

NPDES PHASE II STORMWATER ANNUAL REPORT

DECEMBER 2016 – JUNE 2018

NPDES Permit No. NC000560



City of Shelby, North Carolina



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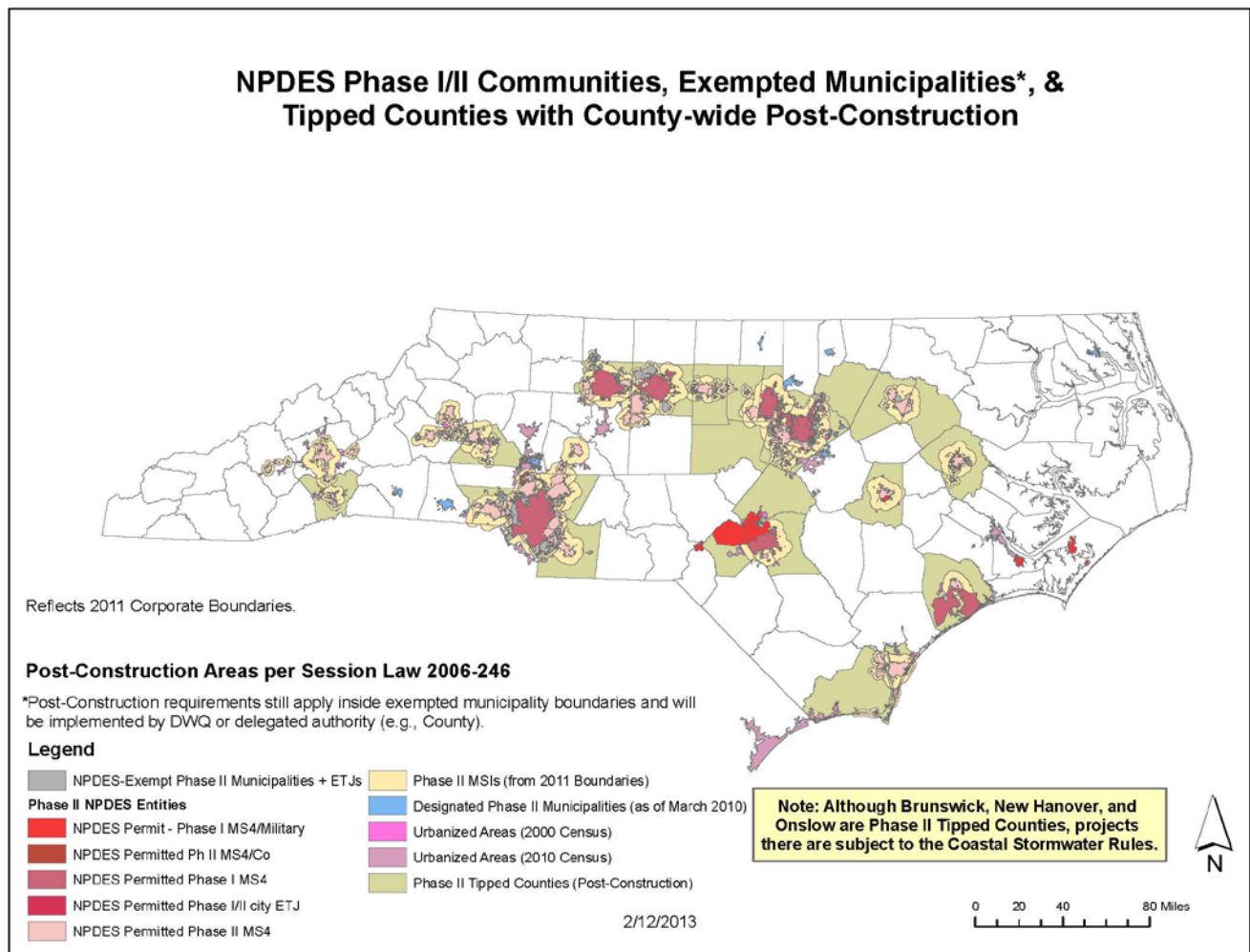
Appendix B – Major Stormwater Outfalls Map

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History

On July 1, 2005, the North Carolina Division of Water Quality (DWQ) in the North Carolina Department of Environmental Quality (NCDEQ) began issuing Phase II stormwater permits to municipalities in North Carolina under the National Pollutant Discharge Elimination System Program (NPDES). At the time, the NPDES Phase II Program was the latest stormwater program stemming from the Federal Clean Water Act of 1972. Prior to the Phase II program, EPA and NC DEQ had issued NPDES Phase I Stormwater Permits to Cities with populations larger than 100,000 residents. In North Carolina, these cities were Raleigh, Charlotte, Fayetteville, Durham, Greensboro, and Winston Salem. Following Session Law 2006-246, a city must comply with Phase II NPDES requirements if the city population is greater than 10,000 or more than 4,000 housing units and either a population density of 1,000 people per square mile or more than 400 housing units per square mile. The City of Shelby has a population of 20,323 and 434 housing units per square mile.



On December 1, 2012, the City was first issued a National Pollution Discharge Elimination System (NPDES) Stormwater Discharge Permit (NPDES Permit Number NCS000560). This permit was valid for 5 years and was renewed on February 1, 2018. The intent of the permit is to improve the quality of the nation's waterways by reducing the quantity of pollutants that stormwater transports into stormwater systems and discharges to surface water bodies. The permit requires permittees at a minimum to develop, implement, and enforce a stormwater program designed to reduce the discharge of pollutants from the municipal separate storm sewer system (MS4) to the maximum extent practicable. The stormwater program is composed of the following six management measures as defined in the NPDES Permit:

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Runoff Controls
5. Post-Construction Site Runoff Controls
6. Pollution Prevention and Good Housekeeping for Municipal Operations

Each of these measures consists of required Best Management Practices (BMPs), measurable goals for each BMP and an implementation schedule for the 5-year permit cycle. Additionally, the City of Shelby adopted a Comprehensive Stormwater Management Program, which must be followed just as if it was part of the permit, and completes annual reporting about the NPDES Phase II Program. This Annual Report is intended to document the City's progression in implementing the NPDES Permit and Comprehensive Stormwater Management Plan. With the renewal of the NPDES permit in 2017 and a change in the reporting period for the Annual Report, this report covers the City of Shelby Stormwater Division activities from December 1, 2016 through June 30, 2018. Subsequent reports will coincide with the fiscal year.

Background Information

Name of Public Entity: City of Shelby

Jurisdictional Area (City Limits): 22.2 square miles

Population Permanent: 20,323 (2010 Census)

Stormwater Service Area: 22.2 square miles

River Basin: Broad

Estimated percentage of jurisdictional area containing the following land use activities:

- Residential = 33.3%
- Commercial = 14.2%
- Industrial = 5.6%
- Institutional = 12.7%
- Mixed Use = 1.6%
- Parks = 2.6%
- Open Space = 30.1%

The City of Shelby Stormwater System consists of a combination of piping, ditches, and sheet flow. Per City Ordinance, all new city streets constructed by private developers must have

curb and gutter stormwater systems with the exception of very low volume roads (400 trips per day serving less than 20 lots greater than one acre each). The stormwater conveyance system within the City's public right-of-ways is maintained by the City of Shelby's Stormwater Division and Public Works Department. The stormwater system for state maintained roads is operated and maintained by the North Carolina Department of Transportation. A map of the City of Shelby Phase II Area is provided in Appendix A.

In addition to the City of Shelby Phase II NPDES Stormwater Program, the City also has two additional water quality programs:

1. The Watershed Protection Overlay Districts (Unified Development Ordinance Section 10-1) are designed to protect designated public water supply watersheds from activities which could degrade water quality. The purpose of this is to implement the provisions of the Water Supply Watershed Protection Act (NCGS 143-214.5) which requires the City of Shelby to adopt minimum land use regulations to protect water quality of public surface water supplies within the City's zoning jurisdiction. Development within this district shall employ best management practices to minimize water quality impacts.
2. The Flood Hazard Overlay District (UDO Section 10-2) is designed for the purpose of protecting people and property from the hazards of flooding in accordance with the authority provided in NCGS 160A-381 and 160A-174. This program addresses many issues such as Artificial Obstructions with Floodways, building design requirements above base flood elevations, and on-site sewage disposal system requirements that avoid impairment or contamination from it during flooding.

