

Capital Needs Inventory (CNI) Annual Report

**SB 199/HB 114, Ch. 20, 2021
Special Session**

A Report to the Senate Budget and Taxation Committee, House Appropriations Committee, and the House Environment and Transportation Committee

January 2022

MSAR# 13865

Maryland Department of Transportation (MDOT)
Maryland Transit Administration (MTA)

Introduction

The first Maryland Department of Transportation (MDOT) Maryland Transit Administration (MTA) Capital Needs Inventory (CNI) was published in 2019 to meet the requirements of §7-309 of the Transportation Article, Maryland Annotated Code. The purpose of the CNI is to assess the MDOT MTA's ongoing unconstrained capital needs over a 10-year period. It presents a snapshot from MDOT MTA's ongoing transit asset management analyses and annual call for projects process and is intended to support improved decision-making regarding the maintenance and enhancement needs of MDOT MTA's transit assets over the long term. The annual call for projects process is part of MDOT MTA's capital programming process, where project managers submit capital projects for inclusion in the future Consolidated Transportation Program (CTP). The call for projects gathers information on each project including the justification of the need, the assets being addressed, and the anticipated years of expenditure.

Capital needs may include, but are not limited to, the costs to maintain assets in a State of Good Repair; meet existing or new regulatory requirements; invest in transit infrastructure, assets, or service enhancements; and modernize or adapt to new technologies or new mobility options.

In addition, the CNI is updated at least once every three years by law and submitted to the Senate Budget and Taxation Committee, the House Appropriations Committee, and the House Environment and Transportation Committee. The next update will be completed and submitted in July 2022 and will illustrate changes in the backlog and funding gap since the 2019 report. The updated 2022 CNI report will also include a more current and detailed listing of project-based needs that is aligned to line items funded in the CTP.

Additional funding has been made available since 2019 which provides MDOT MTA more opportunity to reduce the funding gap and address the backlog of needs. For example, federal funding relief through the American Rescue Plan Act of 2021 has helped to address State of Good Repair rail needs and launch the \$43 million Fast Forward program, which will improve transit reliability, system safety, and customer experience through investments in:

- designing and constructing additional dedicated bus lanes;
- implementing transit signal prioritization;
- making lane modifications that promote faster, more efficient transit;
- creating new and enhanced transit hubs;
- adding more bus shelters;
- making ADA and pedestrian safety improvements near bus stops;
- improving signage to convey real-time information; and
- enhancing wayfinding along Light RailLink routes.

MDOT MTA also continues to aggressively apply for competitive grants and was successfully awarded a Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant to complete \$50 million in projects. Additional local, state, and federal support has also been used to address Enhancement needs.

This CNI Annual Report was prepared to meet the requirements of §7-309 of the Transportation Article, Maryland Annotated Code, as amended under Chapter 11 of the 2021 Special Session. The language states:

On or before January 20, 2022, and on or before January 20 each year thereafter, the Administration shall, in accordance with § 2–1257 of the State Government Article, submit an accounting of the capital funds programmed, appropriated, and expended on each of the projects identified in the assessment required under subsection (A) of this section for the prior fiscal year to the Senate Budget and Taxation Committee, the House Appropriations Committee, and the House Environment and Transportation Committee.

Further details of the CNI requirements are provided in the Appendix.

