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# Comparing Water Quality Data of Atlanta's Sewage Overflows and Spills

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ABSTRACT

COMPARING WATER QUALITY DATA OF ATLANTA'S SEWAGE OVERFLOWS AND SPILLS

By

Bonnie Marie Pirlot

04/01/2021

Purpose

The city of Atlanta, Georgia has experienced high-volume and reoccurring sewer spills over the past ten years; these spills are documented, and the locations made publicly available. With Atlanta's sewer system aging and large sections both undergoing and still in need of repair, it is likely that sewer spills may continue to occur and have the potential to go undetected if finding them depends on being visible. These spills jeopardize the quality of water, human health, recreational waterways, nature, and aquatic life. There is ongoing research attempting to proactively identify sewage spills by monitoring urban surface waters for spikes in numbers of *E. Coli*. To help determine if *E. Coli* spikes are indicators of sewage traveling from infrastructure points (pipes, manholes, pump stations) to surface water, this study directly observed terrain where past sewage spills occurred. The study examined the relationship between sites of sewage spills, their documented location in city records, the contaminated waterway documented in city records, their sewer system sources, and their proximity to neighboring creeks.

Methods

In this study, public data from the City of Atlanta was gathered and sorted based on date, time, volume of sewage in gallons, and impacted waterways. This project collected detailed data on a subset of sites that had documented sewage spills, including spill source, terrain type, proximity to surface water, and other characteristics.

Results

The results of this study suggest that Peachtree Creek and neighboring residents and wildlife may be at high risk for sewer spill related contamination.

Discussion

Although the City of Atlanta has funded billions of dollars towards addressing the aging and complex city sewer system, methods are still needed to proactively identify and prevent spills that affect the health of city residents, wildlife, and aquatic life.

# COMPARING WATER QUALITY DATA OF ATLANTA'S SEWAGE OVERFLOWS AND SPILLS

by

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APPROVAL PAGE

COMPARING WATER QUALITY DATA OF ATLANTA'S SEWAGE OVERFLOWS AND SPILLS

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I acknowledge my wonderful family for their support and kindness through this process. I couldn't have done it without you, with love.

Author's Statement Page

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# CHAPTER I

## Introduction

Sewer systems are a critical factor in the City of Atlanta's urban infrastructure. It is necessary that these sewer systems are maintained, repaired, and replaced to promote sanitation and prevent disease in the community. Sewage can contain harmful bacteria, viruses, and parasites found in human and animal waste, sewage leaks and combined sewer overflows also affect the water quality of neighboring waterways including creeks and streams. These creeks are used for recreational use and drinking water supply and are home to aquatic species. In addition, creeks and streams in the greater Atlanta area flow into the Chattahoochee, South, and Flint Rivers, which are used for drinking water supply. The quality of these waters is routinely monitored by sampling for the bacterium *Escherichia coli* (*E. Coli*). *E. Coli*, when detected, is often used by researchers as an indicator of water contamination. Thus, it is imperative that *E. Coli* levels are closely monitored and studied to determine if they act as indicators that leaked or spilled sewage is traveling from infrastructure points (pipes, manholes, pump stations) to surface waters. When high *E. Coli* levels are detected in urban creeks and streams, they may indicate that sewage is leaking or spilling into the surface water. To understand 1) how this happens, and 2) if *E. Coli* levels are a reliable indicator that there has been a leak or spill, it is necessary not only to monitor waters for *E. Coli*, but to understand how sewage can travel from infrastructure points (pipes, manholes, pump stations) to surface waters. Therefore, the goal of this capstone is to observe and record natural and manmade features present at the location

where documented sewage spills into surface water have taken place. This also includes making recommendations to authorities.

This project is part of a larger study that is analyzing a large data set of *E. Coli* measurements from metro Atlanta surface waters, mostly creeks and streams pertaining to the Chattahoochee River Watershed. This study is led by Georgia State PhD student, Sarah Anderson. One of the goals of the larger study is to determine if spikes and outliers observed in levels of *E. Coli* are indicators of sewage possibly traveling from various manmade structures (such as pipes, manholes, and pump stations) to surface water. This is done partly by analyzing whether *E. Coli* spikes and outliers at specific surface water sites correlate spatially and temporally with past sewage spills documented by the city of Atlanta. However, city reports of sewage spills include very little information about how the spill actually happened and whether/how sewage traveled to surface water. This sub-project will help determine whether the relationships between spikes and spills seen from analyzing the data set make sense if someone observes the actual spill site. To determine if correlations between *E. Coli* levels and specific spills make sense, features and terrain around spill sites were observed to see how sewage may have escaped the system and how the sewage could have reached surface waters. Therefore, subsets of sites from the larger data set where *E .Coli* was measured were selected for observation in this study. To determine which specific sites were to be observed, ten years worth of public data documenting sewage spills from the City of Atlanta were obtained and reviewed.

