

Countywide Infrastructure Replacement Requirements

Program Description

This section provides a compilation of the Infrastructure Replacement and Upgrade requirements associated with the various program areas contained in the Capital Improvement Program (CIP). Infrastructure Replacement and Upgrades is the planned replacement of building subsystems such as roofs, electrical systems, HVAC systems, plumbing systems and other infrastructure that has reached the end of its useful life. Without significant reinvestment in building subsystems, older facilities can fall into a state of deterioration and the maintenance and repair costs necessary to keep them functional will increase. One of the primary roles in facility management is to maximize the life of facilities, avoid their obsolescence and provide for a planned program of repairs, improvements and restorations. Infrastructure Replacement and Upgrades projects also include the reinvestment required for stormwater facilities and conveyance pipes, sewer lines, parks, trails, and bus shelters. It is important to support the reinvestment and maintenance of spaces, structures and infrastructure in a routine, scheduled, or anticipated fashion to prevent failure and/or degradation. More importantly, this type of infrastructure replacement and upgrade work can reduce the potential for the exorbitant cost and inconvenience associated with unanticipated failures and safety concerns.

Link to the Comprehensive Plan

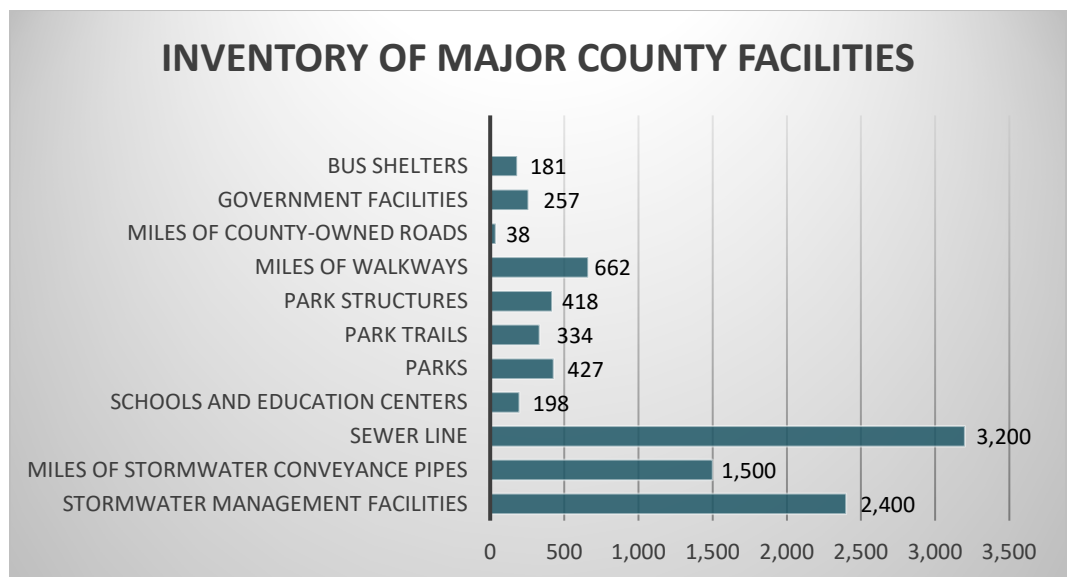
The Public Facilities Policy Plan within the Fairfax County Comprehensive Plan, includes the following established objectives:

- Construct and maintain facilities in accord with expected levels of service objectives and fiscal limitations.

Source: Fairfax County Comprehensive Plan, 2017 Edition; Policy Plan

Current Infrastructure Replacement Program

As the County infrastructure ages, more frequent replacement and upgrades are required. Fairfax County's inventory of infrastructure includes not only government buildings, but housing units, miles of walkways and sewer pipe and many facilities such as residential facilities and fire stations that operate 24/7, 365 days per year. Infrastructure replacement and upgrades are prioritized based on life safety concerns, repair history and availability of replacement parts. The following chart displays some of the types of infrastructure that the County is responsible for maintaining.



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Infrastructure Replacement and Upgrades

In the Spring of 2014, the Board of Supervisors and the School Board approved the Infrastructure Financing Committee's Final Report and Recommendations regarding long-term maintenance plans for both the County and Schools. The Report contained many recommendations, one of which was to develop standard definitions. The Joint Board definition approved for Infrastructure Replacements and Upgrades is stated below:

Infrastructure Replacement and Upgrades

Infrastructure Replacement and Upgrades refers to the planned replacement of building subsystems that have reached the end of their useful life. These systems, once replaced, will have an average life cycle of 20 years or more. Without significant reinvestment in facility subsystems, older facilities can fall into a state of ever-decreasing condition and functionality, and the maintenance and repair costs necessary to operate the facilities increase. Currently these types of Infrastructure Replacement and Upgrades are funded within operational budgets or financed using municipal bonds. Examples of Infrastructure Replacement and Upgrades include:

- Roof Replacement
- Electrical System Replacement
- HVAC Replacements
- Plumbing Systems Replacements
- Replacement Windows
- Parking Lot Resurfacing
- Fire Alarm System Replacements
- Sprinkler Systems
- Emergency Generator Replacements
- Elevator Replacement

Infrastructure Life Cycles

For planning purposes, the County uses the following life cycle guidelines when projecting future replacement requirements. Some of the major work completed annually at County facilities includes the replacement of building subsystems: HVAC and electrical system repairs and replacement, roof repairs and waterproofing, carpet replacement, parking lot and garage repairs, window repairs/replacement, elevator/escalator repairs/replacement, fire alarm replacement and emergency generator replacement. Replacement of these building subsystems is based on not only age and lifecycle, but on repair history, safety concerns, and availability of replacement parts. The following chart includes the expected lifecycle of building infrastructure.

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General Guidelines for Expected Service Life of Building Subsystems

Electrical

Lighting	20 years
Generators	25 years
Service/Power	25 years
Fire Alarms	15 years

HVAC

Equipment	20 years
Boilers	15 to 30 years
Building Control Systems	7 years

Conveying Systems

Elevator	25 years
Escalator	25 years

Plumbing

Pumps	15 years
Pipes and fittings	30 years
Fixtures	30 years

Finishes

Broadloom Carpet	7 years
Carpet Tiles	15 years
Systems Furniture	20 to 25 years

Site

Paving	15 years
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Roofs

Replacement	20 years
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Program Area Requirements

