

Infrastructure Replacement and Upgrades

PROGRAM DESCRIPTION

One of the primary roles for facility management in both government and private industry is to provide for the long-term needs of the organization's capital assets. This maximizes the life of the facilities, avoids their obsolescence and provides for a planned program of repairs, improvements and restorations to make them suitable for organizational needs. Infrastructure Replacement and Upgrades is the planned replacement of building subsystems such as roofs, electrical systems, HVAC systems and plumbing systems that have reached the end of their useful life. Major renewal investment is required in facilities to replace old, obsolete building subsystems that have reached the end of their life cycle. Without significant reinvestment in building subsystems, older facilities will fall into a state of ever deteriorating condition and functionality and the maintenance and repair costs necessary to keep them functional will increase. This section also includes the upgrades associated with Americans with Disabilities (ADA) compliance at County facilities.

PROGRAM INITIATIVES

The Facilities Management Department (FMD) currently provides support for evaluating facilities, identifying problems, developing costs estimates, establishing priorities and performing required infrastructure replacement and upgrades. 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. Fairfax County will have a projected FY 2021 facility inventory of over 11.6 million square feet of space (excluding schools, parks, housing and human services residential facilities). This inventory continues to expand with the addition of newly constructed facilities, the renovation and expansion of existing facilities and 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.

Many County facilities have outdated HVAC and electrical systems that are susceptible to failure or are highly inefficient energy users. Sites are identified and each individual project involves a two-step process to complete both design and construction. Roof replacement, repairs, and waterproofing are conducted in priority order based on an evaluation of maintenance and performance history. Repairs and replacement of facility roofs are considered critical to avoid the serious structural deterioration that occurs from roof 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.

Critical emergency repairs and renovations are accomplished under the category of emergency building repairs. These small projects abate building obsolescence and improve the efficiency and effectiveness of facilities and facility systems. The following table outlines, in general, the expected service life of building subsystems used to project infrastructure replacement and upgrade requirements, coupled with the actual condition of the subsystem component:

**GENERAL GUIDELINES FOR EXPECTED
SERVICE LIFE OF BUILDING SUBSYSTEMS**

ELECTRICAL	
Service/Power	25 years
Generators	25 years
Lighting	20 years
Fire Alarms	15 years
HVAC	
Equipment	20 years
Boilers	15 to 30 years
Building Control Systems	10 years
PLUMBING	
Pipes and fittings	30 years
Fixtures	30 years
Pumps	15 years
OTHER	
Elevator	25 years
Escalator	25 years
Systems Furniture	20 to 25 years
Roofs	20 years
Paving	15 years
Carpet Tiles	15 years
Broadloom Carpet	7 years

Each year, the FMD prioritizes and classifies infrastructure replacement and upgrade 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.

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. The Committee found the analysis of financial policy, the review of the condition of hundreds of facilities, and the scarce options for financing to be challenging. A Final Report was developed and approved by the Board of Supervisors on March 25, 2014, and the School Board on April 10, 2014. The Report included support for conducting capital needs assessments, new policy recommendations for capital financing, including a capital sinking fund and increased annual General Fund supported funding, the adoption of common definitions related to all types of maintenance, support for County and School joint use opportunities for facilities, and continued support for evaluating ways to further reduce capital costs.

The Board of Supervisors approved the establishment of the Capital Sinking Fund as part of the FY 2014 Carryover Review. To date, a total of \$49,310,128 has been dedicated to capital sinking funds and allocated for infrastructure replacement and upgrades to the following areas: \$27,120,573 for FMD, \$9,862,026 for Parks, \$5,512,585 for Walkways, \$4,931,012 for County-owned Roads and \$1,883,932 for Revitalization. Projects have been initiated in all of these program areas from the sinking fund allocation. FMD has initiated several larger scale projects with the \$27,120,573 allocated to the Sinking Fund, including HVAC system component replacement at the Patrick Henry Library; emergency back-up generator replacements at the Government Center, Herrity Building and Pennino Building; replacement of the reflective coating, flashing and caulking of the roofs at the Pennino Building, Herndon Fortnightly Library and James Lee Community Center; fire alarm system replacement at the Seven Corners Children's Center; windows replacement at the Hollin Hall building; and waterproofing of the exterior building, doors and windows at the Bailey's Community Center.

