



STORMWATER MASTER PLAN



Prepared by:



EXECUTIVE SUMMARY

DeKalb County frequently experiences flooding as a result of an outdated and inadequate stormwater infrastructure. The current network of storm sewers, culverts, ponds, and related structures is significantly aged and requires substantial effort and funding to operate and maintain. Over time, the county's stormwater program has become reactive in addressing system problems. This lack of proactive maintenance has led to public safety issues and environmental issues, such as sinkholes and roadway washouts (see **Figure ES-1**). Wash out of critical roadways can isolate homes, businesses, and worse prevent access for emergency services. Consequently, unplanned repair costs amounting to hundreds of thousands of dollars are incurred by county residents and businesses, disrupting planned work and necessitating immediate attention and resources from county staff. To address these challenges, it is essential for county staff to prioritize adopting a proactive approach to stormwater management moving forward.



Figure ES-1. Sinkholes and Roadway Washouts Caused by Drainage System Issues

The DeKalb County Stormwater Utility (SWU) was formed in 2003 and the County uses its funds to manage and perform maintenance of stormwater infrastructure within unincorporated DeKalb County and the City of Stonecrest. The SWU was initially created to manage and fund the County's obligations under the National Pollutant Discharge Elimination System (NPDES) Stormwater Phase I Permit, but the SWU has assumed additional responsibilities, such as bridge maintenance and has undergone many changes including changes in service area and NPDES Permitting requirements, that have necessitated the development of its first comprehensive Stormwater Master Plan.

This "high-level" strategic master plan offers a vision for the County to progress to a proactive stormwater management program that can address the present and anticipated future program needs. A practical road-map is provided to achieve this vision over a planned multi-year time horizon. The plan also identifies the need for more detailed watershed-level evaluations to address site-specific concerns.

The master plan includes steps necessary to implement a successful program, provided that a committed and sustained effort is undertaken by the County to implement the plan and maintain adequate funding.

EXISTING CHALLENGES

One of the key challenges facing the County is that over the years the service area (see [Figure ES-2](#)) has decreased in size along with a significant reduction in associated revenues, resulting in the County having to do more with less while maintaining an aging drainage system. Because of the reduced revenue, Public Works, Roads and Drainage staff generally is not able to plan ahead for capital improvement and renewal projects and instead must focus on reacting to emergencies or unforeseen events that often drain the County's allocated budget. Additionally, the regulatory requirements have changed significantly in some cases, with more activities required such as reporting inspection on specific structures ID's to address water quality protection.

Another challenge is determining the extent of service area for which the County has primary responsibility. The County is responsible for drainage infrastructure located on County roadways (within the right-of-way), on County-owned properties, and in some instances on private property where the County has drainage easements. The same appears to be true for Stonecrest. The County, however, does not appear to have adequate records for the majority of its drainage easements in order to determine which of the stormwater infrastructure on private properties is part of the County's extent of service area. Therefore, it cannot be said with certainty but the total length of storm sewer infrastructure within the SWU's jurisdiction is more than 3.6 million feet in length.

Maintenance of drainage assets is a significant challenge for the SWU. Maintenance needs are identified during routine regulatory-driven inspections and through citizen complaints. Whether noted in an inspection or as a result of a citizen complaint, all service requests are logged and then sent to an inspector for further investigation. These investigations are required to help define the nature of the services needed, identify work constraints before crews are dispatched, as well as determine if the request falls within the County's responsibility. Because numerous service requests can be generated from a single storm event and staff and resource constraints, it is common for the backlog of service requests to number in the hundreds awaiting investigation. At the end of 2022, several staff positions that were funded for Roads and Drainage remained unfilled. To address staff shortages and meet other demands, the SWU funded a team of consultants and contractors over the years to provide engineering services as well as pipe repair and lining services, but maintenance remains an ongoing challenge.