Broad River Basin Receiving Waters

The following table was compiled from data provided by NCDEQ. The table provides a list of receiving streams that are impacted by stormwater from the City of Shelby. This table lists the stream name, water quality classification given by NCDEQ, and any water quality issues that are known to exist on the stream segment. The water quality classifications are defined as follows:

- "C" indicates waters protected for secondary recreation (wading, boating, and other uses involving human body contact with water), fishing, wildlife, fish consumption, aquatic life including propagation, survival, and maintenance of biological integrity, agriculture and other uses suitable for Class C.
- "WS-III" indicate waters used as sources of water supply for drinking, culinary or food processing purposes where a more protective WS-I or WS-II classification is not feasible. These waters are also protected for Class C uses. WS-III waters are typically in low to moderately developed watersheds.
- "WS-IV" indicates waters used as sources of water supply for drinking, culinary or food processing purposes where a WS-I, WS-II, or WS-III classification is not feasible. These waters are also protected for Class C uses. WS-IV waters are generally in moderately to highly developed watersheds.

Receiving Stream Name	Stream Segment	Water Quality Classification	Use Support Rating	Water Quality Issues	303(d) List
Beams Lake	9-50-30-1	C	Not Rated	N/A	No
Bear Creek	9-50-31-1	C	Not Rated	N/A	No
Beason Creek	9-53-8	C	Not Rated	N/A	No
Beaverdam Creek	9-50-32	C	Not Rated	N/A	No
Brushy Creek	9-50-29	C	Not Rated	N/A	No
Buffalo Creek	9-53-(1)	WS-III	Not Rated	N/A	No
Buffalo Creek (Kings Mountain Reservoir)	9-53-(2.9)	WS-III, CA	Not Rated	N/A	No
First Broad River	9-50-(19.5)	WS-IV	Supporting	Ecological/biological Integrity Benthos	No
First Broad River	9-50-(28)	C	Impaired	Turbidity	No
First Broad River	9-50-(28)	C	Supporting	Ecological/biological Integrity Benthos	No
First Broad River	9-50-(28)	C	Not Rated	Fecal Coliform (recreation)	No
Hawkins Branch	9-50-32-5	C	Not Rated	N/A	No
Hickory Creek	9-50-30	C	Not Rated	N/A	No
Little Creek	9-50-29-4	C	Not Rated	N/A	No
Little Hickory Creek	9-50-30-2	C	Not Rated	N/A	No
Logan Branch	9-50-30-3-1	C	Not Rated	N/A	No
Long Creek	9-53-3-(1)	WS-III	Not Rated	N/A	No
Mayne Creek (East Fork Sandy Run Creek)	9-46-3	C	Not Rated	N/A	No
Muddy Fork	9-53-6	C	Not Rated	N/A	No
Overflow Branch	9-50-32-1	C	Not Rated	N/A	No
Poplar Branch	9-50-32-4	C	Not Rated	N/A	No
Potts Creek (Pilot Branch)	9-53-6-3	C	Not Rated	N/A	No
Roberts Branch	9-53-7-(2)	C	Not Rated	N/A	No
Roberts Branch (Joe's Lake)	9-53-7-(1)	B	Not Rated	N/A	No
Shoal Creek	9-50-31	C	Not Rated	N/A	No
Suck Creek	9-53-2.7	WS-III	Not Rated	N/A	No
Sugar Branch	9-53-32-3	C	Not Rated	N/A	No
Sulphur Springs Branch (Little Hickory Creek)	9-50-30-3	C	Not Rated	N/A	No
Swainsville Creek	9-50-32-2	C	Not Rated	N/A	No
Unnamed Tributary between Shelby Raw Water Intakes	9-50-27-(2)	WS-IV, CA	Not Rated	N/A	No
Unnamed Tributary between Shelby Raw Water Intakes (North Club Lake)	9-50-27-(1)	WS-IV	Not Rated	N/A	No
Williams Creek	9-50-26	WS-IV	Not Rated	N/A	No
<i>N/A denotes that data was not available</i>					

NPDES Phase II Minimum Control Measures

Each of the six Minimum Control Measures (MCM's) has a set of best management practices (BMP's) that are intended to foster compliance with both the City's Permit and the CSWMP.

Public Education and Outreach

The City operates a Public Education and Outreach program that is designed to educate the general public about the need to improve water quality in stormwater. The general objectives are to distribute educational materials to the community and/or to conduct equivalent outreach activities about the impacts of stormwater discharges on surface waters and the steps the public can take to reduce pollutants in stormwater runoff. These objectives have been further refined to target residents, schoolchildren, local businesses (examples include: gas station owners, landscaping companies, and contractors), and industry because these groups have the most impact on stormwater pollution prevention. Pollutants discussed in the educational program include but are not limited to:

- Trash and Debris
- Yard Waste
- Automobile and Equipment Washing
- Sediment
- Used Oil
- Lawn Care Products
- Household Chemicals
- Fecal Coliform

City staff also maintains a variety of brochures and other handouts at multiple public and private locations such as:

- City Hall
- Shelby Utilities Operation Center
- Shelby Customer Services
- Shelby-Cleveland County Regional Airport
- Cleveland Memorial Library
- Veterinary Hospitals and Pet Supply stores
- Local Hardware Stores
- City of Shelby website at <http://www.cityofshelby.com/services/stormwater/>

The following is a partial list of the topics addressed in the literature at these locations:

- Pet Waste
- Oil and Chemicals
- Erosion Control
- Litter
- Yard Waste
- Agriculture

The City of Shelby Planning and Development Services is responsible for building and development permitting throughout the City. At the time of issuing permits, contractors are provided with information including a handout on erosion and sediment control. During this reporting period, 355 handouts were distributed.

During the last permit year, City staff has presented stormwater information at booths and presentations at various events such as:

- Cleveland County Schools 5th Grade Career Fair
- Arts on the Square Festival
- Earth Day at Foothills Farmer's Market
- 7th Inning Stretch Festival
- Cleveland County Fair
- Mush, Music, and Mutts Festival
- Airport Fly-In and Open House
- Shelby Intermediate Club Presentation

In these combined events, there were more than 3,000 stormwater related pamphlets, booklets, stickers, brochures, etc. given away. The City of Shelby Stormwater Division also began raffling rain barrels to citizens. During the year, a rain barrel was given away and the raffle drew a lot of attention and offered the opportunity to discuss how homeowners can help with stormwater quality and quantity.



Arts on the Square – April 2017



Cleveland County Fair – October 2017



In spring of 2016 the City opened the First Broad River Trail, a part of the Carolina Thread Trail system. This trail meanders 2.2 miles along the banks of the First Broad River. In an effort to reduce pet waste pollution, one of the posted trail rules states, “Clean up after your pet”. The City installed four pet waste bag stations along the trail for public use. During the reporting period, approximately 4,600 bags were distributed from the stations along the walking trail. The Stormwater division also stocks two stations in the downtown area, where approximately 2,700 bags were distributed. In addition to these pet waste bag stations, City Park staff maintain 6 stations on park property.

Beginning in the October 2015 billing cycle and repeating annually in the March and October billing cycles, the bill insert shown is mailed to approximately 8,000 stormwater utility customers providing education on how to properly handle yard waste and lawn care. A new bill insert is planned for fiscal year 2019.

A Guide To Yard Waste and Lawn Care

Water from our yards and streets flows directly into creeks, rivers, and lakes without ever being treated and cleaned. As it flows to storm drains or ditches, stormwater can pick up things including oil, dirt, pet waste, garbage, yard chemicals, and yard waste.

Lawn Mowing and Yard Waste

Yard waste can block storm drains and ditches causing localized flooding. If yard waste reaches streams, rivers, or lakes, it can also over fertilize the water leading to algal blooms and fish kills.

- *Blow leaves and grass clippings back into your yard instead of in the street. This reduces the amount of waste washing into storm drains.*
- *Keep storm drains and ditches open and free flowing. Remove debris (leaves, grass, and garbage) from storm drains and ditches.*
- *Per City ordinance, place grass clippings and debris on top of the curb or ditch for the City of Shelby to pick up rather than in the street gutter or ditch.*
- *Consider leaving grass clippings in your yard. The clippings decompose acting as a natural fertilizer for yards.*
- *Raise the mower blade to 3". Longer grass gives lawns healthier roots with less weeds.*
- *No logs, wood, limbs, branches, or tree trimmings greater in length than 4 feet or larger than 6 inches in diameter or in piles greater than 3 feet wide by 3 feet high by 4 feet long will be collected by the City.*
- *Discuss these things with your lawn care provider.*




A Guide To Yard Waste and Lawn Care

Excessive fertilizers and pesticides applied to lawns can potentially be carried by stormwater into our waterways.