# CHAPTER II

## Background

Prior to 1998, the City of Atlanta's sewer system was largely a combined sewer system. This is a water system structure that allows for both storm water and sanitary sewage to combine and flow in the same pipes. This material would then flow to wastewater treatment plants for treatment prior to discharge into surface waters. However, during heavy rains, the volume of combined sewage and stormwater would exceed the maximum threshold of the volume that wastewater treatment plants could treat. When this happened, overflow volume would be diverted from plants into surface waters, resulting in the untreated material being forced into the environment or waterways. This sewage and rainwater mixture, called a combined sewer overflow, could contain harmful human and animal pathogens that had the potential to contaminate waterways and ground water. After being sued by the EPA and citizens in 1998, the City of Atlanta was required by a consent decree to eliminate their Combined Sewer Overflow system by November 2007. The goal was to separate a minimum of 27% of the combined sewer system and construct a deep-rock tunnel storage and treatment system to capture and store 85% of the combined storm water and sewage to two new CSO treatment facilities (Clean Water Atlanta, n.d.). Essentially, the City of Atlanta wanted to move in the direction of completely separate sewage systems (meaning that sewage and storm water would flow through separate pipes for decontamination). However, according to Clean Water Atlanta, full separation alone would not achieve water quality improvements comparable to storage and treatment. Separate systems would also be extremely costly and infrastructure additions

would be necessary. These include storm water ponds, detention structures, and other storm water management techniques. The combined system represents 15% of the city and 85% is already separated. According to the city's proposed plan, the maximum amount of separation of the wipes in Atlanta's sewer system will be 90% (Clean Water Atlanta, n.d.).

The City of Atlanta currently has Capital Improvement Programs (CIPs). This is an implementation plan for the construction, maintenance, and renovation of public facilities and infrastructure over the next five years (Atlanta Gov, n.d.). According to Atlanta's Watershed Management CIP website, three out of the six sites observed in this study are currently considered "Active Capital Improvement Projects" (between 2015 and 2019). These sites include Woodward Way, Wesley Drive, and Battleview Drive. For example, Memorial Park is located off of Wesley Drive. This park has a history of flooding after heavy rainfall. Since 2013, this location has had 13 documented sewer spills. This flooding, along with public pressure, resulted in about $30 million worth of repairs to the sewage structure including repairing a 90-inch pipe from 1910 that ran below the park. The city also implemented raised manholes throughout Memorial Park that were intended to keep water from flowing into the sewer line and prevent future sewer leaks. However, according to this study, Memorial Park had five documented sewer spills from 2017 to 2020. It is suggested that the current funding and repairs may not have been completely effective in preventing combined sewer overflow and spill events.

## CHAPTER III

### Methodology

Due to the constantly changing infrastructure and terrain of the Atlanta area, only years 2017 to 2020 of Atlanta's public data was examined. It was necessary to determine which specific documented sites had repeated sewer spills over that time period. Sites (or documented addresses) that appeared greater than or equal to three times in the public data records were added to the list of sites that needed observation. There were five addresses that showed greater than or equal to three sewer spills reported between 2017 and 2020. Prior to the visitation of the recorded sites, it became apparent that those five locations were all in close proximity or boarding Peachtree Creek. However, it was necessary to select another site that also had reoccurring spills, but that was in association with a different creek or stream in Atlanta. Proctor Creek is another major stream in Atlanta that is known for sewer related contamination. According to the public City of Atlanta sewage spill records, there was one site that appeared two times within the 2017 to 2020 timeframe that bordered Proctor Creek. Thus, this site was added to the visitation list. The sites in close proximity to Peachtree Creek included addresses off Battleview Drive, Woodward Way, Wesley Drive, Adams Drive, and Lindbergh Drive (all within the upper region of Atlanta). The site in close to proximity to Proctor Creek was Parrott Avenue (located in the Northwest region of Atlanta).

While visiting the sites, attributions, characteristics and descriptions of the terrain were noted. These include the presence/absence of manholes, sewer/pipes, and drains at the sites. Videos,

images, detailed descriptions, and several interviews of residents were taken at the sites to provide researchers data for further investigation in regard to the ongoing *E. Coli* research. In addition, accurate detailed notes regarding the specific attributes at each site were developed with the use of a Major Spills Report form provided by researcher Sarah Anderson. Prior to visiting each site, rainfall reports from the documented days were also obtained to determine whether or not heavy storms contributed to the contamination reports. Spill sites that corresponded to rainfall values of 0.0 inches were investigated further and the rainfall values the day prior were also determined. These estimated rainfall values were taken from the National Weather Service website.

Figure 2.1 Map of Atlanta Sites Visited in Study. Credit: Sarah Anderson, 2021.