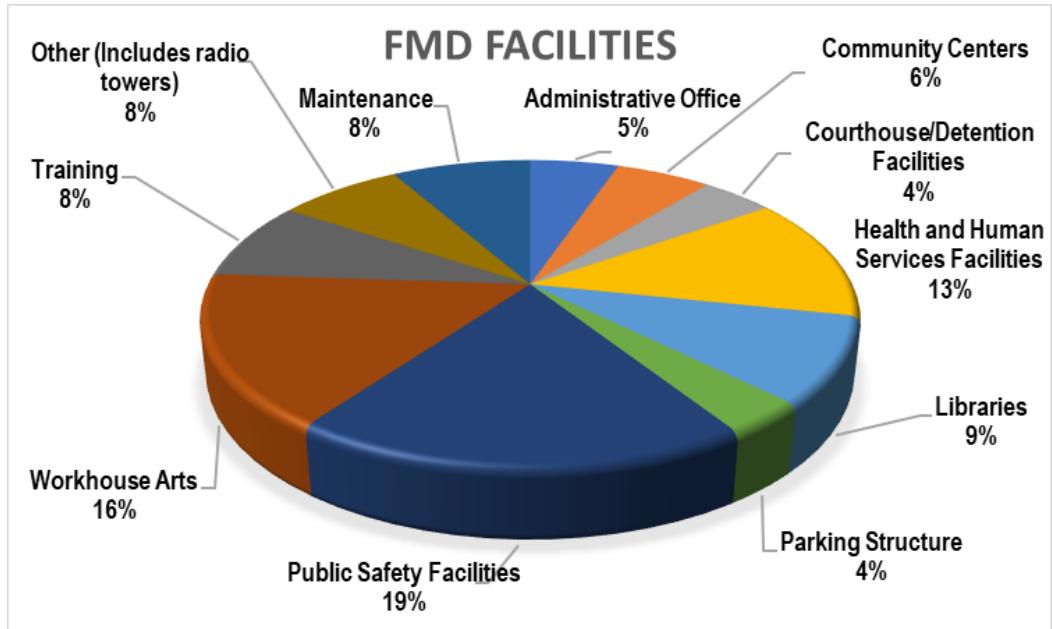
The sections that follow are grouped by specific capital program areas. Each program area has identified slightly different methodologies for categorizing projects, measuring the facility conditions and identifying funding sources. Many program areas are assessed on an annual basis and some have developed multi-year plans for maintaining infrastructure.

Each year, many County agencies prioritize and classify infrastructure replacement and upgrades projects into five categories. Projects are classified as Category F: urgent/safety related, or endangering life and/or property; Category D: critical systems beyond their useful life or in danger of possible failure; Category C: life-cycle repairs/replacements where repairs are no longer cost effective; Category B: repairs needed for improvements if funding is available, and Category A: good condition. Other County organizations have other methodologies for prioritization of projects, including the Fairfax County Public Schools (FCPS). FCPS uses a Comprehensive Investment Capital Plan (CICP) which provides an assessment index (AI) to prioritize capital asset renewal projects, based on the capital asset's useful life and criticality.

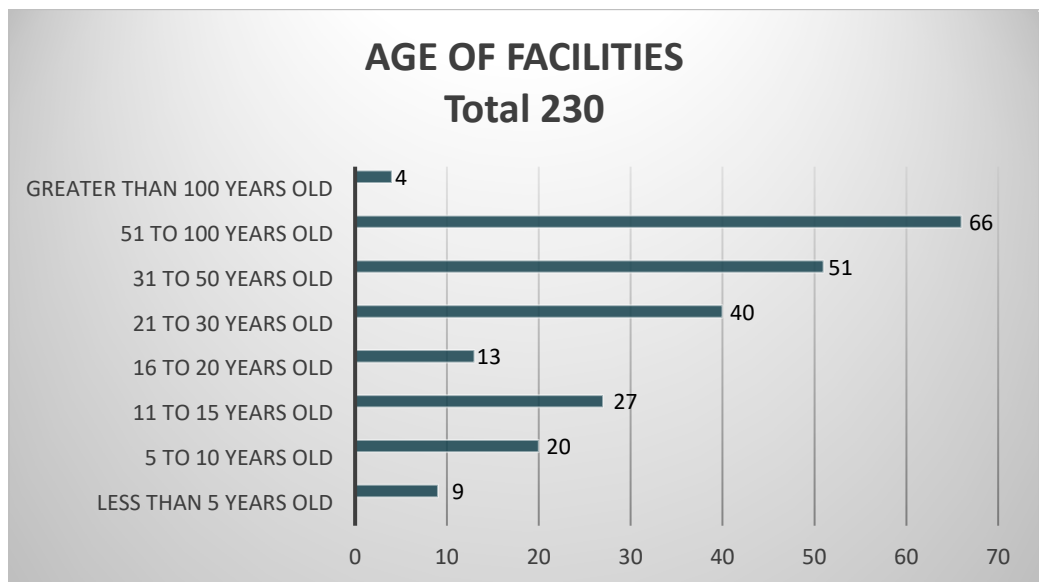
County Facility Infrastructure Replacement and Upgrades - FMD

The Facilities Management Department (FMD) currently provides support for evaluating facilities, identifying problems, developing costs estimates, establishing priorities and performing the upgrades required to county-owned buildings. Fairfax County will have a projected FY 2022 facility inventory of nearly 12 million square feet of space throughout the County (excluding schools, parks, and housing facilities). This inventory is expanding both with the addition of newly constructed facilities and with the acquisition of additional property. With such a large inventory, it is critical that a planned program of repairs and restorations be maintained. In addition, the age of a major portion of this inventory of facilities is reaching a point where major reinvestments are required in the building subsystems. The chart below includes the types of facilities managed by FMD.

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FMD is currently responsible for an inventory of 257 buildings. Of this amount, 27 facilities are maintained by FMD, but Infrastructure Replacement and Upgrade work is performed by another entity, such as the Department of Housing and Community Development. As the inventory of County facilities age, reinvestment in buildings and building equipment becomes critical. Currently, 70 percent of the buildings for which FMD has responsibility for infrastructure replacement and upgrades are over 20 years old. Per industry standards, most building systems require replacement at 20 to 25 years of age. Infrastructure replacement and upgrades extend the serviceability and life of a building and provide for the continued effective, efficient, and safe operation of a building. These needs vary by building size and type, the extent of facility use, and maintenance management.



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Many County facilities have outdated HVAC and electrical systems which are susceptible to failure or are highly inefficient energy users. Sites are identified and each individual project involves a two-step process normally requiring two years to complete design and construction. Roof repairs and waterproofing are conducted in priority order after an annual evaluation of the maintenance history. Based upon the results of that evaluation, critical requirements are prioritized, and a plan is established. Repairs and replacement of facility roofs are considered critical to avoid serious structural deterioration caused by water leaks. By addressing this problem in a comprehensive manner, a major backlog of roof problems can be avoided. Carpet replacement and parking lot resurfacing are evaluated annually and prioritized, based on the most critical requirements for high traffic areas. In addition, emergency generators and fire alarm systems are replaced based on equipment age, coupled with maintenance and performance history. Minor repairs and renovations are also conducted in priority order. These projects, usually generated by customer requests, are small projects which abate building obsolescence, improve facility efficiency and effectiveness and address major structural repairs.

