FB04
Department of Information Technology – Capital

Capital Budget Summary

State-owned *Capital Improvement Program*
($ in Millions)

Projects	Prior Auth.	2022 Request	2023 Est.	2024 Est.	2025 Est.	2026 Est.	Beyond CIP
Public Safety Communications System	$359.489	$5.300	$5.500	$9.000	$8.701	$5.500	$0.000
Total	**$359.489**	**$5.300**	**$5.500**	**$9.000**	**$8.701**	**$5.500**	**$0.000**

Fund Source	Prior Auth.	2022 Request	2023 Est.	2024 Est.	2025 Est.	2026 Est.	Beyond CIP
GO Bonds	$238.563	$5.300	$5.500	$9.000	$8.701	$5.500	$0.000
PAYGO GF	27.400	0.000	0.000	0.000	0.000	0.000	0.000
Other[1]	93.526	0.000	0.000	0.000	0.000	0.000	0.000
Total	**$359.489**	**$5.300**	**$5.500**	**$9.000**	**$8.701**	**$5.500**	**$0.000**

CIP: *Capital Improvement Program*
GF: general funds
GO: general obligation
PAYGO: pay-as-you-go

[1] State Highway Administration projects included in prior years.

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Key Observations

- The Public Safety Communications System is expected to become operational in all Maryland jurisdictions in fiscal 2022. Calvert, Charles, Prince George's, and St. Mary's counties are expected to go in service in July 2021, and Montgomery County is expected to go in service in September 2021.

- The master plan proposes a schedule for improving radio coverage in 12 locations throughout the State from fiscal 2023 to 2026.

Summary of Recommended Bond Actions

1. Public Safety Communications System

   Approve $5,300,000 in general obligation bonds to continue construction of the statewide Public Safety Communications System.

2. SECTION 13 – Department of Information Technology – Public Safety Communications System

   Approve $2,650,000 in general obligation bonds for fiscal 2023 to continue construction of the statewide Public Safety Communications System.

Budget Overview

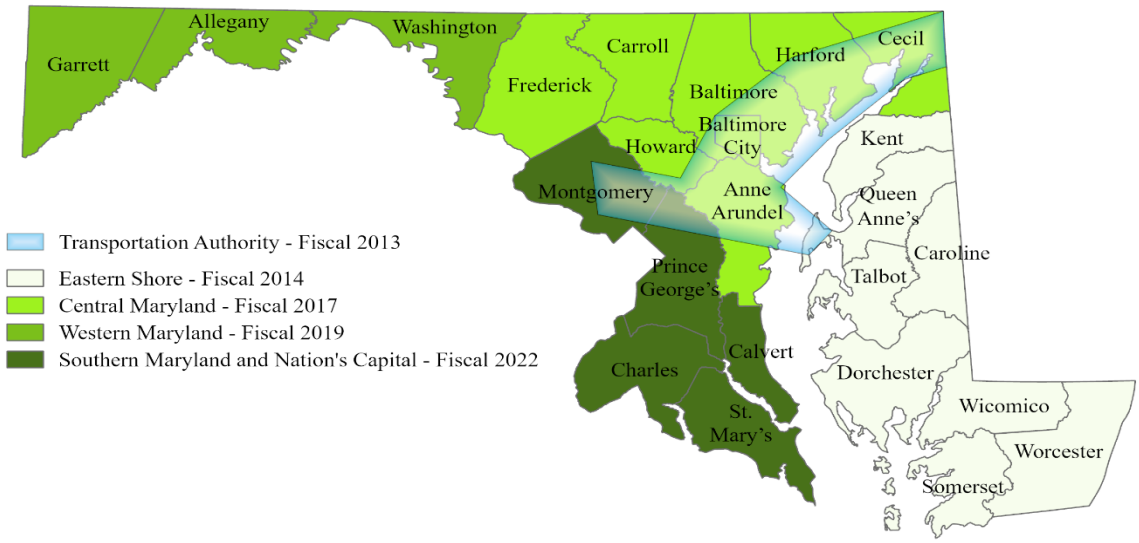
The Department of Information Technology (DoIT) fiscal 2022 capital budget includes one project, the Public Safety Communications System project. This provides an integrated statewide public safety wireless communication system and a primary radio communication system for public safety first responders throughout the State. The system uses the Public Safety 700 megahertz (MHz) spectrum licensed to the State by the Federal Communications Commission. The program is also referred to as Maryland First Responders Interoperable Radio System Team (FiRST).

The State has a contract with Motorola to build and renovate infrastructure for this project. Once completed, this radio system will be the primary operating radio system for all State agencies, providing a communications platform for State agencies and allowing for seamless interoperability among State users and first responders at all levels of government. Interoperable communications is the ability for first responders to transmit voice and data communications in real time, regardless of agency or jurisdictional boundary. The system also supports local jurisdictions as primary users and federal partners as interoperability users.

