Comprehensive Drainage Study

Preliminary Engineering Report

Prepared for

City of Mechanicville

Mechanicville, New York

August 2024

Comprehensive Drainage Study

City of Mechanicville, Saratoga County, New York

Preliminary Engineering Report

August 2024

Prepared For:

City of Mechanicville
36 North Main Street
Mechanicville, New York 12118

Prepared By:

Barton & Loguidice, D.P.C.
10 Airline Drive, Suite 200
Albany, New York 12205

Table of Contents

1.0 EXECUTIVE SUMMARY

The City of Mechanicville has historically experienced significant localized flooding along its roadways, resulting in negative impacts to critical transportation routes and potentially endangering the structural integrity of buildings along flood-prone streets. Specifically, 1st Avenue and the area directly underneath the existing railroad bridge across South Central Avenue are especially vulnerable to heavy rain events; with flood waters observed to flow over the curbed sidewalks and directly impact residences. The City has been working, independently and with support from the NYSDOT and consulting firms, to implement drainage improvement projects aimed at relieving flooding and flow issues. However, without a comprehensive understanding of the conditions of its current stormwater drainage infrastructure system, these efforts are not as impactful as they could be.

The stormwater drainage infrastructure in Mechanicville is aged and in poor condition, with ample evidence of repairs and patching, corrosion or rusting, cracking or spalling, and other degradations throughout. There is a wide variety of stormwater pipes throughout the city including HDPE, concrete, steel, clay, and PVC. There are many instances in which pipes of different types and sizes have been connected together, which may be contributing to flooding and drainage system capacity issues. Many of the catch basins have been adequately maintained, and most were not observed to have excessive amounts of debris or sediment accumulation. Generally, catch basin grates and manhole covers are in good condition. However, there are a few instances of manhole and catch basin covers being covered by asphalt paving or exhibiting rusting, as well as a few shallow catch basins in residential areas that were observed full of debris, and sediment burying the pipes.

The City has retained the professional services of Barton & Loguidice D.P.C. (B&L) to create a comprehensive inventory of its stormwater infrastructure system, along with this summary report with recommendations and cost estimates. As part of the City MS4 program, we are also compiling that information into a usable system map. The system map will be used by the Department of Public Works (DPW) to guide future planning for addressing the City's ongoing drainage issues. Using this data, along with input from city DPW and public input received from outreach efforts, areas of potential drainage system improvements and implementation of stormwater best management practices have been identified; with the overall objective of creating a more resilient stormwater system and improving public health and safety for City residents and commuters.

2.0 EXISTING CONDITIONS / PROJECT OVERVIEW

2.1 Necessity of Project

The City of Mechanicville currently does not have a comprehensive understanding of all of its stormwater drainage infrastructure, which has left it vulnerable to the impacts of localized flooding and other drainage issues. Creating a comprehensive system map of the drainage infrastructure within the city is critical to assist in identifying areas that are prone to flooding and in need of improvement or upgrading, which will allow the City to take proactive measures to prevent stormwater accumulation and manage it effectively. System mapping will also be essential to schedule regular maintenance activities that ensure the City's stormwater drainage infrastructure remains functional by prioritizing areas in need of immediate attention. During heavy rain events or system failures, a well-mapped drainage system will allow for quick and effective responses, which will minimize damage to existing residences and buildings and disruption to critical transportation and emergency services routes. A comprehensive stormwater drainage infrastructure map can also aid in the future development of the city, by allowing the Planning Commission to make informed decisions about proposed land use, zoning, and development projects.

The current 24-hour rainfall events in the City of Mechanicville for 1, 10 and 100 year storm events are 2.21 inches, 3.77 inches, and 5.62 inches respectively. The drainage area of 1st Avenue, covers approximately 35 acres, requires a pipe capacity of around 35 cfs for a 1-year storm, 80 cfs for a 10-year storm, and 135 cfs for a 100-year storm. However, the existing 18-inch pipe at the end of 1st Avenue has a capacity of only 5-6 cfs, making it significantly undersized and unable to handle the stormwater flow, even during a 1-year storm event. Much of the drainage network in the city is older infrastructure that was not designed to handle the development that has happened over the last century. This has led to system not having the capacity to handle the increases in flows and storm intensities that we are now facing.

2.2 Existing Conditions

Stormwater runoff in the City of Mechanicville generally flows from west to east through City-owned closed drainage systems to the Central Avenue corridor, where it then flows either north or south depending on the location. Flows in the vicinity of the railroad bridge crossing over South Central Avenue head north to discharge at the Anthony Kill bridge crossing. B&L has designed and overseen the installation of two overflow systems to alleviate some of the flooding issues in this area in recent years. Once stormwater reaches a certain head elevation in the existing catch

basin structures, the first overflow system conveys stormwater to the east along Green Street to a discharge location along the Hudson River. East of Central Avenue, stormwater flows east along the various side streets and is collected by catch basins and underground piping that ultimately discharge and various locations into the Hudson River. The second overflow directs flow from the Hill Street - Central Avenue intersection east via closed drainage piping to the Anthony Kill. In both instances the intent is to remove flow north along the Central Avenue corridor for discharge at the Anthony Kill crossing and instead direct the flow sooner to the Anthony Kill or Hudson River.