Each year, FMD prioritizes and classifies infrastructure replacement and upgrades projects into five categories. Projects are classified as Category F: urgent/safety related, or endangering life and/or property; Category D: critical systems beyond their useful life or in danger of possible failure; Category C: life-cycle repairs/replacements where repairs are no longer cost effective; Category B: repairs needed for improvements if funding is available, and Category A: good condition.

Acceptable levels of Infrastructure Replacement and Upgrades

For many years, the requirement for County infrastructure replacement and upgrades has been estimated at \$26 million per year. This estimate is based on collected assessment data, as well as industry standards (2 percent of the current replacement value). Based on current staffing levels, the complexity of many of the projects, and the timeline for completing replacement and upgrade projects, it is estimated that approximately \$15 million per year would be a good funding goal.

The following chart includes both funded and unfunded infrastructure replacement and upgrade requirements identified to date at County owned facilities. This list totals approximately \$115 million, of which \$6.282 million will be considered for funding as part of a quarterly review during FY 2021. It should be noted that when facilities undergo full renovation, they are removed from this list reducing the outstanding requirements. In addition, this number is a moving target, as building systems and components can fail without notice and many buildings in the portfolio have not been assessed in over 15 years. In addition, many of facilities with category "F" and "D" upgrade projects identified may not be remediated for several years. The backlog requirements will continue to increase as capital components pass the end of their useful life.

Countywide Infrastructure Replacement Requirements

Category	Proposed FY 2021 Quarterly Review	Unfunded	Total
Asphalt and Paving	\$0	\$6,991,144	\$6,991,144
Building Envelope	\$0	\$9,837,148	\$9,837,148
Electrical	\$0	\$18,943,218	\$18,943,218
Elevators and Escalators	\$0	\$5,120,298	\$5,120,298
Fire Alarms and Fire Suppression	\$502,000	\$9,235,874	\$9,737,874
Generators	\$670,000	\$596,132	\$1,266,132
HVAC & Building Automation	\$2,825,000	\$42,180,758	\$45,005,758
Interior & Exterior Repairs	\$1,000,000	\$4,445,945	\$5,445,945
Plumbing	\$150,000	\$7,597,304	\$7,747,304
Roof	\$1,135,000	\$2,549,476	\$3,684,476
Parking Garage	\$0	\$1,339,000	\$1,339,000
Total	\$6,282,000	\$108,836,297	\$115,118,297

Emergency System Failures Project

In addition to the planned replacement of building systems, unplanned emergencies often occur. As part of the *FY 2013 Carryover Review*, the Board of Supervisors approved an amount of \$5.0 million to support unexpected emergency system failures that occur at aging County facilities throughout the year. This project provides a source of funding for unforeseen emergency repairs and allows FMD to address projects not currently funded for which repairs are becoming more imminent. The Board makes every effort to replenish this fund annually as part of the Carryover Review in order to maintain this level of funding and address emergency repairs at facilities in the event of a major systems failure. Some examples of Emergency System Failure projects include: the replacement of a failed Uninterruptable Power Supply at the Jennings Courthouse, replacement of failed piping in the Pennino Building child care center kitchen, replacement of electrical service at West Ox Department of Vehicle Services Garage to correct safety issues, structural repairs to the Government Center cooling towers and platforms, replacement of a failed roof top unit at the Kings Park Library, and replacement of the failed/leaking roof at the Jennings Courthouse

Countywide Infrastructure Replacement Requirements

Fairfax County Public Schools (FCPS)

Fairfax County Public School (FCPS) maintains more than 27 million square feet of school buildings and office space. To date, FCPS has inventoried most major building systems, as well as the associated equipment, and developed analytics to identify life cycle expectations and optimize service by application of an effective maintenance and replacement strategy. Along with life cycle analysis, a process was established to assign a base condition and mission criticality rating to each asset. The base asset condition and criticality rating combine to provide an industry accepted asset assessment index (AI) value, which allows staff to prioritize resources for maintenance and replacement.

The core program provides the foundation to ensure proper Resource Stewardship but needs additional investment to engage a third party for comprehensive condition assessment of each asset. A recent review by the Office of the Auditor General recommended implementing a systemic assessment of all FCPS facilities over a 5-year period, or 20 percent of all facilities per year. FCPS met with the Facility Engineering Association (FEA) to review performing a comprehensive facility condition assessment and discuss similar programs that FEA provides to neighboring school divisions. For example, Montgomery County Public Schools initiated a program at the cost of \$.05 per square foot. Based on this pricing structure, it would cost an estimated \$1.35 million to implement at FCPS.

While critical building systems and components have been inventoried at most FCPS facilities, except for the schools currently under renovation there are other capital assets that remain to be inventoried such as; finished flooring, plumbing fixtures, building's exterior that will require capital investment to replace. Inventorying these assets will also increase existing financial requirements both in future needs and current deferred replacement backlog. Currently, the average asset age of capital assets inventoried is 17 years with 30 percent of these past their life cycle.

ASSET CATEGORY	TOTAL ASSETS	ASSETS PAST USEFUL LIFE	AVG. LIFE EXPECTANCY (YEARS)	AVG. ASSET AGE (YEARS)	EST. REPLACEMENT COST
ADA ACCESSIBILITY	27	10	25	22	\$ 569,249
ASPHALT/PAVEMENT	1,300	436	22	17	\$ 52,730,440
ATHLETIC INFRASTRUCTURE	474	108	24	16	\$ 68,609,037
ENERGY MANAGEMENT SYSTEMS	212	68	17	14	\$ 168,559,594
FIRE SPRINKLER SYSTEMS	3,453	1,164	25	20	\$ 16,729,749
HVAC INFRASTRUCTURE	25,071	8,285	22	17	\$ 386,795,454
MECHANICAL/ ELECTRICAL SYSTEMS	19,790	6,337	21	17	\$ 283,139,884
PLAYGROUND SYSTEMS	248	131	15	16	\$ 33,965,075
PLUMBING SYSTEMS	2,115	591	18	13	\$ 28,253,910
STRUCTURAL SYSTEMS	708	343	19	19	\$ 42,208,475
Grand Total	53,398	17,473	21	17	\$ 1,081,560,868

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FCPS has a robust capital replacement program including renovations, new schools and capacity enhancements. Beginning in FY 2016, the County has transferred \$13.1 million annually to FCPS for capital infrastructure replacement in order to offset expenses previously funded by school bonds for facility infrastructure replacement. This \$13.1 million transfer supports infrastructure replacement in school system facilities such as HVAC, ADA, security, roof replacement, athletic infrastructure, life safety systems, and asphalt paving.