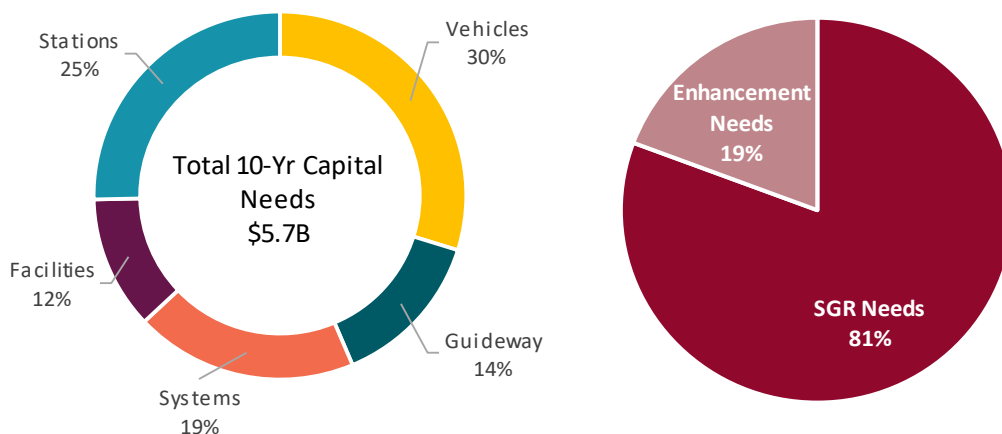
Overview of 2019 CNI Outcomes

All references in this document to CNI results are from the 2019 CNI report.

Between 2019 and 2028, MDOT MTA’s total capital needs are expected to reach more than \$5.7 billion in year of expenditure (YOE) dollars, including an annual inflation rate of 3 percent. The largest category of total needs over the 10-year period is vehicles (30 percent). Stations comprise the next-largest category of total needs (25 percent), followed by systems (19 percent), guideway (14 percent), and facilities investment needs (12 percent). These asset categories follow the Federal Transit Administration’s (FTA) hierarchy for transit assets.

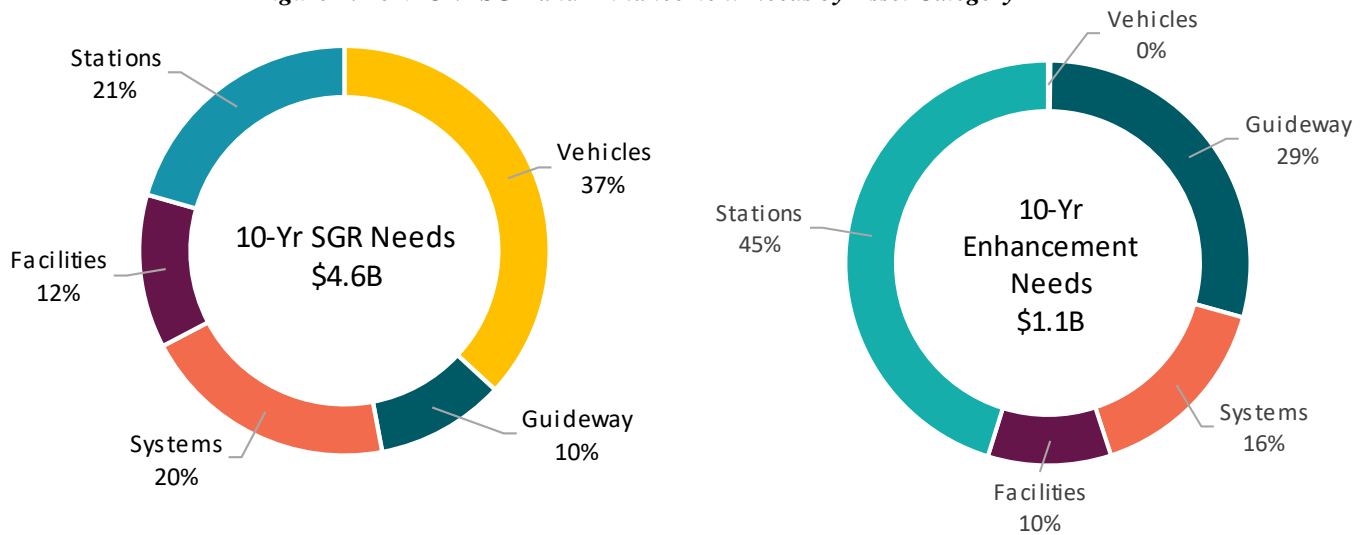
State of Good Repair needs for MDOT MTA’s current asset inventory drive 81 percent of total needs. Enhancement needs to meet system performance goals as well as current and future service demand make up 19 percent of total needs over the 10-year period (see **Figure 1**).

