

Stormwater Management

PROGRAM DESCRIPTION

Fairfax County's Stormwater Management program is managed on a comprehensive watershed basis and consists of: Regulatory Compliance, Dam Safety and Facility Rehabilitation, Stream and Water Quality, Emergency and Flood Control, Conveyance System Rehabilitation, contributory funding requirements and Operational Support.

LINK TO THE COMPREHENSIVE PLAN

Fairfax County's Comprehensive Plan has established a number of objectives and policies in order to:

- ✓ Identify, protect and enhance an integrated network of ecologically valuable land and surface waters for present and future residents of Fairfax County.
- ✓ Prevent and reduce pollution of surface and groundwater resources in order to protect and restore the ecological integrity of streams in Fairfax County.
- ✓ Apply better site design and low impact development (LID) techniques, and pursue commitments to reduce stormwater runoff volumes and peak flows, to increase groundwater recharge, and to increase preservation of undisturbed areas.
- ✓ Provide for a comprehensive drainage improvement and stormwater management program to maximize property protection and environmental benefits throughout the watershed.
- ✓ Provide a system of drainage facilities that prevents or minimizes structure flooding, stream degradation and traffic disruption in an efficient, cost-effective and environmentally sound manner.

Source: 2017 Edition of the Comprehensive Plan, Policy Plan Element, Environment (amended through 3-14-2017), Land Use (amended through 3-4-2017), and Public Facilities Sections (amended through 7-25-2017), as amended.

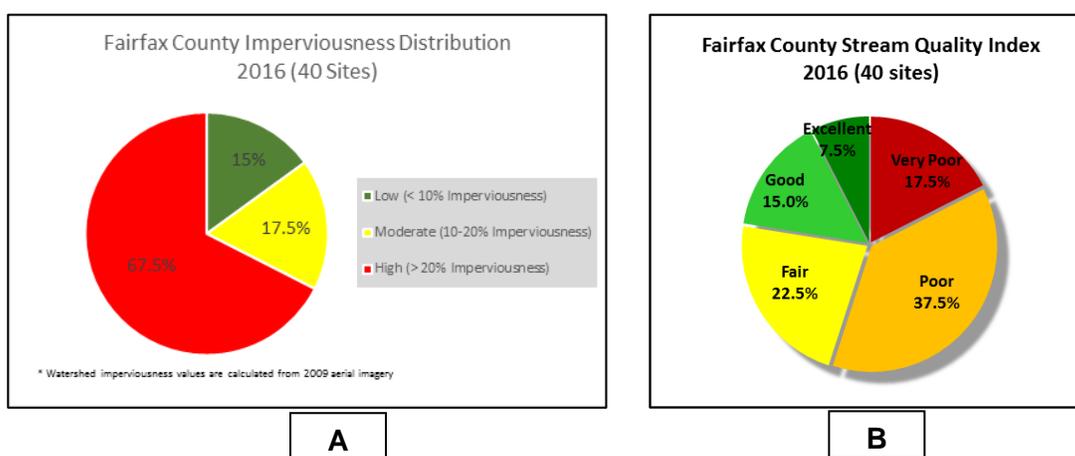
PROGRAM INITIATIVES

The long-range goal or mission for the stormwater program is dictated by the County's need to preserve and restore the natural environment and water resources, while being in full compliance with all applicable federal and state laws and mandates. Many of the requirements are derived from the State's Chesapeake Bay Initiatives, Municipal Separate Storm Sewer System Permit (MS4), and other Clean Water Act requirements and County ordinance and policies, such as the Water Supply Protection Overlay District. In order to comprehensively address program requirements and strategies for restoring water quality on a holistic basis, updated watershed management plans have been completed.

Watershed Planning and Implementation

Plans for all 30 County watersheds have been completed. Previously prepared watershed master plans developed during the 1970s did not reflect changes in stream conditions resulting from land use practices, water quality standards and environmental goals, most of which have evolved over the last 30 years. The watershed plans provide targeted strategies for addressing stream health given current and future land use practices and relative stream conditions.