The following chart includes both funded and unfunded infrastructure replacement requirements throughout FCPS. Any renovation project that has been bid for construction has not been included below; however, infrastructure replacements associated with renovation projects planned over the 5-10-year period are included here as many of these building components will require replacement prior to scheduled renovations. FCPS' backlog requirements will continue to increase as capital components pass the end of their useful life.

SUMMARY-FCPS FY 2022 REPLACEMENT AND UPGRADE REQUIREMENTS			
Fund	Funded FY22	Unfunded	Total
ADA-Facilities	\$1,250,000	\$0	\$1,250,000
Asphalt Capital	\$1,000,000	\$8,016,237	\$9,016,237
Athletic Capital	\$225,000	\$5,898,078	\$6,123,078
Electrical Systems	\$0	\$22,200,602	\$22,200,602
Health-Safety-ADA Equipment	\$0	\$19,864,784	\$19,864,784
HVAC and Energy Management	\$4,000,000	\$123,286,677	\$127,286,677
Information Technology	\$2,000,000	\$0	\$2,000,000
Plumbing Systems	\$0	\$0	\$0
Roofing	\$3,625,000	\$0	\$3,625,000
Safety and Security	\$600,000	\$2,050,000	\$2,650,000
Structural Capital	\$400,000	\$0	\$400,000
Total	\$13,100,000	\$181,316,378	\$194,416,378

Lack of adequate funding for facilities maintenance is allowing systems to run past the useful life cycle, is inefficient, and introduces a myriad of other risks and higher maintenance costs. The lack of funding support for a capital asset replacement program significantly increases the risk of critical equipment failure, which can result in the potential disruption of instructional time, though OFM strives to minimize both factors.

According to the National Research Council (NCR) report titled *Committing to the Cost of Ownership: The Maintenance and Repair of Public Building*, the appropriate level of Maintenance and Repair spending should be, on average, in the range of 2 to 4 percent of Current Replacement Value (CRV). FCPS' CRV is estimated at \$6.2 billion, but only receives funding totaling 0.4 percent of the CRV. This pattern of under-funded maintenance requirements has increased FCPS' deferred backlog at an average rate of \$10 million annually – (\$110 million in FY 2016, \$128 million in FY 2017, \$142 million in FY 2018, \$157 million in FY 2019, \$162 million in FY 2020 and \$179 million for FY 2021). A review of FCPS 10-year cash flow of \$514,548,832 in End of Useful Life (EOUL) requirements, projects that FCPS will need an increase in the Infrastructure Replacement Funding and FCPS Major Maintenance allocation to keep pace and become good stewards of the capital asset program prior to renovations.

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Park Authority Infrastructure

The Park Authority has been working to address the backlog of reinvestment requirements at deteriorating facilities, athletic courts, pedestrian bridges, parking lots, and trails located throughout the County. The Park Authority is responsible for 418 structures at 427 Parks with 58 percent of this total inventory over 30 years old. In addition, the Park Authority owns a total of 23,595 park acres which equates to over 9.3 percent of the land mass of Fairfax County. In 2016, Parks Count, which is the Park Authority Needs Assessment was completed and provides recommendations for capital investments in the park system based on a body of data that the Park Authority will continue using for years. The total projected need for the ten-year period was \$939,161,000; that amount has been reduced to \$744,461,000 due to the approval of \$94,700,000 as part of the 2016 Park Bond Referendum and \$100,000,000 as part of the 2020 Park Bond Referendum. The remaining needs of \$744,461,000 are broken out into three strategic areas in five-year increments.

- Critical, "Repairing what we have" makes the most of existing resources with the primary goal being for FCPA to maintain services. The plan addresses deferred maintenance at existing parks and facilities. The Critical funding need is \$82,691,424 over the next five years.
- Sustainable, "Upgrade Existing" looks at enhancing existing programs, beginning new alternative programs, or making other strategic changes that would require additional operational or capital funding. The Sustainable need for years 1-5 is \$102,461,220, the need for years 6-10 is \$164,282,756, for a total of \$266,743,976.
- Visionary, "New, Significant Upgrades" includes new and expanded facilities to fully meet needs desired by the community and ensure that the Park Authority remains a preferred provider of park and recreation amenities. The Visionary need is \$395,025,600 over the 10-year period, and if funding is made available in 1-5 years staff would accelerate visionary elements that include expansion and renovation of existing recreation centers and development of new athletic facilities.

Based on continual facility condition assessments, growing and shifting community needs and expectations, an ever-increasing amount of funding will be needed for capital maintenance and replacement of aging park assets in order to maximize the life of the existing facilities and to develop new facilities. The following table includes a total of \$151,501,517 in estimated Park Authority Category "F" projects and Category "D" projects combined. In addition, the Park Authority realigned their renewal projects to the categories as defined by FMD, resulting in additional Category "C" items being reclassified as "Category D" based on many subsystems categorized as beyond their useful life or in danger of possible failure. The impact of failed/failing/beyond end of useful life includes higher cost of operations, difficulty to repair and maintain, availability of spare parts, unhappy visitors, inefficient energy usage, and deteriorated/compromised structural systems and elements.

To further safeguard and align with County practices, the Park Authority established a Capital Sinking Fund within their Park Improvement Fund. To date, the Park Authority has identified approximately \$20 million in category D and F projects associated with 9 RECenters. This critical funding element of sustainability cannot be realized through charging of fees. It is anticipated that this sinking fund will assist with funding for lifecycle/capital renewal maintenance of the revenue facilities.

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Category	Total
Building/Structures	\$58,111,413
Recreation/Playgrounds	\$24,411,300
Trails	\$12,169,992
Roads & Parking Lots	\$22,992,690
Athletic Fields	\$22,170,000
Lighting and Irrigation Systems	\$3,330,500
Athletic Courts	\$5,438,716
Equipment	\$2,291,906
Fire and Security	\$585,000
Total	\$151,501,517

Athletic Field Infrastructure

The Athletic Field Program facilitates the development, maintenance, and replacement of athletic fields, including synthetic turf fields, throughout the County. The maintenance of athletic fields includes field lighting, fencing, irrigation, dugout covers, infield dirt, aeration and seeding. These maintenance efforts improve safety standards, enhance playing conditions and increase user satisfaction. Athletic field maintenance is funded by the General Fund and is supplemented by an Athletic Services Fee. Annual funding \$8,215,338 has been included for the athletic field maintenance and sports program in FY 2022. This level of funding is supported by a General Fund transfer of \$6,740,338 and revenue generated from the Athletic Services Fee in the amount of \$1,475,000. Of the Athletic Services Fee total, \$800,000 will be dedicated to the turf field replacement program, \$275,000 will be dedicated to custodial support for indoor sports organizations, \$250,000 will be dedicated to maintenance of school athletic fields, \$75,000 will be dedicated to synthetic turf field development, and \$75,000 will partially fund the Youth Sports Scholarship Program. The Athletic Service Fee revenue is based on a rate of \$5.50 per participant per season and \$15 for tournament team fees for diamond field users and indoor gym users and a rate of \$8.00 per participant per season and \$50 tournament team fees for rectangular fields users. The rate applied for rectangular field users specifically supports the turf field replacement fund.