Figure 1: 2019 CNI Summary of Total 10-Year Capital Needs



State of Good Repair needs and Enhancement needs are further divided by asset category, as shown below in **Figure 2**.

Figure 2: 2019 CNI SGR and Enhancement Needs by Asset Category



The needs estimates and priorities described in the 2019 CNI report represent a snapshot in time based on the best information available in 2018. As MDOT MTA has matured and invested in the transit asset management program, the capital programming process has adapted to account for new and better asset data and improved forecasting processes. These improvements are implemented annually as part of the call for projects process and drafting of the CTP and reflect MDOT MTA’s commitment to continuous improvement. The 2022 CNI report will reflect these changes.

Overview of Backlog

2019 CNI – State of Good Repair Backlog

The State of Good Repair backlog is the cumulative dollar value of deferred capital reinvestment and replacement needs, including for those assets that may have surpassed their expected useful life. The State of Good Repair backlog value represents the total amount of capital funding it will take at any given time to bring an agency’s assets into a State of Good Repair. Nationally, the State of Good Repair backlog for transit is estimated at nearly \$100 billion, a majority of which is associated with the legacy (aging) transit systems in the United States.

MDOT MTA’s State of Good Repair backlog from the 2019 CNI was estimated at \$1.5 billion in 2018 dollars. as shown in **Figure 3**, this backlog includes about \$287 million in vehicles, \$294 million in guideway assets, \$179 million in systems assets, \$403 million in facilities, and \$372 million in station assets.

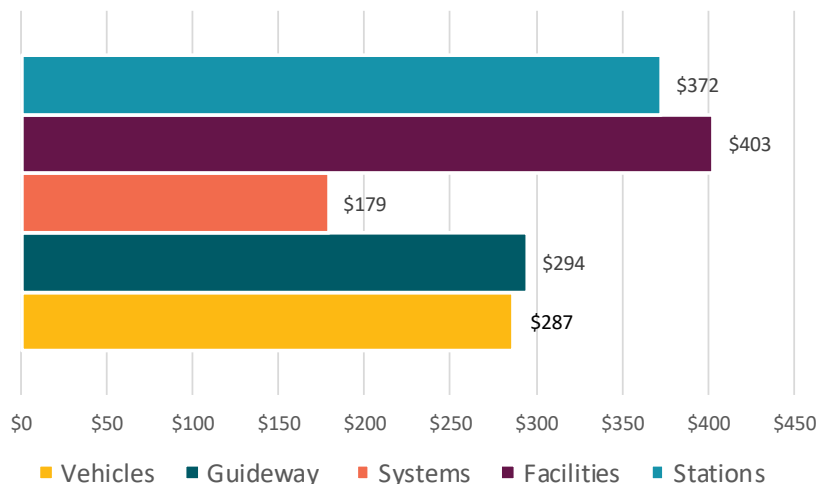


Figure 3: 2019 CNI SGR Backlog by Asset Category (\$2018)

Many of the needs identified in MDOT MTA’s State of Good Repair backlog in 2019 were funded to some extent in the CTP, including but not limited to:

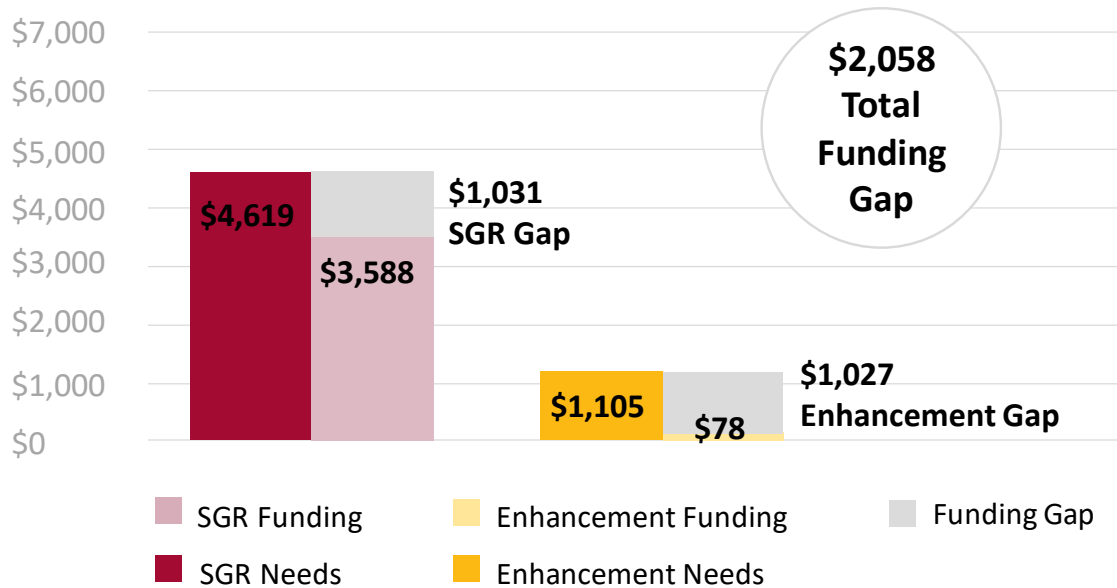
- Replacement of Metro SubwayLink railcars
- Replacement and upgrade of Metro SubwayLink signal system
- Replacement and modernization of Kirk Division Bus Garage
- Multiple segments of Light RailLink and Metro SubwayLink trackwork
- MARC train revenue vehicle replacement
- Light RailLink revenue vehicle overhauls
- MobilityLink revenue vehicle replacement
- Agencywide radio system upgrades
- Light RailLink traction power system upgrades
- Agencywide maintenance facility and station roof replacements
- Agencywide fare collection equipment replacement

In addressing the backlog, MDOT MTA prioritizes safety-critical projects to ensure safe operation of the system (e.g., rail car, track, and signaling reinvestment needs are considered higher priority than farebox equipment replacement).

2019 CNI – Funding Gap

The 2019 CNI analysis identified a shortfall in funding of about \$2 billion over 10 years to address MDOT MTA’s needs (see **Figure 4**). MDOT MTA is prioritizing safety-critical needs and leveraging technology, practical design, partnerships, shared mobility solutions, and discretionary grants to extend dollars and achieve enhancements.

Figure 4: 2019 CNI Funding Gap (YOE \$)



As presented in the FY 2019-2024 CTP, outside of the Purple Line, a high percentage of MDOT MTA funding is prioritized for State of Good Repair needs to address the backlog of State of Good Repair needs across the transit system. MDOT MTA continues to program a majority of the CTP to prioritize State of Good Repair needs and the backlog of deferred maintenance.

Methodology

MDOT MTA’s investment needs are organized into two major categories:

State of Good Repair needs are capital investment needs associated with existing assets and ongoing or periodic investment required to maintain or achieve a state of good repair. The FTA defines State of Good Repair as “the condition in which a capital asset is able to operate at a full level of performance.” A capital asset is in a state of good repair when that asset:

1. Is able to safely perform its designed function;
2. Does not pose a known unacceptable safety risk; and/or
3. Its lifecycle investments have been met or recovered.

Enhancement needs are new capital investments in transit infrastructure, assets, or service enhancements that support achievement of the agency’s strategic priorities as well as current or future service demand. Enhancement needs may also include investments to upgrade, modernize, or adapt the system to new requirements, technologies, or new mobility options.

While enhancement investments are often perceived as new assets, they may also include safety and environmental improvements or actions to protect existing assets. For example, new capital investments were needed to implement positive train control systems and meet the Positive Train Control Enforcement and Implementation Act requirements by December 31, 2018. Similarly, to

meet the new Total Maximum Daily Load requirements from the Environmental Protection Agency (EPA), new assets will also be needed to comply and realize environmental benefits.