In addition, as discussed with the IFC, the requirement for County infrastructure replacement and upgrades is estimated at \$26 million per year. This estimate is based on current 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.

Due to budget constraints, there is no funding included in FY 2021 in this fund. However, an amount of \$8,980,000 will be considered for funding as part of the *FY 2020 Carryover Review*. In recent years, it has been the Board of Supervisors' practice to fund some or all of the infrastructure replacement and upgrade projects using one-time funding as available as part of quarterly reviews. These projects, all Category F, will address emergency building repairs, fire alarm system replacement, HVAC system upgrades and building automation, roof repairs and waterproofing, elevator repairs, and parking lot and garage repairs. The table on the following page provides specific project details of the projects that will be considered to be funded at the *FY 2020 Carryover Review*.

FY 2021 INFRASTRUCTURE REPLACEMENT AND UPGRADE PROGRAM					
PRIORITY	PROJECT TYPE	FACILITY	CATEGORY	EXISTING CONDITIONS/DEFFICIENCIES	ESTIMATE
PROJECTS PROPOSED TO BE FUNDED AS PART OF THE FY 2020 THIRD QUARTER REVIEW					
1	Fire Alarm	Herrity Building	F	<ul style="list-style-type: none"> · Increased maintenance required to keep system operational · System has exceeded its useful life · Disruption to building operations/end users · Elevated potential for loss of property and equipment 	\$200,000
2	Roof	Centreville Regional Library	F	<ul style="list-style-type: none"> · Maintenance and repairs no longer feasible · Water leaks · Disruption to building operations/end users · Increased utilities costs 	\$1,130,000
3	Elevators	Courthouse	F	<ul style="list-style-type: none"> · Increased equipment failure · Old technology · Parts difficult to obtain · Unreliable equipment · Disruption to building operations/end users 	\$2,500,000
4	Site Work	Thomas Jefferson Library (Main entrance canopy and pavement)	F	<ul style="list-style-type: none"> · Potential tripping hazard · Water leaks · Disruption to building operations/end users 	\$115,000
5	Parking Lot	Springfield Warehouse	F	<ul style="list-style-type: none"> · Maintenance no longer feasible · Potential tripping hazard · Surface has failed 	\$600,000
6	Site Work	Gum Springs Community Center (Ceiling tiles, restrooms, lighting fixtures and other interior work)	F	<ul style="list-style-type: none"> · Continual maintenance and repairs · Restroom fixtures and finishes are in poor condition · Increased maintenance costs 	\$360,000
7	Site Work	Government Center (Concrete decking, drains and waterproofing)	F	<ul style="list-style-type: none"> · Continued mold growth · Water leaks · Potential tripping hazard 	\$1,000,000
8	HVAC	Herrity Building	F	<ul style="list-style-type: none"> · Increased failures · Unreliable equipment · Disruption to building operations/end users · Increased utilities costs 	\$2,500,000
9	Parking Lot	Courthouse	F	<ul style="list-style-type: none"> · Surface has failed · Maintenance no longer feasible · Potential tripping hazard 	\$110,000
10	Building Automation System	Fairfax City Library	F	<ul style="list-style-type: none"> · Increased maintenance costs · Frequent Control Board replacements · Unreliable equipment · Disruption to building operations/end users · Increased utilities costs 	\$150,000
11	Building Automation System	Fire Training Academy	F	<ul style="list-style-type: none"> · Increased maintenance costs · Frequent Control Board replacements · Unreliable equipment · Disruption to building operations/end users · Increased utilities costs 	\$175,000
12	Site Work	Herrity Building (Pavers)	F	<ul style="list-style-type: none"> · Potential tripping hazard · Disruption to building operations/end users 	\$100,000
13	Elevators	Fire Training Academy (Design phase only)	F	<ul style="list-style-type: none"> · Increased equipment failure · Old technology · Parts difficult to obtain · Unreliable equipment · Disruption to building operations/end users 	\$40,000
Total					\$8,980,000

In addition to the above projects identified as part of the FY 2021 plan, FMD has identified many additional Category F and D projects. Analysis of these requirements is conducted annually, and projects may shift categories, become an emergency and be funded by the emergency systems failures project, or be eliminated based on other changes, such as a proposed renovation project.