Stream physical and biological degradation becomes apparent when the extent of impervious surfaces within a watershed area reaches 10 to 20 percent. High levels of degradation occur as imperviousness exceeds 20 percent. During previous decades, prior to implementation of modern stormwater controls, the County's percent of imperviousness increased drastically which contributed to the current degraded conditions of many County streams. As depicted on graph A below, 67.5 percent of County stream monitoring sites in 2016 had impervious levels at or above 20 percent (high). In addition, 17.5 percent of the 40 sites monitored were between 10-20 percent impervious (medium). As depicted on the graph B below, and based on the same 2016 stream monitoring, just 22.5 percent of the County's streams are in good to excellent biological health condition. This condition is determined using an Index of Biological Integrity (IBI) which evaluates stream ecological health based on the community structure of bottom-dwelling aquatic invertebrates inhabiting the streams.



The Federal Clean Water Act and Virginia state laws require Fairfax County to meet water quality standards for surface streams. The County discharges stormwater from its storm drainage network into the waters of the state and must comply with all pertinent water quality standards and conditions established by the MS4 permit. The permit conditions require that the County have a comprehensive stormwater management program that includes inspection of existing stormwater facilities, watershed planning, public outreach, monitoring and implementation of practices to improve stormwater quality.

In addition to the MS4 permit requirements, Virginia and other signatory states to the Chesapeake Bay 2000 Agreement prepared "The Potomac River Tributary Strategies" in 2005 to set specific targets for reduction and capping of nutrients and sediment pollutants entering the Bay through its various tributaries and from both point source (e.g. wastewater treatment plants) and non-point source pollution. However, the Tributary Strategies are now replaced by the State's Watershed Improvement Plans (WIP) in response to requirements for a Chesapeake Bay-wide Total Maximum Daily Load (TMDL), established by the EPA in December 2010. The TMDL for the Chesapeake Bay has established a "pollution diet", or pollution load reduction targets needed to remove the Bay from the impaired waters list. The requirements for Bay states and localities are also being driven by a Presidential Executive Order number 13508 of May 2009 that called for more stringent actions, increased accountability and firm deadlines. The implementation phase of the TMDL is well on the way and Bay states have already completed a Phase I WIP in November 2010 and have also developed a Phase II WIP which was submitted to EPA in March 2012. The WIPs involve increased measures tied to firmly established milestones with an interim midpoint program assessment in 2017 and an ultimate implementation deadline of 2025. On January 28, 2014, the Board of Supervisors adopted a revised Stormwater Management Ordinance, effective July 1, 2014 to implement the new Virginia Stormwater Regulations. Through the stormwater program and other efforts, the County is doing its part to increase water pollution control measures in order to effectively improve local stream conditions, comply with increasing regulations and help restore the Chesapeake Bay.

While every effort has been made to accurately reflect the 5-year capital improvement plan for the stormwater program, there are currently multiple issues that are in various stages of the regulatory and permitting processes that will possibly have significant funding impacts on the Stormwater program. Increases in regulatory requirements associated with the reissuance of the next 5-year MS4 permit, the Chesapeake Bay-wide TMDL requirements, State's stormwater regulations impact the funding requirements on a continual basis. Unforeseen flood mitigation efforts resulting from County-wide flooding events require a significant investment to implement corrective actions and correct failing and deficient storm drainage systems that are impacting county residential and commercial properties. In addition to these funding impacts to the stormwater program, the transfer of the MS4 permit program for Fairfax County Public Schools (FCPS) to the County represents added funding requirements to the stormwater program as well.