Fertilizers

- *Fertilizer nutrients such as nitrogen, phosphorus, and potassium cause algae blooms and excessive plant growth in waterways. Algae depletes oxygen in water causing harm to aquatic life. Excessive plant growth and algae reduce sunlight to water as well.*
- *Conduct soil testing before applying fertilizers. Soil tests reports precise amounts of nutrients for the soil and plant types in your lawn. By doing this, it may reduce fertilizer costs and prevent over fertilization. Nutrients not used by your lawn contributes to stormwater pollution.*
- *Apply fertilizers exactly where they are needed.*
- *Use compost and organic mulch where applicable.*
- *Leave grass clippings on your lawn as a natural fertilizer.*
- *Store fertilizers away from contact with stormwater and rainfall.*

Pesticides

- *Use pesticides sparingly.*
- *Apply only where they are needed.*
- *Avoid spraying pesticides onto hard surfaces such as driveways or sidewalks.*
- *Avoid applying pesticides when rain is forecasted.*
- *Avoid spraying vegetation along ditches and waterways as established vegetation helps reduce erosion and improves water quality.*
- *Apply according to the label.*
- *Properly identify the pest plant or insect and purchase the appropriate pesticide.*
- *Store pesticides away from contact with stormwater or rainfall.*

For more information about stormwater and what you can do to help, contact the City of Shelby Stormwater Division.



STORMWATER DIVISION
 PO Box 207, Shelby, NC 28151-0207
 Phone: (704) 484-6840
 Email: stormwater@cityofshelby.com

The City utilized the EnviroScape watershed model at the Cleveland County Schools 5th Grade Career Fair in 2017 and 2018. This event allowed us to demonstrate to 5th grade students the importance of water quality and how they can help as citizens. This event always generates questions related to our jobs and what we do each day.



In January of 2018, the stormwater division received an invitation from the Shelby Intermediate School Robotics Club to speak at one of their afterschool meetings to assist them in their project relating to stormwater. On February 13, 2018, staff spoke and gave demonstrations related to topics such as stormwater, pollution prevention, and our daily job responsibilities to approximately 25 students.

BOTTOMS UP.

CAR WASH SOAP

YARD WASTE

LITTER

SEDIMENT

STORMWATER POLLUTANTS FIND THEIR WAY INTO WHERE WE FISH, WHERE WE SWIM AND WHAT WE DRINK. Everything that goes into our storm drains—grass clippings, soap, pesticides, pet waste, whatever—makes its way straight to our streams. Stormwater pollution is our biggest source of water pollution. It all adds up. It all comes back. And you're the solution, now that you know where it goes. Find out more today. Visit KnowWhereItGoes.org.

KnowWhereItGoes.org

The stormwater division has placed education stormwater posters in public locations and City buildings throughout the City similar to the one pictured to the above. These posters cover topics from pollutants, vehicle washing, lawn care, pet wastes, and many more. The posters are rotated periodically in hopes to reach a broad audience.

The Shelby Shopper & Info, which distributes 28,000 copies and reaches 55,000 readers weekly, publishes our educational material periodically helping to reach a large audience and educate the public about stormwater issues and ways they can help.

Thursday, August 3-August 9, 2017

www.shelbyinfo.com

704/484-1047 - shelby shopper & info - Page 23

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 12x24- \$2995 +tax

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HAY, GRASS HAY, 4X5 rolls, 10 rolls or more, \$30 each. Less than 10, \$40 each. 704-692-6025.



Creed Band members and parents help wash a big truck at a pancake breakfast and car wash fundraiser held on Saturday, July 30th, 2017. The fundraiser was for the Band's trip to Disney. The Band is performing for the Make a Wish Foundation and will play in the Magic Kingdom Parade at Disney. Their next fundraiser will be at the 7th Inning Stretch Festival on August 5th, 2017 in Uptown Shelby. Photo by Jeff Melton

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TRAILERS, LAWNMOWER TRAILERS, Flat Bed Trailers, Enclosed Trailers, Horse & Cattle Trailers, Saddlery. Check our prices and quality before you buy. Bridges Riding Equipment, Boiling Springs, NC. 704-434-6389.

FOR SALE

NEW 30" ROUND BLACK TABLE with pedestal leg. \$125. 704-487-0321.

REMODELED 3BR HOUSE, near Waco, \$79,500. Husqvarna 42", 18HP riding mower used 6x, \$1200. 704-466-5880.

FOR SALE, CHICKEN LITTER, Fourwinds Farm, Polkville Area, U-Haul, price depending on size of load. 704-538-3710, 704-692-3681, 704-692-0617, leave message.

TWO ANTIQUE MANTEL CLOCKS, one, grandfather clock, some chairs, tall antique bed, came bottom rocker. 704-482-3519.

REFRIGERATORS, STOVES, WASHERS, DRYERS, Discount Prices. 1205 Earl Road, Shelby NC. 704-487-4443.

USED KIRBY G4 VACUUM with attachments, \$275. Can send pictures by phone. Call 704-300-1818

REFRIGERATORS, STOVES, washers, dryers & odd furniture. Call 704-481-0954. After 5pm, call 704-482-0540.

PROMOTE YOUR BUSINESS WITH SCRATCH PADS! Press Room Printing. 704-538-5788, 704-482-2243.

HORSE QUALITY HAY, Square bales. 704-487-6855.

FORMAL DINING ROOM SUITE. Table with leaf, 6 chairs, hutch & server. \$800. 704-484-0217, leave message.

FOR SALE

1997 BUICK LESABRE, good tires, 3.6 engine, auto, power windows, etc. Only \$775. 704-466-2671.

HOWARD MILLER GRAND-FATHER CLOCK, floor model, \$250. Strobel Beginner's Violin with case, \$250. Black violin case, \$40. 704-466-0973.

2 CEMETERY PLOTS, Cleveland Memorial Park, near Bell Tower. Below market price. 704-491-0376.

INVERSION THERAPY TEE-TER HANG UP, like new, assembled, all accessories included, \$300. Exercise Bicycle, \$75. 704-491-0376.

STAINLESS STEEL, NUTS, BOLTS & WASHERS, 304-316, approximately 7000 lbs. Bulk sale, 704-460-1745.

CUB CADET ZERO TURN MOWER 22H, 50" cut. John Deere with Kawasaki industrial engine & bagger. (4) 235-60-15 tires, Cooper Cobras, white letters, new. 704-300-8684.

MINI FRIGIDES, USED, COLLEGE DORM or man cave, \$25. Set of 4 chrome Playa wheels & tires, excellent condition, \$400. 704-538-8010.

USED CAMPER TOPS: Various Sizes & Styles. Also buying them in Rutherford County. 828-980-0881.

(2) PORTABLE AC UNITS with remotes, both heat & air. (1) 11,000 BTU heat; (1) 12,000 BTU air, \$450 both. 864-266-8282.

10 Things You Can Do to Prevent Stormwater Runoff Pollution

- Use fertilizers sparingly and sweep up driveways, sidewalks, and gutters
- Never dump anything down storm drains or in streams
- Vegetate bare spots in your yard
- Compost your yard waste
- Use least-toxic pesticides, follow labels, and learn how to prevent pest problems
- Direct downspouts away from paved surfaces; consider a rain garden to capture runoff
- Take your car to the car wash instead of washing it in the driveway
- Check your car for leaks and recycle your motor oil
- Pick up after your pet

EPA
 For more information, visit www.epa.gov/eprp or www.epa.gov/eprp/creatoreator

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Medical Arts Pharmacy



The City began placing storm drain markers on drains where issues with illegal dumping had been detected. Markers are placed on drains within the City right-of-way and on private property with permission. The hope is the markers will deter illegal dumping in the future. In 2017, 11 drain markers were placed throughout the City.

The City continues to replace standard manhole lids that serve the stormwater system with new City of Shelby Stormwater manhole lids. The goal is to bring awareness that stormwater is not treated and everything that enters the stormwater system flows to streams and rivers.



Public Participation and Involvement

The City Stormwater Division views the requirement for Public Participation and Involvement as an essential feature of a successful stormwater program. The City has seen a growing interest in the stormwater program and will continue placing a large emphasis on promoting stormwater.

In an effort to make it more convenient for citizens to obtain additional information or to report issues, the City maintains a stormwater hotline (704-484-6866) with the Customer Services Department. The City also utilizes an email address that is simply stormwater@cityofshelby.com that is intended to provide another simple means of communication.

