in large part by public water.
- **Rank 2** – Flash flooding of City streets (where water levels are high enough to enter vehicles), and long-term street flooding that does not result in road closures.
- **Rank 3** – Flooding on private property which is caused in large part by public water where water recurrently sits for more than one month at a time contributing to: difficulty mowing/maintaining the landscape or recurrent damage to secondary structures (such as playsets or sheds).
- **Rank 4 (least priority)** – Flooding on private property where public water does not contribute to the problem or the contribution is considered very minor. These types of problems are considered the responsibility of the property owner, and the Stormwater Utility generally does not contribute to fixing these issues.

Chapter 14: Maintenance of Private Stormwater Facilities

Non-Residential Maintenance of Private Stormwater Facilities

As new areas of the City are developed, or currently developed areas are re-developed, developers may be required by City ordinance (Section 30, Article II) to construct private stormwater facilities. These private stormwater facilities protect the public and downstream properties from the increased risk of flooding and pollution associated with development. These facilities must be maintained into perpetuity in order to ensure the stormwater facilities continue to provide the same level of protection as specified in the original design.

Annual maintenance reports must be submitted to the City per Ordinance 40-896. Public Works staff collect and review these reports to ensure private stormwater facilities are being maintained to provide the same level of protection as specified in the original design. Council approved a Standard Operating Procedure for this oversight activity (R-201-19) which is available at:

http://www.fitchburgwi.gov/DocumentCenter/View/20256/City-of-Fitchburg-Long-term-SW-Maintenance-SOP

Homeowner Opportunities

The article below was published in the June 2019 edition of the Fitchburg Star and is reproduced here with permission from the author.

Better stormwater management is easier than you think

By Nate Ewanowski, Chair of the Resource Conservation Commission

My home, like many others in the Dane County area last year, suffered from flood damage last year.

Though 2018 marked the second wettest year in the last 150 – and August brought us 11 to 13 inches of rain in less than 24 hours – the only reason my home didn't weather it was poor ground sloping, combined with downspouts routing to a bad location in the yard.

Extreme rainfall events are becoming the new normal for Fitchburg and other communities across Wisconsin. Last year, the more than 50 inches of rainfall caused all four Madison lakes to rise above their summer maximum levels, resulting in slow-no-wake orders for most of the summer, and the August downpour caused substantial damage to homes and businesses.

We cannot control Mother Nature, but we can prevent damage to our homes and businesses – and reduce safety risks – by improving our stormwater management and incorporating green infrastructure.

Homeowners in particular have many easy options.

The most important is to prevent stormwater from entering your basement by making sure the ground slopes away from your house and that your downspouts send water far enough away to take advantage of the slope. It should be at least 6 inches over 10 feet.

To manage water that falls on your roof, make sure your gutters are always clear of leaves, sticks and debris and are sized appropriately for larger storm events. For some of us, that means upsizing our current gutters.

That is just the beginning of the stormwater battle.

Directing water away from your home too quickly can pose problems for the local storm sewer and waterways, so to reduce localized flooding, we need to slow the path of water to the stormwater system.

As you direct your downspouts away from your house, avoid routing them straight to the curb or driveway. These impermeable surfaces don't allow water to soak into the ground and result in faster moving water.

Insufficient stormwater infiltration contributes to flooding in general, and during extreme rainfall events, it can overburden local streets, storm sewers, and waterways. The more rainfall we can all keep on our own properties or slowed through the routing process, the less extreme the flood event will be for everyone.

There are several green infrastructure solutions for promoting water retention and infiltration. These include rain barrels, rain gardens, vegetating bare spots and adding native landscaping.

In addition to being a good stormwater management practice, native landscaping can increase the curb appeal of your home.

As water moves off your property, don't allow it to get stuck in clogged storm drains. Keep your curb area free of grass clippings, sticks, leaves and debris from storm drains, which provide a clear flow path to the local waterway and reduce the amount of unneeded nutrients flowing into it.

Excess nutrients in streams and waterways not only affect water quality but also promote vegetative growth. Too much vegetative growth slows stream flow and can block critical water paths, contributing to more flooding.

Some of these simple improvements not only help manage stormwater issues and reduce the risk of water damage in your home and to other residents and businesses in the community, they can also reduce your bills. The City of Fitchburg Stormwater Utility offers credits to property owners who have rain barrels, rain gardens, pervious pavement systems and to those who pledge to be a Fitchburg Creek Support.

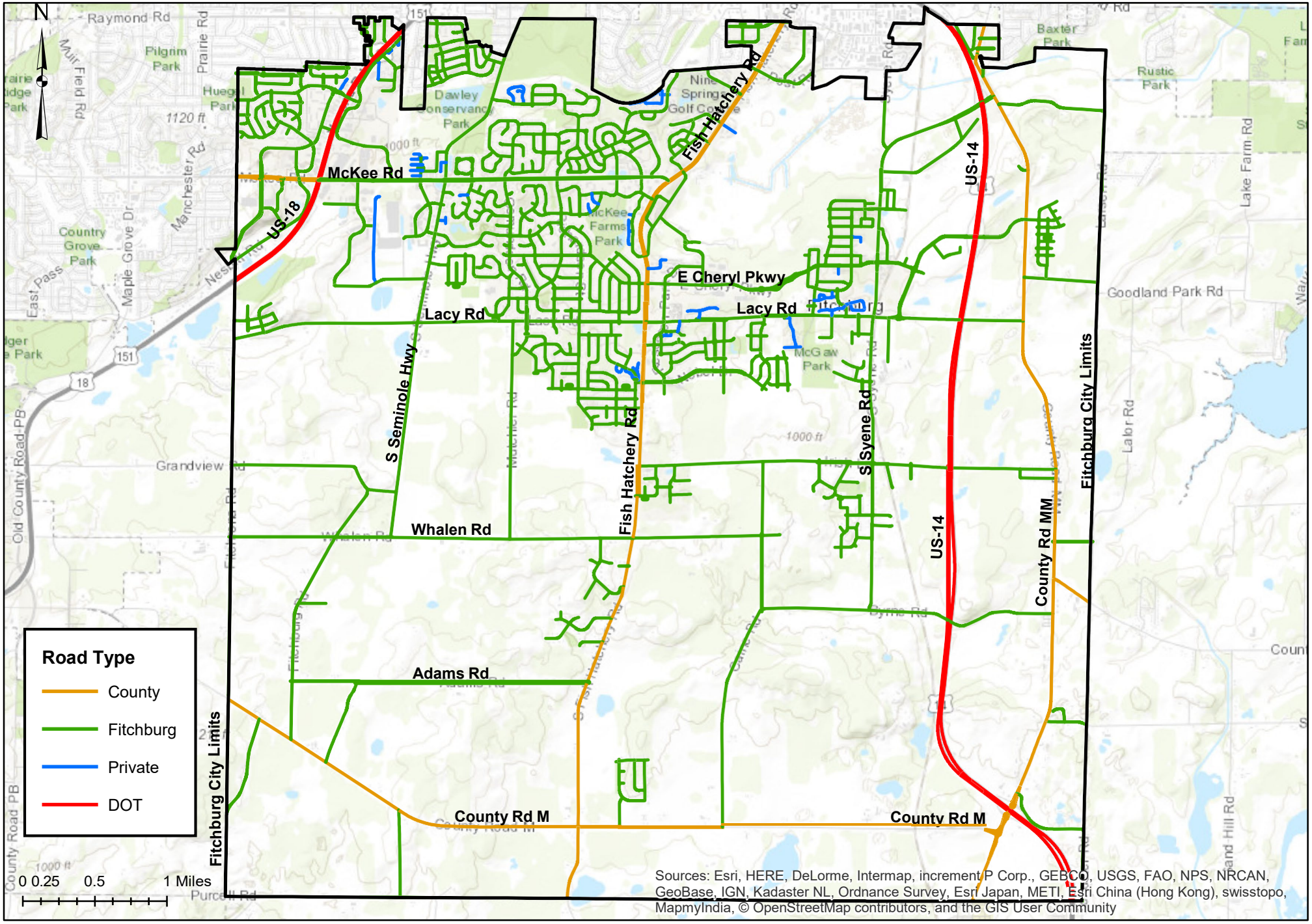
For information on Fitchburg's stormwater credit opportunities, visit the city's website at fitchburgwi.gov and search for Credit Opportunities.