Maintenance efforts include contracted services to improve the condition of 408 non-Park Authority athletic fields scheduled for community use at FCPS elementary schools, middle schools and centers; upgrades to athletic field lighting systems at middle and high schools; and the development and replacement of synthetic turf fields. A large portion of the program supports synthetic turf fields which allow for year-round use in most weather increasing playable hours, provide playing surfaces and conditions that are similar to grass fields, and eliminate the need for watering, mowing, and fertilizing. There are a total of 96 synthetic turf fields throughout the County, of which 24 are FCPS stadium fields and 72 are County park/FCPS non-stadium fields. Increased annual funding has been provided to begin to address the growing need for field replacement and to establish a 10-year replacement schedule. The first turf field replacement efforts began in 2013 for the first two fields developed. Most manufacturers provide an eight-year warranty for a properly maintained synthetic

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turf field; however, it is a generally accepted practice to assume a life expectancy of the synthetic turf field of no more than 10 years. The current projected replacement cost per field is approximately \$480,000. Based on the increased number of fields in the replacement fund and the average replacement cost of \$480,000 per field, the annual contribution to fully fund this reserve is \$3,450,000 assuming no increase in inventory or replacement cost.

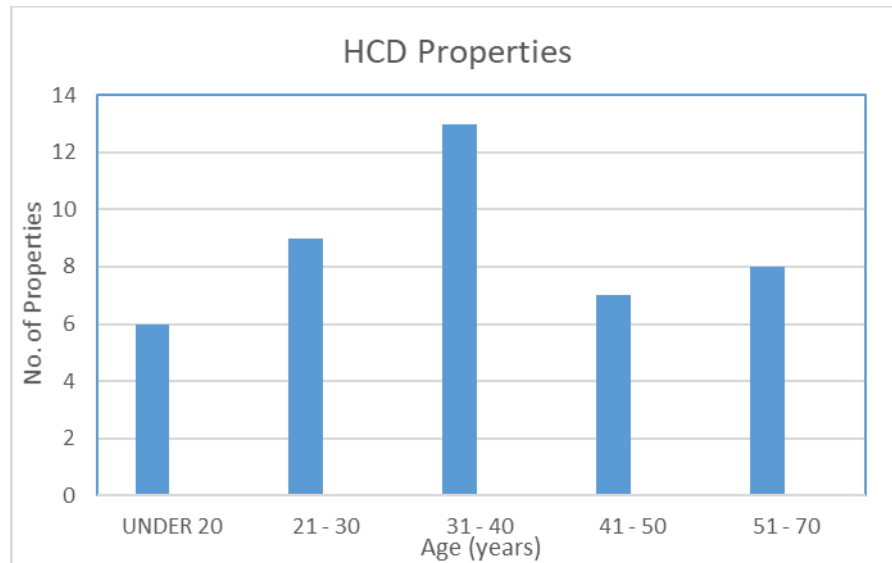
The following chart outlines the 10-year Plan for turf field replacement at the current levels of both Athletic Service Fee revenue and General Fund support. The program includes the number of fields anticipated to be replaced per year and is fully funded through FY 2021. The level of funding support will need to be re-evaluated based on the projected unfunded balance starting in FY 2022. One-time budget allocations as well as long-term funding increases will be needed to keep the replacement plan fully funded.

FCPA/NCS - Turf Field Replacement Plan (Current Funding)									
10 year Replacement Cycle	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029
Fund- Beginning Balance	\$210,895	\$298,635	(\$458,325)	(\$688,285)	(\$2,274,245)	(\$5,412,845)	(\$8,642,805)	(\$8,486,445)	(\$10,072,405)
Replacement Fund Contribution	\$2,250,000	\$2,250,000	\$2,250,000	\$2,250,000	\$2,250,000	\$2,250,000	\$2,250,000	\$2,250,000	\$2,250,000
Partner/Matching Funds	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
One-time Agency Contribution (From Application Fee)	\$0	\$0	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000
Total Available Funds	\$2,460,895	\$2,548,635	\$1,866,675	\$1,636,715	\$50,755	(\$3,087,845)	(\$3,317,805)	(\$6,161,445)	(\$7,747,405)
Estimated # of Turf Field Replacements Required	5	6	5	8	11	5	11	8	7
Estimated Cost	\$2,162,260	\$3,006,960	\$2,554,960	\$3,910,960	\$5,463,600	\$2,554,960	\$5,168,640	\$3,910,960	\$3,360,640
Year End Fund Balance	\$298,635	(\$458,325)	(\$688,285)	(\$2,274,245)	(\$5,412,845)	(\$8,642,805)	(\$8,486,445)	(\$10,072,405)	(\$11,108,045)

Housing and Community Development (HCD) Facilities

HCD's housing inventory includes seventy-five residential properties, ten group homes, one mobile home park covering 115 land lots leased by individual owners and two office buildings. The inventory is significant, housing approximately 21,948 residents in 2,238 apartments, 551 townhouses, 10 group homes and 115 mobile home lots. As evidenced in the graph below 65 percent of the properties are 31 years or older. Many infrastructure replacement and upgrade projects have been deferred due to increasingly less funding from HUD. Some of the major items that have been deferred include replacement of central boilers, HVAC systems, roofs, electrical systems, flooring, windows, and resurfacing of parking lots. Deferral of these items results in inefficient utility usage as well as higher future maintenance costs.

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The following table identifies the top 14 Housing facility priorities including \$0.837 million category “D” projects, which are scheduled to be funded in FY 2021. In addition, Housing and Community Development staff have identified \$0.630 million category “C” projects that will require funding in FY 2022, totaling \$1.467 million.