Stormwater runoff from the South Street intersection on Central Avenue vicinity flows south via large underground reinforced concrete piping within the NYSDOT roadway corridor along Route 32 to a discharge location along the Hudson River further south. The City worked with NYSDOT to clean this closed system during roadway improvements conducted in 2022. These efforts initially appeared to help alleviate the flooding events; however, 1st Avenue has recently experienced more frequent flooding during heavy rain events and further evaluation is needed.

Over the past several years, the Department of Public Works (DPW) has completed many small, localized drainage improvements. The projects mainly focused on cleaning out structures and pipes, select repair of damaged pipes, and resetting drainage frames and covers to better accept roadway drainage.

2.3 Public Feedback

Barton & Loguidice D.P.C. (B&L) created a map-based web page where City residents could provide their input on local drainage concerns. The comment period was open between March 6, 2024 and June 14, 2024. Participants were able to add a map 'pin' to the area where they had drainage concerns and could attach a comment and any images to help illustrate the extent of any drainage or flooding issues. Feedback received from the public highlighted several areas throughout the city that are in need of drainage improvements or have environmental concerns.

Along Round Lake Ave near Capital Region Toys for Tots, there are concerns about contaminated stormwater runoff flowing into Anthony Kill from the Industrial Park located directly to the south. The site has not received a Brownfield Site Certificate of Completion from the NYSDEC, which is fueling concerns about water contamination.

There are a variety of residential streets that have reports of flooding and drainage issues from residents:

- Properties along North 5th Ave, between Chestnut Street and Elizabeth Street, experience flooding when the existing infrastructure reaches its capacity to manage runoff.
- Both ends of Tallmadge Place experience drainage issues, with the western edge having several low spots that collect and pond runoff, whereas other flooding issues exist on adjacent properties at the eastern end near the intersection of Post Office Street.
- The east end of Green Street floods during heavy precipitation events. There previously was a storm drain at a low point in the street, however it was removed during a previous sidewalk reconstruction project.
- At the east end of Underwood Avenue, directly south of Green Street mentioned above, the City experiences similar issues with heavy rain causing ponding of stormwater and erosion of driveways along the street.
- On 1st Avenue directly across from the Cumberland Farms, extreme flooding occurs during heavy rain events due to trash and debris flow from other streets clogging drainage pipes and catch basin grates. **Figure 1** below shows floodwater spilling over the curb onto the sidewalks on both sides of the road. It also appears that this closed drainage system is significantly undersized.
- The existing infrastructure at the corner of South Street and Second Street has inadequate drainage capacity, which is exacerbated during heavy rain events.
- The drainage system in the John S. Moore residential community is inadequate, causing frequent flooding in front of most buildings.
- On South Main Street, directly across from Paul Luther Memorial Park, the low points in the road collect water, and the area has experienced flooding due to catch basins overflowing.
- The Park Plaza Shopping Center entrance located along North Central Avenue experiences ponding during significant rain events. See **Figure 2** below.
- The area under the railroad bridge over South Central Avenue, experiences short-term ponding of runoff events during significant rain events. This typically affects the east turning lane and results in a lane closure for short periods of time. The overflow installed has helped to reduce the number and significance of flooding events; however, during significant short duration rain events, flooding still occurs for short period of time (generally one hour or less).
- Tallmadge Park becomes ‘swampy’ after rain events
- The west floods around Broadway and 8th street from runoff from the hill.

Figure 1. Flooding on 1st Avenue spilling onto the sidewalks.

Figure 2. Ponding at the entrance to Park Ave Plaza**.**

3.0 FIELD INVESTIGATIONS AND SYSTEM MAPPING

Field investigations were performed during the spring of 2024 in order to better understand the existing conditions of the closed drainage system in the City, and to document the locations, sizing and invert elevations of all existing stormwater drainage pipes. The rim elevations for each stormwater catch basin and manhole were determined using a Carlson GPS unit. Each manhole was assessed to determine if it was a sanitary sewer manhole or stormwater manhole, and what piping connections existed. B&L performed an evaluation of the pipes in the stormwater manholes and catch basins, which included identifying the number of pipes in the structure, the direction of pipes, sizes of pipes, material of pipes, and invert elevations. Measurements were taken in the field of the distance from the rim elevation of the structure to each pipe invert. The invert elevation of the pipes is critical for determining the direction of flow within the stormwater drainage system.

All of the data collected in the field was then summarized using AutoCAD Civil3D to begin to develop a city-wide map of all existing stormwater infrastructure with GIS integration. The system map will be used by the Department of Public Works (DPW) to guide future planning for addressing the City's ongoing drainage issues. Using this data, potential drainage system improvements and implementation of stormwater best management practices can be better identified and will help to bring the City into compliance with NYSDEC permitting requirements for small municipal separate stormwater sewer systems (MS4s). The mapping efforts are ongoing, and the current state of the map is included in **Attachment A**.