Since last fall, I fixed my water drainage problems by sloping the ground better, and relocating a downspout to a different area in my yard. By coupling these solutions with my existing rain garden, I feel a lot better knowing my yard's stormwater is being better managed.

Think about how you can manage your stormwater by beautifying your yard and preventing localized flooding.

Appendix A
Map of Roads

Map of City Roadways



Drawn by N. McCraw

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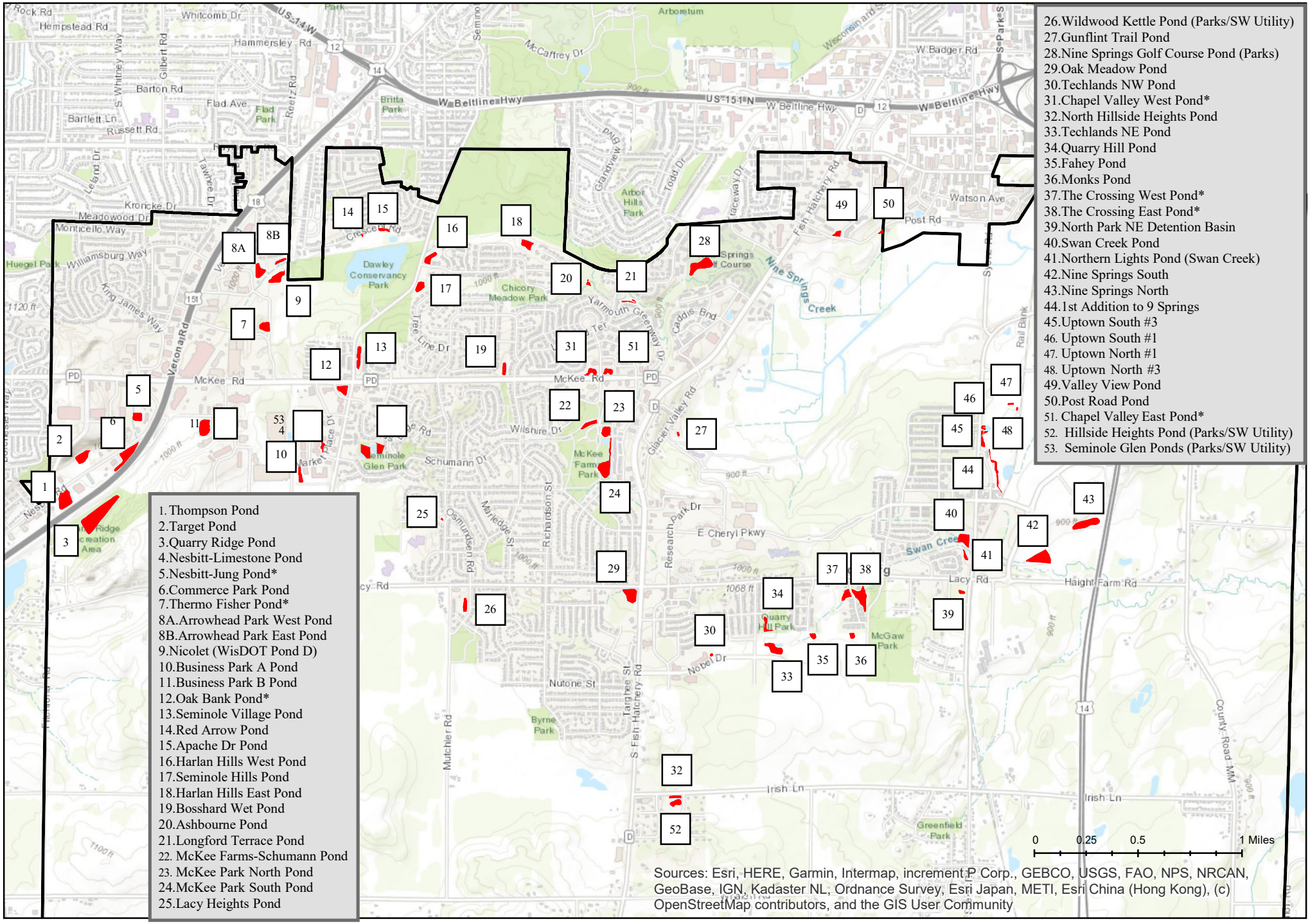
Appendix B
Map of Ponds