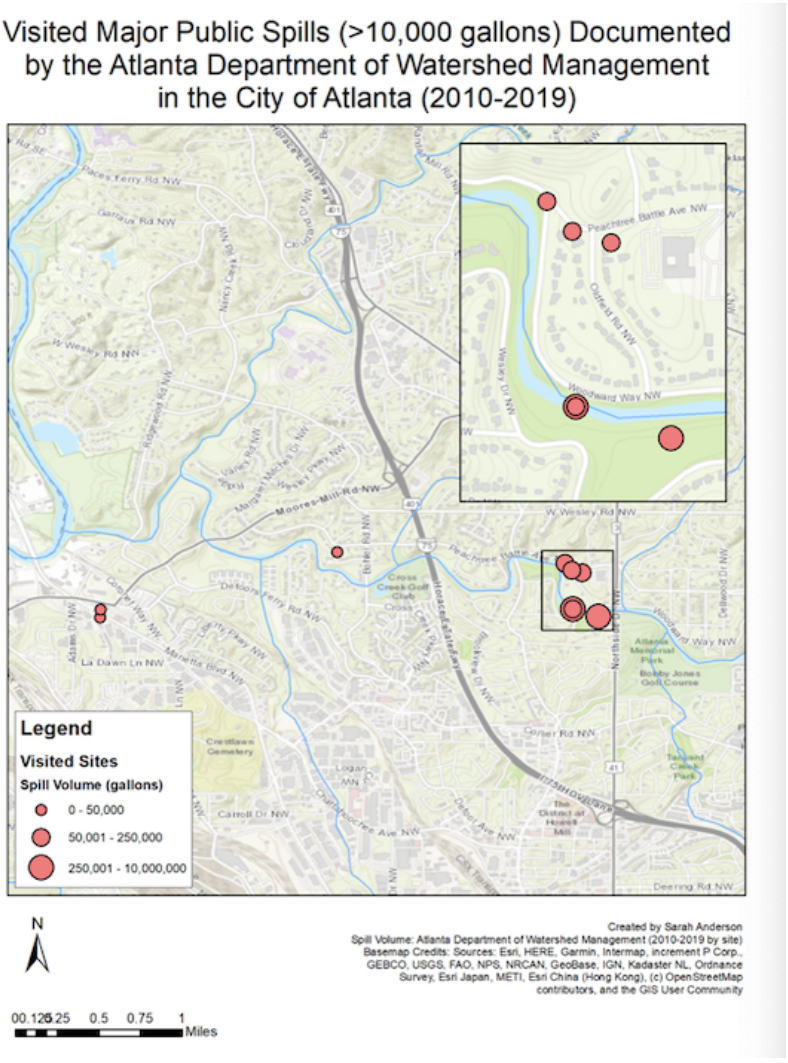
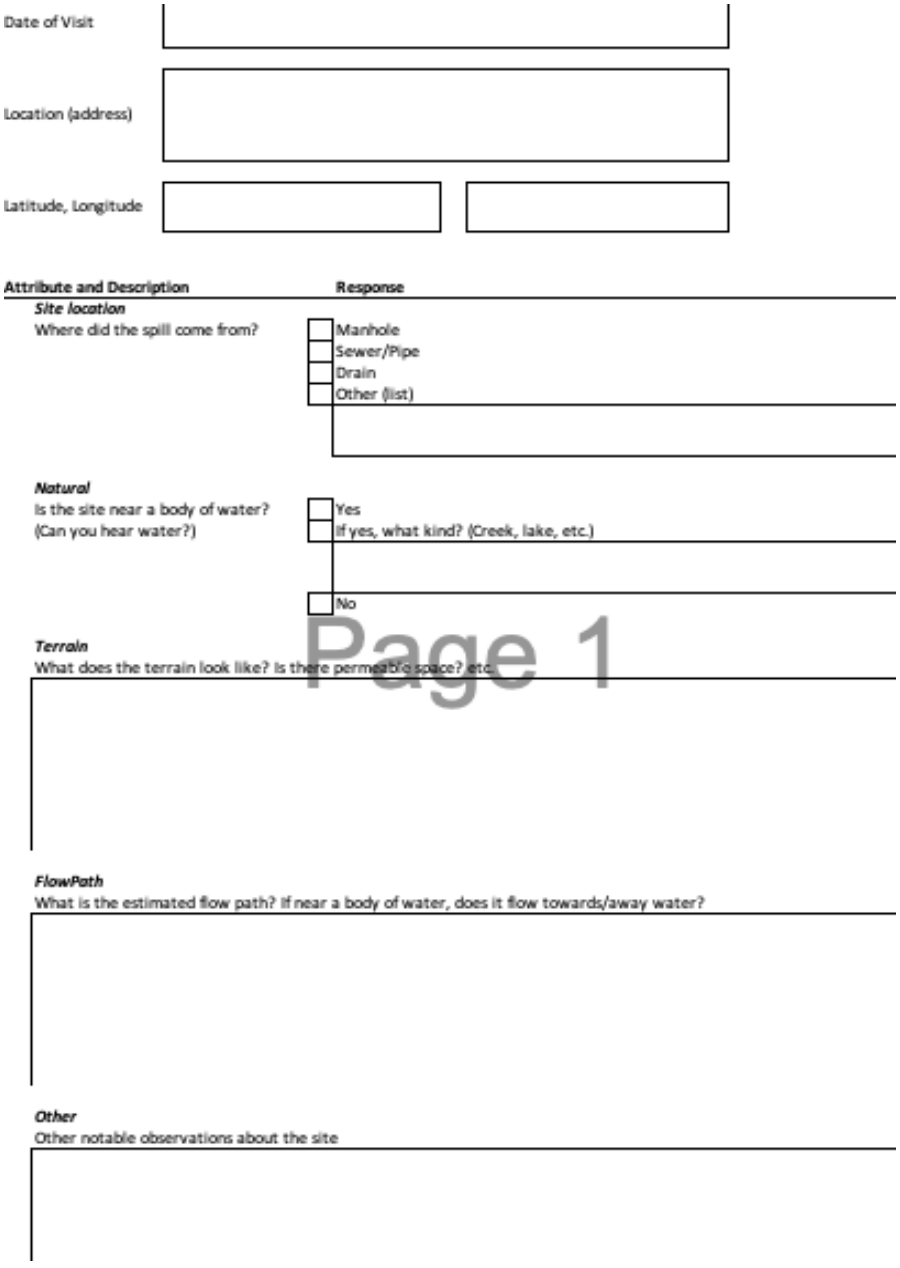


Figure 2.2 Major Report Spill Form Used at Visited Sites. Credit: Sarah Anderson, 2021.