The City of Shelby partnered with Keep Shelby Beautiful to coordinate seven litter collection events within the City during this reporting period. Local citizens collected approximately 2,350 pounds of garbage during the seven events.

The City of Shelby assisted Cleveland County in the Annual Household Hazardous Waste Collection Day in 2017. Approximately 167 county residents participated in disposing of hazardous wastes such as paint and pesticides. Approximately 780 pounds of pesticides were collected during the event as well as approximately 67 pounds of unwanted/expired medication being taken out of the waste stream.



On September 16, 2017, the City of Shelby Stormwater Division organized a First Broad River Clean-Up Event. The event covered approximately 0.6 miles of the First Broad River where participants collected four tires and five bags of trash. The event was covered in the local Shelby Shopper & Info, as seen in the photograph below. The City plans to continue in 2018 with river and/or stream clean-up events.

Thursday, September 21-September 27, 2017

www.shelbyinfo.com

Layne Owen, coordinator of the City of Shelby Stormwater Division carries a canoe to the First Broad River. Owen and others helped clean the area of First Broad River near W. Dixon Boulevard off the the First Broad River Trail.

Photo by Jeff Melton



The City of Shelby also sponsored and supported The Broad River Alliance, a Waterkeeper Affiliate, in a river clean-up upstream of the City of Shelby raw water intake on the First Broad River on September 9, 2017. Several local businesses also partnered with the Alliance in hosting this event. They collected garbage including scrap tires from this section of the river.

Illicit Discharge Detection and Elimination

The City of Shelby continues to implement an effective Illicit Discharge Detection and Elimination (IDDE) Program. The goal of the IDDE Program is to identify and eliminate any discharges to the stormwater system that are not strictly stormwater runoff with the only exceptions being those that are specifically listed in the City of Shelby Phase II Stormwater Ordinance.

An illicit discharge is typically dirt, soap, pet waste, litter, oil, fertilizer, pesticides, or raw sewage and often times comes from “generating sites.” Generating sites are points of pollution that continue over a period and are recurring at regular or irregular intervals.

The foundation of the IDDE program is the City of Shelby Phase II Stormwater Ordinance that was adopted in November 2013 by Shelby City Council. The IDDE ordinance provides legal authority to restrict illegal discharges, prohibits illicit connections, provides conditions for cleaning up and preventing polluted spills, provides for right of entry into a property to investigate prohibited activities, and provides the City with options for enforcing the Ordinance.

The second portion of the IDDE program focuses on the City’s Stormwater System Map. The initial mapping phase was completed by GPS mapping and is now maintained in the City’s GIS system. The initial data has been verified and the map is being updated as necessary. The map includes the entire stormwater system and serves as an efficient tool when investigating illicit discharges or connections.

The IDDE program also utilizes dry weather screening of outfalls and storm system pipes. The location of the outfalls is shown in Appendix B. Outfalls and storm system pipes that had dry weather flows are reported and then have follow up investigations completed. During this reporting year, 292 major outfalls were inspected.

Since 2015, staff have identified 50 possible illicit discharges, connections, or dumping within the

City. During the reporting year, three new illicit discharges were found, two of which were resolved. The new illicit discharges consisted of two illegal dumping of paint and oil and one septic tank issue. To date, 24 of 50 issues located have been either resolved or considered closed out and addressed through public education and outreach. Some of these are ongoing issues that we continue to work to resolve. The City Stormwater Department continues to



investigate issues to resolve them with the goal of protecting the City's water quality. The Stormwater Division utilizes a CCTV pipe inspection camera system in not only surveying piping throughout the City, but also to assist in tracking the source of illicit discharges/connections. The current locations of illicit discharges within the City are show on the map in Appendix C.

The City had seven reportable sanitary sewer overflows during this reporting period, which resulted in 45,523 gallons of sanitary sewer reaching surface waters. Of the seven reaching surface waters, four were the result of line blockages, one was a result of debris in an air release valve, and two were a result of heavy rainfall. The City's Field Operations Department works to operate and maintain the sanitary sewer system on a daily basis. Several projects have been completed over the last year to specifically reduce inflow and infiltration to the sanitary sewer system with the ultimate goal of reducing overflows.

City Staff are trained on an annual basis to identify illicit discharges and connections and the reporting process for these issues. This training is combined with the Pollution Prevention and Good Housekeeping training of public works, utilities, recreation, planning, and code enforcement staff as well as some fire and police personnel.



Construction Site Runoff Controls

The City of Shelby, like many other municipalities in North Carolina, delegate the Construction Site Runoff Controls to the NCDEQ Division of Energy, Mineral, and Land Resources. While the City of Shelby does not have a delegated erosion control program, City Staff does ensure that all site development plans that disturb greater than 1.0 acres of land provide a copy of the erosion control plans and an approved permit from NCDEQ. Although the City does not have an erosion control program, all commercial construction sites that disturb over an acre are subject to random erosion control inspections by stormwater staff. The City of Shelby has a strong working relationship with NCDEQ and reports sedimentation and erosion control issues as they arise.



Sediment basin at a local construction site

Post Construction Site Runoff Controls

On November 18, 2013, the Shelby City Council approved Ordinance No. 41-2013 that established the City's post-construction stormwater management requirements. This ordinance was largely based on the state model ordinance and meets NCDEQ rules and regulations. In addition to the Post-Construction Ordinance, a stormwater administrative manual that outlines permitting, and an efficient review and permitting process were established. The Post-Construction Stormwater Management Program applies to projects that exceed 1.0 acre of disturbance or have a common plan of development that will cumulatively exceed 1.0 acres of disturbance. Projects that exceed the 1.0-acre threshold are then identified as either high or low density projects based upon their built upon area (BUA). Projects that exceed 24% BUA qualify as high density projects, while projects that are less than 24% BUA are low density projects. High Density Projects are then required to meet the following requirements:

- Control and treat runoff from the first 1" of rain.
- Treated runoff is to have an 85% TSS reduction.
- Discharge treated water at a rate less than or equal to the pre-development rate for the 1-year 24-hour storm.
- Discharge treated water between 48-120 hours.
- Stormwater control measures must be in recorded access easements and must have a recorded operation and maintenance agreement.

Stormwater control measures, as well as runoff calculations, are prepared based on the most recent version of the NCDEQ Design Manual and are then reviewed by the Certified Plan Reviewers within the City of Shelby Engineering Department. City Staff that are responsible for the review of stormwater plans and issuing the Stormwater Management Permits must obtain a Plan Reviewer Certification through NC State and then complete the necessary annual recertification process.

The Engineering Department then ensures that the plans either meet or are revised to meet state standards for stormwater management. After plans are approved and the appropriate preliminary documents are submitted, a City of Shelby Stormwater Management Permit is issued.

After approval of the project and completion of construction, the owner is required to complete an Operation and Maintenance Agreement and an Access Easement for the stormwater control measures. The O&M agreement with the appropriate stormwater control measure (SCM) specific addenda along with the access easement are then recorded at the Cleveland County Register of Deeds. The recording of these documents meet the permit and Phase II Ordinance requirements.



Bioretention cell under construction at a local school

The City of Shelby issued four stormwater management permits during this reporting period and currently has 17 total permitted sites, three of which are currently under construction. The location of the 17 sites that are completed or under construction is shown in Appendix D. The breakdown of the type of permits issued is as follows:

<i>Permit Year</i>	<i>High Density</i>	<i>Low Density</i>	<i>High/Low Density</i>
2014	4		1
2015	2	3	
2016	2	1	
2017	2	1	
2018	1		



Constructed wetland at the Cleveland County Health Department

The City of Shelby conducts construction inspections and requires as-built drawings and an Engineer's Certification of Completion prior to a Certificate of Occupancy being issued for any project that is issued a Stormwater Management Permit. After construction of a BMP is completed, the information is added to the City's GIS system. This system then has all related information linked to the newly added feature so future access to the information will be readily available. The City currently has 11 certified and completed projects, one in the final closeout phase, and five that are either in the planning or construction phase.

The City also encourages consultation meetings with representatives of future projects that will be required to conform to Phase II stormwater management requirements to assist in the permitting process and ensure compliance with the City ordinance. It has been the experience of City staff that completing these meetings and discussions early in the planning process are critical to an efficient review and permitting process. A substantial amount of time was spent by the City to develop a thorough Administrative Manual that outlines the requirements and steps necessary to apply for and receive a stormwater management permit. This manual includes application forms and detailed checklists that a developer is able to utilize when preparing plans for a proposed project in an effort to streamline the permitting process to the extent possible.

