

**Capital Needs Inventory (CNI)**

**Annual Report**

**(Transportation Article §7-309)**

**A Report to the Maryland General Assembly**

**Senate Budget and Taxation Committee, House**

**Appropriations Committee, and House Environment**

**and Transportation Committee**

**MSAR # 13865**

**March 2023**

**Maryland Department of Transportation (MDOT)**

**Maryland Transit Administration (MTA)**

## **Introduction**

The Maryland Department of Transportation (MDOT) Maryland Transit Administration (MTA) Capital Needs Inventory (CNI) was updated and published in July 2022, highlighting MDOT MTA's progress in reducing its State of Good Repair backlog by prioritizing State of Good Repair investments since 2019. The 2022 CNI report also illustrates the changes to the funding gap since 2019 and includes a more current and detailed listing of project-based needs that more closely align to line items funded in the Consolidated Transportation Program (CTP).

The first MDOT MTA CNI was published in 2019 to assess MDOT MTA's ongoing unconstrained capital needs over a 10-year period as required by §7-309 of the Transportation Article, Maryland Annotated Code. 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, during which project managers submit capital projects for inclusion in the future 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; meeting existing or new regulatory requirements; investing in transit infrastructure, assets, or service enhancements; and modernizing or adapting to new technologies or new mobility options.

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.

In addition, 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.

The results of the 2022 CNI presents that the availability of additional funding since 2019 has allowed MDOT MTA the resources and opportunity to reduce the funding gap and address the backlog of needs. Multiple state and federal funding sources have been invested to help address State of Good Repair needs across modes through projects including:

- Eastern Bus Division reconstruction as a fully electric bus facility
- Metro fleet and train control replacement program
- Zero-emission bus (ZEB) infrastructure at Kirk and Northwest Bus Divisions
- Light rail vehicle mid-life overhaul
- Additional funding for ZEBs

- Additional funding for Metro station rehabilitation and lighting program
- Additional funding for Locally Operated Transit Systems (LOTS) program
- MARC passenger and locomotive overhaul
- Bush Division boiler replacement
- Wabash Shop equipment upgrades
- Mondawmin elevators
- BaltimoreLink bus shelters and transitways
- Bus United Systems Architecture (USA)
- Riverside Heavy Maintenance Building
- Agencywide rail maintenance of way improvements

MDOT MTA continues to aggressively apply for competitive grants to leverage available State funds and was successfully awarded a Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant to complete a \$50-million multimodal Enhancement project in an east-west transit corridor along two of the agency’s highest-ridership routes.

MDOT MTA has also completed North Avenue Rising, a project that was funded through a \$27 million dollar TIGER grant in June 2022. The work completed over the last year of construction included: completion of transit signal priority and the addition of a queue jump, painting of the shared bus/bike lanes, installation of bike boulevards and traffic calming on parallel streets, finalizing a center-running bike facility, rehabilitation of escalators and painting of a mural at the Penn-North Metro Station and the addition of a curb extension at the corner of North Avenue and Howard Street to improve pedestrian safety.

MDOT MTA was also awarded a RAISE grant for Building Baltimore Penn Station Connections, a project that will include transit priority treatments on adjacent corridors, dedicated bus lanes, bus stop amenities for nearby stops, and bicycle and pedestrian enhancements including traffic signal and crosswalk enhancements for nearby streets.

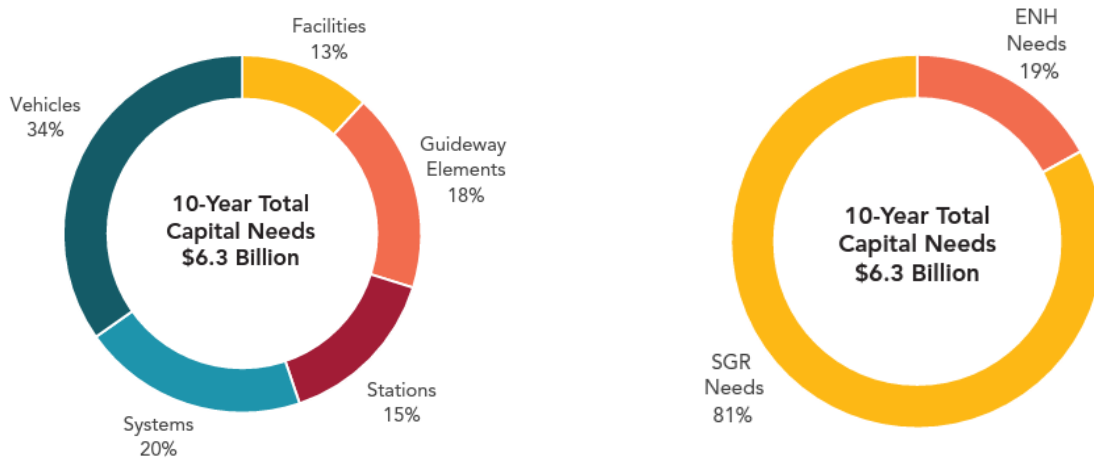
Similarly, MDOT MTA also partnered with Amtrak to win a \$20 Million dollar Federal-State Partnership for State of Good Repair Grant to finalize design for the Susquehanna River Bridge in Northeast Maryland. The bridge expansion will reduce and eliminate train delays, increase train speeds, and improve train capacity and safety.