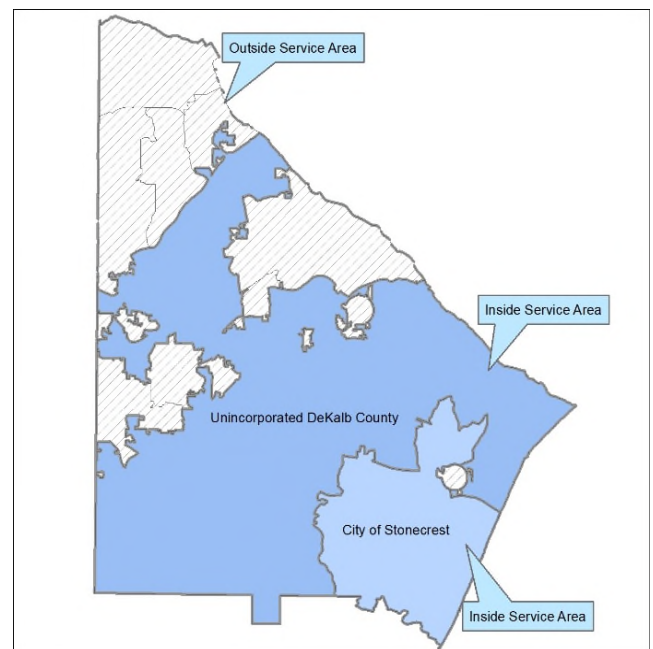


Figure ES-2. SWU Program Service Area

The SWU's function, funding, and management were evaluated using a scorecard assessment approach to determine overall performance. Regarding the SWU's function, a lack of defined/proactive program elements necessary for a successful stormwater management program was noted. Opportunities for enhancing equity in the SWU's rate structure and other rate program deficiencies were noted for funding. Regarding management of the SWU, the County's public engagement program scored low and was identified as an area for potential improvement. Although challenges with the existing program were noted, opportunities for future success were also identified.

RISK-BASED APPROACH TO ASSET MANAGEMENT

As the County moves from a reactive to a more proactive stormwater management program, asset risk should be used to prioritize operation and maintenance (O&M) and capital program projects across its four primary work areas: routine maintenance, corrective maintenance, capital improvement and renewal, and regulatory compliance. Risk is based on the probability of failure (POF) of an asset due to its condition and performance multiplied by its consequence of failure (COF) based on cost, social, and environmental factors. **Figure ES-3** illustrates how POF and COF scores dictate whether an asset falls within the preventative or predictive maintenance categories, which are part of SWU's O&M program, or the renewal/replacement category, which is part of the CIP program.

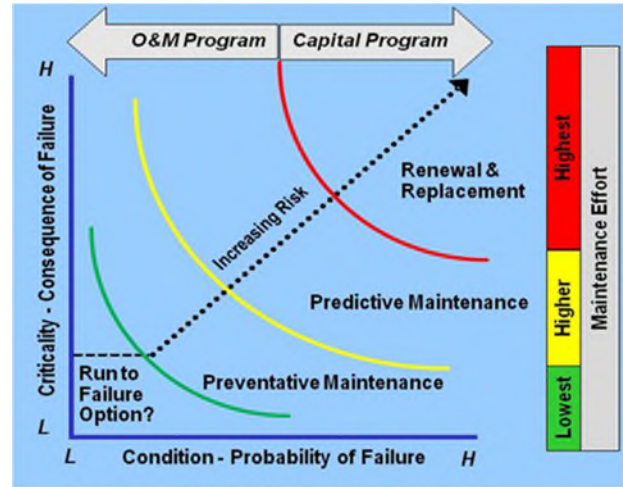
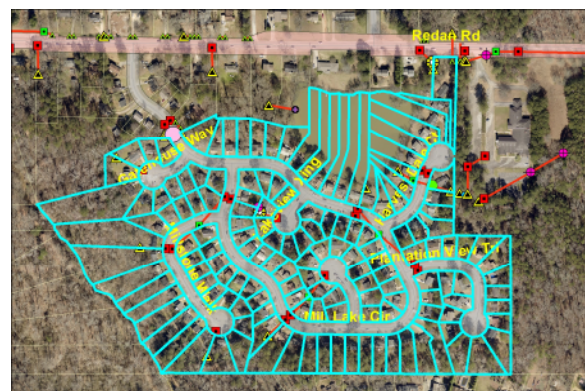


Figure ES-3. Risk Determination for O&M vs CIP Program

There are many factors that are recommended for the County to consider when identifying overall risk of an asset or project. These risk factors include single ingress/egress routes; pipe location relative to right-of-way, pavement, and roadway classification; pipes conveying stream flows and perennial waterways; asset material; pipe size; remaining useful life; loss of access to critical facilities; distance from impaired streams; structural condition; and blockage/obstructions. Based on an initial risk assessment of the various pipes in the County, one specific subset of pipes was identified as very high risk – large-diameter corrugated metal pipes that are located under single ingress/egress roadways. The primary concern is that if these pipes were to collapse, they are large enough to cause the road to become impassable for residents, businesses, and emergency services. In the figure below, a double 48-inch culvert conveys a stream under Mill Lake Circle. If the pipe were to fail and the roadway become unpassable, then all properties highlighted in blue would be cut off from Redan Road (the only way out of the neighborhood).