Date of Visit

Location (address)

Latitude, Longitude

**Attribute and Description** **Response**

***Site location***

Where did the spill come from?

- ☐ Manhole
- ☐ Sewer/Pipe
- ☐ Drain
- ☐ Other (list)

***Natural***

Is the site near a body of water? (Can you hear water?)

- ☐ Yes
  - If yes, what kind? (Creek, lake, etc.)
- ☐ No

***Terrain***

What does the terrain look like? Is there permeable space? etc.

***FlowPath***

What is the estimated flow path? If near a body of water, does it flow towards/away water?

***Other***

Other notable observations about the site

## CHAPTER IV – OBSERVATIONS

The following observations were made between January 2021 and March 2021. On average, one site was visited per week alongside Dr. Lisa Casanova. Detailed descriptions were taken at each site and reports were compiled and forwarded to researchers for further study.

### 1380 Battleview Drive Northwest, Atlanta, Georgia 30327

This location had three repeated appearances in the City of Atlanta's documented spills report. These spills occurred on 04/05/2017, 12/28/2018, and 04/19/2019. Heavy rainfall was noted on 12/28/2018 (3.0 to 4.0 inches) and 04/19/2019 (2.0 to 2.5 inches). On 04/05/2017 no rainfall was reported. The total volume of sewage spillage at this site was 78,802 gallons (total of all 3 spills).

The sewage spill address listed by the City of Atlanta was documented as a residential address (located in cul-de-sac). The City reports do not include information about why a particular street address is attached to a spill (whether that address is the site of the spill, the nearest street address, the address of the person who reported it, etc.). After speaking with the owner of a home adjacent to the recorded address, it was determined that the sewer spill likely came from behind the home, the backyard of which was directly bordering Peachtree Creek. The stream's water flow was moderately rapid. The location (home) visited was roughly ten to fifteen yards from the Peachtree Creek and slightly located on a hill (about ten feet above the water). There was a large, rusted pipe that extended from one side of Peachtree Creek to the

other side. The pipe appeared to be suspended from a tree by loosely constructed wires (approximately ten to fifteen feet above the water). One side of the pipe ran through the homeowner's documented address and their neighbor's property. Although close observations of the pipe going into the ground were not taken on the residential side of the creek, the other side of the pipe was accessible on the opposite and public side of the property. This public area showed the pipe going into the ground. A metal fence, metal plate, and orange traffic cones surrounded the pipe. Behind the apparent construction area, there was a children's park. It is also important to note that in front of the address/cul-de-sac, there was a wooden fenced " box" about ten feet by six feet that mostly likely contained a portion of the pipe and/or construction related pipe equipment. Researchers were not able to observe inside of boxed structure. A manhole was also notable on the opposite side of the location about five yards from the water. After observing the terrain and speaking with the homeowner of the documented address, it was likely that the repeated sewer spills were due to the pipe extending above the creek. During storms and high wind speeds, it is likely that debris fell upon the pipe and caused it to break; also during periods of high flow debris carried by the stream piled up against the pipe. This resulted in pipe breakage and the pipe fell into Peachtree Creek. As a result, flooding of residential basements and pollution of the creek occurred.

**Woodward Way NW, Atlanta, Georgia, 30327**

For this investigation, three locations were combined for one analysis and report. These addresses included 757 Woodward Way, 760 Woodward Way, and 761 Woodward Way. These addresses were next to each other and seemed to be attached to the same spill site; it is not

clear why the same spill site had three different addresses recorded for its location. The combined addresses have a total of five reported spills according to the City of Atlanta's spill data. These spills corresponded with three heavy rainfall dates with five out of the six documented on the following dates: 12/09/2018, 12/28/2018 and 04/19/2019. The total volume of sewage spillage from 2017 to 2020 was 315,781.55 gallons.

The addresses listed above were directly across the street from Peachtree Creek. The three addresses were located at a slightly higher elevation (about six feet) than Peachtree Creek. Thus, when looking from the street view, one could look down at the creek. The terrain was mostly residential with two sites/addresses documented at home addresses (761 Woodward Way and 760 Woodward Way). However, the other address (757 Woodward Way) was documented as a Community Garden. When looking at the Community Garden, the residential addresses noted above were directly to the left of the garden. In order (with Peachtree Creek located on the right): 760 Woodward Way (residential), 761 Woodward Way (residential), 757 Woodward Way (garden). When looking directly in front of Peachtree Creek, the flow of the water was going to the right. It is likely that the flow path was headed towards the Chattahoochee River. The Community Garden had a "Floodplain Protected Greenspace" sign. The garden did not necessarily appear that it was flourishing at the time (most likely due to weather/season at the time of visitation). The garden had multiple brick surrounded plots with several green plants/small trees. A pipe ran on the right side of the garden and it is likely that it ran underneath the road into Peachtree Creek. Behind the small garden space, there was a chain length fence leading into the backyard of a residential home. The backyard had a small

stream that flowed out of the underground pipe and opened at the opposite side of the street at the entrance of the Community Garden. The pipe had water flowing out of it and into a small stream that wrapped around the back of the Community Garden. There were two above ground green structures located in the garden (one at the front, and one in the back). The third green structure was located directly across the street in front of Peachtree Creek. Although the function of the green structures was not determined, it is likely that the green structures may have been above ground manholes. However, researchers were confident after the visitation that the recorded sewage spills most likely comes from the green, above ground manholes. It is likely that the structures flood/burst during heavy rainfall/storms and caused flooding of the residential addresses and the Community Garden.