## Overview of 2022 CNI Outcomes

All references in this document to CNI results are from the 2022 CNI report.

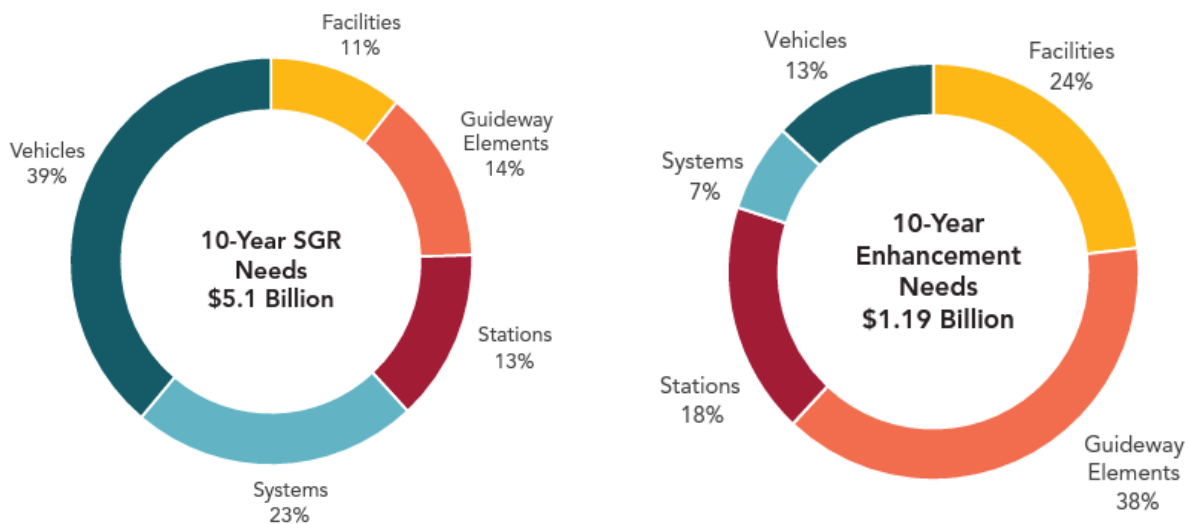
Between 2022 and 2031, MDOT MTA’s total capital needs are expected to reach more than \$6.3 billion in year-of-expenditure (YOE) dollars, including an annual inflation rate of 3 percent. The largest category of total needs over the 10-year period is vehicles (34 percent). Systems comprise the next-largest category of total needs (20 percent), followed by guideway (18 percent), stations (15 percent), and facilities investments (13 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: 2022 CNI Summary of Total 10-Year Capital Needs (Year of Expenditure \$)**