CURRENT PROJECT DESCRIPTIONS

1. **ADA Compliance - FMD** (Countywide): This is a continuing project to support County compliance with the Americans with Disabilities Act at County-owned facilities. Funding for annual ADA projects to support the continuation of improvements is required, as buildings and site conditions age. For example, over time sidewalks or pavers may settle or erosion occurs changing the slope or creating gaps/obstructions, program usage changes can result in new physical barriers, or ADA entrance ramps for pedestrians can fail due to increased usage for the movement of bulk materials and equipment. Funding in the amount of \$300,000 has been included in FY 2021 for this project.
2. **Building Energy Management Systems** (Countywide): This is a continuing project to support the installation of Building Energy Management Systems (BEMS) within existing County facilities. BEMS control facility lighting, HVAC, bay door interlocking, and negative pressure room systems. Older facilities are retrofitted with these systems in order to increase energy efficiency.
3. **Capital Sinking Fund – FMD** (Countywide): \$27,120,573 has been allocated to date for the capital sinking fund for FMD. The Capital Sinking Reserve Fund was established as a direct result of the Infrastructure Financing Committee (IFC). The Board of Supervisors approved the allocation of the Capital Sinking Reserve Fund for capital projects as part of the *FY 2016 Third Quarter Review*. It is anticipated that funding for each sinking fund will be approved annually as part of the Carryover Review and will be allocated based on the following percentages: 55 percent for FMD, 20 percent for Parks, 10 percent for walkways, 10 percent for County maintained Roads and Service Drives, and 5 percent for revitalization.
4. **Carpet Replacement** (Countywide): This is a continuing project for carpet replacement at various County facilities where the existing carpet has deteriorated beyond repair or is in an unserviceable condition.
5. **Electrical System Upgrades and Replacements** (Countywide): This is a continuing project for the repair, renovation and upgrading of mechanical and electrical systems in various facilities throughout the County.
6. **Elevator/Escalator Replacement** (Countywide): This is a continuing project for the replacement and repairs of elevators throughout the County.
7. **Emergency Building Repairs** (Countywide): This is a continuing project to support the critical repair, renovation, remodeling and upgrading of various facilities throughout the County. Requirements include abatement of health or safety hazards and emergency or unanticipated repairs to building exteriors.
8. **Emergency Generator Replacement** (Countywide): This is a continuing project for generator replacements at various sites throughout the County. Requirements are programmed based on equipment age coupled with maintenance and performance history.
9. **Emergency Systems Failures** (Countywide): This is a continuing project to support emergency repairs and replacements to County facilities in the event of a major systems failure, such as a large HVAC system or other unforeseen event. Currently, this is the County's only source to deal with potential emergency system failures. Infrastructure Replacement and Upgrades funding is encumbered quickly because it is earmarked for specific projects. As a result, specific project balances are unavailable for emergencies. If a system failure should occur, there is the potential that a County facility may shut down, suspending services to residents and disrupting County business. Although the County's emphasis on infrastructure replacement and preventative maintenance is intended to ensure these kinds of interruptions are avoided, this funding will enable potential disruptions to be corrected immediately.

10. **Fire Alarm System Replacements** (Countywide): This is a continuing project for the replacement of fire alarm systems based on age, difficulty in obtaining replacement parts, service and overall condition assessment. This program provides for the replacement of fire alarm systems which are 15 to 30 years old, have exceeded their useful life and experience frequent failure when tested.
11. **HVAC System Upgrades and Replacement** (Countywide): This is a continuing project for the repair, renovation and/or upgrading of Heating Ventilation and Air Conditioning (HVAC) systems in various facilities throughout the County. In general, the useful life of HVAC systems is 20 years; however, some systems fail earlier due to wear and tear, and often emergency repairs are costly based on difficulty in obtaining parts and additional code requirements.
12. **MPSTOC County Support for Renewal** (Springfield District): \$2,138,067 is currently in reserve to begin to address future capital renewal requirements at the McConnell Public Safety Transportation Operations Center (MPSTOC). This funding is appropriated at the end of each year and supported by revenues received from the State. This revenue represents funding associated with the state reimbursement for their share of the operational costs at MPSTOC such as security, custodial, landscaping, maintenance, parking lot repairs and snow removal costs. The County pays for all operational requirements and the State reimburses the County annually for their share of these costs.
13. **MPSTOC State Support for Renewal** (Springfield District): \$781,733 is currently in reserve to begin to address future capital renewal requirements at the McConnell Public Safety Transportation Operations Center (MPSTOC). This funding is appropriated at the end of each year and supported by revenues received from the State. This revenue represents the state's annual installment of funds for their share of future repairs and renewal costs in order to avoid large budget increases for capital renewal requirements in the future. This contribution is based on the industry standard of 2 percent of replacement value or \$3.00 per square foot.
14. **Parking Lot and Garage Repairs** (Countywide): This is a continuing project for the repair and maintenance to parking lots and garages at various locations throughout the County. Parking lot surfaces are removed, the base re-compacted and a new surface course installed. In some cases, asphalt paving is milled down and resurfaced.
15. **Roof Repairs and Waterproofing** (Countywide): This is a continuing project for the repair and replacement of facility roofs and waterproofing systems at County buildings. Typically, roofs at County facilities range in warranty periods from 10 to 20 years.
16. **Window Replacement** (Countywide): This is a continuing project for the replacement or repair of windows where water is leaking into County buildings.