Additional, less defined funding impacts to the stormwater program include long term stormwater management maintenance requirements of County facilities that are designed and built using innovative stormwater management systems, such as Low Impact Development Systems (LIDS), also called Green Stormwater Infrastructure (GSI). Past stormwater maintenance at County-owned and operated facilities traditionally consisted of maintenance of catch basins, storm pipes and surface ponds. However, to meet current stormwater quality requirements, more extensive and complex stormwater management systems are being developed with "Best Management Practices" for the treatment of stormwater runoff. These water quality systems continue to require more routine and more complex operational and maintenance efforts to meet and comply with the stormwater permit. Without the proper on-going operation and maintenance, the systems will likely fail, requiring more extensive costs to reconstruct the systems to function as designed. As these water quality systems and stormwater facilities come on-line, funding will be needed to meet the recurring maintenance requirements.

Financing the Stormwater Program

As part of the FY 2010 Adopted Budget Plan, a special service district was created to support the Stormwater Management Program and provide a dedicated funding source for both operating and capital project requirements, as authorized by Code of Virginia Ann. Sections 15.2-2400. In FY 2019, the stormwater service rate will increase from \$0.0300 to \$0.0325 per \$100 of assessed real estate value. In FY 2015, staff developed a five-year rate plan and a phased approach for funding and staffing to support the anticipated regulatory increases.

The FY 2019 levy of \$0.0325 will generate \$77,886,250, supporting \$22,078,534 for staff and operational costs; \$54,682,716 for capital project implementation including, infrastructure reinvestment, regulatory requirements, dam safety, and contributory funding requirements; and \$1,125,000 transferred to the General Fund to partially offset central support services such as Human Resources, Purchasing, Budget and other administrative services supported by the General Fund which benefit this fund.

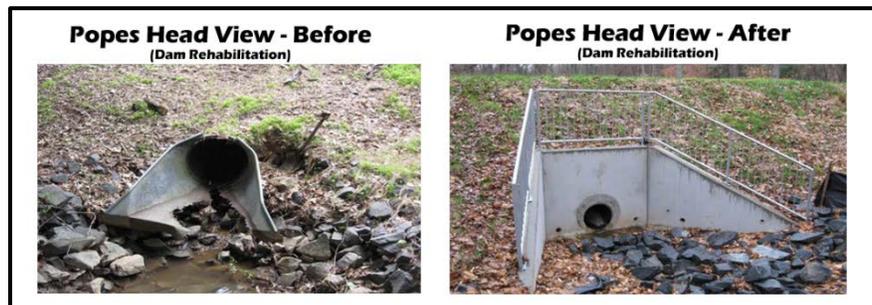
The 5-year spending plan includes approximately \$225 million in required projects and operational support. This increase will support a number of goals. First, it will provide for constructing and operating stormwater management facilities, including stream restorations, new and retrofitted ponds, and installation of Low Impact Development (LID) techniques, required to comply with the federally mandated Chesapeake Bay Program. Second, the increase will aid in the planning, construction, and operation of stormwater management facilities required to comply with state established local stream standards. Third, the increase will support the federally mandated inspecting, mapping, monitoring, maintaining, and retrofitting of existing stormwater facilities. Fourth, the increase will aid in collecting stormwater data and reporting the findings; providing community outreach and education, supporting new training programs; and developing new Total Maximum Daily Loads (TMDL) Action Plans for impaired streams related to the MS4 Permit requirements. Fifth, the increase will improve dam safety by supporting annual inspections of 20 state-regulated dams in the County and by developing Emergency Action Plans required by the state. Finally, the increase will facilitate maintaining, rehabilitating, and reinvesting in the County's conveyance system. Staff will continue to review the 5-year Stormwater spending plan on an annual basis. The County's conveyance system includes over 62,000 structures and 1,400 miles of pipes and improved channels, and it is valued at more than \$1 billion. The FY 2019 rate of \$0.0325 per \$100 of assessed real estate value is consistent with the 5-year plan.

DPWES has also identified the need for a new facility for office staff and field maintenance operations to address the inadequate and outdated current space and accommodate the future positions required to support the increased scope of the stormwater program. Expansion to the current West Drive site is hampered by strict City of Fairfax zoning ordinances that do not allow expansion of the buildings or any exterior improvements to the property. Consolidation of Stormwater and Wastewater Divisions will combine functions and operations, and maximize efficiencies. It is anticipated that EDA bonds will finance this Stormwater/Wastewater consolidated facility and the Stormwater Fund and the Wastewater fund will proportionately provide for the annual debt service requirements associated with this \$80 million facility.