**Wesley Drive NW, Atlanta, Georgia, 30305**

For this analysis, two locations were combined and observed to form one report. The addresses provided by the City of Atlanta's data include 644 Wesley Drive and 740 Wesley Drive. These sites combined had a total of six reported sewage spills with five listed at 644 Wesley Drive and one at 740 Wesley Drive. These spills occurred on dates of notable rainfall including 06/20/2017,12/28/2018, and 04/19/2019. The 12/28/2018 and 04/19/2019 spills had a significant reported rainfall of 2.0 to 4.0 inches of rain. However, the two dates 04/05/2017 and 01/23/2019 reported no rainfall on those days that the spills occurred. The total volume of sewage spillage for this site from 2017 to 2020 was 1,179,203.00 gallons.

644 Wesley Drive was documented as Memorial Park. The residential address (740 Wesley Way) was located on the opposite side of the road (across from Memorial Park). Peachtree Creek was located on the opposite side of the road of the residential address and flowed directly behind Memorial Park. A small walking path separated the park and the creek. It is important to note that the residential homes across the street from Memorial Park (including 740 Wesley Drive) were at a much higher elevation than Memorial Park and Peachtree Creek. Peachtree Creek was at a lower elevation than Memorial Park (about six to eight feet lower). When looking directly at Peachtree Creek (while standing in Memorial Park), the flow of the water was going to the right. It is likely that it headed towards the Chattahoochee River. There was also a stream that wrapped around Memorial Park on the right side, as well as a small stream that ran through the middle of the park. The streams were somewhat shallow. These water levels may have been dependent on the weather, meaning they may most likely fluctuate through the seasons.

In Memorial Park, there was a walking path, playground, small solar panels, picnic benches, and stone paths that wrapped around the park. There was a "Certified Wildlife Sanctuary Sign" present in the park. Within the park, there were about seven to eight large green structures present (the same type of structures noted off the Woodward Way addresses). The above ground manholes were scattered randomly throughout the park. It is likely they were connected beneath the ground. There were also two to three above ground pipes present, as well as about two "openings" to pipes that ran underground from the opposite side of the street (one located across the street of the residential address, and the other located about 150

yards from that location). These pipes appeared randomly above ground in short segments and then proceed back into the ground. Both pipes were located inside of the park. Across the street from the residential address, there were high stacked (about ten+ feet) worth of bags of rocks lining the street. The ditched area had a pipe opening and a stream with rocks stacked on the side closest to the street. Most likely, the rocks were placed there for erosion purposes, and/or to prevent the growth of kudzu. However, the purpose of the rocks was not determined. Ultimately, it is likely that the sewage leaks were noted at the residential address even though the spill came from the green structures located in Memorial Park and/or the pipes that opened across the street from the site.

**Adams Drive NW, Atlanta, Georgia, 30318**

For this report, two addresses were noted in the City of Atlanta's data and combined to form one analysis. The addresses include 2335 Adams Drive and 2310 Adams Drive. 2335 Adams Drive is a Karate Studio (business location) and 2310 Adams Drive is a home address (residential location). The addresses had a combined total four documented sewer spills. The dates of the spills include 02/19/2019, 04/14/2019, and 04/19/2019. The 04/19/2019 date had the highest rainfall of an estimated 2.0 to 3.0 inches that day and two of the four reports documented on that day. There was an insignificant amount of rain on 04/14/2019 with 0.01 to 0.10 inches noted that day, and no rainfall reported on 02/19/2019. The total volume of sewage spillage for this site between 2017 and 2020 was 76,695.00 gallons.

The noted locations approximately 1-2 miles south of Peachtree Creek. There was a stream that flowed behind 2335 Adams Drive and flowed towards the Karate Studio. The stream flowed to the east and connected to Peachtree Creek.

The terrain was presented as an industrial and business area with parking and sidewalks present. The residential address noted was on the other side of the street (about 50 to 100 meters) away from the business location. The residential address noted did not have any obvious pipes, construction, or notable characteristics that would attribute to the noted spills. Behind the Karate Studio and in front of the residential address, there was a nature area with a wood bridge that one can walk across. When walking across the bridge, one could see the back of the Karate Studio directly to the left, and a home on the right. There were trees (including bamboo) on the backside of the Karate Studio and in the wooded area. Also on the left, there was a large, rusted pipe that stretched from one side of the road along the backside of the Karate Studio. At the opposite side of the pipe and the Karate Studio, there was a construction area that showed the pipe running beneath the ground and then going above ground (about 15 feet worth of asphalt where it is underground). At this point, the pipe was no longer metal and was a hose structure. The hose continued up the side of the business complex (about 200 meters) and ran into a manhole in the ground at the back of the complex in a wooded area. There was a drain present, as well as another pipe that opened at the side of the Karate Studio. The industrial area appeared to be under heavy construction. After observation, it is likely that the spills reported came from the large pipe directly located behind the Karate Studio.