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



**Figure 2: 2022 CNI State of Good Repair and Enhancement Needs by Asset Category**

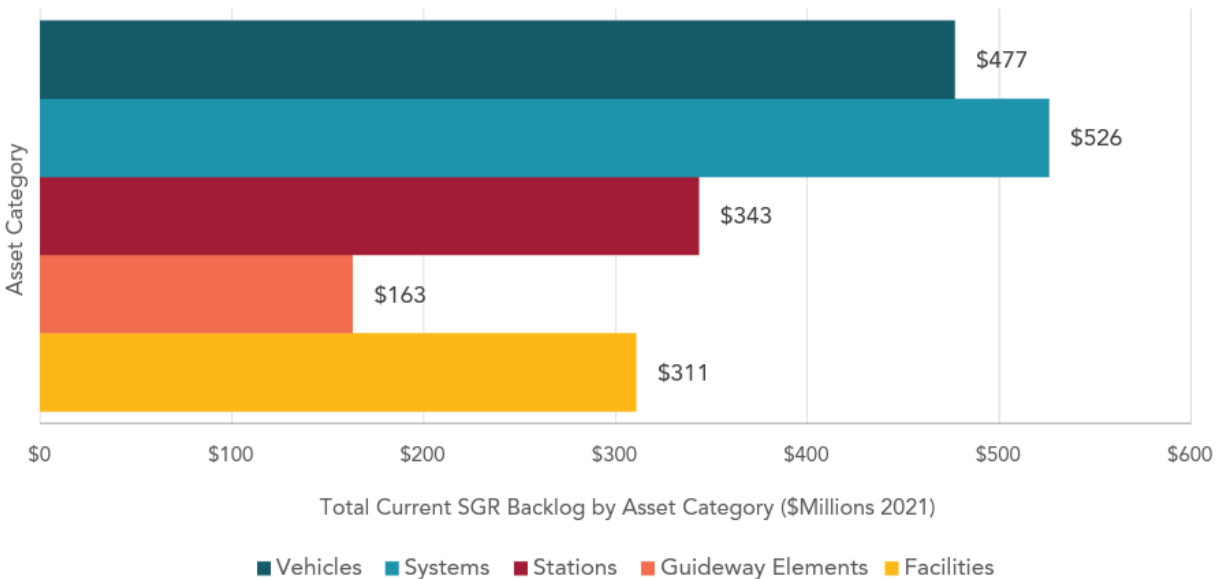
Three years of improvements in data have resulted in a better understanding of MDOT MTA’s asset holdings and lifecycle plans, including improved conditions and useful lives to estimate needs. The total value of MDOT MTA’s asset base has increased in real terms as new assets have been acquired or constructed – such as MARC Train’s Riverside Yard and the Kirk Bus Division, respectively – and additional assets have been included in the capital asset inventory. Additional structures related to guideway, including tunnel segments and at-grade substructures, have been included and properly valued to reflect modern construction costs. These improvements have driven the majority of the increase in inventory value since 2019, along with three years of inflation driving up replacement costs.

## Overview of Backlog

### 2022 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 2022 CNI was estimated at \$1.8 billion in 2021 dollars. As shown in **Figure 3**, this backlog includes about \$311 million in facilities, \$163 million in guideway assets, \$526 million in systems assets, \$477 million in vehicles, and \$343 million in station assets.



**Figure 3: 2022 CNI State of Good Repair Backlog by Asset Category (\$2021)**

Many of the needs identified in MDOT MTA’s State of Good Repair backlog in 2022 were funded to some extent in the CTP, including, but not limited to:

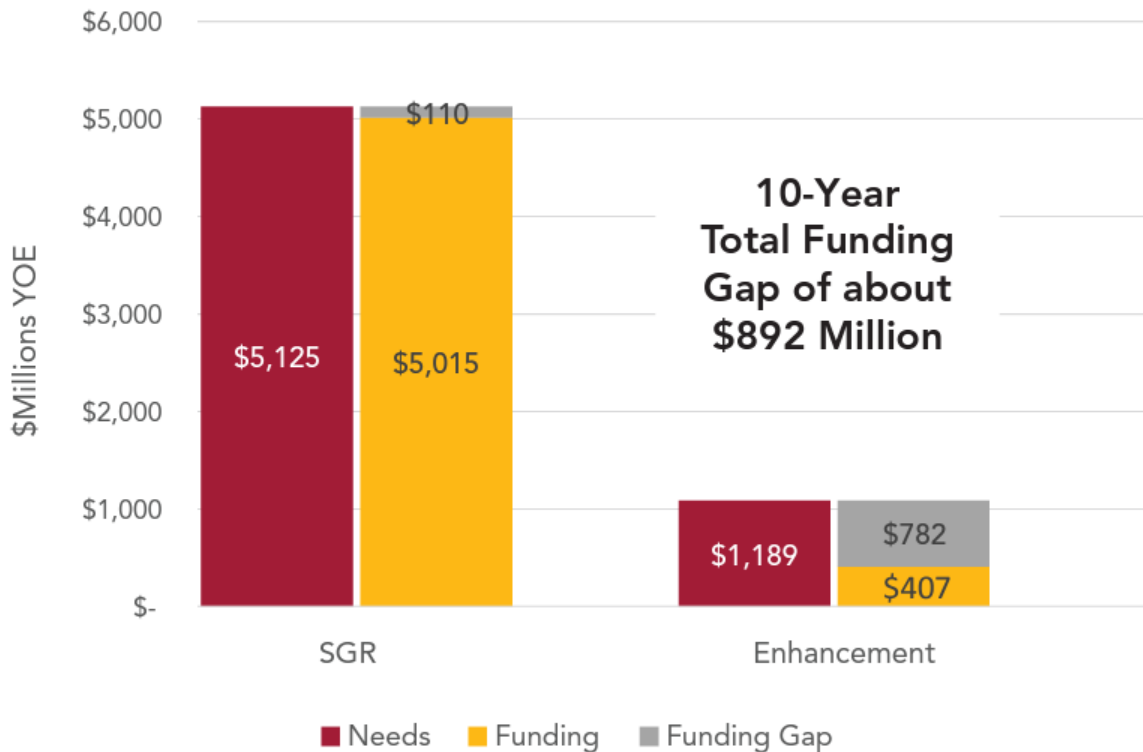
- Replacement of diesel buses with ZEB vehicles
- Multiple segments of Light RailLink and Metro SubwayLink trackwork
- Light RailLink revenue vehicle overhauls
- MARC III coach minor vehicle overhaul (63 railcars)
- MARC IV railcars and truck components overhaul
- MARC multilevel railcars overhaul or replacement (60 railcars)
- MARC GP39 locomotive overhaul (6 locomotives)
- Metro SubwayLink electrification system
- MobilityLink revenue vehicle replacement
- Light RailLink interlocking, train control, and catenary systems

- Agencywide radio system upgrades
- Light RailLink traction power system upgrades
- Agencywide maintenance facility and station roof replacements

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

*2022 CNI – Funding Gap*

The 2022 CNI analysis identified a shortfall in funding of about \$892 million 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: 10-Year Total Capital Needs vs. Total Capital Funding Forecast (2022 to 2031, \$ Millions YOY)*

As presented in the fiscal year (FY) 2022–2027 CTP, outside of the Purple Line, Freight, and LOTS, 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 investments in enhancement are often perceived as new assets, they also may 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 (TDML) requirements from the Environmental Protection Agency (EPA), new assets also will be needed to comply and realize environmental benefits.

MDOT MTA's 2022 CNI is organized by the following transit asset categories that align with FTA reporting requirements:

- Vehicles – including revenue (bus, railcar, 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 2022, 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 also are 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.

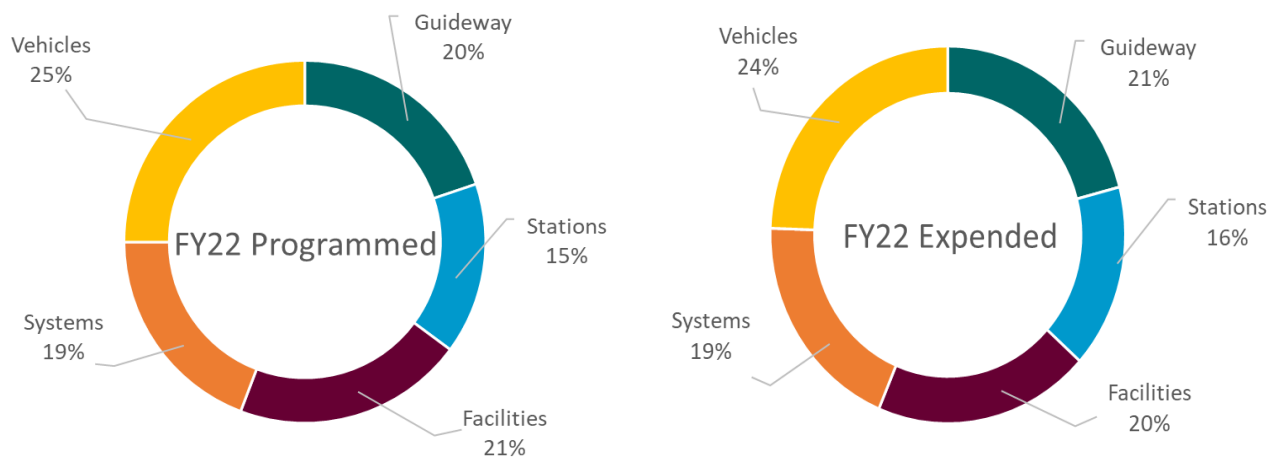
Line items for Purple Line, LOTS, and Freight are excluded from this analysis. These items in MDOT MTA’s section of the CTP are not included in the needs required or reported through the 2022 CNI. Therefore, they do not align to MDOT MTA’s capital needs in the context of this report.