In summary, Stormwater funding is essential to protect public safety, preserve property values and support environmental mandates, such as those aimed at protecting local streams and the Chesapeake Bay. Projects include: repairs to stormwater infrastructure, measures to improve water quality, such as stream stabilization, rehabilitation and safety upgrades of dams, repair and replacement of underground pipe systems and surface channels, structural flood proofing and Best Management Practices (BMP) site retrofits. This funding also supports increased public outreach efforts and stormwater monitoring activities. The approach to capital investment in stormwater management will be to improve infrastructure reinvestment cycles, and increase capital project implementation schedules to responsibly manage stormwater runoff within Fairfax County, while maintaining compliance with increasing regulatory requirements and operational requirements. Focus will be provided to balance effectiveness and efficiencies through management of staff resources balanced with delivery of services through outsourced opportunities.

CURRENT PROJECT DESCRIPTIONS

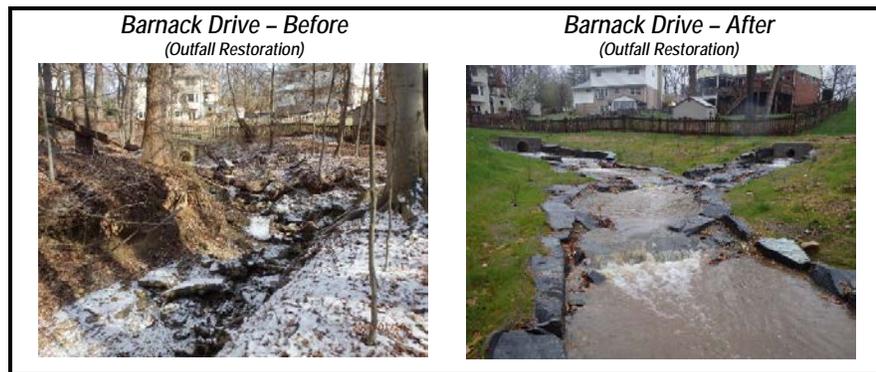
- Stormwater Regulatory Program (Countywide):** This is a continuing program to support the required federal law to operate under the conditions of a state issued Municipal Separate Storm Sewer System (MS4) Permit. The MS4 Permit allows the County to discharge stormwater from its stormwater systems into state and federal waters. The County currently owns and/or operates approximately 6,800 regulated outfalls within the stormwater system that are governed by the permit. The current permit was issued to the County in April 2015. The permit requires the County to better document the stormwater management facility inventory, enhance public outreach and education efforts, increase water quality monitoring efforts, provide stormwater management and stormwater control training to all County employees, and thoroughly document all of these enhanced efforts. The permit also requires the County to implement sufficient stormwater projects that will reduce the nutrients and sediment delivered to the Chesapeake Bay in compliance with the Chesapeake Bay TMDL implementation plan adopted by the State. Funding in the amount of \$6.5 million is included for the Stormwater Regulatory Program in FY 2019.



- Emergency and Flood Response Projects (Countywide):** This program supports flood control projects for unanticipated flooding events that impact storm systems and flood residential properties. The program provides annual funding for scoping, design, and minor construction activities related to flood mitigation projects. Funding in the amount of \$5.0 million is included for the Emergency and Flood Response Projects in FY 2019.