Figure ES-4. Single Ingress/Egress Route Example



The following figure illustrates asset data types considered in the risk assessment. Graphs represent the total length of pipes in each category.



Figure ES-5. Types of Information Considered in the Risk Assessment

INCREASED RISK TO INFRASTRUCTURE FROM FUTURE DEVELOPMENT

Projected future land use in *The DeKalb County 2050 Unified Plan: Comprehensive Land Use Plan* was compared to existing land use. The comparison shows that unincorporated DeKalb County has several areas with projected net increase in impervious areas. The future land use for the City of Stonecrest is nearly identical to the existing land use. **Figure ES-6** shows these areas and the details of one example area just southwest of the I-20 and I-285 interchange along Flat Shoals Road within Unincorporated DeKalb County, where future land use would result in an increase in percentage of impervious surfaces. Major culverts downstream of these areas could be potentially impacted by future development and consisted of those under roadways that were owned or maintained by the County (principally those in unincorporated DeKalb County and the City of Stonecrest). Based on a qualitative assessment at this time, these culverts may not meet their Level of Service in the future. A more detailed analysis of these and ways to mitigate any impacts from future development by either upsizing a culvert or providing regional detention in areas upstream of increase impervious area to reduce flows down to its capacity will be undertaken in watershed-based implementation plans.