4.0 CURRENT DRAINAGE ISSUES AND POTENTIAL SOLUTIONS

4.1 Southern End of 1st Avenue

Issue: For several years, 1st Avenue has regularly experienced flooding issues. **Figures 3 and 4** below show the substantial ponding of water at the intersection of 1st Avenue and South Street that can occur after heavier rainfall events. The amount of water that ponds in the intersection of these streets can lead to hazardous road conditions for drivers that could be damaging to vehicles, lead to a loss of steering control, and an increased risk of hydroplaning. During winter months, ponded water freezes and causes hazardous icy conditions that can be dangerous for pedestrians. In particular, the roadway needs to be closed for periods of time, impacting emergency services response events.

As previously mentioned, the City worked with NYSDOT in 2022 to clean out debris and sediment accumulations in the downstream stormwater system, and initially the flooding issues improved. However, this area is now experiencing flooding issues again and further evaluation and determination of long-term solutions for improving the flooding in this area is needed.

Potential Solution: The existing infrastructure along 1st Avenue is made up of a mix of pipe sizes ranging from 12" to 18" in diameter. Through aerial mapping and field investigations, a drainage area of approximately 18 to 22 acres drains through the 1st Avenue system. The existing 18" pipe has slope runs as shallow as 0.23%. The theoretical capacity of this run of 18" storm pipe is approximately 5 cfs. The runoff rate for 18 acres in residential urban areas for a 1-year storm event is more than 23 cfs; and is more than 42 cfs during a 10-year storm event. This demonstrates that even in low storm events, the infrastructure along 1st Avenue is severely undersized to handle existing flows.

The infrastructure leading into and along 1st Avenue should be further analyzed, and the undersized drainage infrastructure should be replaced to increase the stormwater conveyance capacities of the system. It is generally an acceptable engineering practice to size storm drains to safely convey a 10-year storm event. Increasing the existing 18" storm drainage piping to 36" HDPE piping at a 0.5% slope would sufficiently increase the capacity of the system to manage the 10-year storm event for this area. There is also potential to create a new pipe network that conveys drainage from this area more directly to the Hudson River via South Street, Ellsworth Avenue and Underwood Avenue, which could help to alleviate flooding in other adjacent downstream areas.

Figure 3. Flooding at Southern end of 1st Avenue.

Figure 4. Alternate view of flooding at Southern end of 1st Avenue.

4.2 Intersection of Spring Street and 1st Avenue

Issue: After heavy rainfall events, the catch basin at the intersection of Spring Street and 1st Avenue does not adequately drain and causes ponding of stormwater in the area. In the winter months, this area of the road becomes hazardous due to the ice that forms from the ponded water freezing. The pipes connecting into the catch basin may be clogged and are unable to properly allow the stormwater to flow through the pipe.

Potential Solution: Further field investigation and analysis is needed to determine if there are any blockages in the pipes. If sediment or debris accumulations are encountered, clearing the blockage(s) using high-pressure water jets and vacuum equipment may help to mitigate the flooding issues around this catch basin. The City could then develop a maintenance schedule to ensure that the catch basin is regularly cleaned to remove debris, sediment, or trash build up; to identify and address any potential system blockages prior to flooding issues arising.

If no blockages are found in the pipes, additional catch basins or larger diameter piping could be installed to allow a larger volume of runoff to enter and be adequately conveyed through the system.

Figure 5. Intersection of Spring Street and 1st Avenue.

4.3 Under the Existing Railroad Bridge over South Central Avenue

Issue: After heavy rain events, the catch basins underneath the existing railroad bridge over South Central Avenue at times become backed up with stormwater, causing substantial flooding (See **Figure 6**). There have been reported incidents where stormwater flooding extends to the existing Dunkin Donuts, located over 200 feet to the Northeast. Back-to-back storm events can be particularly problematic for this area because they exacerbate the limitations of the current piping and catch basins and can lead to increased flooding and road hazards.

The flooding is very hazardous to drivers and local police are often needed to blockade the easternmost northbound lane so vehicles do not drive through the flooded lane. As shown in **Figure 6**, cars can become stranded or disabled and then need to be towed out of the flooded area. Barton & Loguidice, D.P.C. (B&L) has designed and overseen the installation of two overflow systems to alleviate some of the flooding issues in this area in recent years for smaller storm events. It was reported by the DWP superintendent that a potential cause of the backup has been debris clogging the inlets along central.

Potential Solution: Further field investigation and analysis is needed to determine if the pipes along South Central Avenue/North Central Avenue that flow north to Anthony Kill have sufficient capacity to handle the amount of stormwater that ultimately drains through this system, particularly during the larger and higher intensity storm events. Based on available data, the existing piping along this system ranges from 15”-24”. This range of pipe sizing may be inadequate and could require replacement to have sufficient capacity to convey all of the runoff that drains through this system, while also would help to alleviate any backup in the system.