Considering the majority of the noted spills occurred on days of heavy rainfall, it is suggested that the spills occurred due to falling debris and the breaking and/or falling of the pipe.

**424 Lindbergh Drive NE, Atlanta, Georgia 30305**

This reported address had a notable four recorded sewage spill reports from 2017 to 2020. The dates of the spills are as follows: 06/20/2017, 11/12/2018, 12/28/2018, and 02/19/2021. There was heavy rain noted on 12/28/2018 with a recorded 3.0 to 4.0 inches of rain. 06/20/2017 and 11/12/2018 had little rainfall with a recorded 0.01 to 0.25 inches of rain on those days. However, on the 02/19/2019 spill, there was no recorded rainfall. The total recorded sewage spillage volume between 2017 and 2020 was 369,700.00 gallons.

The location was north of Peachtree Creek by an estimated two to three miles. Thus, the location did not border Peachtree Creek. The documented address is an apartment complex. The area had public green space, trees, dirt, and a parking area. In the stream directly next to the apartment complex, there were two to three pairs of rusted and exposed pipes that ran slightly above water level from one side of the stream to the other side. They were in sets of two, with a total of approximately six pipes. There was a stream that bordered the complex on the left side. One could hear and see the water. The stream was shallow and diverged about 100 yards from the front of the street into two smaller streams. They likely flowed towards Peachtree Creek running south. When the stream diverged at the back of the complex, there were bags of rocks stacked alongside the creek. Their purpose was most likely to prevent erosion. There was also a bridge that extended from one side of the stream to the other that

led directly inside of the apartment complex. It is also important to note that the apartment complex had unique storm drains. Across the street, the small creek wrapped around residential property for approximately 100 meters and formed a "hook" shape. There were roughly four large pipes suspended high above the water level (about 10 to 20 feet above water level). At this point, the creek below was nearly 30 feet below ground level forming small cliffs with the stream below. It is likely that the spills recorded came from broken pipes either at the noted address or at the location across the street.

**3125 Parrott Avenue NW, Atlanta, Georgia 30318**

This location was the one selected sewer spill site that did not border Peachtree Creek. Instead, it bordered Proctor Creek. This site was also located slightly more west than the previous sites visited. According to the City of Atlanta's public data, there were two recorded spills from 2017 to 2020. These spills were noted on 03/04/2019 and 12/05/2020. There was a fair amount of rain on 12/05/2020 with a record of 1.0 to 1.5 inches and less rain noted on 03/04/2019 with a recorded 0.25 to 0.50 inches. The total volume of sewage spillage for this site between 2017 and 2020 was 492,900.00 gallons.

The address provided was an industrial area and private property belonging to Colonial Pipeline Company. It was likely that the actual site of the sewer spill was behind gated territory. Thus, detailed documentation and video footage was unable to transpire. However, about 100 yards from the noted address, Proctor Creek ran close to the road (about 10 feet from the road) and the road was slightly elevated. When looking at the creek, the slow-moving water flowed to

the right. It is likely that it flowed towards the Chattahoochee River. The documented area, as one could see through a fence, contained construction zones, trees, asphalt, dirt, and debris. There may have been a pipe present far behind the site (hundreds of yards away from visible view), although no confident observations could be made at the site. Unfortunately, due to the area being private property, results of this visitation were not successful.

Table 4.1 Suggested Characteristic Attributed to Spill Reports Per Site

| **Documented Site** | **Characteristic Attributed to Spill** | | | |
|---|---|---|---|---|
| | Manhole | Sewer/Pipe | Drain | Other/Unknown |
| **Battleview Drive** | | X | | |
| **Woodward Way** | X | | | |
| **Wesley Drive** | X | | | |
| **Adams Drive** | | X | | |
| **Lindbergh Drive** | | X | | |
| **Parrott Avenue** | | | | X |

Table 4.2 Documented Sites Based on Date and Reported Rainfall (estimated values retrieved from National Weather Service)

| Documented Site | Date of Spills | Number of Spills Reported on Day | Estimated Rainfall (in inches) |
|---|---|---|---|
| **Battleview Drive** | 04/05/2017 | 1 | 0.0 |
| | 12/28/2018 | 1 | 3.0 - 4.0 |
| | 04/19/2019 | 1 | 2.0 - 2.5 |
| **Woodward Way** | 12/09/2018 | 1 | 2.5 - 3.0 |
| | 12/28/2018 | 2 | 3.0 - 4.0 |
| | 04/19/2019 | 2 | 2.0 - 2.5 |
| **Wesley Drive** | 04/05/2017 | 1 | 0.0 |
| | 06/20/2017 | 1 | 0.01 - 0.10 |
| | 12/28/2018 | 2 | 3.0 - 4.0 |
| | 01/23/2019 | 1 | 0.0 |
| | 04/19/2019 | 1 | 2.0 - 2.5 |
| **Adams Drive** | 02/19/2019 | 1 | 0.0 |
| | 04/14/2019 | 1 | 0.01 - 0.10 |
| | 04/19/2019 | 2 | 2.0 - 3.0 |
| **Lindbergh Drive** | 06/20/2017 | 1 | 0.01 - 0.10 |
| | 11/12/2018 | 1 | 0.10 - 0.25 |
| | 12/28/2018 | 1 | 3.0 - 4.0 |
| | 02/19/2019 | 1 | 0.0 |
| **Parrott Avenue** | 03/04/2019 | 1 | 1.0 - 1.5 |
| | 12/05/2020 | 1 | 0.25 - 0.50 |