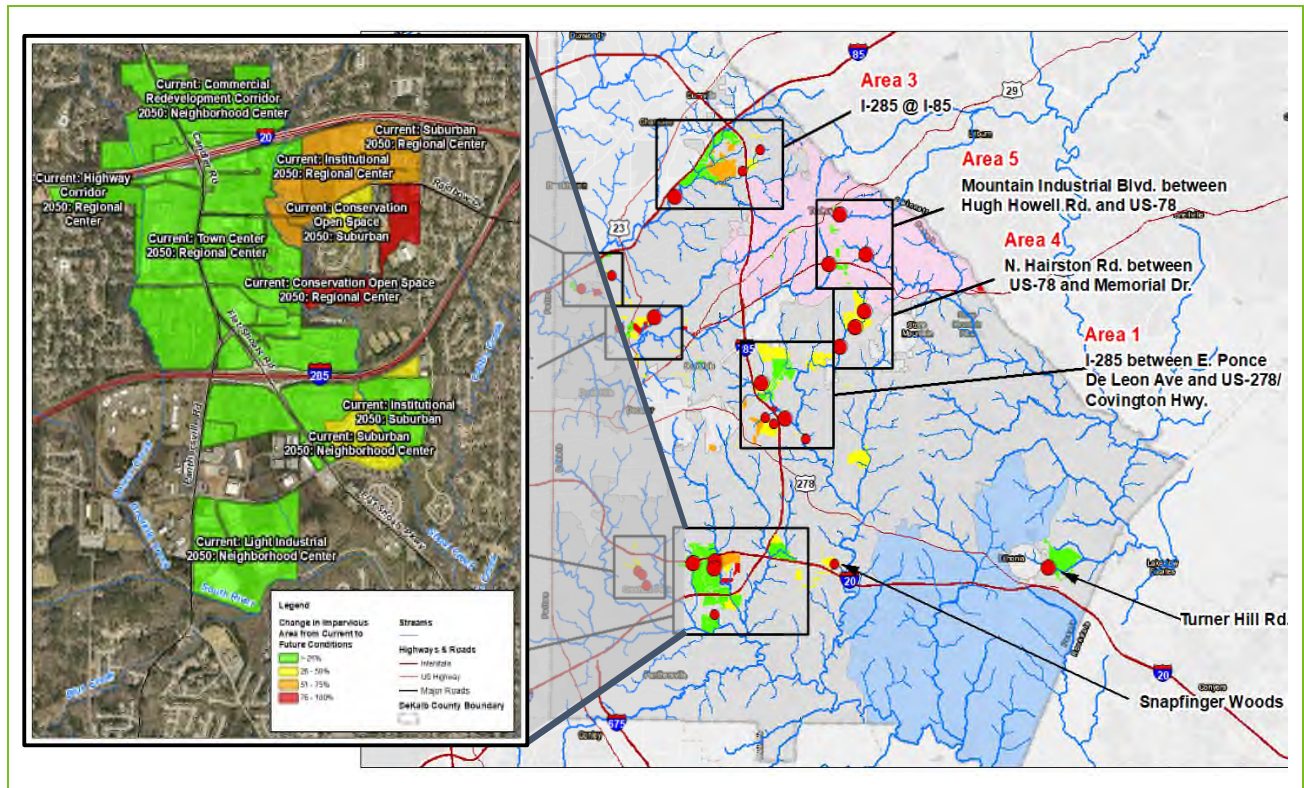


Figure ES-6. Major Areas of Significant Changes in Projected (Future) Land Use

CAPITAL RENEWAL AND REPLACEMENT--

An estimate of closed conveyance renewal and replacement (R&R) project costs over the next 20 years is provided for unincorporated DeKalb County and the City of Stonecrest in **Figure ES-7**. The total estimated cost for unincorporated DeKalb County is more than \$530 million, with almost half of that amount for R&R of pipes associated with local roadways. Annual expenditures are estimated at almost \$49 million. For Stonecrest, the total estimated cost is more than \$100 million, with annual expenditures estimated at \$8.7 million. To reduce risk in a cost-effective manner, repair/replacement of high-risk pipes associated with single ingress/egress and arterial/collector roads should be prioritized over pipes in local roadways or off the ROW.

Stormwater infrastructure renewal estimate for unincorporated DeKalb County exceeds \$500M.

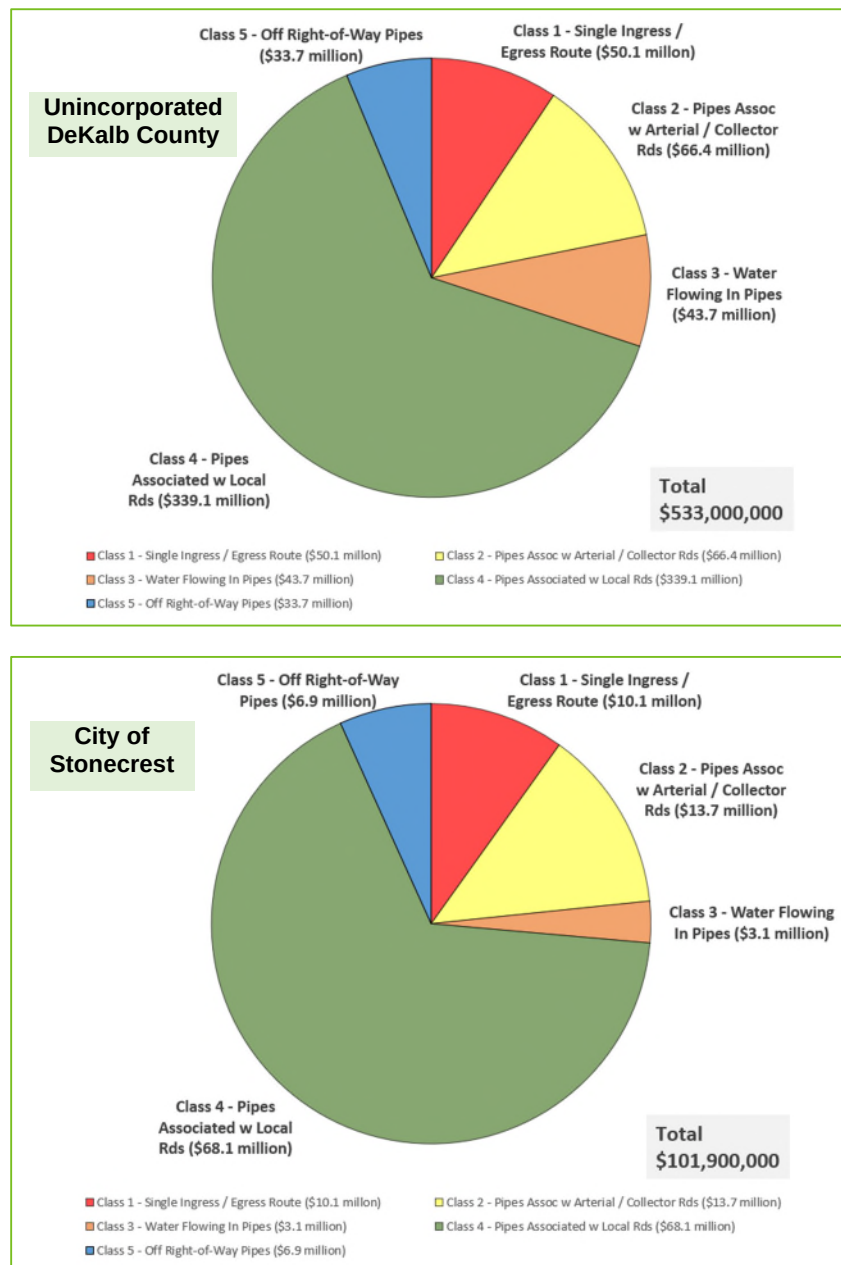


Figure ES-7. Stormwater Infrastructure Renewal Cost Estimates for Unincorporated DeKalb County and City of Stonecrest