3. **Dam Maintenance, Safety and Facility Rehabilitation** (Countywide): This program provides for dam safety and rehabilitation. There are currently more than 6,200 stormwater management facilities in service that range in size from small rain gardens to large state regulated flood control dams. The County is responsible for inspecting both County owned and privately owned facilities and for maintaining County owned facilities. This inventory increases yearly and is projected to continually increase as new development and redevelopment sites are required to install stormwater management controls. This program maintains the control structures and dams that control and treat the water flowing through County owned facilities. This initiative also includes the removal of sediment that occurs in both wet and dry stormwater management facilities to ensure that adequate capacity is maintained to treat the stormwater. The program results in approximately 70 projects annually that require design and construction management activities as well as contract management and maintenance responsibilities. Funding in the amount of \$7.5 million is included for Dam Safety and Facility Rehabilitation in FY 2019.

4. **Conveyance System Rehabilitation** (Countywide): This program provides repair and rehabilitation of storm drainage conveyance systems and stormwater drainage structures in the County. The County owns and operates approximately 1,400 miles of underground stormwater pipes and paved channels with an estimated replacement value of over one billion dollars. The County began performing internal inspections of the pipes in FY 2006. The initial results showed that more than 5 percent of the pipes were in complete failure and an additional 15 percent of them required



immediate repair. Acceptable industry standards indicate that one dollar re-invested in infrastructure saves seven dollars in the asset's life and \$70 dollars if asset failure occurs. Funding in the amount of \$5.0 million is included for Conveyance System Rehabilitation in FY 2019.

5. **Conveyance System Inspection and Development** (Countywide): This program provides inventory inspection and assessment services for storm drainage conveyance systems and stormwater drainage structures in the County. The County owns and operates approximately 1,400 miles of underground stormwater pipes and paved channels with an estimated replacement value of over one billion dollars. The County began performing internal inspections of the pipes in FY 2006. The initial results showed that more than 5 percent of the pipes were in complete failure and an additional 15 percent of them required immediate repair. The goal of this program is to inspect pipes on a 20-year cycle. Funding in the amount of \$2.0 million is included for Conveyance System Rehabilitation in FY 2019.

6. **Stream and Water Quality Improvements** (Countywide): This project supports the implementation of projects generated by the 30 watershed master plans as well as flood control projects, citizen response projects and other special project needs meeting the established project implementation criteria. This program funds water quality improvement projects necessary to mitigate the impacts to local streams and the Chesapeake Bay resulting from urban stormwater runoff. This includes water quality projects such as construction of stormwater management ponds,



implementation of low impact development techniques on stormwater facilities, stream restoration, and approximately 1,700 water quality projects identified in the completed countywide Watershed

Management Plans. In addition, Total Maximum Daily Load (TMDL) requirements for local streams and the Chesapeake Bay are the regulatory process by which pollutants entering impaired water bodies are reduced. The Chesapeake Bay TMDL was established by the EPA and requires that MS4 communities as well as other dischargers implement measures to significantly reduce the nitrogen, phosphorous and sediment loads entering waters draining to the Bay by 2025. Compliance with the Bay TMDL requires that the County should undertake construction of new stormwater facilities, retrofit existing facilities and properties, and increase maintenance. Based on several years of experience constructing projects, and including recent changes in the nutrient accounting guidelines, staff has reduced the estimated cost of compliance with the Bay TMDL to approximately \$25 million per year. The EPA is currently updating the Bay model and it is anticipated that the update will result in changes to both the assigned targets as well as how projects are credited, which will likely impact future compliance estimates. In addition to being required to meet Bay TMDL targets, the current MS4 Permit requires the County to develop and implement action plans to address local impairments. Most of the 1,700 watershed management plan projects contribute toward achieving the bay and local stream TMDL requirements. Funding in the amount of \$24.2 million is included for Stream and Water Quality Improvements in FY 2019.