Map of Ponds to be Dredged



D. Dorn 8/5/2020

N

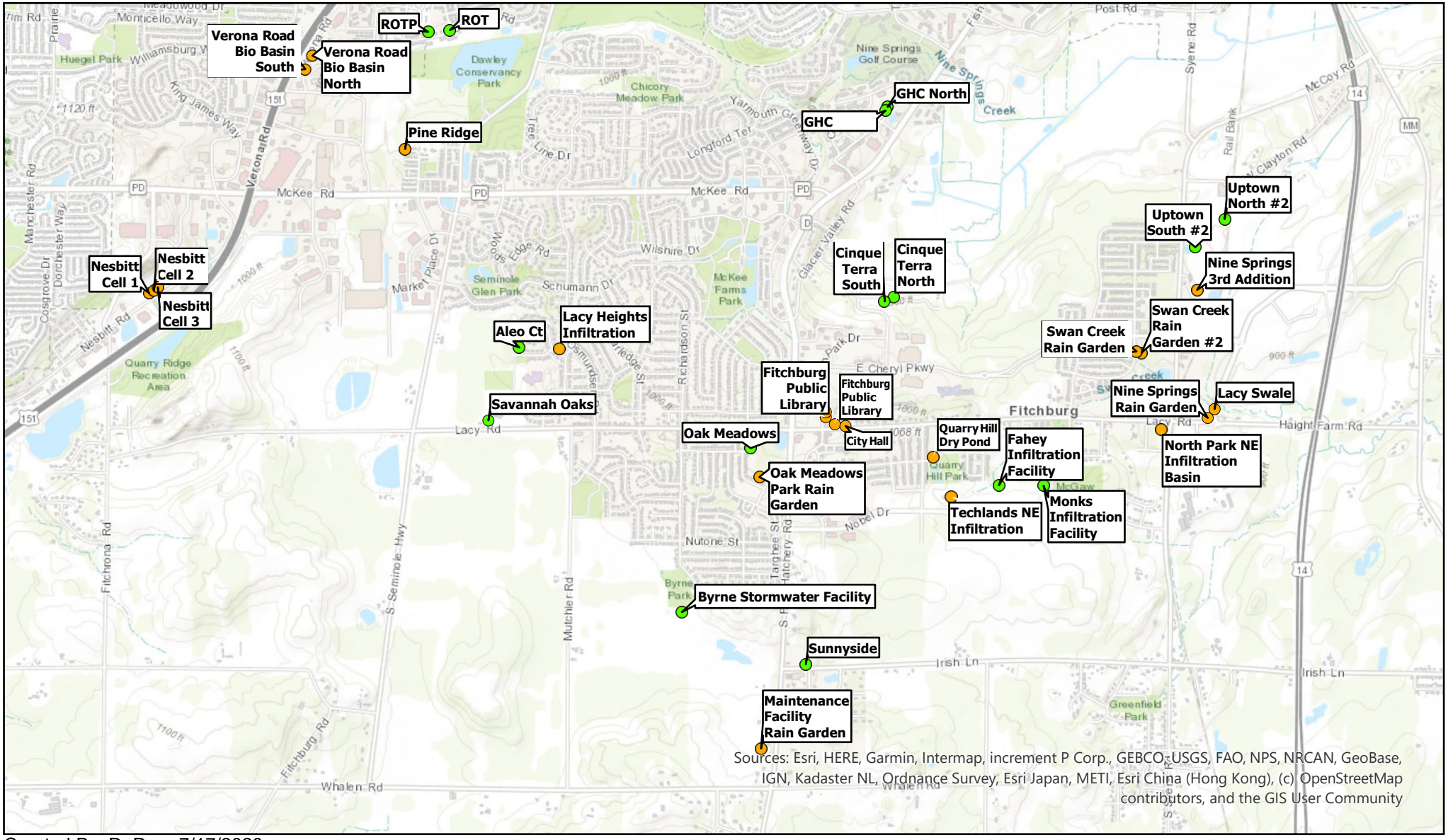
0.5 Miles

*Privately-owned pond with Public Stormwater Easement.
Public maintenance responsibilities TBD by future resolutions.

Pond

Appendix C
Map of Infiltrative Devices

Fitchburg Infiltration Devices



Created By: D. Dorn 7/17/2020

N

0.5 Miles

The following facilities are not maintained by the Stormwater Utility:

- Sunnyside Infiltration Basin (to be maintained by Parks)
- City Hall Bioretention Basin (to be maintained by Building Maintenance)
- Fire Station Bioretention Basins (to be maintained by Fire Department)
- Fitchburg Public Library Bioretention Basins (to be maintained by Library)
- Maintenance Facility Bioretention Basin (to be maintained by Public Works)