FUNDING NEEDS

The majority of funding for the County's stormwater program is derived from its SWU. The SWU charges a fee to all developed properties based on the amount of impervious surface on each parcel of land, referred to as an equivalent residential unit (ERU). The fee per ERU has been \$48 per year since the inception of the SWU; however, the cost to conduct stormwater operations has increased while the SWU service area has decreased. This has caused expenditures to exceed revenues, and the SWU has been using fund balances or other sources to maintain operations.

A comprehensive review of the stormwater program funding needs and the stormwater utility is recommended every 3 to 5 years.

A rate increase was approved by County Commissioners on May 23, 2023. The rate for 2023 is \$96 per ERU per year, with the rate increasing in 2024 (\$108 per ERU per year) and again in 2025 (\$120 per ERU per year). The additional revenue will be used to fund the stormwater program without using reserves, but is also intended to be used to address the backlog of work orders, increase the County's responsiveness in addressing failed pipes and catch basins, increase the maintenance of the County's existing detention ponds, build a CIP reserve for emergency projects, begin an enhanced infrastructure inspection program to identify maintenance needs, and begin proactively addressing identified maintenance needs from inspections. New pipe repair and pond maintenance staff will be added as part of the funding increase and additional services such as catch basin cleaning and pipe inspection will be contracted out.

While the recent rate increase will provide much needed revenue, it is significantly below what is needed to adequately address stormwater management needs in the SWU service area (unincorporated county and Stonecrest at the time of this report). **Figure ES-8** provides a comparison of annual billings revenue versus expenditures and projected CIP needs. Expected revenues to be generated from stormwater fees are represented by the blue line. This revenue includes the rate increase noted above and will cover the base program and a CIP reserve set-aside amount from Fiscal Year 2023 through 2028. As evident by **Figure ES-8**, capital renewal (both high risk and moderate risk assets) funding is largely unmet (estimated to be nearly \$60 million per year) even with the additional revenue from the recent rate increase. Critical high risk capital improvement projects include, among many other assets, renewal and replacement of old, undersized corrugated metal pipe (CMP) culverts under single ingress/egress roads, major roadways, or those with possibly corroded bottoms because of flowing water. These are the ones most at risk of failure as shown in **Figure ES-4**. Other high or moderate risk assets include severely aged or undersized pipe systems leading to system failure and risk to public health or safety. Significant investment beyond the recent rate increase will be required to address renewal of existing infrastructure as that ages further over the years.