7. **Stormwater Related Contributories** (Countywide): This project provides funding for contributions associated with the Northern Virginia Soil and Water Conservation District (NVSWCD), and the Occoquan Watershed Monitoring Program (OWMP). The NVSWCD is an independent subdivision of the Commonwealth of Virginia that provides leadership in the conservation and protection of Fairfax County's soil and water resources. The goal of the NVSWCD is to continue to improve the quality of the environment and general welfare of the citizens of Fairfax County by providing them with a means of dealing with soil, water conservation and related natural resource problems. It provides County agencies with comprehensive environmental evaluations for proposed land use changes with particular attention to the properties of soils, erosion potential, drainage and the impact on the surrounding environment. NVSWCD has consistently been able to create partnerships and leverage state, federal and private resources to benefit natural resources protection in Fairfax County. The OWMP and the Occoquan Watershed Monitoring Laboratory (OWML) were established to ensure that water quality is monitored and protected in the Occoquan Watershed. Given the many diverse uses of the land and water resources in the Occoquan Watershed (agriculture, urban residential development, commercial, and industrial activity, water supply, and wastewater disposal), the OWMP provides a critical role as the unbiased interpreter of basin water quality information. FY 2019 funding of \$527,730 is included for the County contribution to the NVSWCD and \$128,383 is included for the County contribution to the OWMP.
8. **Stormwater Allocation to Towns** (Countywide): This project is a continuing project which provides for allocations to the Towns of Vienna and Herndon. On April 18, 2012, the State Legislature passed SB 227 which entitles the Towns of Herndon and Vienna to all revenues collected within their boundaries by Fairfax County's stormwater service district. An agreement was developed for a coordinated program whereby the Towns will remain part of the County's service district and the County will return 25 percent of the revenue collected from properties within each town. This allows for services that towns provide independently such as maintenance and operation of stormwater pipes, manholes, and catch basins. The remaining 75 percent will remain with the County and the County will take on the responsibility for the Towns' Chesapeake Bay TMDL requirements as well as other TMDL and MS4 requirements. This provides for an approach that is based on watersheds rather than on jurisdictional lines. Funding in the amount of \$800,000 is included for the Stormwater Allocations to Towns project in FY 2019.

9. **Flood Prevention-Huntington Area-2012** (Mt. Vernon District): \$40,000,000 for storm drainage improvements to prevent flooding in the Huntington community. During the past 15 years, three floods have damaged homes, vehicles and other property in the Huntington neighborhood. In June 2006, 160 homes were flooded, and 160 homes were damaged in 2011 during Tropical Storm Lee. Today, there are 180 homes in the FEMA-designated floodplain that are at risk. Homes in the area were built in the 1940s and 50s before regulations were enacted that prevented them from being sited in floodplains. At Fairfax County's request, the U.S. Army Corps of Engineers studied the best ways to protect Huntington from future floods. The study examined a number of options, including dredging Cameron Run, buying the flood-prone properties and flood proofing individual homes. The study found that building a levee and a pumping station is the most cost-effective way to reduce flooding in the neighborhood. Funds have been approved to purchase land, design and build a 2,800-foot-long levee and pumping station. While the levee can prevent flooding of houses from the types of storms that have happened in the past, it is not designed to offer protection from flooding that is caused by storms that are greater than a 100-year event. During major storms, street flooding may continue to occur in the Huntington area after the levee is built. The design of the levee is complete and construction began in early 2017. The current, updated total project estimate is approximately \$40,000,000. Funding of \$30,000,000 was approved for this project as part of the fall 2012 Stormwater Bond Referendum. To accommodate funding beyond that currently approved, a strategy was developed using a portion of revenue from the Stormwater Service District allocated to the Stream and Water Quality Improvements Program. The strategy reallocates a total of \$10,000,000 over a four year period. Use of the Stormwater Service District for this project is consistent with the goals of the program to address structural flooding and other critical community stormwater needs. Funding in the amount of \$3.0 million is included for Flood Prevention to supplement the bond funds FY 2019.
10. **Stormwater/Wastewater Facility** (TBD): \$80,000,000 for a Public Works complex to consolidate functions and operations and maximize efficiencies between Stormwater and Wastewater Divisions. The Stormwater business area provides essential watershed planning, engineering design, project management, contracting, monitoring, and maintenance services for stormwater management, storm drainage, flood control, snow removal, water quality, commercial revitalization, county-maintained roads and walkways, trails, public street name signs, and other designated county infrastructure. Current program operations are conducted from various locations throughout the County, with the majority of staff at the West Drive facility. Current facilities for field maintenance operations and for field/office based staff are inadequate and outdated for the increased scope of the stormwater program, and inadequate to accommodate additional required future positions. The West Drive site is restricted by City of Fairfax zoning ordinances which do not allow expansion of the buildings or any exterior improvements to the property. The Wastewater Collection Division operating out of Freds Oak, provides for the sewer collection and conveyance system for the County. The concept design of this new consolidated facility and the programming scope will be completed as part of the land acquisition phase and zoning approvals. It is anticipated that the facility will be financed by EDA bonds with the Stormwater Services Fund and Wastewater Fund supporting the debt service.
11. **Pro Rata Share Drainage Improvements** (Countywide): This is a continuing Program which utilizes Pro Rata funds received from developer to support watershed planning, regional pond development and other drainage improvement projects. Contributions are received in accordance with the Pro Rata Share Program approved by the Board of Supervisors on December 16, 1991. The Pro Rata Share Program provides a funding source to correct drainage deficiencies by collecting a proportionate share of the total estimated cost of drainage improvements from the developers of the land. As projects are identified and prioritized during scheduled budgetary reviews, Pro Rata funds on deposit are appropriated.
12. **Tree Preservation and Plantings** (Countywide): This is a continuing project which provides for tree plantings throughout the County. Revenues collected through the land development process are appropriated at year end to support the tree preservation and planting program.