However, replacing the existing infrastructure along South Central Avenue and North Central Avenue would be a significant and a costly undertaking, which ultimately may not be feasible due to topographic and monetary constraints. As the road was improved via mill and fill in 2022 with an approximate 10 year expected lifespan, the City should consider looking for future funding options in concert with future NYSDOT funding for the eventual full reconstruction of this roadway corridor and utilities.

It is also important to ensure there is no debris accumulated on or near the catch basin grates that could result in blockages that prevent stormwater from entering the system. It would be beneficial to check the catch basin grates for accumulated debris after heavy storm events at frequently flooded locations to clean the debris prior to the next storm event. It is possible that installing different types or sizing of grates on the existing catch basins could help mitigate this issue. Another solution to reduce trash and debris accumulation in the catch basins could involve the city conducting more regular street sweeping activities.

Figure 6. Flooding underneath existing railroad bridge over South Central Avenue that resulted in a disabled vehicle needing to be towed.

4.4 Tallmadge Park

Issue: There have been numerous occasions of Tallmadge Park significantly flooding after heavy rainfall events. Stormwater collects in low areas of the park and remains for several days, reducing the availability of select park areas until it dries out. The park is a key recreational area in the City of Mechanicville and is used by many community members, making it a priority area in need of drainage improvements. **Figures 7-11** below show low points in the park where water frequently pools after heavy storm events and the water typically remains in those areas for several days.

There currently exists one catch basin in the middle of the field of Tallmadge Park, west of the existing monument and gazebo. When field observations were made following a rain event, the catch basin was full and water appeared stagnant. The area of the park near the wooded area behind the fountain often floods due to the water flowing down the steep hill between the park and the retaining wall along the road on South Street.

Potential Solution: There is insufficient storm drainage throughout Tallmadge Park. The terrain in the park is undulating with many low-lying areas lacking drainage infrastructure. Since there is currently a lack of drainage structures in the park, it is possible that an underdrain system installed throughout the park could more effectively manage the stormwater runoff and reduce the amount of time it takes for the field to dry and be usable. Low-lying areas of the park could be regraded with additional topsoil fill to eliminate these low points and help mitigate the stagnant water issues. Storm infrastructure could then also be added to further help address these concerns.

Figure 7. Area in Tallmadge Park that remains wet for several days after heavy rain events.

Figure 8. The grass near the fountain at the southern part of Tallmadge Park frequently floods.

Figure 9. Flooding along the edge of Park Place and the grass at the park.

Figure 10. Low point at the northeastern corner of the Park that floods.

Figure 11. The grass area east of the fountain that frequently floods.

4.5 Intersection of Ellsworth Avenue and South Main Street

Issue: After heavy rainfall, water ponds around the catch basin underneath the existing railroad bridge at the intersection of Ellsworth Ave and South Main Street (See **Figure 12**). The pipes connecting to the catch basin may be clogged, or the pipes may not be adequately sized to manage the full volume of stormwater that drains to this area. During winter this area becomes hazardous as the ponded water freezes, creating ice on the road.

Potential Solution: To mitigate flooding around the catch basin, first determine if the pipes are blocked and clear any blockages using high-pressure water jets and vacuum equipment. Regularly clean the catch basin to remove debris, sediment, and trash. Schedule routine inspections to identify and address potential issues before flooding occurs. If no blockages are found, consider installing additional catch basins to distribute the water load or increasing the pipe sizes to accommodate higher water volumes. As mentioned previously there also may be potential to create a new pipe network that conveys drainage from this area directly to the Hudson River via Ellsworth Avenue and Underwood Avenue. This system could ultimately connect to a proposed system at the intersection of 1st Avenue and South Street, which could then help to alleviate flooding in other downstream adjacent areas as well.

Figure 12. Catch basin underneath existing railroad bridge at the intersection of Ellsworth Ave and South Main Street.

4.6 Flooding along South Main Street

Issue: Various locations along South Main Street experience flooding after rain events such as areas South of Riverside Park S., adjacent to Paul Luther Memorial Park and Playground, and between Alexander J. Avenue and Arnold Avenue. Low points along the sidewalk and the edges of the driveways along the road flood and have stagnant water remain for days after a storm event. The existing railroad tracks west of the South Main Street act as a drainage divide and runoff from the embankment flows through adjacent property owners' yards and collects at the low points along the road as shown in the **Figures 13 to 17** in Sections 4.6.1, 4.6.2 and 4.6.3 below. There is also a notable lack of drainage infrastructure along this stretch of South Main Street. Due to the frequent ponding of water, the pavement in the low points is deteriorating resulting in costly upkeep.

Potential Solution: Further analysis is needed to determine the best solution to mitigate drainage issues. However, there are likely multiple potential solutions to help address the existing drainage issues, such as:

- To reduce the ponding of water, the road should be regraded and resurfaced when the roadway needs to be rehabilitated to eliminate the low points in the road and promote positive drainage. When the City updates their annual roadway paving priority listing, this area may need to be considered sooner rather than later for rehabilitation.