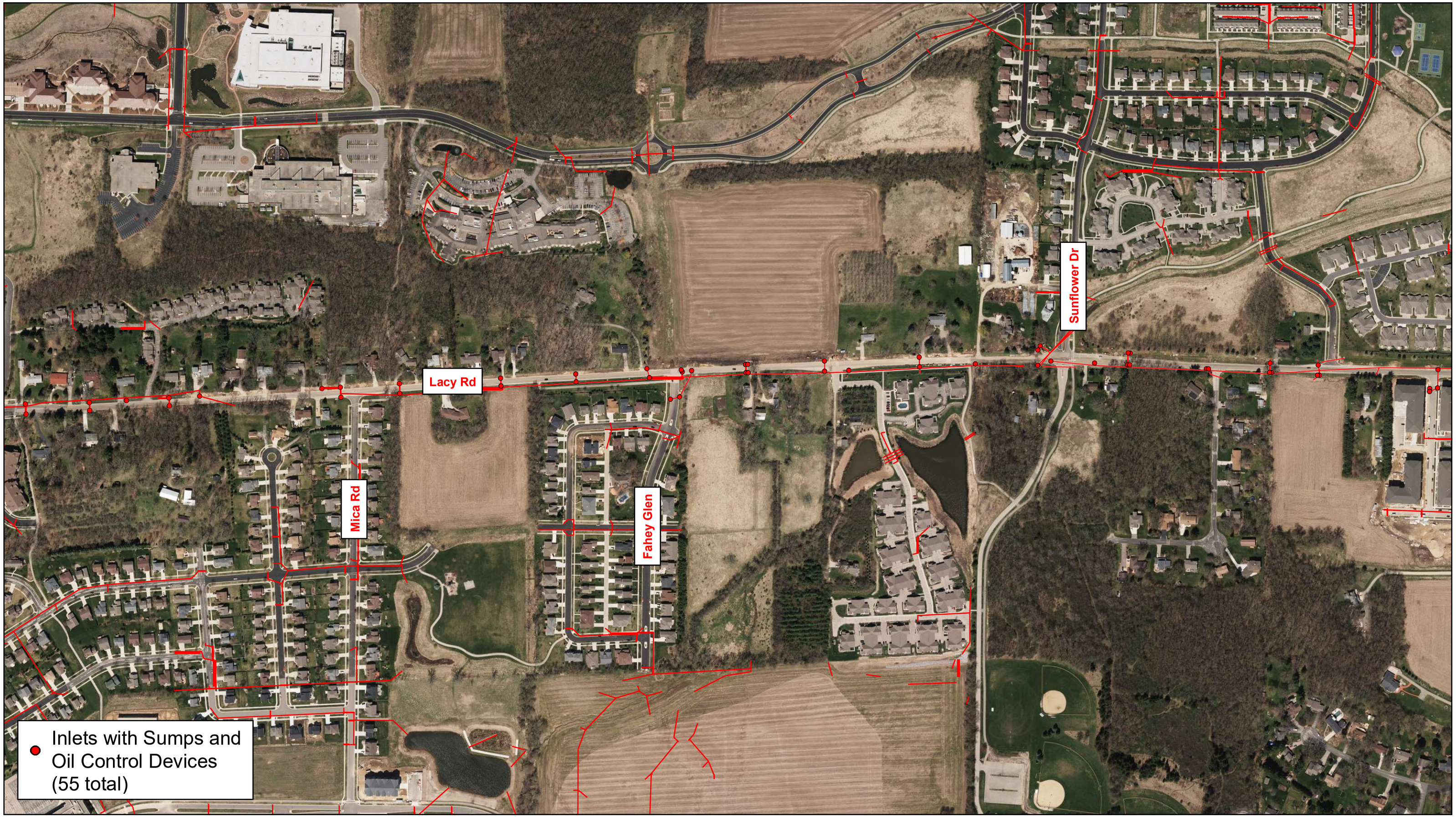
Legend

- Bioretention
- Infiltration

I:\Public Works\Engineering\Environmental\Stormwater\Storm Water\Mgmt Plan\Citywide\2020 Citywide SW Utility Maintenance Plan\Plan\Appendices

Appendix D
Map of Sumps and Oil Control Devices

Map of Sumps and Oil Control



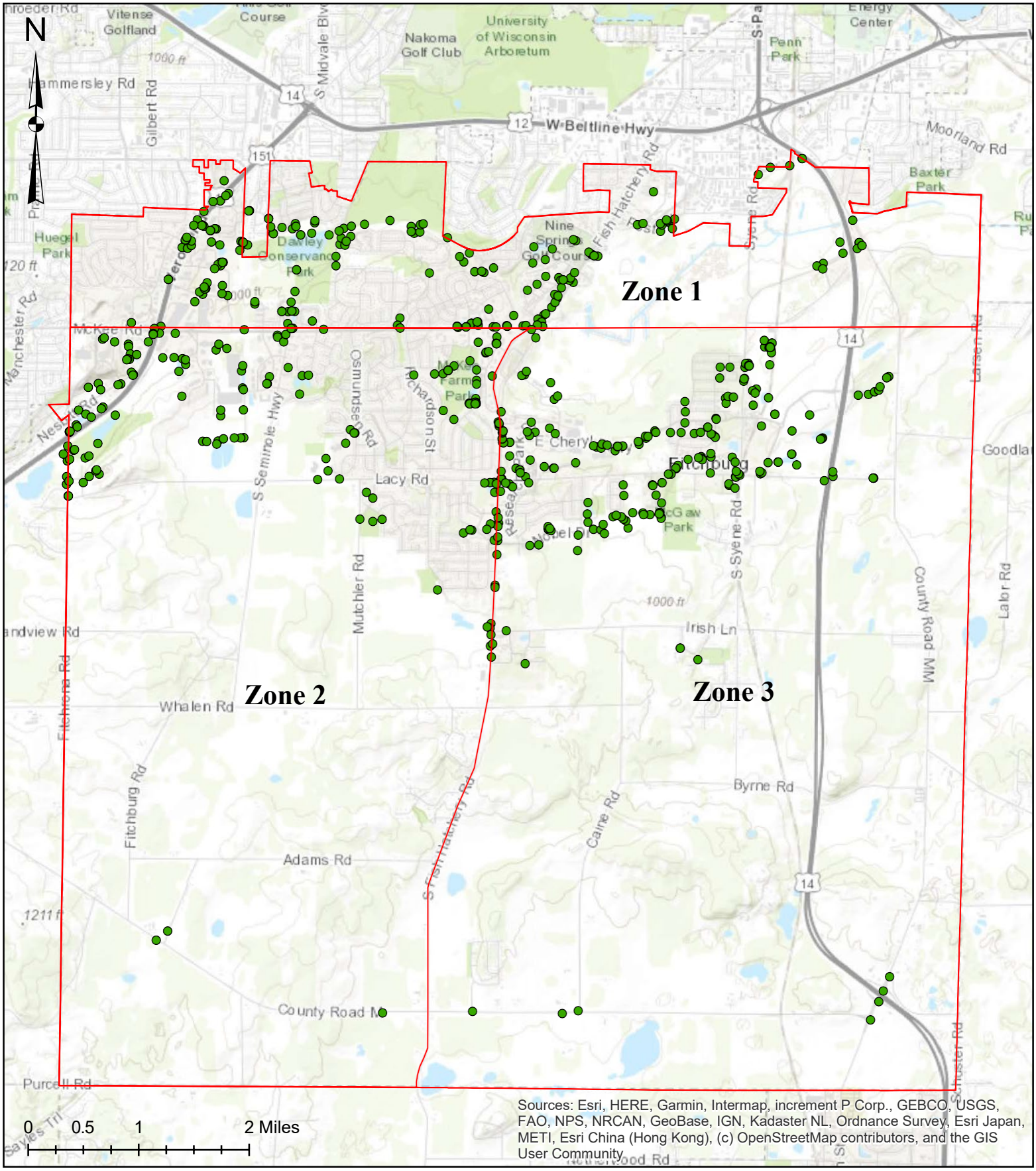
Drawn by N. McCraw

0 0.075 0.15 0.3 Miles

Appendix E
Illicit Discharge Detection and Elimination

Appendix E-1. Zones and Map of City Outfalls

Map of City Outfalls



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Drawn by N. McCraw

Appendix E-2. Standard Operating Procedures for Illicit Discharge Sampling

Standard Operating Procedure for Illicit Discharge, Detection, and Elimination Field Analysis Water Sampling, (Last updated: July 24, 2020)

If flowing water is not determined to be an approved discharge (see **List 1** at the end of this document), first drive around the area that drains to the outfall to determine if you can find the source of the illicit discharge. If you cannot find the source, call your supervisor for assistance (270-4262). Then, follow these steps to test for detergents, ammonia, potassium, and fluoride.