PROJECT COST SUMMARIES
INFRASTRUCTURE REPLACEMENT AND UPGRADES
(\$000's)

Project Title Project Number	Source of Funds	Budgeted or Expended Through FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Total FY2021- FY2025	Total FY2026- FY2030	Total Project Estimate
1 ADA Compliance - FMD GF-000001	G	C	\$300	\$300	\$300	\$300	\$300	\$1,500	\$1,500	\$3,000
2 Building Energy Management Systems GF-000021	G	C		\$1,500	\$1,500	\$1,500	\$1,500	\$6,000	\$7,500	\$13,500
3 Capital Sinking Fund - FMD GF-000029	G	\$27,121						\$0		\$27,121
4 Carpet Replacement 2G08-003-000	G	C		\$500	\$500	\$500	\$500	\$2,000	\$2,500	\$4,500
5 Electrical System Upgrades and Replace. GF-000017	G	C		\$500	\$500	\$500	\$500	\$2,000	\$2,500	\$4,500
6 Elevator/Escalator Replacement GF-000013	G	C		\$1,000	\$1,000	\$1,000	\$1,000	\$4,000	\$5,000	\$9,000
7 Emergency Building Repairs GF-000008	G	C		\$500	\$500	\$500	\$500	\$2,000	\$2,500	\$4,500
8 Emergency Generator Replacement GF-000012	G	C		\$1,000	\$1,000	\$1,000	\$1,000	\$4,000	\$5,000	\$9,000
9 Emergency Systems Failures 2G08-005-000	G	C		\$1,000	\$1,000	\$1,000	\$1,000	\$4,000	\$5,000	\$9,000
10 Fire Alarm System Replacements GF-000009	G	C		\$500	\$500	\$500	\$500	\$2,000	\$2,500	\$4,500
11 HVAC System Upgrades and Replacement GF-000011	G	C		\$6,500	\$6,500	\$6,500	\$6,500	\$26,000	\$32,500	\$58,500
12 MPSTOC County Support for Renewal 2G08-008-000	X	\$2,138						\$0		\$2,138
13 MPSTOC State Support for Renewal 2G08-007-000	X	\$782						\$0		\$782

PROJECT COST SUMMARIES
INFRASTRUCTURE REPLACEMENT AND UPGRADES
(\$000's)

Project Title Project Number	Source of Funds	Budgeted or Expended Through FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Total FY2021- FY2025	Total FY2026- FY2030	Total Project Estimate
14 Parking Lot and Garage Repairs GF-000041	G	C		\$1,200	\$1,200	\$1,200	\$1,200	\$4,800	\$6,000	\$10,800
15 Roof Repairs and Waterproofing GF-000010	G	C		\$600	\$600	\$600	\$600	\$2,400	\$3,000	\$5,400
16 Window Replacement 2G08-006-000	G	C		\$200	\$200	\$200	\$200	\$800	\$1,000	\$1,800
Total			\$30,041	\$300	\$15,300	\$15,300	\$15,300	\$61,500	\$76,500	\$168,041

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

Key: Source of Funds
 B Bonds
 G General Fund
 S State
 F Federal
 X Other
 U Undetermined