- Installing drainage devices near the railroad tracks could help to reduce runoff flowing through adjacent property owner's land and collecting along the road.

- Another option could involve installing drainage structures along the road in the locations that are currently experiencing flooding to capture and convey runoff to a controlled discharge location, likely to the Hudson River.

4.6.1 *Along South Main St. South of Riverside Park South*

Figure 13. Ponding at the edge of a driveway along South Main St. South of Riverside Park South.

Figure 14. Ponding along the sidewalk along South Main St. South of Riverside Park South.

4.6.2 *Along South Main St. adjacent to Paul Luther Memorial Park and Playground.*

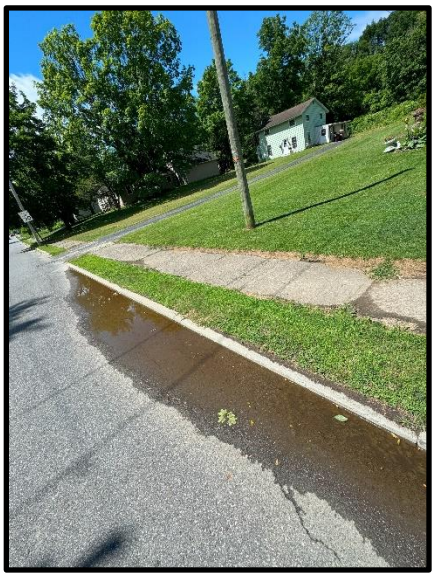

Figure 15 Ponding at the edge of a curb along South Main St. near Paul Luther Memorial Park and Playground.
South of Riverside Park South.

Figure 16. Alternate view of ponding at the edge of a curb along South Main St. near Paul Luther Memorial Park and Playground.
South of Riverside Park South.

4.6.3 *Along South Main Street between Alexander J. Avenue and Arnold Avenue*

Figure 17. Remnants of ponding at the edge of a driveway along South Main St. between Alexander J. Avenue and Arnold Avenue.

4.7 Railroad Street between Broadway and Park Avenue

Issue: On the western side of Railroad Street there are frequent stormwater ponds and remains for several days after rainfall events. There is "alligator cracking" of the pavement observed in the low points in the road where the stormwater ponds and does not drain. There are currently no drainage structures on Railroad Street between Park Avenue and Broadway. During large storm events ponding of water creates a safety hazard for drivers, especially in the winter months when the water freezes and leads to icy road conditions.

Potential Solution: It would be recommended to repair the alligator cracking as it will worsen over time. Increased water penetration/degradation of the pavement layers, and freeze-thaw cycles, will cause the cracks to expand and will leave voids in the pavement structure causing it to weaken further. The damaged pavement should be excavated and removed, as well as any unstable or weak base material. These areas should be regraded to eliminate the low points and ensure that there is positive drainage. Upon further analysis, installing drainage infrastructure along this strip of the road could be considered to prevent future stormwater ponding, extend the pavements' lifespan, and provide safer driving conditions.

Figure 18. Ponded stormwater observed along the side of Railroad Street.

Figure 19. Ponded stormwater and "Alligator cracking" observed along the

4.8 Walnut Street West of Pittsburgh Avenue

Issue: There have been several occurrences of flooding around the catch basin on Walnut Street West of Pittsburgh Avenue. This catch basin collects runoff from upgradient areas to the north. The catch basin and associated piping may not be adequately sized to manage all of the stormwater runoff flowing to it; or the outflow piping may be damaged or clogged.

Potential Solution: Further inspection of the catch basin and outflow pipes is needed to ensure they are in good condition and working properly. If so, analysis of the flow capacity should be conducted to determine if increasing the size of the outlet piping or another drainage structure is recommended to capture all of the stormwater runoff flowing to this area and reduce ponding of water during large rainfall events.

Figure 20. Catch basin on Walnut Street West of Pittsburgh Ave with the upgradient drainage area in the background.

4.9 Walnut Street Between Pittsburgh Avenue and New York Avenue

Issue: There is a low point between the sidewalk and edge of road where the stormwater runoff from upgradient areas collects and does not drain.

Potential Solution: Upon further analysis, it may be recommended that a drainage structure be installed and connect it into existing drainage infrastructure along Walnut Street to reduce ponding in this area.

Figure 21. Area with evidence of ponded stormwater on Walnut Street Between Pittsburgh Ave and New York Ave.

4.10 Walnut Street Between New York Avenue and Philadelphia Avenue

Issue: Stormwater runoff from upgradient areas ponds in this general vicinity and does not drain due to the existing topography being relatively flat and there is no drainage infrastructure in close proximity.

Potential Solution: Upon further analysis, it may be recommended to install a catch basin in this area to collect the stormwater runoff from the upgradient areas.

Figure 22. Area with evidence of ponded stormwater on Walnut Street Between New York Ave and Philadelphia Ave.