Pollution Prevention and Good Housekeeping

Pollution prevention is a primary goal of the City's stormwater management plan and good housekeeping is critical to that goal. Municipalities, in general, conduct many activities that can potentially pose a threat to water quality. Municipal facilities are a potential source of contamination but with good housekeeping habits this potential can be greatly reduced. The City attempts to minimize stormwater pollution from municipal operations by implementing BMPs such as training, inspections, and providing spill controls and countermeasures. The City purchased twelve 30-gallon mixed application spill kits to be placed at various City facilities as well as 102 vehicle spill kits for City vehicles. Facility inspections are conducted annually to ensure BMPs are in place and functioning properly. Deficiencies are reported to facility managers to ensure they are adequately addressed. Each facility also inspects their respective areas on a regular basis and corrects deficiencies as necessary. Vehicle wash bays at various facilities are cleaned as needed and collected sediment is properly disposed of.



City employee utilizing a spill kit to assist a citizen

City staff training is an important part of pollution prevention and good housekeeping. Staff training includes but is not limited to proper materials handling procedures and spill prevention, control, and countermeasures. At this point, the Stormwater Division primarily utilizes Excal Visual training videos for staff training. These videos cover the topics of stormwater pollution prevention for MS4s and illicit discharge detection and elimination.

The City of Shelby operates two street sweepers on a daily basis. Mobile 311, a GPS based mapping tool, is utilized to monitor the streets being swept. With this information, City staff is able to analyze the frequency that streets are being swept and determine if there are environmental or infrastructure conditions that can be improved at areas that require the most frequent sweeping. Through the large emphasis placed on street sweeping, the City removed approximately 700 tons of debris during the reporting period and disposed of the debris at the Cleveland County Landfill.

The City operates two leaf/grass clipping vacuum trucks daily. During the months of October through December, the City operates two additional vacuum trucks. During this reporting period, the City of Shelby has disposed of approximately 4,800 tons of material at the Cleveland County Landfill.



As specified in the City's *Municipally Maintained Streets, Catch Basins and Conveyance Systems Operation and Maintenance Manual* dated November 1, 2013, the City inspects and cleans all City owned parking lots once per month or as needed. Culverts throughout the City are inspected periodically throughout the year for excessive debris and cleaned as needed. Components of the stormwater system (pipes, catch basins, grates, inlets, etc.) are primarily inspected and cleaned during or following rain events and when problems are reported.



Utilizing the City's jet vacuum truck, approximately 100 structures (catch basins and pipes) have been cleaned allowing stormwater to flow and reducing street flooding.

During the winter, the City of Shelby primarily utilizes sand for traction control during ice or snow events. Salt is utilized on a very limited basis for de-icing primarily on steep inclines and bridges. Most of the ice and snow removal on City maintained streets and parking lots is completed via snow plows and other mechanical means.



Infrastructure

Based on the GIS mapping that has been completed by City staff over the past 3 years, the City maintains approximately 28 miles of stormwater piping and over 2,800 stormwater structures within City of Shelby public rights-of-way.

During the reporting period, the City received 45 stormwater related work orders. Work orders are issued based primarily on citizens calling Customer Service. The breakdown of the work order issues are as follows:

- 12 were private property issues for the property owner to address
- 26 were City issues to be addressed by City Staff
- 5 were North Carolina Department of Transportation issues
- 2 were both a private property and City issue

The City completed the design and/or construction on multiple infrastructure improvement projects during the permit year. The following list is a sample of some of the stormwater construction projects that were completed:

- Commerce/Metrolina Dr. Improvements (\$108,363)
- W. Dale St./S. Trade St. Improvements (\$98,830)
- Mark Dr. - replacement of two culvert (\$125,004)
- Pine St. Emergency Stormwater Repair (\$24,034)
- Sumter St. Emergency Culvert Replacement (\$58,591)
- Briar Creek Dr. Emergency Culvert Replacement (\$48,430)
- Crestview Dr. Emergency Culvert Replacement (\$51,388)
- Hillside Dr. Culvert Replacement (\$71,634)
- Broad St. Stormwater Improvements (\$32,300)
- Plating and injecting three culverts throughout the City (\$47,544)

These projects include the replacement of failing or undersized structures and the installation of new structures within the public right-of-way.

As part of the annual City of Shelby Street Resurfacing Project, stormwater fees are used for street milling. This allows the City to reclaim and/or maintain curb lines for stormwater flow. During this reporting period, \$60,000 of stormwater fees were utilized for this project.

Utilizing the Transportation Asset Management Plan developed for the City in February 2015, two culverts were identified for repair this year. This process includes filling inverts with sandbags if necessary, installing reinforcing bands, plating the inverts of the pipes, and injecting resin into the voids to create a solid seal around the pipe. A third location was added following the discovery of a sinkhole underneath a sidewalk. By doing this, the City avoided costly replacement of the pipes as well as maintained traffic on the streets.



Westover Terrace Culvert- before plating



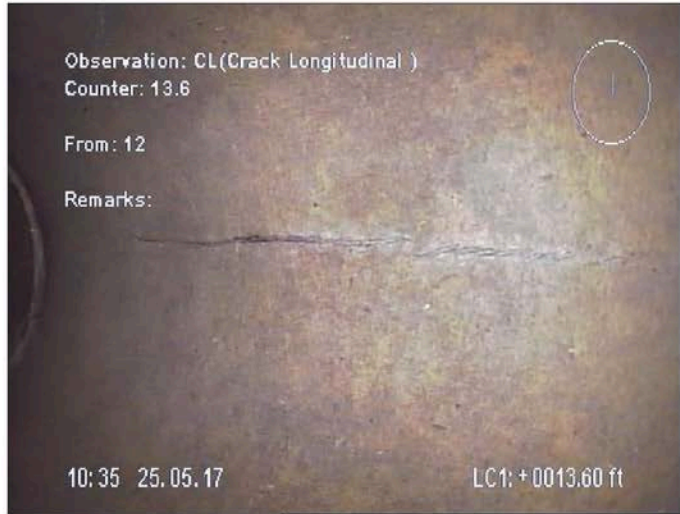
Westover Terrace Culvert- after plating

In January 2017, the City purchased a new IBAK CCTV pipe inspection camera. The new camera has improved lighting, video/photograph quality, and better maneuverability over the previous camera system utilized by the City. Camera operators obtained NASSCO PACP certification which teaches uniform defect definitions in pipe assessment. By utilizing the camera system and the PACP rating system, City staff are able to survey and evaluate stormwater infrastructure and review the ratings to prioritize system repair projects. The reports and videos generated by the system are linked to the City of Shelby GIS and are easily accessed for review.



CCTV pictures of SGM-7040 for CITY OF SHELBY

Work Order	Surveyed On 2017/05/25	Setup 5
Street Name 130 W WARREN ST	Weather Saturated	Video
City Name SHELBY		
Location Sidewalk		
From Manhole 0230	To Manhole 2117	Direction Downstream



Date: 2017/05/25 Distance: 13.6 Ft Obs: Crack Longitudinal
Comments:

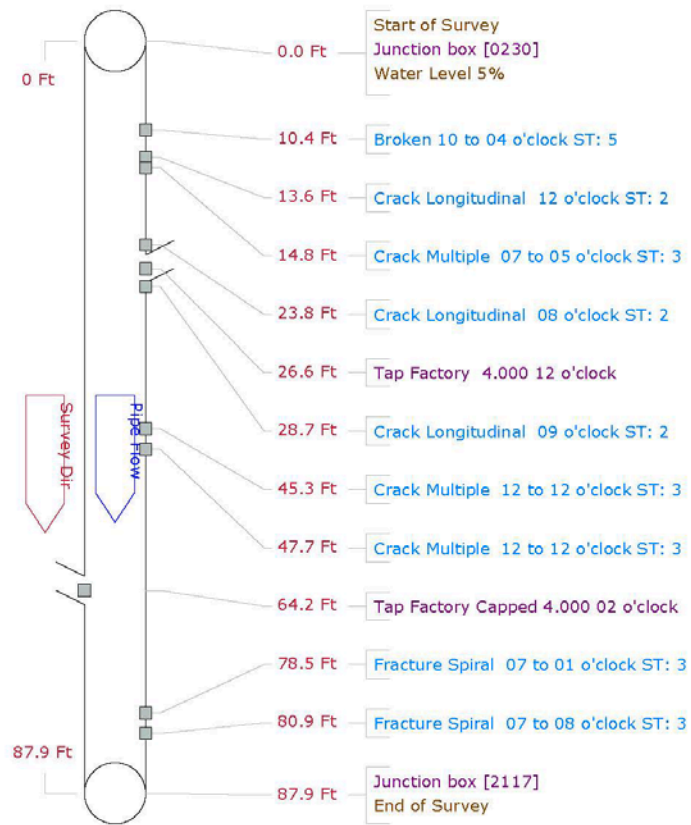


Date: 2017/05/25 Distance: 14.8 Ft Obs: Crack Multiple
Comments:

City of Shelby

Pipe Graphic Report of PSR SGM-7040 for CITY OF SHELBY

Setup	5	Surveyor	TYLER	Certificate #	U-0317-07007328	System Owner	
Drainage		Survey Customer					
P/O #		Date	2017/05/25	Time	11:30	Street	130 W WARREN ST
City	SHELBY	Further location details					
Up	0230	Rim to invert		Grade to invert		Rim to grade	Ft
Down	2117	Rim to invert		Grade to invert		Rim to grade	Ft
Use	Stormwater	Direction	Downstream	Flow control	Not Controlled	Media No	
Shape	Circular	Height	12	Width	ins	Preclean	N
Material	Vitrified Clay Pipe	Joint length	Ft	Total length	Ft	Date Cleaned	
Lining		Year laid		Year rehabilitated		Length Surveyed	87.90 Ft
Purpose	Maintenance Related	Cat				Weather	Saturated
Additional Info							
Location	Sidewalk					Structural	O & M
Project	SHELBY PD ALLEYS					Miscellaneous	Hydraulic
Northing		Eastings				Work Order	
Coordinate System						Elevation	
						GPS Accuracy	



City of Shelby

Sample of the report generated by the camera system

Stormwater Infrastructure Assistance Program

On February 1, 2016, the Shelby City Council approved Ordinance No. 3-2016 that established the City's Stormwater Infrastructure Assistance Program. This ordinance was to provide a program to assist property owners with the costs of resolving issues related to stormwater on private property. At the time a property owner applies for assistance, City staff evaluates the problem based on the following criteria:

- Threat to an inhabited home from severe erosion.
- Threat of flooding to an inhabited home.
- Damaged or undersized drainage features connecting to street drains.
- Damaged or undersized drainage features no connected to street drains.
- Illicit discharges or connections.
- Private property flooding (not impacting a permanent structure).

Each application is processed and categorized based on these criteria and in a first-come, first-served basis. Funding for the program is evaluated annually with the adoption of the City's operating budget. For residential properties, the City pays 80% of the cost and the property owner pays 20%. For commercial properties, the City pays 50% and the property owner pays 50%. The City has also established a means for the property owner's costs to be assessed over a 5-year period.

Since the adoption of the ordinance, the City has completed six projects under the program. The City has spent \$94,345 and the private property owners have spent \$20,455. We currently have seven applicants on the list and have selected three projects to proceed with.



Poplar Circle Project Before Repairs



Poplar Circle Project After Repairs

Stormwater Utility

The City's stormwater utility fee has a flat monthly fee of \$2.50 for all single-family residential properties. Commercial properties (any property other than a single-family dwelling on one parcel) incur a fee based on the impervious surface area of the property and the adopted tiered fee schedule. Impervious surface areas are determined based on aerial photography in the City's GIS system and is updated on individual properties as development is permitted. The impervious surfaces were updated this year based on the new 2015 aerial photographs. The impervious surface area is converted to an ERU based on 1 ERU = 2,600 square feet. The fee is then determined from the following tiers:

- 1 – 5 ERUs \$10.00
- 6 – 25 ERUs \$25.00
- 26 – 50 ERUs \$75.00
- 51 – 100 ERUs \$150.00
- 101+ ERUs \$300.00

An amended fee schedule has been approved by the Shelby City Council for Fiscal Year 2019 and will be implemented on July 1, 2019.

For commercial properties, the Shelby City Council adopted a Stormwater Utility Fee Credit Program via Resolution No. 41-2014. There is a maximum credit of 30% with a 10% fee credit offered in three categories:

1. Water Quality (10% credit) – Properties must provide an onsite BMP that reduces the impact of pollution on water quality and conforms to the design and maintenance standards in the City of Shelby's Phase II Stormwater Ordinance and the NCDEQ BMP Manual (minimum 85% TSS removal).
2. Water Quantity (10% credit) – Properties must provide a post-development rate of runoff that is less than or equal to the runoff rates at pre-development. If properties cannot achieve pre-development runoff rates, but do reduce runoff rates, fee credits will be issued proportionally based on the amount of reduction achieved.
3. Industrial Stormwater Permit (10% credit) – An industrial property that is covered by an individual or general NPDES stormwater discharge permit is eligible for this credit if all requirements of the permit are satisfied.

There are currently seven customers taking advantage of this program and are receiving a 10% credit on their monthly bill.

General Stormwater Program Information

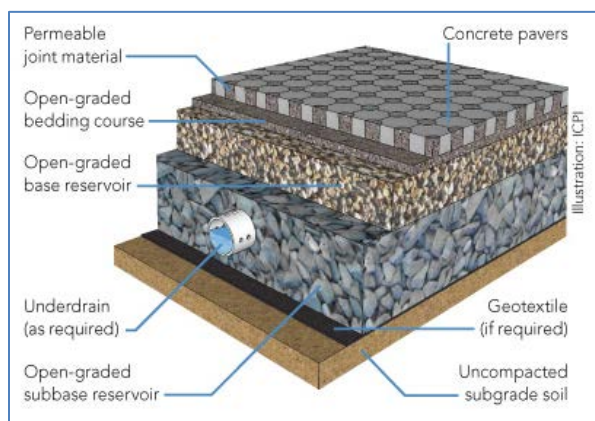
Even prior to being issued the Phase II Stormwater Permit by NC DEQ in 2012, the City has been an active participant in various professional organizations and taken advantage of multiple educational opportunities for staff members. City staff is currently active members in the following organizations:

- UNCC IDEAS
- UNC Stormwater Listserv
- Stormwater Association of North Carolina
- American Society of Civil Engineers
- American Public Works Association

City staff has also taken advantage of multiple educational opportunities via workshop and seminars offered by various sources. Over the last year, city staff has completed training or received certifications related to the following topics:

- Permeable Pavement
- BMP Plan Reviewer
- BMP Inspection and Maintenance
- Low Impact Development (LID) & Storm-EZ
- Aquatic Pesticides and Stormwater Management

It is a focus of the Stormwater Division to utilize all reasonable resources with the objective of continuing the development of an effective, efficient, and progressive stormwater program.