1. Pick up sampling materials from City Hall at the locations specified below:

    a. Sampling Material Locations:

        i. Sample Bottles: City Hall Garage, behind the truck
            1. Public Health Lab Bottles
            2. State Lab of Hygiene Bottles
        ii. Coolers: City Hall Garage, behind the truck
            1. City of Fitchburg Cooler
            2. State Lab of Hygiene Cooler
        iii. Gloves: City Hall Garage, behind the truck
        iv. Ice: purchased from a grocery store or gas station
            1. REMINDER: Bring the printed Tax Exempt Form along in order to make a tax-exempt purchase

2. Take water samples by collecting water into the appropriate bottle and carrying out the appropriate preservation technique (see **Table 1** and **Table 2** at the end of this document).

    a. Sampling Procedure

        i. Obtain all of the Sampling Materials from City Hall and buy ice from a store.
        ii. Do not open the bottle cap until ready to take the sample
        iii. Put on safety gloves.
        iv. Carefully remove the bottle cap and collect flowing water into bottle.
        v. Replace bottle cap and immediately follow proper preservation technique (see **Table 1**).
        vi. Repeat for every type of sample.

3. Water samples will be taken to two separate labs. Potassium, ammonia and fluoride samples will be taken to the Dane County Public Health Lab. Detergent water samples will be taken to the State Lab of Hygiene. The Dane County Public Health Lab does not test for detergents, and the City's MS4 permit requires detergents testing, therefore that sample is taken to the State Lab of Hygiene.

4. Fill out the Dane County Public Health Lab bottle labels with the appropriate information

    a. Matrix: Other
    b. Sample Site: Location that sample was taken at
    c. Date & Time: Date and time sample was taken
    d. Preservation Technique: Specified in the **Table 1**, available at the end of this document
    e. Sampler: Your name

5. Fill out the State Lab of Hygiene bottle labels with the appropriate information

    a. Field ID: Stormwater
    b. Sample Location/Description: Illicit Discharge @ (location) for detergent testing
    c. Preservative Added: Ice

6. Fill out the "Illicit Discharge, Detection and Elimination Field Analysis Water Testing" sheet (attached below) and place with all Dane County Lab sample bottles.

    a. Testing Information: potassium, fluoride, ammonia
    b. Sampler Contact Information: Name, Phone, Email and City of Fitchburg information

7. Fill out the State Lab of Hygiene yellow "Water Test Request Form" (printed and located in State Lab of Hygiene red cooler)

    a. Report/Bill to: City of Fitchburg, 5520 Lacy Rd. 5371, your name and phone
    b. Check one report option: Email address (your email)
    c. Reason for test: Investigation (I)
    d. Well Information: N/A
    e. Collection Date: REQUIRED
    f. Sample Source: Other (PO)
    g. Sample Type: Storm Water (NP)

8. Once the samples have been collected, properly preserved, and labeled they should immediately be taken to the labs:

    a. See the **Table 1** below to find the hold time for each sample. The hold time is the allowable amount of time between taking and analyzing the sample in order for results to be valid. Fill out the **IDDE Field Analysis Water Testing Form** (available at the end of this document) to drop off with the samples).

b. Public Health Madison & Dane County Lab
   i. Lab is located at:

      Madison City County Building (CCB)
      210 Martin Luther King Jr. Blvd., Room 507
      Madison, WI 53703

   ii. Sample Drop Off
      1. Normal Procedure: Drop them off in Room 507
      2. COVID-19 Procedure: A drop off must be arranged as the lab is locked. Call (608)-243-0357 to arrange.

   iii. Lab hours of operations: Monday – Friday: 8:00 am – 4:30 pm

   iv. Parking and Directions to Public Health
      1. Parking at the Government East Garage ramp would be the most reliable parking available:

         Government East Garage
         110 E Wilson St
         Madison, WI 53703

      2. There is also limited street parking on MLK Blvd.

c. State Hygiene Lab

   i. Lab is located at:

      2601 Agriculture Dr
      Madison, WI 53718

ii. Sample Drop Off:
    1. Call Phil Manion (City of Fitchburg Utility Supervisor) to notify that samples are being dropped off - this step is IMPORTANT to ensure samples are NOT tested as municipal water
        a. Phone: (608)-729-1730
    2. Call the lab before dropping off samples (608)-224-6203
    3. Drive around to the back of the building

iii. Hours of Operation: Monday – Friday 7:45 am - 4:30 pm

iv. Parking and Directions
    1. Drive to the back driveway of the building

9. Payment Information

    a. Public Health Lab
        i. Bring cash or check made out to the City Treasurer

City of Madison Treasurer
PO Box 2999
Madison, WI 53701

ii. If payment is not brought up front, the Public Health Lab will send an invoice for the water samples. Forward the invoice to your supervisor for payment.

b. State Hygiene Lab
   i. Do NOT bring payment with samples
   ii. The lab will send an invoice. Forward the invoice to your supervisor

10. Other Useful Information

a. Location of all IDDE files: I:\Public Works\Engineering\Environmental\Stormwater\Storm Water\NR216 Permit\IDDE Field Screening Protocol
   i. Analyte Table: "I:\Public Works\Engineering\Environmental\Stormwater\Storm Water\NR216 Permit\IDDE Field Screening Protocol\Analyte Table.docx"
   ii. Bottle Key: "I:\Public Works\Engineering\Environmental\Stormwater\Storm Water\NR216 Permit\IDDE Field Screening Protocol\Bottle Key.docx"
   iii. Illicit Discharge, Detection and Elimination Field Analysis Water Testing Sheet: "I:\Public Works\Engineering\Environmental\Stormwater\Storm Water\NR216 Permit\IDDE Field Screening Protocol\IDDE Blank Test Info Sheet.docx"
   iv. Public Health Lab Documents: I:\Public Works\Engineering\Environmental\Stormwater\Storm Water\NR216 Permit\IDDE Field Screening Protocol\Dane County Public Health Lab Documentation
b. Public Health Lab Info
   i. Main Phone: (608)-266-4821
   ii. Environmental Health Lab: (608)-243-0357
c. State Lab of Hygiene Info
   i. Main Phone: (608)-224-6202
d. City MS4 Permit