INFRASTRUCTURE REPLACEMENT AND UPGRADE REQUIREMENTS: HOUSING						
PRIORITY	PROJECT TYPE	FACILITY	CATEGORY	EXISTING CONDITIONS/DEFFICIENCIES	ESTIMATE	Funding Status
1	Seal/stripe parking lot	Rosedale Manor Apartments	D	-Critical Systems beyond their useful life	\$71,431	FY 2021
2	Seal/stripe parking lot, Replace vanity cabinets and medicine cabinets	Westford Townhomes	D	-Critical Systems beyond their useful life	\$110,046	FY 2021
3	Replace laundromat water heaters	The Atrium Apartments	D	-Critical Systems beyond their useful life	\$6,000	FY 2021
4	Seal/stripe parking lot	Kingsley Park Townhomes	D	-Critical Systems beyond their useful life	\$22,205	FY 2021
5	Seal/stripe parking lot, Replace HVAC's at the 1st floor, 2nd floor, and common area	Greenwood Apartments	D	-Critical Systems beyond their useful life	\$627,157	FY 2021
Total					\$836,839	
6	Replace dumpster enclosures and VCT flooring, paint entrance steel doors, Refurbish catwalks and garden area concrete	The Atrium Apartments	C	Life cycle repairs where repairs are no longer cost effective	\$52,233	FY 2022
7	Replace sliding glass doors and vinyl sidings	Ragan Oaks	C	Life cycle repairs where repairs are no longer cost effective	\$106,838	FY 2022
8	Replace 4 gas water heaters	Tavener Lane Apartments	C	Life cycle repairs where repairs are no longer cost effective	\$10,000	FY 2022
9	Repair concrete sidewalk	Westford Townhomes	C	Life cycle repairs where repairs are no longer cost effective	\$15,670	FY 2022
10	Replace metal fencing Paint exterior guardrails	Rosedale	C	Life cycle repairs where repairs are no longer cost effective	\$21,203	FY 2022
11	Replace rear sliding glass doors and front entrance doors	Waters Edge	C	Life cycle repairs where repairs are no longer cost effective	\$28,000	FY 2022
12	Replace 8 HVAC's	Colchester Condominiums	C	Life cycle repairs where repairs are no longer cost effective	\$64,000	FY 2022
13	Paint exterior, Replace asphalt shingles	Greenwood Apartments	C	Life cycle repairs where repairs are no longer cost effective	\$270,000	FY 2022
14	Replace bathroom vinyl sheet flooring, replace entrance doors	Kingsley Park Townhomes	C	Life cycle repairs where repairs are no longer cost effective	\$114,240	FY 2022
Total					\$629,951	
Grand Total					\$1,466,790	

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Wastewater Infrastructure

There are 3 major infrastructure systems, within the Wastewater System: Pump Stations, the Noman Cole Pollution Control Treatment Plant, and Collections System. In any given year, the amount programmed for infrastructure replacement and upgrades in each area may vary based on specific project schedules, however; staff is attempting to manage the system on a programmatic basis over a ten-year period.

There are 63 wastewater pump stations. Each station typically has multiple pumps for peak flows and emergency backup, motors associated with the pumps, a backup generator, a force main, electrical control equipment, communication equipment for monitoring and remote operation, and a building or other housing structure. County staff monitor the condition of each asset at each pump station and attempt to schedule rehabilitation or replacement before failure. Each pump station is also monitored as a unit, and prior to replacing a major component, an in-depth review is completed to determine if rehabilitation or replacement of other component systems are required at the same time. The current 10-year financial plan (FY 2022-FY 2031) includes an average \$37.4 million per year for reinvestment and rehabilitation of these facilities. This component of the system is currently fully funded.

At the Noman Cole Treatment Plant, there are over 4,000 assets monitored making up 32 major operating systems such as Odor Control, Primary Treatment and others. Each operating system consists of many components such as pumps and concrete tanks. Redundancy is built into all critical systems to allow for maintenance. The condition of each component is monitored during routine maintenance checks as well as by the age of system. Based on age and condition, reinvestment schedules are determined. Currently in the 10-year plan there is an average of \$64.6 million per year programmed for treatment plant capital improvements, the majority is for replacement and rehabilitation. Based on current information, the appropriate reinvestment amounts are being funded.

The Collection system consists of approximately 3,200 miles of pipe and 94,000 manholes. Approximately 70 percent of the system is 30 years or older. In the late 1990s the County began a significant reinvestment program by relining existing pipes utilizing a trenchless technology called cured-in-place-pipe (CIPP). Approximately 20 percent of the system has been rehabilitated utilizing this technology, primarily on the smaller, 8" to 15" lines. In recent years, the program has been expanded to include inspection and rehabilitation of the larger trunk lines. The 10-year financial plan includes a continual increase in funding for collection system rehabilitation with an average of \$42.3 million per year. With this gradual ramp up and based on current information, the appropriate reinvestment amounts are being funded. Failures in either the collection system, pump stations or treatment plant will likely result in discharges of untreated raw sewage into basements or streams, therefore, all three of these systems are considered critical. As a result, the wastewater rates are reviewed each year and the 10-year financial plan is reviewed and updated to ensure adequate funds are programmed to safely maintain and operate the systems.

At this time, based on current information, there is not a funding gap to safely operate the wastewater systems. Annual infrastructure replacement and upgrades throughout the Wastewater system are reflected below:

Countywide Infrastructure Replacement Requirements

INFRASTRUCTURE REPLACEMENT AND UPGRADE REQUIREMENTS: WASTEWATER FACILITIES						
PRIORITY	PROJECT TYPE	FACILITY	CATEGORY	EXISTING CONDITIONS/DEFFICIENCIES	ESTIMATE	Funding Status
1	Pump Stations	Countywide	C	Projected lifecycle is 30 years	\$37,380,200	Annual Requirement
2	Treatment Plan Improvements	Noman Cole Pollution Control Plant (NCPCCP)	C	Projected lifecycle is 30 years	\$64,592,300	Annual Requirement
3	Gravity Sewer Lines	Countywide	C	Projected lifecycle is 50 to 75 years	\$42,325,700	Annual Requirement
Total					\$144,298,200	

It should be noted that the Sanitary Sewer System also has an established Capital Reinvestment Reserve which is intended to address both anticipated and unanticipated increases within the Capital Improvement Program. This reserve provides for significant rehabilitation and replacement of emergency infrastructure repairs. A reserve of 3.0 percent of the five-year capital plan is consistent with other utilities and is recommended by rating agencies. Based on the total five-year capital plan, an amount of \$31 million would be required to reach 3.0 percent. The Sanitary Sewer System is currently maintaining a reserve of approximately \$40 million.

Stormwater Infrastructure

There are two major infrastructure systems associated with the stormwater program, the conveyance system including pipes, manhole inlets and open channels; and the management facilities including bio retention, infiltration, wet and dry ponds, porous pavements, manufactured devices and other items used to improve water quality or manage water quantity. There are currently 1,500 miles of pipes and improved channels, and approximately 69,000 manholes and inlets. The pipes range in size from 12 to 84 inches and are made with reinforced concrete, corrugated metal, or plastic. The life of the system varies with the material type and the original construction practices, but the general estimated lifecycle is 50-75 years. A study indicated the County should invest an estimated \$16 million per year in rehabilitating or replacing the existing system on about a 70-year cycle.

The County currently maintains approximately 2,400 stormwater management facilities ranging from small rain gardens to large flood control dams. Reinvestment projects vary in scope and size; many of them include replacement of plant materials as part of the treatment process for dredging the larger lakes and ponds. As the routine and life cycle operating procedures for many of these facilities are still being developed, a good life cycle cost model does not exist. The county has prepared estimates based on recent dredging experiences as well experiences with “green” infrastructure facilities and estimates an annual program expense of \$16.6 million. Because the plant material is an active component of the “green” infrastructure and because routine maintenance relates directly to the life and function of the facility the \$16.6 million estimate includes both annual operating expenses as well as capital expenses such as dredging and dam repair.