**PROJECT COST SUMMARIES
STORMWATER MANAGEMENT
(\$000's)**

Project Title Project Number	Source of Funds	Budgeted or Expended Through FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Total FY2019- FY2023	Total FY2024- FY2028	Total Project Estimate	
1 Stormwater Regulatory Program 2G25-006-000	S	C	\$6,500	\$7,000	\$7,500	\$7,500	\$7,500	\$36,000	\$37,500	\$73,500	
2 Emergency and Flood Response Projects SD-000032	S	C	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$25,000	\$25,000	\$50,000	
3 Dam Maint., Safety and Facility Rehab. SD-000033	S	C	\$7,500	\$9,000	\$11,500	\$16,600	\$16,600	\$61,200	\$83,000	\$144,200	
4 Conveyance System Rehabilitation SD-000034	S	C	\$5,000	\$6,500	\$7,500	\$8,000	\$9,000	\$36,000	\$45,000	\$81,000	
5 Conveyance System Inspection and Dev. 2G25-028-000	S	C	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$10,000	\$10,000	\$20,000	
6 Stream and Water Quality Improvements SD-000031	S	C	\$24,227	\$26,000	\$26,000	\$26,000	\$26,000	\$128,227	\$130,000	\$258,227	
7 Stormwater Related Contributories 2G25-007-000, 2G25-008-000	S	C	\$656	\$656	\$656	\$656	\$656	\$3,280	\$3,280	\$6,560	
8 Stormwater Allocation to Towns 2G25-027-000	S	C	\$800	\$850	\$900	\$950	\$950	\$4,450	\$4,750	\$9,200	
9 Flood Prevention -Huntington Area-2012 SD-000037	B, S	\$32,489	\$7,400	\$111				\$7,511		\$40,000	
10 Stormwater/Wastewater Facility SD-000039	B, S	\$0	\$10,000	\$40,000		\$30,000		\$80,000		\$80,000	
11 Pro Rata Share Drainage Improvements Fund 30090	X	\$3,305						\$0		\$3,305	
12 Tree Preservation and Plantings 2G25-030-000	X	\$99						\$0		\$99	
Total			\$35,893	\$69,083	\$97,117	\$61,056	\$96,706	\$67,706	\$391,668	\$338,530	\$766,091

Notes: Numbers in **bold italics** represent funded amounts. A "C" in the 'Budgeted or Expended' column denotes a continuing project.

B Bonds
G General Fund
F Federal
X Other
U Undetermined
S Service District