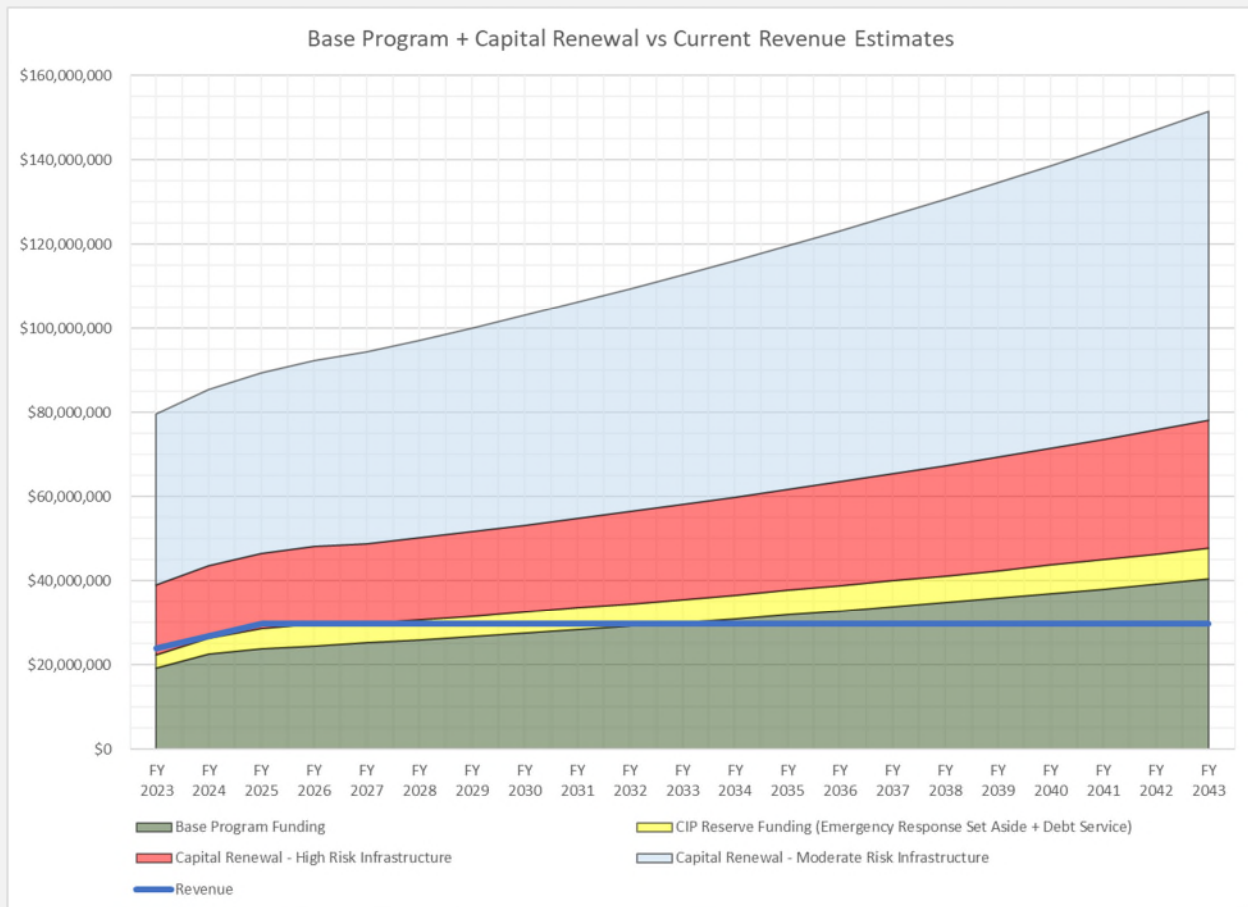


Figure ES-8. SWU Program Revenue vs Expenditures & Capital Renewal Estimates

Having a dedicated source of funding such as a stormwater utility is the most effective way to maintain consistent revenues for a stormwater program. However, it is recommended that other funding streams such as Special Purpose Local Option Sales Tax (SPLOST), infrastructure improvement bonds and loan programs utilizing strategic debt financing, and national, state, and local grants be considered to supplement or leverage existing program funds. Additional fund sources will allow the County to expand its services and implement additional capital projects while maintaining lower stormwater utility fee rates.

PROGRAM RECOMMENDATIONS

A scorecard assessment was conducted to identify a recommended program baseline for the SWU (see [Figure ES-9](#)) that will be used to make the County more proactive in how it manages its stormwater assets while being more efficient with its resources. These baseline program elements were used to develop a roadmap for the program to provide a solid foundation and will allow the SWU to meet its current and future needs.



Figure ES-9. Stormwater Program Recommendations

Four stormwater infrastructure elements (see [Figure ES-10](#)) are recommended for operation, maintenance, repair, and renewal of the County's stormwater program moving forward. To differentiate whether a project should be categorized as a CIP or corrective maintenance item, a value of \$250,000 is recommended and should be used while the master plan is implemented as the program matures. This value can be revisited after 5 years or another appropriate time based on projected capital projects volume, inflation, or other cost escalation factors.



Figure ES-10. Recommended Stormwater Infrastructure Program Elements

Routine Maintenance. It is recommended that catch basin cleaning, detention pond cleaning, closed-circuit television (CCTV) inspection, and other routine maintenance items be increased as the program becomes more proactive. Brief descriptions of the recommended activities for each routine maintenance item follow:

- Catch Basin Cleaning – Focus on complaints and areas of recurring flooding.
- Pipe Cleaning – Start CCTV inspection program and include pipe cleaning as the program evolves.
- Pond Maintenance – Define inspection frequency for County-maintained ponds and perform maintenance as required (note that hydrologic and hydraulic evaluations of ponds must be performed to determine continued need of each pond based on function and performance).
- Dam Maintenance – Define inspection frequency for County-maintained dams and perform maintenance as required.
- Assessment Tools – Use criteria and processes recommended in Chapter 3 of this Stormwater Master Plan to assess assets.