Exhibit 1 shows the construction schedule by phases. The phases are:

- phase 1 is the Maryland Transportation Authority and Baltimore City that became operational in fiscal 2013;
- phase 2 is the Eastern Shore that was deployed in fiscal 2013 and 2014;
- phase 3 is Central Maryland in which Baltimore, Carroll, Cecil, Frederick, and Harford counties became operational in fiscal 2016, while Anne Arundel and Howard counties became operational in fiscal 2017;
- phase 4 is Western Maryland in which Washington County became operational in December 2017, Allegany County in July 2018, and Garrett County in December 2018; and
- phase 5 is the nation's capital area and Southern Maryland. In Southern Maryland, coverage testing is scheduled to begin in April 2021 for Charles County and in May 2021 for Calvert and St. Mary's counties. Southern Maryland is expected to be operational in July 2021. In the nation's capital region, Prince George's County is expected to begin coverage testing in April 2021 and be operational in July 2021. Montgomery County has coverage testing beginning in September 2021 and is expected to become operational in September as well.

Exhibit 1
Schedule for Implementing Maryland FiRST
Fiscal Years That Regions Become Fully Operational



FiRST: First Responders Interoperable Radio System Team

Source: Department of Information Technology

Out-year Authorizations for Site Improvements and Ethernet Coverage

Once complete, the system's infrastructure will consist of a backbone of approximately 170 radio transmitter sites (that includes towers and shelters), radio equipment, fiber and microwave transport, and data communications equipment. The system is designed for on-street radio coverage but in many areas also provides a level of in-building coverage. With phases 1 to 4 live and operational, DoIT is able to gather system radio coverage data across the majority of the State. The department has found some deficiencies in that coverage and the backend infrastructure that are addressed in the *Capital Improvement Program* (CIP).

In an effort to mitigate these deficiencies, DoIT recommends additional transmitter radio sites be added to the system in areas with demonstrable coverage gaps. DoIT is also looking at providing in-building coverage for schools and malls, particularly in the eight counties that use Maryland FiRST as their primary public safety communications system, to support a response to an active shooter situation. DoIT makes every attempt to utilize or build towers on State-owned properties to minimize the cost of purchasing or leasing real estate. The costs to develop transmitter sites can vary substantially site by site, depending on the available assets and site geography. These variable costs include the costs to build the tower and shelter, remediate an existing tower, purchasing and installing equipment, and implementation of fiber and/or microwave backhaul.

Radio communications between users consists of both voice and data information. The 700 MHz system uses fiber and microwave backhaul to transmit voice and data between transmitter sites and often over large geographical distances. Due to limitations with fiber and microwave technologies, the 700 MHz system is designed to be robust with redundant links wherever possible to reduce the risk of a system interruption. DoIT has identified potential backhaul improvement opportunities that will further harden the system and provide additional redundancy. These can be realized through the use of new fiber installs, rerouting of existing connections, and the addition of new microwave paths.

Master Plan Site Improvements

In 2020, DoIT prepared a master plan that identified areas with poor coverage that could benefit from improvements. Site improvements funded in fiscal 2021 and 2022 were to existing locations. **Exhibit 2** shows that planned fiscal 2023 improvements are also to existing locations, while more expensive projects are in fiscal 2024 to 2026. Adding the greenfield locations in fiscal 2024 increases costs from $2.85 million in fiscal 2023 to $9 million in fiscal 2024.

Exhibit 2
Planned Future Radio Sites
Fiscal 2023-2026

Fiscal Year	County	Site Name or Identifier	Status
2023	Queen Anne's	Queenstown 50/301	To be determined
2023	Garrett	Accident	Existing
2024	Washington	Greenbriar State Park	Existing
2024	Garrett	New Germany State Park (West)	Greenfield
2024	Montgomery	Elmer School	Existing
2024	Carroll	Harvey Gummel	Existing
2024	Howard	Patapsco State Park	Greenfield
2025	Allegany	Barton	Greenfield
2025	Dorchester or Somerset	Bishop's Head	Greenfield
2025	Montgomery	Silver Spring	Existing
2026	Garrett	New Germany State Park (East)	Greenfield
2026	Anne Arundel	Harwood	Existing

Source: Department of Information Technology

When preparing its master plan, the department prioritized locations based on the factors to maximize available funding. These key factors, in order of highest to lowest, are:

- locations where a State tower, equipment shelter, and backhaul communication equipment already exist;
- locations where a county or commercial tower exists; however, backhaul and/or equipment shelters may not be present;
- greenfield sites where there is no tower, equipment shelter, and existing backhaul; however, a partner may provide funding for a new tower; and
- greenfield sites where there is no tower, equipment shelter, and existing backhaul communication equipment and no outside funding is available.