An ultimate rate of \$0.0400 per \$100 of assessed value had been estimated to be required to fully support the stormwater program in the future; however, staff is currently evaluating the long-term requirements for an expanded program. Some of the additional requirements under evaluation include debt service to support the Board’s approval of the dredging of Lake Accotink, the anticipation of additional flooding mitigation requirements, and strengthening the role and financial support for the implementation of stormwater requirements associated with Fairfax County Public Schools sites under renovation. This enhanced program may require incremental changes to the rate over time and may result in a higher ultimate rate to fully support the program. Staff will be evaluating these requirements, as well as the staffing to support them, and analyzing the impact of increased real estate values and revenue projections. Staff will return to the Board of Supervisors at a future Budget Committee meeting to define the needs and opportunities for the future.

Countywide Infrastructure Replacement Requirements

While staff continues to further evaluate the long-term requirements for the Stormwater Program, the FY 2022 rate is proposed to remain the same as the FY 2021 Adopted Budget Plan level of \$0.0325 per \$100 of assessed value. Actual revenue collected in recent years has been higher than projected as a result of increases in property values throughout the County. Based on capital project costs and projected revenues, no rate increase is recommended for FY 2022. It is anticipated that in the next several years, incremental rate increases will be required based on continued growth of stormwater facilities and infrastructure that must be inspected and maintained by the county, additional requirements in the new 2020 Municipal Separate Storm Sewer System (MS4) permit and several of the enhancements noted above. On an annual basis, staff will continue to evaluate the program, analyze future requirements and develop Stormwater operational and capital resource needs.

Annual infrastructure replacement and upgrades for the County's Stormwater Facilities are reflected below:

INFRASTRUCTURE REPLACEMENT AND UPGRADE REQUIREMENTS: STORMWATER FACILITIES						
PRIORITY	PROJECT TYPE	FACILITY	CATEGORY	EXISTING CONDITIONS/DEFICIENCIES	ESTIMATE	Funding Status
1	Conveyance System	65,000 structures and 1,500 miles of pipes	D	Lifecycle is 50-75 years	\$16,000,000	Annual Requirement
2	Stormwater Management Facilities	2,400 county facilities including 20 state regulated dams and 5,300 private facilities	C	Projected lifecycle is 35 years	\$16,600,000	Annual Requirement
Total					\$32,600,000	

Revitalization Infrastructure

The Board of Supervisors defines five geographical boundaries as Commercial Revitalization Districts (CRDs): Annandale, Baileys/Seven Corners, McLean, Route 1, and Springfield. The County implements an ongoing enhanced maintenance program in all CRDs to improve the economic vitality, appearance, and function of the revitalization areas. Routine maintenance includes mowing, weeding, edging, mulching, pruning, leaf removal, litter pick-up, sidewalk/street sweeping, and monthly inspections of approximately 821,000 square feet of landscaped areas. Non-routine maintenance projects such as replacing/repairing pavers, sidewalks, street furnishing, sidewalk, landscaping, and bus shelters are completed as needed. Asset-based CRD projects such as sidewalk and bus shelter replacement utilize the sinking fund. Current projects include the Route 50 Pedestrian Bridge Stairwell Redesign to provide a safer, cleaner passage through a pedestrian bridge; the Springfield CRD Stormwater Pilot project evaluating the feasibility/options to implement a stormwater facility within the CRD streetscape; and replacing sidewalks in several CRDs.

The enhanced maintenance program is also implemented at assets constructed as part of the Tyson's Silver Line. Plant maintenance, mowing, edging, mulching, weeding, and trash removal are routinely performed at 27 bioretention facilities, 145 tree boxes, and two commuter facilities. Commuter facility maintenance also includes asphalt repair/replacement and snow removal.

Staff continues enhancing the appearance, functionality, and sustainability of CRD streetscape and infrastructure and continues supporting the long-term goal of expanding the enhanced maintenance program to all streetscape and walkways within the entirety of each CRD boundary.

Countywide Infrastructure Replacement Requirements

Transportation Infrastructure

The County maintains an assortment of transportation infrastructure that is beyond the service levels provided by VDOT. Some of these include bus shelters, street name signs, trails and sidewalks that provide pedestrian connections, and roads and service drives not maintained by VDOT.

Bus Shelters

The County maintains approximately 181 bus shelters. The infrastructure replacement and upgrade program focuses on repairs to damaged shelters. A fully funded program would include cleaning, trash collection and reinvestment. Some of the cleaning and trash collection is provided by the Office of the Sheriff's Community Labor Force. Annual funding is used to address safety related issues. If there is not adequate funding to perform these tasks, damaged shelters are removed until funding is identified. Some shelters are in need of replacement and a sustainable program to replace shelters on a 20-year cycle estimating \$20,000 per shelter, is \$208,000. This level of funding would replace 104 shelters per year.

Street Signs

As part of the 911 emergency system all roads are required to have a name and street sign to assist emergency response personnel. These signs are not maintained by VDOT and are the responsibility of the County. There are approximately 40,000 signs at 20,000 intersections in the current inventory. The county currently replaces street signs only when they are damaged beyond repair. Over time signs lose their reflectivity and become more difficult to read at night. It is estimated that if the signs are replaced on a 20 year cycle the average annual capital cost would be \$665,000.

Walkways

The County manages the infrastructure replacement and upgrades of 662 miles of walkways and 78 pedestrian bridges valued at an estimated \$220 million. Projects are prioritized based on condition as well as pedestrian usage. In 2013, a Rinker Study was conducted in order to build an accurate inventory and condition assessment of County walkways and revealed that there were approximately 10 miles of trails in extremely poor condition requiring \$3 million in initial reinvestment. The Sinking Fund allocation has provided \$7.8 million to date for reinvestment in these most critical trail needs and continues to provide for trails that have since been identified as deteriorating. The Rinker Study did not include an assessment of pedestrian bridges and sinking fund allocations have enabled some progress in this area. However, pedestrian bridges are being inspected in accordance with National Bridge Inspection Standards to determine repair needs. Since 2013, sidewalk and trail repair and replacement has been on going. A re-assessment of trails and sidewalks is in the planning stages, using current technology and computer software. In addition, a 5-year plan was developed identifying annual emergency funds to increase over time to a level of \$800,000. Annual critical repairs include the correction of safety and hazardous conditions such as damaged trail surfaces, retaining wall failures, handrail repairs, and the rehabilitation of bridges. FY 2022 funding of \$800,000 has been included for reinvestment. Assuming an average service life of 50 years for concrete sidewalks and 25 years for asphalt and bridges, a fully funded reinvestment program is estimated at \$5.4 million annually. In the last several years the sinking fund program has more than doubled the amount being invested in walkways and bridges.