Permeable Pavement Example



Low Impact Development Example

Additional Information and Stormwater Contacts

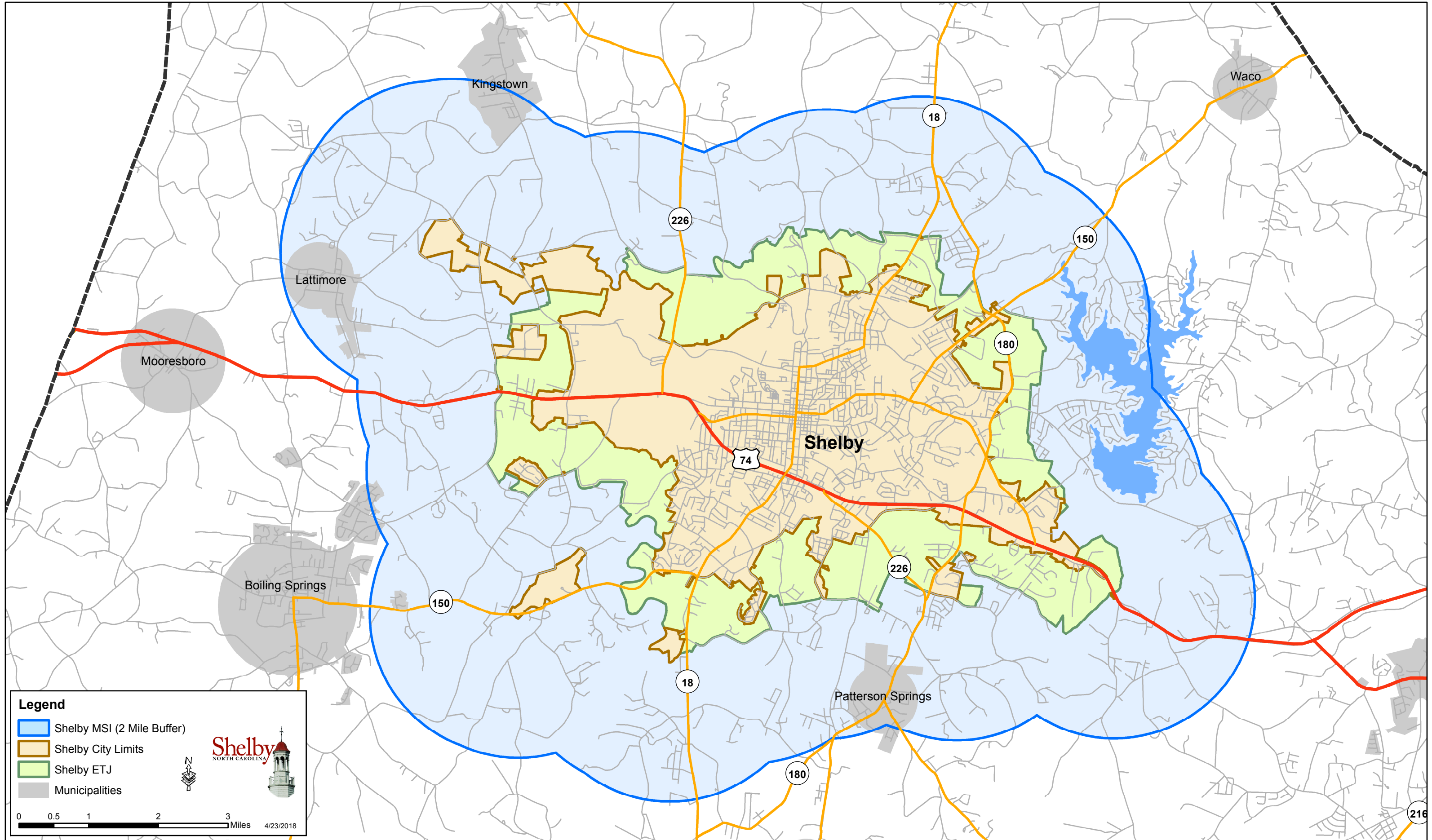
Additional information regarding the City of Shelby Stormwater Division can be obtained by contacting:

Name	Title	Email
Ben Yarboro, E.I.	Engineering Services Director	ben.yarboro@cityofshelby.com
Layne Owen, P.E.	Civil Engineer/Stormwater Manager	layne.owen@cityofshelby.com
Tyler Brooks	Stormwater/Engineering Technician	tyler.brooks@cityofshelby.com

Appendix A

Phase II Stormwater Municipal Sphere of Influence Map


City of Shelby Phase II Stormwater Municipal Sphere of Influence



Legend

- Shelby MSI (2 Mile Buffer)
- Shelby City Limits
- Shelby ETJ
- Municipalities

0 0.5 1 2 3 Miles 4/23/2018

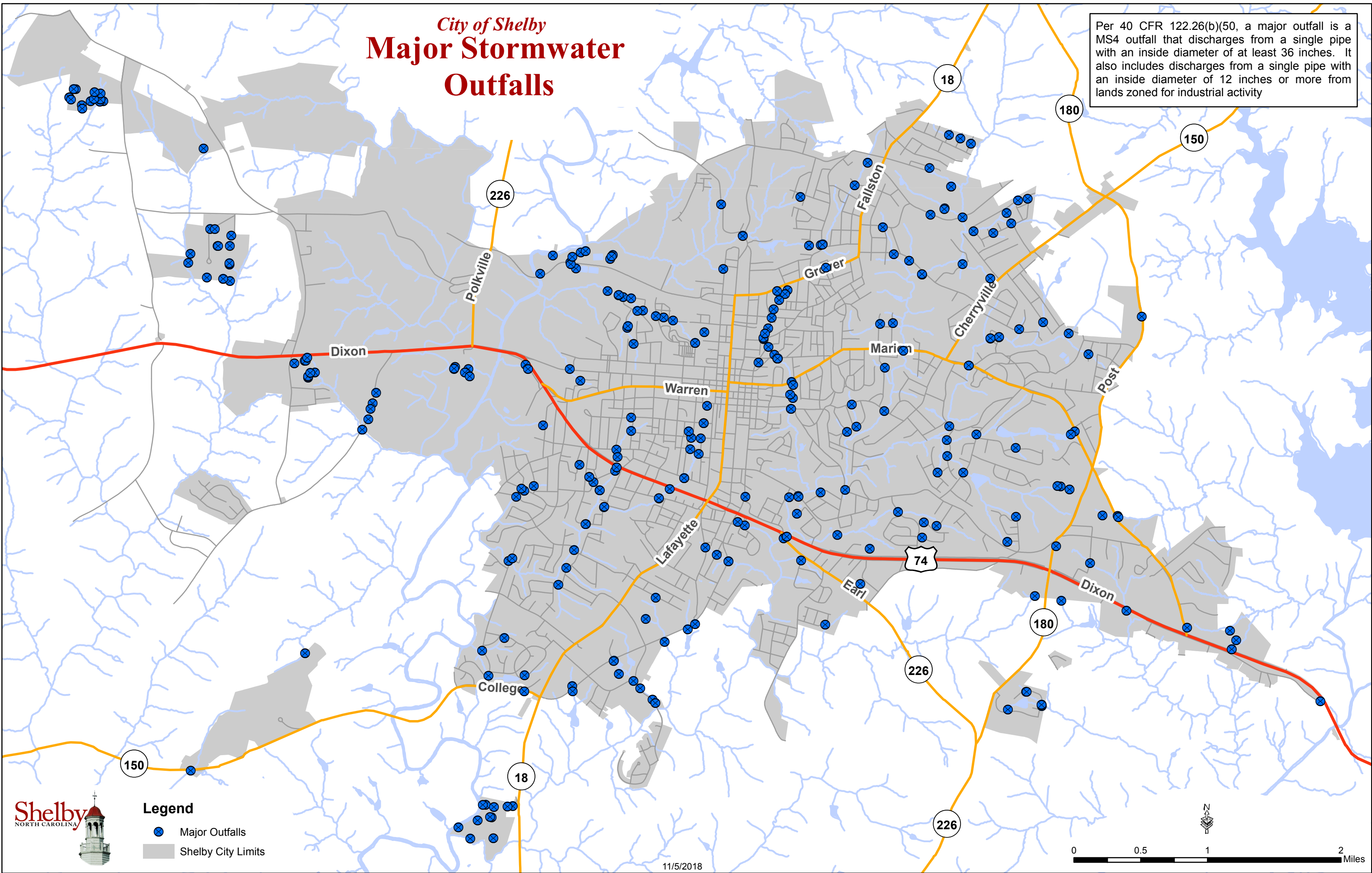


Appendix B



Major Stormwater Outfalls Map

City of Shelby Major Stormwater Outfalls

Per 40 CFR 122.26(b)(50), a major outfall is a MS4 outfall that discharges from a single pipe with an inside diameter of at least 36 inches. It also includes discharges from a single pipe with an inside diameter of 12 inches or more from lands zoned for industrial activity