Corrective Maintenance. Corrective maintenance will vary based on need and budget available. In future years, especially for pipe and culvert repairs, it is recommended that corrective maintenance be increased and linked to a more proactive CIP prioritization process. Brief descriptions of the recommended activities for each corrective maintenance item follow:

- Pipe Lining – Address those assets with needs during the 20-year planning period unless identified as having structural or capacity issues that necessitate replacement.
- Pipe Repair/Replace – Address those assets with needs during the 20-year planning period unless identified as having structural or capacity issues that necessitate replacement and upgrade.
- Emergency Repair/Sinkholes – Perform on a reactionary basis only.
- Catch Basin/Junction Box Repair – Continue to address based on complaints but start a more proactive inspection, cleaning, and repair program.
- Ditch Cleaning – Continue to address based on complaints but start a more proactive inspection, cleaning, and repair program.
- Bridge Maintenance – Incorporate into asset condition inspection program (tie to Georgia Department of Transportation inspection program).

Capital Improvements & Renewal. A CIP prioritization process based on relative significance and potential risk is recommended for evaluating and rating future major repair, rehabilitation, and replacement projects and will differentiate between CIPs and corrective maintenance items.

The three primary goals of the CIP process are to:

- Use likelihood of failure (condition and performance) and consequence of failure (triple bottom line analysis addressing cost, social, and environmental concerns) to evaluate projects.
- Use risk scores from the project evaluation process to rate CIPs.
- Use CIP ratings and benefit-cost analysis data to prioritize projects for grant funding pursuits and implementation.

A lack of condition and performance data currently limits the ability to pair this information with criticality data to prioritize specific at-risk capital improvement and O&M projects. Therefore, while this method

should be used in the future, a more simplified two-step process (shown in *Figure ES-11*) is recommended for initial use.

STEP 1 Rating Criteria Based on Level of Risk and Consequence	STEP 2 Ranking Criteria Based on Ability to be Implemented or Funded
• High Risk/Consequence - o Loss of access - o Imminent failure of asset - o Structure flooding • Medium Risk/Consequence - o Non-flooding safety issues - o Multiple properties impacted • Low Risk/Consequence - o Non-structural flooding	• Project cost • Permitting challenges • Required easement/property acquisition • Located in disadvantaged area • Benefit Cost Analysis (BCA) criteria • Potential for funding

Figure ES-11. Two-Step CIP Prioritization Process

This simplified process accounts for elements of a triple bottom line analysis while allowing projects to be prioritized based on type of issue and eliminates the need to score projects individually in the first step of the project evaluation process. SWU staff can identify future projects that are fundable, address urgent water quantity/quality issues, and improve overall conditions within the County’s drainage network. Based on the initial project assessment and alignment of ranked projects with potential funding sources, those projects that do not appear likely to achieve a positive benefit to cost ratio will be downgraded and those that appear likely to merit funding consideration will move forward for further consideration as part of the County’s CIP program.

Regulatory Compliance. The SWU currently conducts compliance activities related to its Municipal Separate Storm Sewer System (MS4) Permit for the unincorporated areas of the County as well as the City of Stonecrest. It has consistently met its requirements under the permit and received approval of the annual reports documenting its activities each year. However, there are opportunities for improvement within the program, with brief descriptions of recommended activities provided below:

- MS4 Permit Annual Compliance – Enhance the public education/involvement program and other minimum control measures as desired.
- Drainage System Updates – Tie to increased condition inspection program.
- Inspections – Update forms to make the stormwater asset management program more robust.

Regional Approaches and Nature-Based Solutions. Stormwater projects are frequently constructed to address site-specific flooding or water quality concerns, and often this is the only approach considered. While necessary in some cases, there may be opportunities to take a more regional approach that addresses multiple concerns and provides broader community benefits. One example is regional stormwater detention or retention ponds combined with a community amenity where there may be an absence of adequate green or blue space in that part of the community. Nature-based solutions can be used to create or enhance amenities in parks. Restoration of degraded areas can provide wildlife habitat, viewing areas, and opportunities for outdoor education. Buried streams and springs can be unearthed and restored to provide interactive water features such as wetlands, ponds, and creeks for public use. These projects can address equity and enhance public wellbeing and resilience in underserved or underprivileged communities that often lack such amenities. Nature-based solutions serve as multi-benefit infrastructure that meet core community needs while also providing co-benefits.