4.11 Walnut Street East of Philadelphia Avenue

Issue: Stormwater runoff flows down the homeowner's driveway and collects at the bottom of the driveway at the edge of the road.

Potential Solution: Upon further analysis, it may be recommended to install drainage infrastructure to collect stormwater in this area or raise the grade of the driveway to meet the edge of road asphalt pavement so the stormwater runoff flows to the nearest catch basin.

Figure 23. Area where stormwater runoff ponds at the end of the residential driveway on Walnut Street.

4.12 Warsaw Avenue Between Farrell and Maple Streets

Issue: After heavy rainfall events, stormwater runoff ponds at the catch basin on Warsaw Ave between Farrell and Maple Streets. The pipes connecting into the catch basin may be clogged and are unable to properly manage the runoff. In the winter months, this area of the road becomes hazardous due to the ice that forms from the ponded water freezing.

Potential Solution: Further inspection of the existing infrastructure is needed to determine if there are any blockages in the pipes. If debris or sediment accumulation is found, the blockage(s) could be cleared by using high-pressure water jets and vacuum equipment. The City could then develop a maintenance schedule to ensure that the catch basin is regularly cleaned to remove debris, sediment, or trash build up; to identify and address any potential system blockages prior to flooding issues arising.

If no blockages are found in the pipes, additional catch basins or larger diameter piping could be installed to allow a larger volume of runoff to enter and be adequately conveyed through the system.

Figure 24. Catch basin on Warsaw Ave between Farrell and Maple Streets.

Figure 25. Alternate view of catch basin on Warsaw Ave between Farrell and Maple Streets.

4.13 Intersection of Warsaw Avenue and Maple Street

Issue: The area surrounding the existing catch basin at the north side of the intersection of Warsaw Avenue and Maple Street ponds stormwater runoff in large storm events. It is likely that the catch basin does not have adequate capacity to manage the stormwater runoff flowing to it.

Potential Solution: Further inspection of the outflow pipe is needed to ensure that it is not clogged or damaged. If no blockages are found, it may be recommended to install an additional catch basin on the opposite side of the driveway to collect the flow that does not drain into the existing catch basin.

Figure 26. Area where stormwater runoff ponds at end of residential driveway at intersection of Warsaw Ave and Maple Street.

Figure 27. Close up of catch basin at end of residential driveway at intersection of Warsaw Ave and Maple Street.

4.14 Intersection of Warsaw Avenue and Leonard Street

Issue: Stormwater runoff flows down the sidewalk and flooding the sidewalk, edge of the road, and bottom of the driveway on the north side of the intersection of Warsaw Avenue and Leonard Street. During heavy storms, the water ponds on the sidewalk and road and in the winter the water turns to ice, causing safety hazards.

Potential Solution: Upon further analysis it may be recommended to install additional drainage infrastructure at the edge of the curb where the stormwater runoff ponds to help prevent hazardous road and sidewalk conditions in this area.

Figure 28. Area on the north side of the intersection of Warsaw Ave and Leonard Street where stormwater ponds.

4.15 Intersection of Warsaw Avenue and Mulberry Street

Issue: After heavy rainfall events, the catch basin on the south side of Warsaw Avenue at the intersection of Mulberry Street ponds stormwater runoff. It is possible that the pipes connecting into the catch basin may be clogged and are unable to properly manage the runoff flowing to the structure. In the winter months, this area of the road becomes hazardous due to the ice that forms from the ponded water freezing.

Potential Solution: Further inspection of the existing infrastructure is needed to determine if there are any blockages in the pipes. If debris or sediment accumulation is found, the blockage(s)

could be cleared by using high-pressure water jets and vacuum equipment. The City could then develop a maintenance schedule to ensure that the catch basin is regularly cleaned to remove debris, sediment, or trash build up; to identify and address any potential system blockages prior to flooding issues arising.

If no blockages are found in the pipes, additional catch basins or larger diameter piping could be installed to allow a larger volume of runoff to enter and be adequately conveyed through the system.

Figure 29. Close up of catch basin where stormwater ponds at intersection of Warsaw Ave and Mulberry Street.

Figure 30. Intersection of Warsaw Ave and Mulberry Street.

4.16 North End of Penrose Avenue

Issue: Significant "alligator cracking" and pavement degradation exists at the north end of Penrose Avenue as a result of frequent ponding of water and lack of drainage. Stormwater frequently ponds throughout the area in the low points of the road and is reducing the pavement integrity and accelerating the alligator cracking. There is also an existing pothole near the utility pole that holds water when it rains.

Potential Solution: It is recommended to repair the pothole and remove and replace the sections of asphalt affected by alligator cracking. Inspection and repair of the subbase and subgrade layers to ensure adequate thickness for base layers and pavement layers would also be recommended. Upon further analysis it may be recommended to install a drainage structure in this area to collect the stormwater runoff to prevent alligator cracking and water accumulation in the future.

Figure 31. Pothole and "Alligator cracking" at North end of Penrose Ave.