County-Owned Roads

The County is responsible for emergency safety and road repairs to 38 miles of County-owned roads, service drives and County-owned stub streets which are currently not accepted in the Virginia Department of Transportation (VDOT) highway system for maintenance. This infrastructure is valued at over \$230 million. In 2015, a Rinker Study was conducted in order to build an accurate inventory and condition assessment of County-owned roads and service drives and identified an amount of \$4

Countywide Infrastructure Replacement Requirements

million in reinvestment funding required for the roadways with the most hazardous conditions. The Sinking Fund allocation has provided \$5.7 million to date for reinvestment in the most critical needs and continues to provide for roads that have been identified as deteriorating. In addition, a 5-year plan was developed identifying annual emergency funds to increase over time to a level of \$900,000. Annual funding supports pothole repair, drive surface overlays, subgrade repairs, curb and gutter repairs, traffic and pedestrian signage repairs, hazardous tree removal, grading, snow and ice control, minor ditching and stabilization of shoulders, and drainage facilities. Based on the pace of spending to date and project requirements, funding of \$700,000 has been included for this program in FY 2022. A fully funded reinvestment program is estimated at \$6.2 million annually.

Summary of Transportation Infrastructure	
Program Area	Annual Amount
Bus Shelters	\$208,000
Street Signs	\$665,000
Walkways	\$5,400,000
County-owned Roads	\$6,200,000
Total	\$12,473,000

Capital Sinking Fund

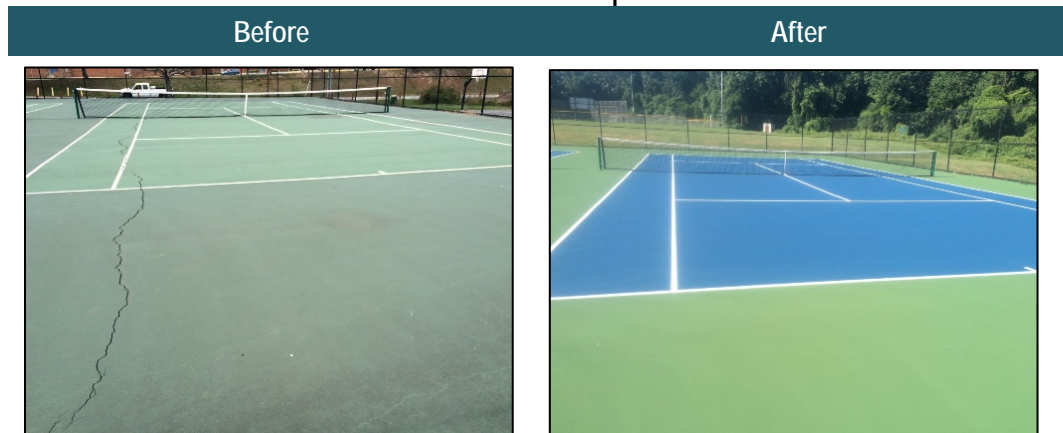
In April 2013, the County and School Board formed a joint committee, the Infrastructure Financing Committee (IFC), to collaborate and review both the County and School's Capital Improvement Program (CIP) and infrastructure upgrade requirements. One of the goals of the Committee was to develop long-term maintenance plans for both the County and Schools, including annual requirements and reserves. The committee conducted a comprehensive review of critical needs and approved recommendations to support the development of a sustainable financing plan to begin to address current and future capital requirements. One of the components of the Final IFC Report included support for a capital sinking fund which would be populated each year as part of the Carryover Review based on 20 percent of the available year end balances. Funding was to provide for infrastructure replacement and upgrades, such as replacement roofs, electrical systems, HVAC and other facility requirements. The Board of Supervisors first approved the establishment of the IFC recommended Capital Sinking Fund as part of the *FY 2014 Carryover Review*. The Board of Supervisors also approved the allocation of the total sinking fund based on specific percentages for each infrastructure area, including: 55 percent for FMD, 20 percent for Parks, 10 percent for walkways, 10 percent for County roads and service drives, and 5 percent for revitalization. At some Carryover Reviews, the Board has approved one-time changes to the allocation based on expenditures to date and work in progress. These funds support prioritized critical infrastructure replacement and upgrades projects throughout the County. The following table includes the allocation of Capital Sinking funds to date.

Countywide Infrastructure Replacement Requirements

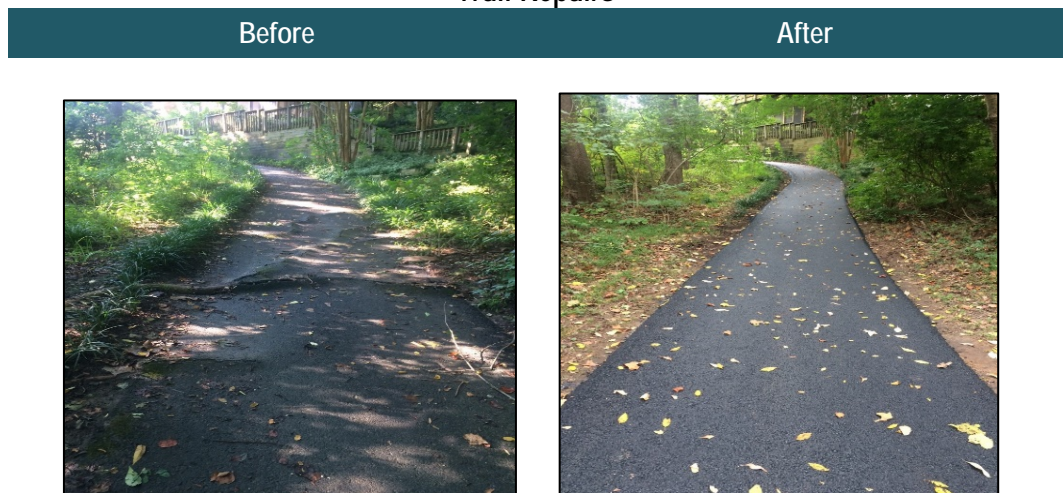
Program Area	Total Allocated to Date
FMD	\$35,621,941
Parks	\$12,953,433
Walkways	\$7,831,140
County Roads	\$5,703,864
Revitalization	\$2,656,783
Total	\$64,767,161

The breadth of the infrastructure upgrades and benefits of the sinking fund allocations can be seen in significant accomplishments throughout the County. Many projects have been initiated or completed in all of the program areas. Below are some examples of Capital Sinking Fund projects:

Athletic Court Repairs



Trail Repairs



Countywide Infrastructure Replacement Requirements

Roof Replacement

Before



After



Generator Replacement



Road Repairs

Before



After