MDOT MTA's 2019 CNI is organized by the following transit asset categories that align with FTA reporting requirements:

- Vehicles – including revenue (bus, rail car, and van) and non-revenue fleets (trucks, steel wheel vehicles, sedans, etc.)
- Guideway – including track and structures (e.g., bridges, tunnels, viaducts, fencing, retaining walls, etc.)
- Systems – including electrification (traction power and distribution), train control, utilities (drainage, lighting, and ventilation), fare collection, fire and life safety, communications, and security systems
- Facilities – including maintenance facilities (e.g., major shops, storage yards) and administrative facilities
- Stations – including passenger stations, parking lots and garages, and major transfer centers or bus loops

Programmed funds are detailed in the six-year CTP for MDOT MTA projects and devoted to a specific project.

Expended funds are the actual amounts spent on each project within a given fiscal year. Expenditures are adjusted throughout the course of a year as work progresses.

To compare the amount MDOT MTA programmed for FY 2019 to FY 2021, the final CTP was categorized by State of Good Repair or Enhancement projects and by asset category for each fiscal year. Where a project impacts multiple asset categories, the amount programmed in the CTP for that fiscal year was divided among the relevant asset categories.

The CTP is a six-year program that is adjusted annually to reflect changes in project cash flows and new need. Future year cash flows in the CTP are also adjusted to reflect more precise planning and procurement timelines as implementation of projects become more concrete. Project cash flows within the CTP are adjusted based on expected project progress and, therefore, the final CTP in each relevant year was used to calculate the programmed amounts.

Line items for Purple Line, Locally Operated Transit Systems (LOTS), and Freight are excluded from this analysis. These items in MDOT MTA's section of the CTP are not included in the needs required or reported through the 2019 CNI. Therefore, they do not align to MDOT MTA's capital needs in the context of this report.

Similarly, the total actual expenditures from each fiscal year from 2019 to 2021 were used to determine the expenditures against projects in the CTP. Actual expenditures reflect a range of circumstances affecting project progress and cost, with some variation expected from projections. The actuals are categorized using the same classifications and methods noted above for programmed funds.

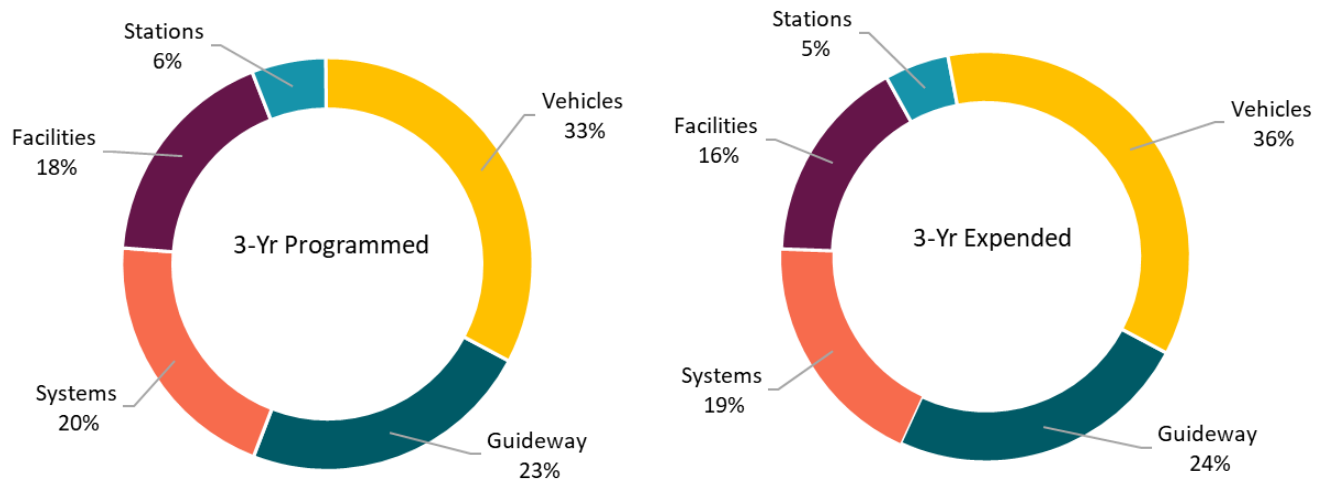
Again, line items for Purple Line, LOTS, and Freight are excluded from this analysis as those needs are not included in MDOT MTA's CNI list.