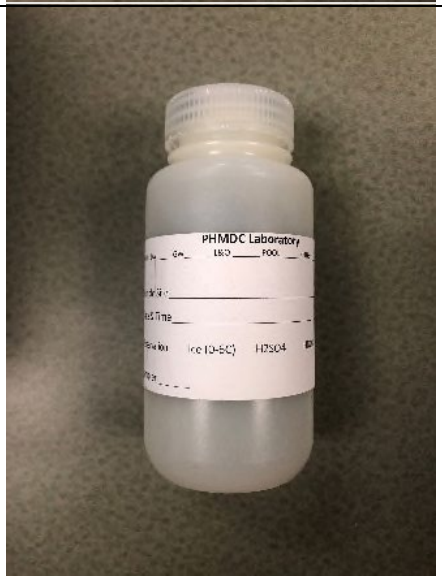
List 1. Approved Discharges from City MS4 Permit Section 3.3.1 IDDE ordinance

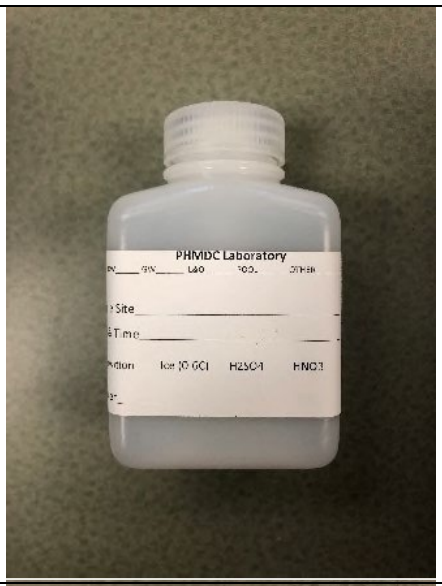
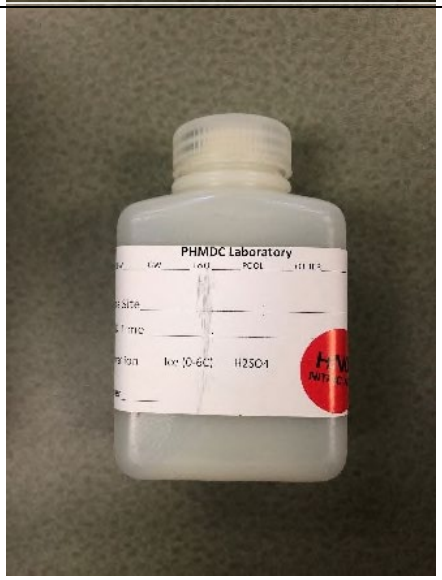
a) Water line flushing
b) Landscape irrigation
c) Diverted stream flows
d) Uncontaminated groundwater infiltration
e) Uncontaminated pumped groundwater
f) Discharges from potable water sources
g) Foundation drains
h) Air conditioning condensation
i) Irrigation water
j) Lawn watering
k) Individual residential car washing
l) Flows from riparian habitats and wetlands
m) Fire fighting
n) Discharged authorized under a WPDES permit

Table 1. Analyte Table

Analyte	Bottle	Preservation Technique	Hold Time	Cost (2020)	Lab
Potassium	250 mL HDPE rectangular, HNO3 in lab	None (HNO3 in bottle)	6 months	$35	Public Health
Ammonia	250 mL HDPE round, H2SO4 in lab	Ice (0-6C) to 4 °C in cooler	28 days	$25	Public Health
Fluoride	250 mL HDPE rectangular, 0-6C	None	28 days	$20	Public Health
Detergents	32 oz (1 quart)	Ice in plastic bag around bottle in cooler	48 hours	$26	State Hygiene

Table 2. Bottle Key

Bottle	Picture	Cooler
200 mL IDEXX		City of Fitchburg
250 mL HDPE round, H2SO4 in lab		City of Fitchburg

250 mL HDPE rectangular, 0-6C		City of Fitchburg
250 mL HDPE rectangular, HNO3 in lab		City of Fitchburg
1 quart		Public Health Lab

Illicit Discharge, Detection and Elimination Field Analysis Water Testing Form

These water samples were dropped off by the City of Fitchburg Public Works Department to be tested for suspected illicit discharge to the stormwater system.

Testing Information

Please test these samples for the following contaminants:

_____

_____

_____

Sampler Contact Information

Name:

Phone:

Email:

City of Fitchburg Information

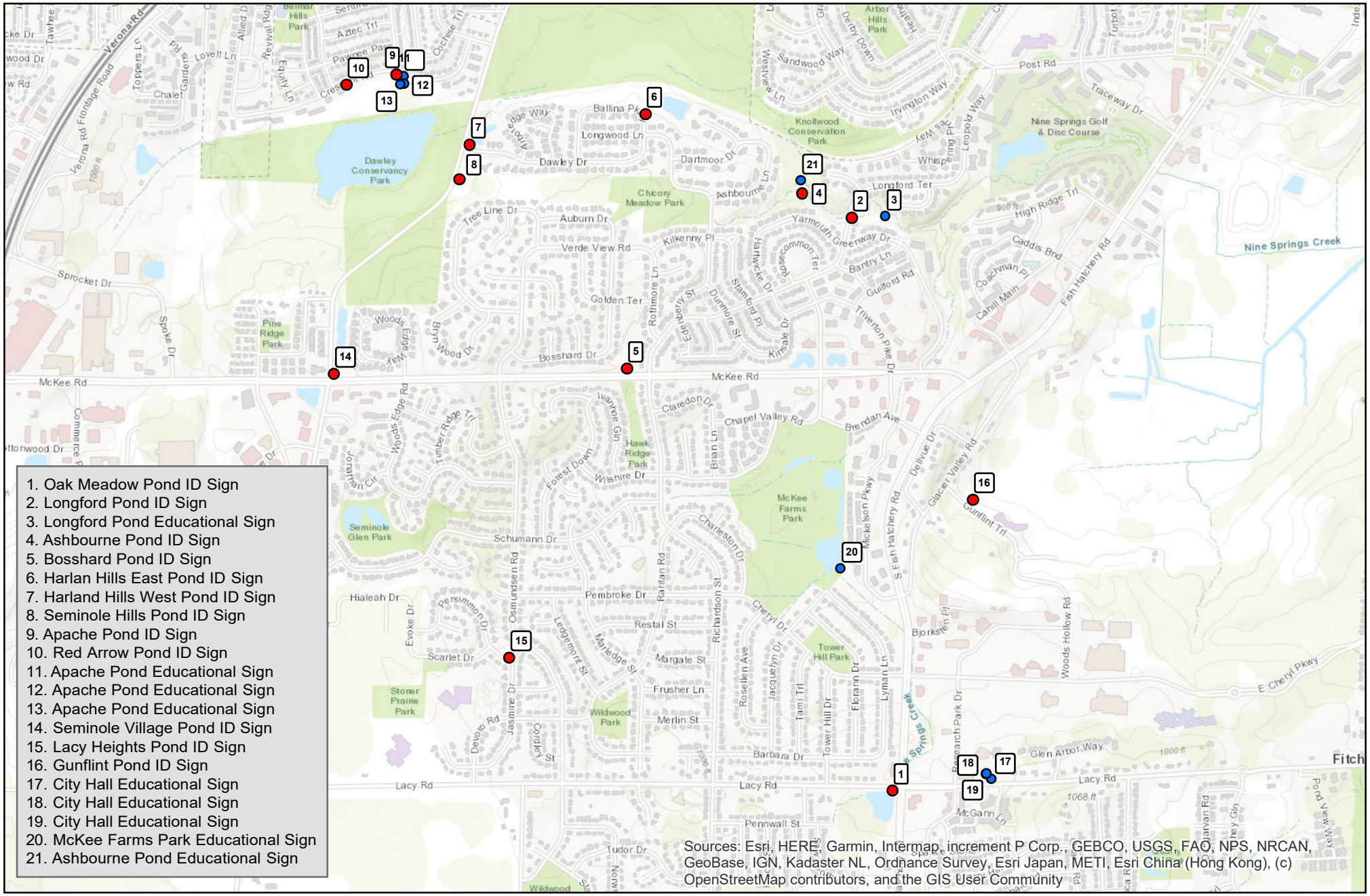
City Hall – Public Works Department
5520 Lacy Rd
Fitchburg, WI 53711