Table 4.3 Documented Site Volume of Spills (in Gallons) Based on Date

| Documented Site | Date of Spills | Spill Volume (in Gallons) |
|---|---|---|
| **Battleview Drive** | 04/05/2017 | 46,000.00 |
| | 12/28/2018 | 14,850.00 |
| | 04/19/2019 | 17,952.00 |
| **Woodward Way** | 12/09/2018 | 74.25 |
| | 12/28/2018 | 147,707.30 |
| | 04/19/2019 | 168,000.00 |
| **Wesley Drive** | 04/05/2017 | 149,128.00 |
| | 06/20/2017 | 255,300.00 |
| | 12/28/2018 | 326,375.00 |
| | 01/23/2019 | 26,000.00 |
| | 04/19/2019 | 422,400.00 |
| **Adams Drive** | 02/19/2019 | 14,800.00 |
| | 04/14/2019 | 31,890.00 |
| | 04/19/2019 | 30,005.00 |
| **Lindbergh Drive** | 06/20/2017 | 110,100.00 |
| | 11/12/2018 | 42,000.00 |
| | 12/28/2018 | 168,850.00 |
| | 02/19/2019 | 48,750.00 |
| **Parrott Avenue** | 03/04/2019 | 117,900.00 |
| | 12/05/2020 | 375,000.00 |
| **Total Spill Volume** | | **2,513,081.55** |

# CHAPTER V

## Study Strengths and Limitations

This study had a direct focus and provided much needed detail on repeated sewer spill site data. By providing specific attributes and confident reasons for the recorded spills, researchers have a greater insight on how *E. Coli* spikes are indicators of sewage traveling from infrastructure points to surface water. The videos, images, and written reports that were provided gave researchers the opportunity to refer back to data and visually understand the terrain; ultimately allowing their project to progress with ease and in a timely manner.

Unfortunately, it was not clear whether or not these locations were considered residential, business, or public areas prior to visitation and documentation of the terrain. With that being said, it limited researchers to be prepared for the visitations. For example, little was known about the location of Parrott Avenue prior to observing the site. If access were granted to the public, it may have given researchers an enhanced understanding of why and how the sewer spill occurred at those locations.

It is suggested that the City of Atlanta documented the same sewer spill at multiple locations. For example, the sewer spills noted off Woodward Way include 757 Woodward Way, 760 Woodward Way, and 761 Woodward Way. Unfortunately, researchers suggest that the spills noted all pertain to the same spill. The overall lack of available data and clarity provided by the city may inhibit research in the future.

Unfortunately, the rainfall data values obtained in this study were approximations. Although each specific address was individually observed on the National Weather Service website for the corresponding sewer spill date, researchers were required to estimate the range of rainfall based on radar maps. This does not provide clarity on the exact amount of rain that each site truly observed on the day or day prior to the sewer spill noted.

There is a limited amount of public data available. Although researchers in this study were confident in attributing certain characteristics (manhole, pipe, etc.) to the documented spills at each site, little data has been provided by the City of Atlanta in regard to reason for spills. This limited data also includes whether or not a sewer spill occurred due to infrastructure failing, or if the occurrence was rain induced.

**Implications of Findings**

Although the City of Atlanta has funded billions of dollars towards sewer related infrastructure, it is clear through this study that there is still a significant amount of repair and rebuilding that needs to be done to guarantee the safety of residents, drinking water, wildlife, and aquatic life. Unfortunately, many of the current repairs taking place may be considered a "quick fix" or "Band-Aid" in the eyes of the public.

Based on the estimated levels of rainfall from the National Weather Service website, the amount of rainfall may have influence on whether or not sewer spills or overflow occurs. For

example, the date 12/28/2018 was consistent for several of the sites including Battleview Drive, Woodward Way, Wesley Drive, and Lindbergh Drive. The date 04/19/2019 was also consistent with spills noted at Battleview Drive, Woodward Way, Wesley Drive, and Adams Drive on that day. This may suggest that these spills may be connected to one another in some way. It was interesting to find that another consistent date (04/05/2017) appeared for two of the listed sites (Battleview Drive and Lindbergh Drive). There was zero inches of rainfall that day. However, the day prior (04/04/2017) both sites reported 0.75 to 1.0 inches of rainfall. This also appeared for 02/19/2019 (Adams Drive and Lindbergh Drive). On 02/18/2019, Adams Drive had approximately 0.25 to 0.50 inches of rain and Lindbergh Drive saw 0.10 to 0.25 inches of rain. Unfortunately, it was undetermined if those spills were weather induced or related in any way considering the amount of rain was insignificant compared to other spills with a corresponding 3.0 to 4.0 inches of rain.