Convert Phases 1 to 4 to Ethernet

The 700 MHz system vendor, Motorola, has announced that it will cease support of T-1 technology in 2022. While phase 5 of the system was designed using Ethernet technology, phases 1 to 4 were implemented using T-1 in an effort to leverage existing State assets. Though Motorola continues to support T-1 technology on the Maryland FiRST system as currently configured, beginning in 2022, Maryland FiRST will no longer be able to receive system upgrades. These system upgrades include updates to software and hardware, security patches, and bug fixes. As T-1 equipment ages, and replacement equipment and support are not available, the system would atrophy in place if not upgraded.

DoIT has initiated a plan with Motorola to convert phases 1 to 4 to Ethernet technology before the system reaches end of life support. Ethernet is the current radio industry standard for backhaul and provides capabilities that T-1 technology did not offer. Ethernet has the capability of carrying more data throughout the system as it has greater bandwidth than T-1. In addition, it provides greater resilience due to the nature of its routing capabilities.

2021 CIP Costs Are Consistent with Prior Year Estimates

Exhibit 3 shows that estimated costs for coverage and site improvements (towers and backhaul) and the Ethernet conversion total $34 million through the end of fiscal 2026. This is consistent with the estimate presented last year. Two sites have been identified for improvement with fiscal 2022 authorizations – LaVale State Police Barracks in Allegany County and Swallow Fall in Garrett County. Costs increase substantially in fiscal 2024 when the State funds the more expensive greenfield sites.

Exhibit 3
Public Safety Communications System Capital Costs
Fiscal 2022-2026
($ in Millions)

	2022	2023	2024	2025	2026	Total
Towers and Backhaul	$2.616	$2.850	$9.000	$8.701	$5.500	$28.667
Ethernet Conversion	2.684	2.650	0.000	0.000	0.000	5.334
Total	**$5.300**	**$5.500**	**$9.000**	**$8.701**	**$5.500**	**$34.001**

Sources: 2021 *Capital Improvement Program*; Department of Information Technology

Operating Budget Impact Statement

Executive's Operating Budget Impact Statement – State-owned Projects
Fiscal 2022-2026
($ in Millions)

	2022	2023	2024	2025	2026
Public Safety Communications System					
Estimated Operating Cost	$13.893	$15.694	$16.236	$16.763	$17.413
Estimated Statewide Life Cycle Radio Equipment Replacement	0.000	1.000	0.000	2.872	4.113
Total Operating Impact					
Estimated Operating Cost	**$13.893**	**$16.694**	**$16.236**	**$19.635**	**$21.526**
Estimated Staffing	**7.00**	**7.000**	**7.00**	**7.00**	**7.00**

The fiscal 2022 allowance includes $13.9 million in operating costs for the Maryland FiRST radio program. The budget also includes 7 regular positions to operate the program. Costs shown in the table are incremental increases in addition to fiscal 2022 budgeted expenses. Cost increases are primarily attributable to inflation, expiring warranties,[1] and anticipated equipment replacement.[2] No additional staffing is anticipated. State agencies using the system are charged the radio program's operating expenses so that the program receives reimbursable funds from State agencies to fund its operations. These charges are based on the number of subscriber radios each agency has registered on the system with agencies that have more radios registered being charged more. Additional costs related to replacing equipment will be borne by the agencies and will be appropriated in the agencies' budgets.

[1] There is a two-year warranty on the equipment. After two years, the State purchases service contracts, resulting in cost increases two years after the beginning of operations in an area.

[2] The notional lifecycle replacement schedule for digital subscriber unit radios is 7 to 8 years. However, due to the high cost of each unit, it is recommended that a 10- to 15-year replacement cycle be followed. The estimate begins to replace equipment in fiscal 2022.

Preauthorizations

Exhibit 4 shows that $2.7 million is provided in fiscal 2023. Preauthorizations allow the project to move forward and the Board of Public Works to approve construction if the entire authorization is not provided in the budget year. In this case, the funds support additional costs associated with upgrading the T-1 connectivity currently in place at many phase 1 to 4 sites with newer Ethernet technology.

Exhibit 4
Preauthorizations
Fiscal 2023-2026

Project	2023	2024	2025	2026	Reason
Public Safety Communication System	$2.685	$0.000	$0.000	$0.000	Funds are needed to complete Ethernet conversion that will be under contract before the funds are authorized in fiscal 2023.

Source: Department of Budget and Management, 2021 *Capital Improvement Program*

GO Bond Recommended Actions

1. Approve $5,300,000 in general obligation bonds to continue construction of the statewide Public Safety Communications System. The authorization supports upgrading to Ethernet technology, adding towers, and improving backhaul.

2. Approve $2,650,000 in general obligation bonds for fiscal 2023 to continue construction of the statewide Public Safety Communications System. These funds continue the conversion to Ethernet technology.