Annual Results

MDOT MTA’s focus on addressing the high-priority State of Good Repair backlog is reflected in the high percentage of programmed funds for State of Good Repair needs over the past three years of CTP updates, with a smaller amount programmed for Enhancement needs. The programming for Enhancement needs has increased slightly since the FY 2019-2024 CTP due to the successful capture of competitive grants to support those projects. While the CTP values change year to year, MDOT MTA always prioritizes the funding and implementation of safety-critical projects.

The total programmed and expended funds by asset category from FY 2019 through FY 2021 are shown below in Error! Reference source not found.. These values show that MDOT MTA has been investing in line with the needs and priorities from the 2019 CNI report, where the highest priority needs are in vehicles, guideway, and systems. Addressing trackwork needs under Guideway has been a high-priority area of investment to ensure safe and efficient transit service.

Figure 5: FY19 through FY21 Programmed and Expended MDOT MTA funds by Asset Category



Since 2019, many State of Good Repair and Enhancement needs have been met including replacing and modernizing stations and maintenance facilities and adding numerous new assets to benefit riders, such as additional shelters and real-time information technology. Key completed investments include:

Project	Description
BaltimoreLink Improvements	The BaltimoreLink program initiated many changes throughout MDOT MTA’s local bus system, including updated signage, new bus branding, and enhanced route designs. These changes have continued since the launch of BaltimoreLink to provide customers new shelters and a high-quality transit experience.
MARC BWI Rail Station Improvements	MDOT MTA renovated the MARC BWI Rail station in 2019 to include more seating, customer-friendly ticketing options, and updated restrooms.
MARC Camden Station Replacement	MDOT MTA opened a brand-new passenger facility in September 2019 at the Camden Yards MARC station in downtown Baltimore. It provides service to both MARC Train and Light RailLink passengers.

Project	Description
North Avenue Rising	North Avenue Rising is a collaboration between federal, state, and city partners to support economic revitalization in communities along North Avenue through sidewalk improvements, dedicated bus lanes, transit signal priority, enhanced bus stops, roadway repaving, and Penn-North Metro SubwayLink Station renovations. Construction of these improvements was completed in 2021.
Replacement and Modernization of Kirk Bus Garage	MDOT MTA completed construction of the new Kirk Bus Division maintenance and support facilities in 2021 that will allow the agency to maintain and operate the bus service with increased reliability and efficiency.
MARC Train Riverside Yard Acquisition and Build-out	Riverside Maintenance yard was purchased from CSX in 2020, which gives MDOT MTA the ability to independently operate its own maintenance yard for MARC vehicles, allowing for increased flexibility and efficiency. Construction of a new heavy maintenance facility at the yard is now underway.
Metro SubwayLink Track and Interlocking Replacements	In the past several years, various track segments of the Metro SubwayLink system have been replaced as part of ongoing maintenance efforts in order to maintain a safe and reliable experience for customers. These replacements include the renewal of interlockings (arrangement of signals that help prevent conflicting movements through special trackwork like turnouts and crossovers that allow trains to cross over between the two mainline tracks) at Charles Center and State Center in 2020.
Bus Unified Systems Architecture (USA)	Bus USA was substantially completed in 2021, including vehicle retrofits with new hardware. Bus USA is a new software platform for bus operations which modernizes operating procedures and allows MDOT MTA to operate much more efficiently and effectively, providing more reliable bus service to customers.
Automatic Vehicle Locator Improvements	In the past few years, MDOT MTA has implemented many automatic vehicle locator improvements to give customers real-time information on the location of their vehicles, which in turn gives the customers an enhanced transit experience.