It has become apparent that unless sewer spills (broken pipes, flooding, etc.) are visible, they may go undocumented. For example, the sewer spill site at Battleview Drive may have gone unnoticed if it were not located directly in someone's backyard. It is likely that some spills were documented due to a foul smell and flooding of the residents' basements or property. However, if a spill such as this were to occur in a wooded and private area, it may go undocumented and unrepaired for a long period of time. This is troublesome in regard to water quality and surrounding wildlife. Sewer spills have the potential to contaminate drinking water and kill plants and aquatic life.

It is also important to note that many of the sewer related repairs could also be a hazard to the residents of Atlanta. The pipe suspended above Peachtree Creek at Battleview Drive was suspended from a tree and hung with loosely constructed wires. Considering it is a residential area with a park on one side, the pipe is a hazard for children if they were to play near the pipe. At Adams Drive, a large, exposed pipe ran for about 200 meters throughout the business complex. It could easily damage a vehicle and/or burst causing more flooding and repair to the area. Memorial Park has a history with flooding. Although it is predicted that the green structures were implemented to control flooding, it may not be as effective as the City of Atlanta had intended considering these locations continue to have documented spillage reports. The flooding causes the park to be unsafe, and unusable for the surrounding residents.

**Recommendations and Prevention Strategies**

- Public engagement and education through news stations, pamphlets at local city offices, or social media in regard to identifying a sewer spill, who to contact if one is identified, and how to protect a place of work or home if one should occur
- Increased public awareness from the city to residents in areas of repeated spills in regard to informing them why and how the spills happen. This may include providing a website link for live feed or updates on the status of a spill located near them.
- Reallocation of funds in regard to prioritizing sewer related spill sites and cleanup to encourage that repairs happen in a timely fashion

- Additional funding towards the monitoring of already active sites and those that have proven to be reoccurring for several years. This may include constant and reoccurring visitation from government officials to sites that have potential to flood in the future.
- Possible technology that may monitor old and/or rusted pipes that are predicted to break in the future to guarantee the safety of the public and encourage the planning of repairs prior to sewage spills and overflows
- Increased funding towards research regarding water quality, sewage disposal systems, and innovative techniques to guarantee the safety of residents while repairs are in process

As of June 2018, the City of Atlanta has implemented a Woodward Way Pump Station Improvement Project. Department of Watershed Management contractors upgraded the sanitary sewer system at the Woodward Way Pump Station located on Woodward Way NW. This included an addition of a new eight-inch sewer main and was to be completed between February 2020 and November 2020 (Atlanta Watershed, 2020). Although these repairs created major traffic delays in the Atlanta area, the $8.6 million project was projected to have eliminated sewer overflows across the Peachtree Creek basin (Andrews, 2018). Other implementations from the City of Atlanta and Watershed included new 10-inch sewers off of Peachtree Battle Avenue, a new storage tank, and pump stations located outside of Buckhead, Atlanta. These construction projects were initiated between 2018 and 2020. The city funded an estimated $108 million toward the projects. It is apparent that the City of Atlanta is aware

of the much-needed repairs of its sewer systems to prevent flooding in the Atlanta area in the future.

Figure 5.1 A map showing the proposed location for a new storage tank near I-85 impacting Peachtree Creek Basin and Peachtree Battle Avenue (retrieved from Reporter Newspaper)

**Conclusion**

As previously mentioned, this study is a sub-set of a larger study. One of the goals of the larger study was to determine if spikes and outliers observed in levels of *E. Coli,* coliforms, floridity, and turbidity are indicators of contamination possibly traveling from various manmade structures along surface water. According to the results of that study, the concentration of several of the water quality variables, including *E. Coli,* were relatively stable across the Chattahoochee River Watershed, making a case that there is a relative baseline level of contamination in the watershed (Anderson, 2021, p. 38). Anderson also found that there is an association between *E. Coli* concentration in surface water and same-day rainfall as well as seasonal variations. It is suggested that the elevated *E. Coli* levels may be a result of stormwater runoff and sewage overflows following heavy rainfall. Researchers in this study have determined that rainfall may influence whether a spill occurs. Additionally, lower rainfall during spring may be associated with decreased contamination in waterways. With that being said, it is imperative that the City of Atlanta continues monitoring sewer spill locations, and it is suggested that a more systematic sampling strategy be implemented to monitor contamination in the Chattahoochee River Watershed.

In this study, public data from the City of Atlanta was gathered and sorted based on date, time, volume of sewage in gallons, and impacted neighboring waterways. Although the data is useful as a starting point for locating spill sites, it provides very little detail, and does not necessarily even point directly to the actual site or source of a documented spill. Making this publicly available data more detailed may aid in the study and analysis of spills. Of the ten years worth of provided data, five sites had three or more reoccurring sewage spills recorded between 2017

and 2020. All five of those documented addresses (Battleview Drive, Woodward Way, Wesley Drive, Adams Drive, and Lindbergh Drive) either border Peachtree Creek or are in close proximity to Peachtree Creek. With that being said, it is likely that residents living near Peachtree Creek are at a higher risk of contaminated ground water from sewage than those living in other areas of Atlanta, especially on days with predicted heavy rainfall. Wildlife, recreational space, green space, and aquatic life may also be at risk due to the high total sewage spill volume in the area. Considering Peachtree Creek leads into the Chattahoochee River, it may have a lasting effect on the overall water quality and recreational functionality of this river. It is imperative that the City of Atlanta proactively identifies, monitor, and efficiently repair and prevent spills from occurring in the future.

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