Phone: (608)-270-4200
Fax: (608)-270-4275

https://www.fitchburgwi.gov/141/Public-Works

Appendix F
Map of Stormwater Utility Signage

Stormwater Utility Signs



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0.5

Miles

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Legend

- Educational
- ID

Appendix G
Hillside Heights Pumping Plan

Hillside Heights Pumping Plan

Last revised: November 6, 2019

Background

The natural topography of the Hillside Heights neighborhood features a land-locked, natural kettle pond with no natural outlet. In 2018 and 2019, the City pumped the pond in order to prevent damage to neighboring properties. Water pumped from the pond was directed to the east on Irish Lane until it achieved gravity flow. In 2019, the City constructed a second, smaller pond to the north of the original natural pond in order to provide additional flood protection storage capacity prior to impacting structures.

Pumping Setup

City staff have used a 4-inch, 6-inch, and 8-inch pump to dewater the Hillside Heights pond. Staff determined that an 8-inch pump was too unwieldly to maneuver and setup, while a 4-inch pump did not dewater the pond at a satisfactory rate. Staff determined that a 6-inch pump provides a good balance between ease of setup and a satisfactory pumping rate.

The pump is setup adjacent to the pond being pump, and its intake is anchored to the center of the pond. The intake is attached to a floatation device to prevent sediment and vegetation from entering the pump. In Figure 1, the drums are full of air to act as floatation devices. This prevents clogs within the pump and decreases the possibility of sending dirty water downstream.

Figure 1. Pumping Setup

A combination of solid and flexible piping are used to pump water to the north side of Irish Lane and approximately 2,150 feet east (see Figure 2). Prior to pumping, two culverts on Irish Lane should be blocked using sandbags or other means to prevent flow from discharging to the south of the road. Allowing water to flow to the south may cause ponding in small natural kettles as shown in Figure 4a.

The 6-inch pump we used has a pumping rate of approximately 40,000 gallons per hour. It took approximately 9.5 hours to completely dewater the northern pond, which means it has an approximate capacity of 380,000 gallons. For the original southern pond, it took approximately 6 hours to dewater the pond two feet (i.e., 240,000 gallons). Pumping continued through the night for an unknown amount of time.

Downgradient conveyance until the initial receiving water (i.e., the flow path shown on Figure 3) shall be inspected during the period of pumping and afterward to evaluate potential channel erosion. Where erosion is identified, management measures will be evaluated and implemented with the goal of eliminating channel erosion.

Pumping may occur during dry conditions to create flood storage protection capacity within the pond. This would minimize potential downstream erosion impacts. Pumping may also occur on an emergency basis as necessary to protect public and private structures.

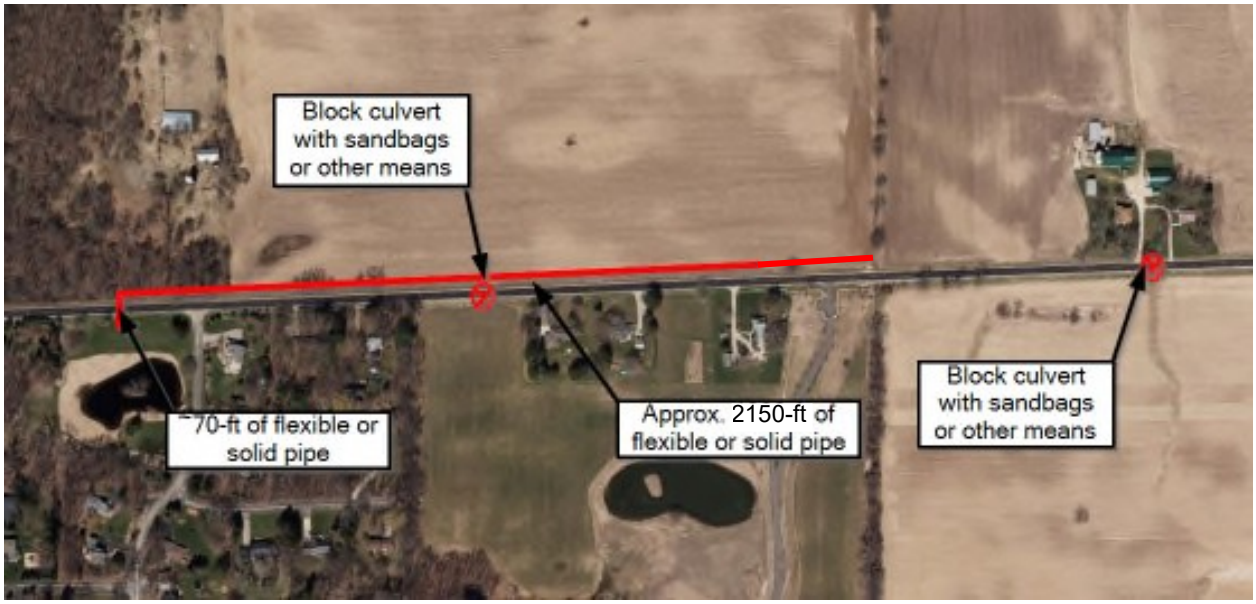

Figure 2. Location of Piping and Sandbags during Pumping Operations

The downstream flowpath of pumped water is shown Figure 3. When pumping in dry conditions (i.e., if it has not rained for a week), it takes less than 1.5 hours for water to flow from the pond to the culvert where water crosses Irish Lane to the south. From there, it takes ***at least*** four hours for water to reach the culvert adjacent to Greenfield Park, near the intersection of Oakhaven Road and East Hill Drive.