Through these efforts, MDOT MTA will continue to sustain a safe and reliable transit service to Maryland’s communities. As additional funding opportunities become available, particularly through the federal Infrastructure Investment and Jobs Act, MDOT MTA will continue to address the funding gap to achieve its vision of providing safe, efficient, and reliable transit across Maryland with world-class customer service.

The detailed values in

Table 1 and **Table 2** summarize the programmed and expended values for State of Good Repair and Enhancement projects, respectively, for MDOT MTA projects. These values exclude LOTS, Freight, and Purple Line values.

Table 1: FY2019–FY2021 State of Good Repair Programmed vs. Expenditures

Asset Category	FY19 Programmed	FY19 Expended	FY20 Programmed	FY20 Expended	FY21 Programmed	FY21 Expended
All Categories	\$ 435,735,000	\$ 312,647,000	\$ 419,078,000	\$ 325,968,608	\$ 407,184,256	\$ 267,577,067
Guideway Elements	\$ 92,861,960	\$ 64,470,040	\$ 84,274,920	\$ 64,582,071	\$ 89,496,153	\$ 68,583,753
Stations	\$ 33,313,000	\$ 20,148,400	\$ 24,474,600	\$ 16,783,407	\$ 17,302,051	\$ 10,203,588
Facilities	\$ 61,699,000	\$ 35,155,400	\$ 89,155,600	\$ 74,693,294	\$ 77,077,133	\$ 40,596,971
Systems	\$ 106,461,960	\$ 69,775,240	\$ 87,587,320	\$ 62,227,191	\$ 71,132,526	\$ 43,708,469
Vehicles	\$ 141,399,080	\$ 123,097,920	\$ 133,585,560	\$ 107,682,646	\$ 152,176,392	\$ 104,484,285

Table 2: FY2019–FY2021 Enhancements Programmed vs. Expenditures

Asset Category	FY19 Programmed	FY19 Expended	FY20 Programmed	FY20 Expended	FY21 Programmed	FY21 Expended
All Categories	\$ 8,881,000	\$ 6,634,000	\$ 16,064,000	\$ 12,970,335	\$ 14,769,574	\$ 13,838,620
Guideway Elements	\$ 7,893,000	\$ 5,872,000	\$ 13,892,000	\$ 11,464,296	\$ 11,883,964	\$ 11,401,273
Stations	\$ 488,000	\$ 64,000	\$ 407,000	\$ 287,873	\$ 240,546	\$ 391,841
Facilities	\$ 500,000	\$ 698,000	\$ 1,313,000	\$ 857,696	\$ 1,824,380	\$ 1,328,562
Systems	-	-	\$ 151,000	\$ 98,879	\$ 217,198	\$ 183,080
Vehicles	-	-	\$ 301,000	\$ 261,591	\$ 603,485	\$ 533,864

During the capital programming process MDOT MTA has the flexibility to move funds between fiscal years within the CTP to address projects where expenditures are accelerating or lagging. Programmed funds can therefore be moved between years to adjust to the reality of project delivery and new needs as they arise or past needs that were deferred. Over the past three fiscal years, the COVID-19 pandemic has significantly delayed expenditures on multiple projects through reduced staffing, slowed construction progress, and delayed supply chains. Prior to the pandemic, vehicle production delays, particularly related to the rehabilitation of Light Rail Vehicles, also impacted the timing of MDOT MTA’s expenditures.

To reduce the impact of these delays on customers, projects have been bundled together to create efficiencies and avoid service disruptions. The process of efficiently scoping projects has been reinforced in the continuous improvement of the annual call for projects process. The refined call for projects process also prioritizes equity, one of MDOT MTA’s strategic goals, and will strengthen the agency’s ability to implement State of Good Repair and Enhancement needs going forward.