A ROADMAP FOR PROGRAM IMPLEMENTATION

The Stormwater Master Plan summarizes existing County stormwater programs, assesses stormwater program needs, and identifies potential program areas that can be improved to provide a more proactive O&M and CIP programs. A detailed list of specific, recommended program improvements by time frame is provided on [Figure ES-12](#). The recommendations in the roadmap include a wide range of program elements that should be considered by SWU as it moves toward a more proactive O&M and CIP program.

The roadmap provides a reasonable framework to achieve short- and long-term improvements as it is not feasible to implement all program recommendations immediately, provided adequate funding is maintained.

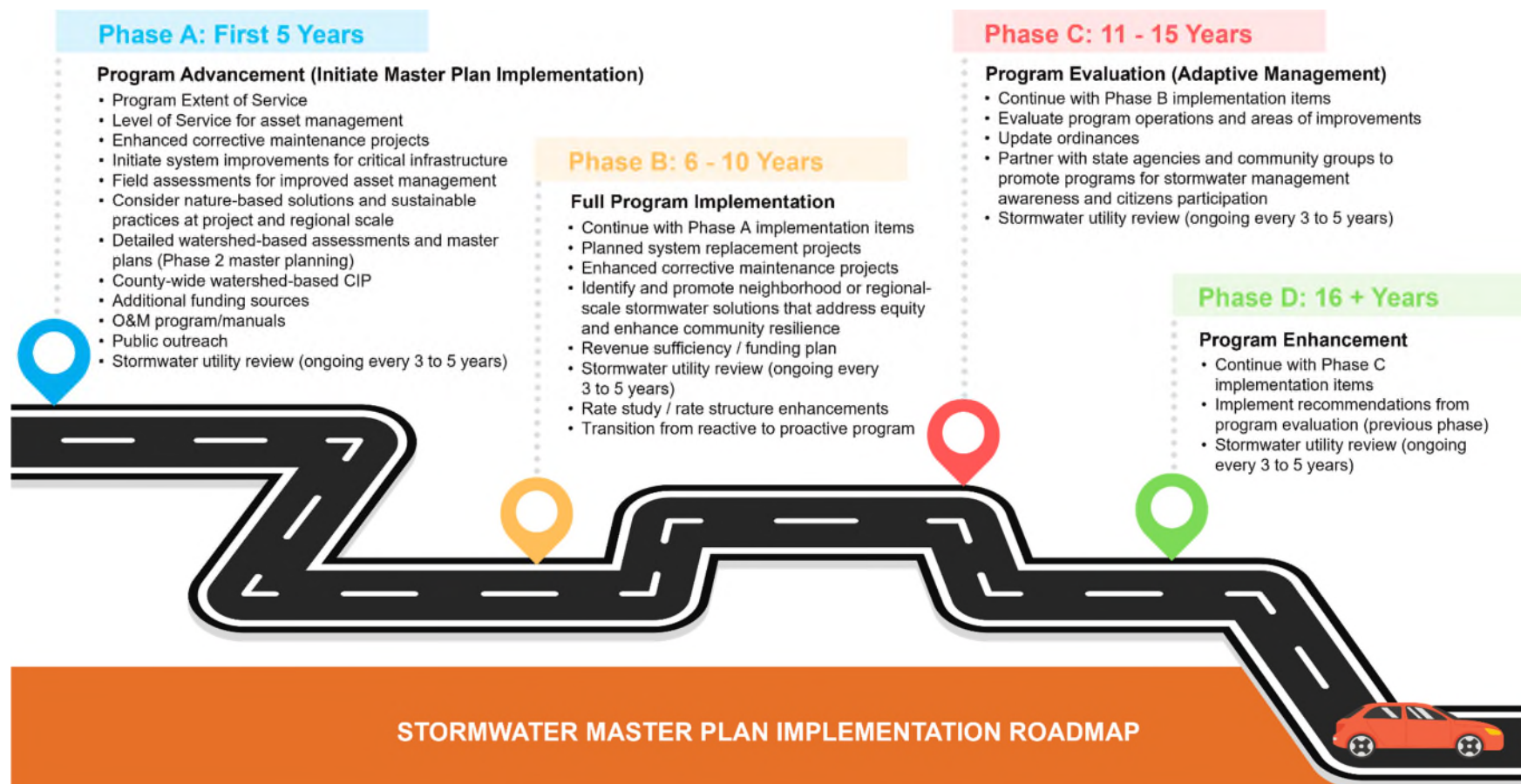


Figure ES-12. Recommended Stormwater Program Implementation Roadmap