Figure 3. Pumping Flow Path

Flooding concerns and potential downstream negative impacts are shown in Figure 4a and 4b. Many of the flooding concerns shown in Figure 4a are addressed by blocking culverts and using the extended pipe setup shown in Figure 2. It is not possible to completely seal the culverts, so some seepage does occur.

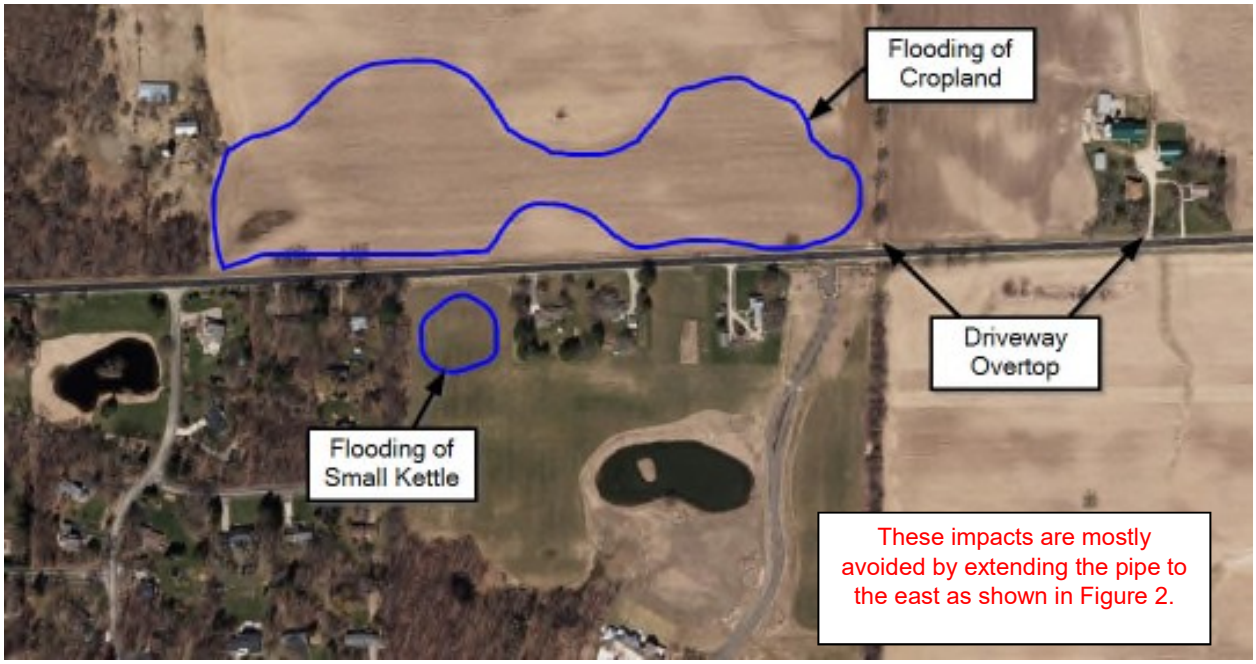

Figure 4a. Potential Downstream Flooding Impacts – Irish Lane

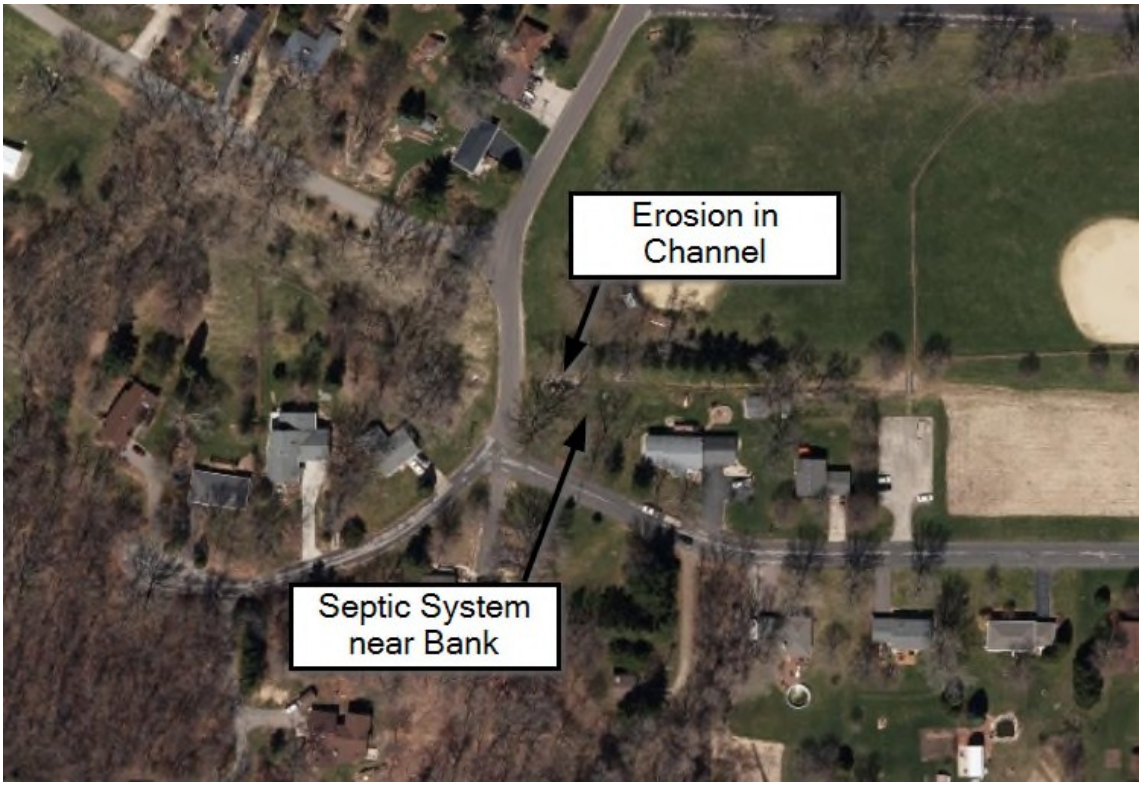

Figure 4b. Potential Downstream Flooding Impacts – Greenfield Neighborhood