Legend

-  Major Outfalls
-  Shelby City Limits

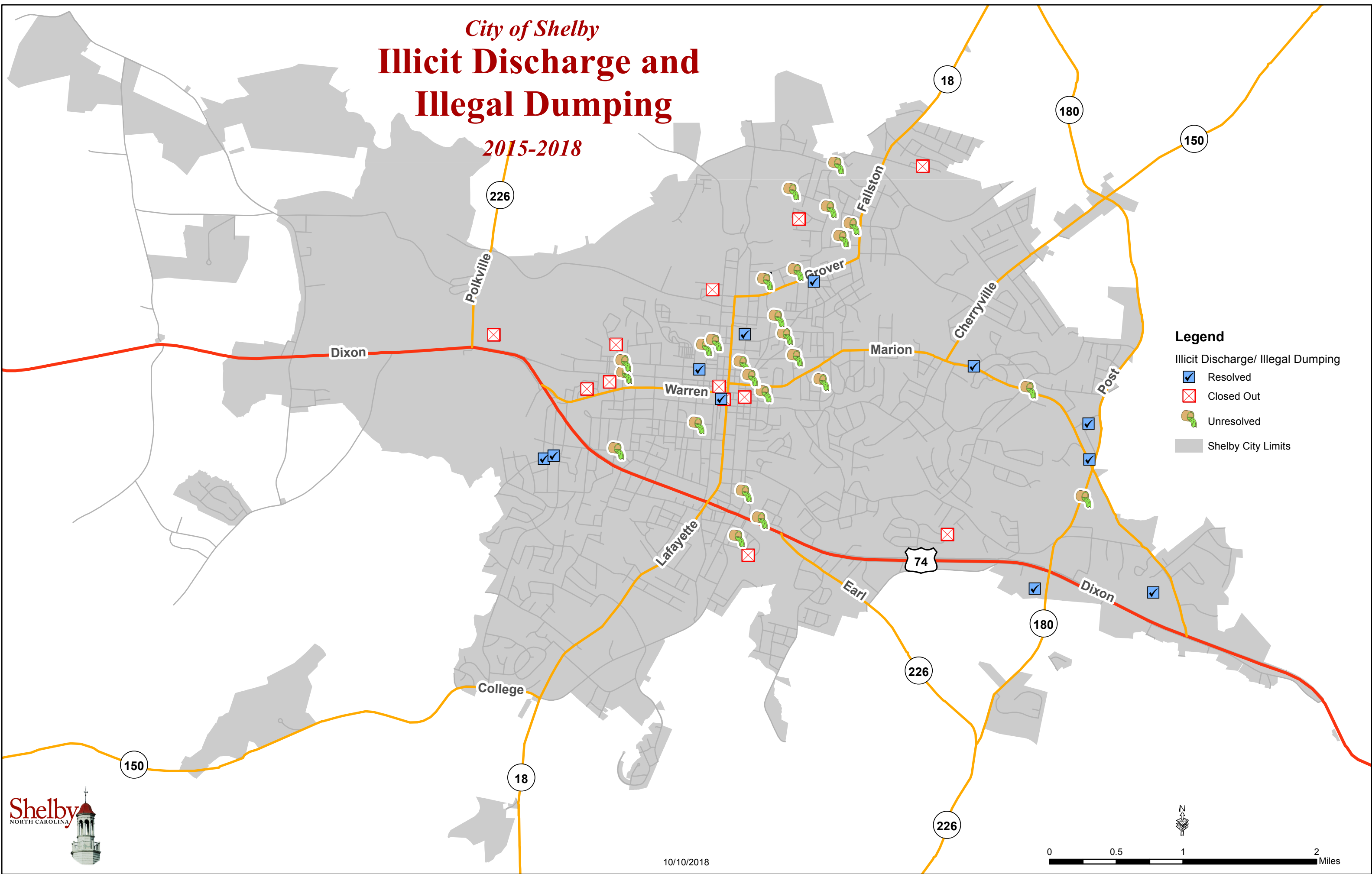


Appendix C

Illicit Discharge and Illegal Dumping Map

City of Shelby Illicit Discharge and Illegal Dumping

2015-2018



Legend

Illicit Discharge/ Illegal Dumping

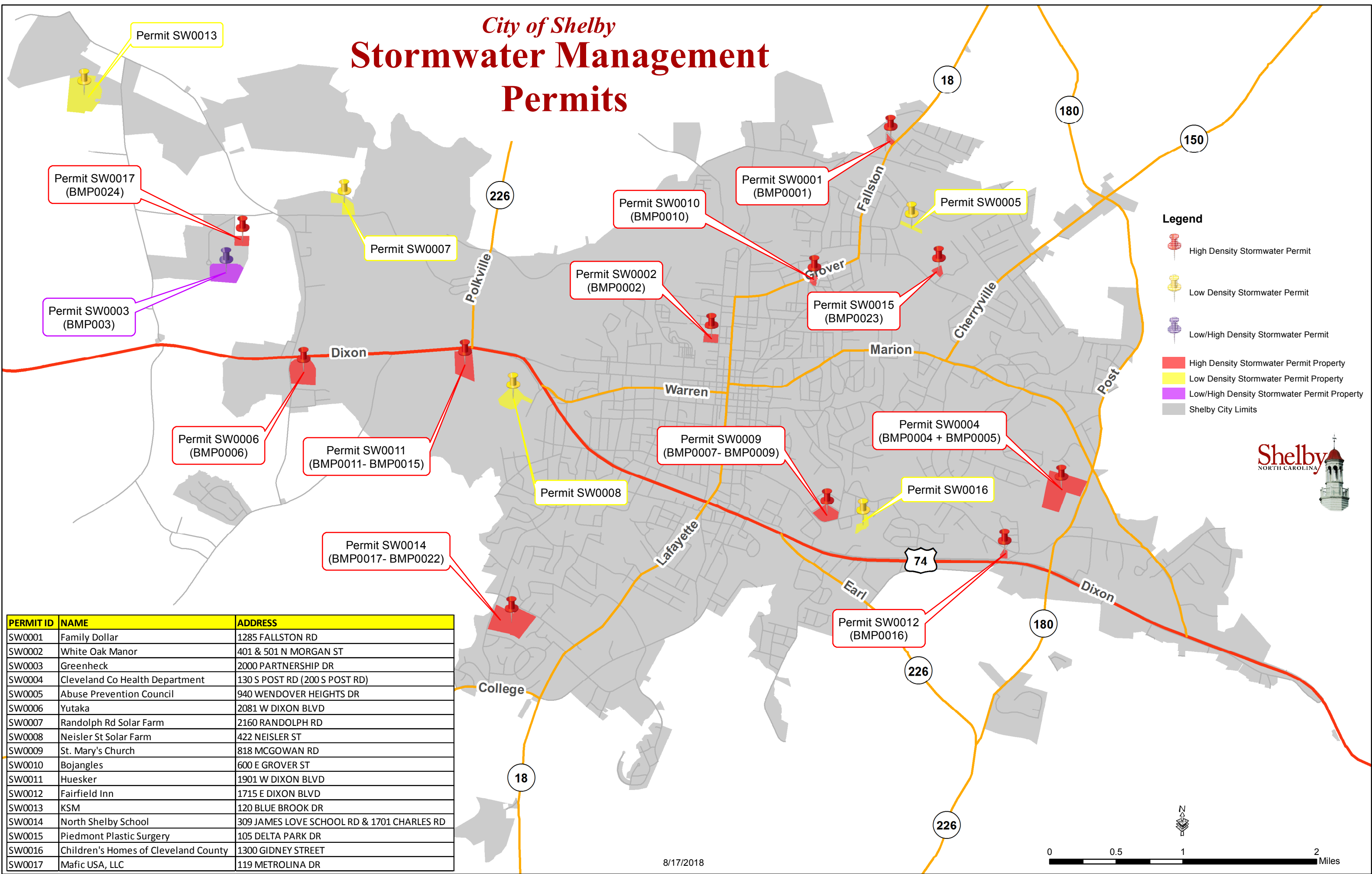
- Resolved
- Closed Out
- Unresolved
- Shelby City Limits



Appendix D

Stormwater Management Permits Map

City of Shelby Stormwater Management Permits



- Legend**
- High Density Stormwater Permit
 - Low Density Stormwater Permit
 - Low/High Density Stormwater Permit
 - High Density Stormwater Permit Property
 - Low Density Stormwater Permit Property
 - Low/High Density Stormwater Permit Property
 - Shelby City Limits



PERMIT ID	NAME	ADDRESS
SW0001	Family Dollar	1285 FALLSTON RD
SW0002	White Oak Manor	401 & 501 N MORGAN ST
SW0003	Greenheck	2000 PARTNERSHIP DR
SW0004	Cleveland Co Health Department	130 S POST RD (200 S POST RD)
SW0005	Abuse Prevention Council	940 WENDOVER HEIGHTS DR
SW0006	Yutaka	2081 W DIXON BLVD
SW0007	Randolph Rd Solar Farm	2160 RANDOLPH RD
SW0008	Neisler St Solar Farm	422 NEISLER ST
SW0009	St. Mary's Church	818 MCGOWAN RD
SW0010	Bojangles	600 E GROVER ST
SW0011	Huesker	1901 W DIXON BLVD
SW0012	Fairfield Inn	1715 E DIXON BLVD
SW0013	KSM	120 BLUE BROOK DR
SW0014	North Shelby School	309 JAMES LOVE SCHOOL RD & 1701 CHARLES RD
SW0015	Piedmont Plastic Surgery	105 DELTA PARK DR
SW0016	Children's Homes of Cleveland County	1300 GIDNEY STREET
SW0017	Mafic USA, LLC	119 METROLINA DR