Conclusion

Investment continues to be consistent with MDOT MTA's Asset Management program and the needs identified in the 2019 CNI. MDOT MTA has made significant investments in guideway, facilities, stations, and vehicles, addressing priority State of Good Repair needs including modernized facilities at the Kirk Bus Garage, replacement BaltimoreLink buses and MobilityLink vehicles, and renewed Metro SubwayLink interlockings. MDOT MTA continues to progress the high-priority replacement of Metro SubwayLink rail cars and the related signaling system through the current CTP. MDOT MTA has also worked collaboratively with funding partners and the industry to leverage new sources of funding and new technologies to improve the delivery of the capital program.

An updated CNI is being drafted for 2022 through 2031, which will be published in July 2022. This updated report will similarly be a snapshot in time of the needs and priorities of MDOT MTA at the time of reporting. The values shown here from the 2019 CNI report will change as they are updated with new and improved asset data, including three years' worth of asset use in transit service along with 3 years' worth of capital renewals, and as new Enhancement projects are developed to deliver goals of the Central Maryland Regional Transit Plan and the upcoming Statewide Transit Plan.

Appendix

CNI Requirements

Error! Reference source not found. outlines the requirements for preparing, maintaining, and monitoring the CNI, as defined in Maryland State Law, Chapter 352 (as amended under Chapter 11 of the 2021 Special Session). The requirements under Subsections 7-309(A)-(C) were met by the development of the *MDOT MTA CY2019-CY2028 10-Year Capital Needs Inventory & Prioritization* (2019 CNI), which drew upon MDOT MTA’s 2018 SGR analyses as part of its annual transit asset management planning process in addition to its 2018 call for projects results.

Subsection 7-309(D) was part of the 2021 amendment of Chapter 352 will be met by the development of this report.

Table 3: Summary of 2019 Capital Needs Inventory Requirements

Chapter 352 Ref.	Requirement	Strategy for Compliance
7-309 (A)	The Administration shall, at least every 3 years, assess the ongoing, unconstrained capital needs of the Administration	MDOT MTA’s 10-Year CNI, established the first regular CNI by July 1, 2019
7-309 (B)	In undertaking the assessment required under subsection (A) of this section, the Administration shall:	
7-309 (B)(1)	Compile and prioritize capital needs without regard to cost	2019 MDOT MTA’s 10-Year CNI Section 7, Prioritization
7-309 (B)(2)	Identify the backlog of repairs and replacements needed to achieve a state of good repair for all Administration assets, including a separate analysis of these needs over the following 10 years	2019 MDOT MTA’s 10-Year CNI Section 4, State of Good Repair Needs, for forecasts over the next 10-year period; SGR needs are prioritized under Section 7.2
7-309 (B)(3)	Identify the needs to be met in order to enhance service and achieve system performance goals	2019 MDOT MTA’s 10-Year CNI Section 5, Enhancement Needs, for forecasts over the next 10-year period; enhancement needs are prioritized under Section 7.3
7-309 (C)	On or before July 1, 2019, and on or before July 1 every 3 years thereafter, the Administration shall, in accordance with § 2-1246 of the State Government article, submit the assessment required under subsection (A) of this section to the Senate Budget and Taxation Committee, the House	2019 MDOT MTA’s 10-Year CNI Section 1.2 describes the purpose of the CNI and review cycle; refer to signature page for submission details

Chapter 352 Ref.	Requirement	Strategy for Compliance
	Appropriations Committee, and the House Environment and Transportation Committee.	
7-309(D)	<p><i>On or before January 20, 2022, and on or before January 20 each year thereafter, the administration shall, in accordance with § 2–1257 of the state government article, submit an accounting of the capital funds programmed, appropriated, and expended on each of the projects identified in the assessment required under subsection (A) of this section for the prior fiscal year to the Senate Budget and Taxation Committee, the House Appropriations Committee, and the House Environment and Transportation Committee.</i></p>	<p><i>Capital Needs Inventory (CNI) Annual Report, January 2022</i></p>