4.17 Intersection of N 8th Avenue and Broadway

Issue: Stormwater runoff ponds on the southwest side of the intersection of N 8th Avenue and Broadway. Currently there are no drainage structures in this area. There is a catch basin opposite the driveway but it is slightly upgradient and likely does not capture the runoff flowing along the western side of N 8th Avenue.

Potential Solution: Upon further analysis it may be recommended to install a catch basin in this area and tie it into the existing stormwater infrastructure in the area.

Figure 32. Area where stormwater ponds on the Southwest side of the intersection of N 8th Ave and Broadway.

5.0 CONCLUSIONS

Upon initial analysis of the data collected by B&L field investigations, there are currently some gaps in the data due to a variety of reasons. There were a few manhole structures that were unable to be physically opened with a magnetic manhole cover lifter, and therefore it was not possible to determine which pipes may connect into those structures and what their invert elevations are, with 100% certainty. Other gaps in the data result from incomplete recordkeeping to verify which structures connect to one another, or how the existing stormwater management system has changed over time. Due to these findings, assumptions have been made at this time as it relates to the system mapping. Additional, and potentially more in-depth, field investigations to gain more certainty regarding the current layout of the City's stormwater infrastructure is necessary as part of the annual MS4 program requirements. For instance, it may be necessary to perform dye testing to better understand the direction of flow in a number of existing pipes. Other more intrusive methods may involve visually inspecting the existing pipe network through CCTV to gain a better understanding of existing conditions, blockages, and connections between structures. Once a more accurate map of the City's stormwater infrastructure has been developed, further hydrological and hydraulic analyses can be completed to identify other potential problem areas needing drainage improvements or identify causes of ongoing drainage issues.

Estimated project cost estimates have been produced for the potential solutions mentioned in this report and are provided in **Table 1** below. This should be considered concept level estimates only and will be refined as those specific areas are further evaluated and designed. Assumptions related to the cost estimates provided in **Table 1** are described below:

4.1 & 4.2) 1st Avenue (Including Spring Street Intersection) Improvements

Improvement cost estimates assume the work will consist of replacing 1,400LF of existing drainage pipe with 36" diameter HDPE pipe, as well as replacing or installing 8 catch basins total along the alignment. Work is also assumed to include saw cutting, demolition and excavation of existing pavement and subbase for half of the roadway, pipe trenching, as well as complete restoration of the full pavement section. Costs also include contingencies for design, permitting and construction services.

4.3) South Central Ave Railroad Bridge Area to Anthony Kill Improvements

Improvement cost estimates assume the work will consist of replacing 1,750LF of existing drainage pipe with 48" diameter HDPE pipe, as well as replacing or installing 15 catch basins total along the alignment. Work is also assumed to include saw cutting, demolition and excavation of existing pavement for half of the roadway, sidewalks and subbase, pipe trenching,

as well as complete restoration of the full pavement section, and sidewalk restoration. Costs also include contingencies for design, permitting and construction services.

4.4) Tallmadge Park Improvements

Improvement cost estimates assume the work will consist of installing 750LF of 6" diameter perforated HDPE pipe, and drainage stone (i.e., French drain). Work is also assumed to include pipe trenching, as well as complete restoration of adjacent grassed areas. Costs also include contingencies for design, permitting and construction services.

4.5) 1st Ave to South Main Street & Ellsworth Ave Railroad Bridge Area Connection and Underwood Ave Outlet Improvements

Improvement cost estimates assume the work will consist of replacing 1,300LF of existing drainage pipe with 550 LF of 36" HDPE pipe and 750LF of 48" diameter HDPE pipe, as well as replacing or installing 9 catch basins total along the alignment. Work is also assumed to include saw cutting, demolition and excavation of existing pavement for half of the roadway, sidewalks and subbase, pipe trenching, as well as complete restoration of the full pavement section, and sidewalk restoration. Costs also include contingencies for design, permitting and construction services.

4.6) South Main Street (Alexander J Ave, Arnold Ave, Paul Luther Park) Improvements

Improvement cost estimates assume the work will consist of replacing 810LF of existing drainage pipe with 12" diameter HDPE pipe, as well as replacing or installing 4 catch basins total along the alignment. Work is also assumed to include saw cutting, demolition and excavation of existing pavement and subbase for half of the roadway, pipe trenching, as well as complete restoration of the full pavement section and supplementing settled areas with additional subbase as needed to remove low spots and promote drainage. Costs also include contingencies for design, permitting and construction services.

4.7) Railroad Street Improvements

Improvement cost estimates assume the work will consist of replacing 570LF of existing roadway for the full width of the road. Work is also assumed to include saw cutting, demolition and excavation of existing pavement and subbase, as well as complete restoration of the full pavement section and supplementing settled areas with additional subbase as needed to remove low spots

and promote drainage. Costs also include contingencies for design, permitting and construction services.

4.8 – 4.11) Walnut Street (All Intersections) Improvements

Improvement cost estimates assume the work will consist of replacing 935LF of existing drainage pipe with 15" diameter HDPE pipe, as well as replacing or installing 6 catch basins total along the alignment. Work is also assumed to include saw cutting, demolition and excavation of existing pavement and subbase for half of the roadway, pipe trenching, as well as complete restoration of the full pavement section. Costs also include contingencies for design, permitting and construction services.

4.12 – 4.15) Warsaw Ave (All Intersections) Improvements

Improvement cost estimates assume the work will consist of replacing 1,050LF of existing drainage pipe with 15" diameter HDPE pipe, as well as replacing one catch basin along the alignment. Work is also assumed to include saw cutting, demolition and excavation of existing pavement and subbase for half of the roadway, pipe trenching, as well as complete restoration of the full pavement section. Costs also include contingencies for design, permitting and construction services.

4.16) Penrose Ave Improvements

Improvement cost estimates assume the work will consist of replacing 100LF of existing drainage pipe with 12" diameter HDPE pipe, as well as replacing or installing 4 catch basins total along the alignment. Work is also assumed to include saw cutting, demolition and excavation of existing pavement and subbase for half of the roadway, pipe trenching, as well as complete restoration of the full pavement section and supplementing settled areas with additional subbase as needed to remove low spots and promote drainage. Costs also include contingencies for design, permitting and construction services.

4.17) N 8th Ave and Broadway Improvements

Improvement cost estimates assume the work will consist of replacing 165LF of existing drainage pipe with 24" diameter HDPE pipe, as well as replacing or installing 2 catch basins along the alignment. Work is also assumed to include saw cutting, demolition and excavation of existing pavement and subbase for half of the roadway, pipe trenching, as well as complete restoration of

the full pavement section. Costs also include contingencies for design, permitting and construction services.

While all potential solutions could improve drainage conditions throughout the City, there are a few possible future projects that could have more notable impacts on the existing drainage issues. Both the 1st Avenue Improvements and 1st Ave to South Main Street & Ellsworth Avenue Railroad Bridge Area Connection and Underwood Avenue Outlet Improvements would help to alleviate flooding in multiple sections of the City that experience the most significant flooding events. Both potential projects would involve replacing the existing infrastructure with larger (36-48" diameter) HDPE piping and supplementing the system with additional catch basin street inlets to further aid in collection of street runoff into the system in these areas. The estimated construction costs for these two projects are $1,200,000 and $1,400,000 respectively. If the City wishes to implement these projects, it would be recommended to research, identify, and pursue public funding sources for these projects.

Table 1. Estimated project cost estimates for drainage improvements.

Drainage Issue Area Potential Improvements	**Estimated Cost**
4.1 & 4.2) 1st Avenue (Including Spring Street Intersection) Improvements	$1,300,000
4.3) South Central Ave Railroad Bridge Area to Anthony Kill Improvements	$2,030,000
4.4) Tallmadge Park Improvements	$220,000
4.5) 1st Ave to South Main Street & Ellsworth Ave Railroad Bridge Area Connection and Underwood Ave Outlet Improvements	$1,510,000
4.6) South Main Street (Alexander J Ave, Arnold Ave, Paul Luther Park) Improvements	$530,000
4.7) Railroad Street Improvements	$460,000
4.8 – 4.11) Walnut Street (All Intersections) Improvements	$760,000
4.12 – 4.15) Warsaw Ave (All Intersections) Improvements	$840,000
4.16) Penrose Ave Improvements	$110,000
4.17) N 8th Ave and Broadway Improvements	$170,000
Total Cost of Improvements	**$7,930,000**

Path: C:\Users\mtedra\Documents\ArcGIS\Projects\Mechanicville Drainage Issue Locations.mxd

Figure	Project No.
1	991.059.001

City of Mechanicville

Mechanicville Drainage Issue Locations

Saratoga County New York

August 2024

List of Drainage Issue Locations	
4.1	Southern End of 1st Ave.
4.2	Intersection of Spring St. and 1st Ave.
4.3	Under the Existing Railroad Trestle over S. Central Ave.
4.4	Tallmadge Park
4.5	Intersection of Ellsworth Ave and S. Main St.
4.6.1	Along S. Main St. South of Riverside Park South
4.6.2	Along S. Main St. adjacent to Paul Luther Park
4.6.3	Along S. Main St. between Alexander J. Ave. and Arnold Ave.
4.7	Railroad St. between Broadway and Park Ave.
4.8	Walnut St. West of Pittsburgh Ave.
4.9	Walnut St. between Pittsburgh Ave. and New York Ave.
4.10	Walnut St. between New York Ave and Philadelphia Ave.
4.11	Walnut St. East of Philadelphia Ave.
4.12	Warsaw Ave. between Farrell and Maple St.
4.13	Intersection of Warsaw Ave. and Maple St.
4.14	Intersection of Warsaw Ave. and Leonard St.
4.15	Intersection of Warsaw Ave and Mulberry St.
4.16	North End of Penrose Ave.
4.17	Intersection of N 8th Ave. and Broadway

1 inch = 700 feet

Sources: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Barton & Loguidice