Similarly, the total actual expenditures from fiscal year 2022 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.

## 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 year of CTP updates, with a smaller proportion programmed for Enhancement needs. The funds programmed for Enhancement needs has increased slightly in FY 2022 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 2022 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 2022 CNI report, where the highest-priority needs are in vehicles, guideway, and facilities. Addressing trackwork needs under Guideway has been a high-priority area of investment to ensure safe and efficient transit service.



*Figure 5: FY22 Programmed and Expended MDOT MTA funds by Asset Category*

In FY 2022, 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:

<b>Project</b>	<b>Description</b>
Fast Forward Customer Experience Enhancements	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 most recently with the launch of the Fast Forward program to provide customers new shelters, wayfinding, real-time information, ADA improvements and a high-quality transit experience.
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. This project was finished earlier in 2022 with queue jumps, bus lanes, bike facilities, escalator rehabilitation and a mural being the highlights of the work that was completed in fiscal year 2022.
Bus Fleet Replacement	MDOT MTA onboarded an additional 71 buses in FY 2022, which allowed older buses to be retired, which in turn will increase reliability for the fleet. This will improve customer experience by ensuring more buses are available for revenue service.
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 projected to be completed by January 2023.
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 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).
Bush Division Boiler Replacement	Bush Division houses the largest proportion of buses for the MDOT MTA Local Bus service. Replacement of these boilers will allow the facilities to continue running efficiently and effectively, which will allow for more reliable bus service.
Light Rail CBD Interlocking and Curve Rehabilitation	This project completed in FY 2022 included the rehabilitation of three interlockings on the Light Rail system as part of ongoing maintenance efforts: the North Avenue north and south interlockings and the Mount Royal interlocking. Due to higher wear on tight curves, the project also rehabilitated 10 restraining rail curves between North Avenue and Camden yards.
MARC Train Locomotive and Coach Overhauls	MARC Train is currently performing overhauls to 6 GP39 Locomotives and 63 MARC III Coach railcars to ensure reliable commuter rail service for customers.
Light RailLink Vehicle Mid-Life Overhauls	Light RailLink is currently in the process of conducting mid-life overhauls for the entire fleet. This will ensure reliable and safe operation of the Light Rail service for its' customers.

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 Bipartisan Infrastructure Law, 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 Error! Reference source not found. and Error! Reference source not found. summarize the programmed and expended values for State of Good Repair and Enhancement projects, respectively, for MDOT MTA projects for FY 2022. These values exclude LOTS, Freight, and Purple Line values.

**Table 1** summarizes the State of Good Repair programmed and expended values in fiscal year 2022.

*Table 1: FY2022 State of Good Repair Programmed vs. Expenditure*

<b>Asset Category</b>	<b>FY22 Programmed</b>	<b>FY22 Expended</b>
All Categories	\$ 454,583,969.91	\$273,686,426.37
Guideway Elements	\$ 82,784,484.72	\$57,364,254.92
Stations	\$ 33,203,442.04	\$12,188,821.27
Facilities	\$ 95,709,944.35	\$49,950,366.16
Systems	\$ 86,763,391.64	\$49,802,231.23
Vehicles	\$ 156,122,707.17	\$104,380,752.80

**Table 2** summarizes the Enhancement programmed and expended values in FY 2022.

*Table 2: FY2022 Enhancements Programmed vs. Expenditures*

<b>Asset Category</b>	<b>FY22 Programmed</b>	<b>FY22 Expended</b>
All Categories	\$ 24,579,227.27	\$ 20,565,543.22
Guideway Elements	\$ 9,877,047.67	\$ 11,339,679.85
Stations	\$ 3,964,365.25	\$ 2,951,924.56
Facilities	\$ 6,666,226.85	\$ 3,507,943.37
Systems	\$ 2,155,101.32	\$ 1,658,638.96
Vehicles	\$ 1,916,486.18	\$ 1,107,356.46

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 fiscal years, the COVID-19 pandemic has significantly delayed expenditures on multiple projects due to staffing shortages, high and unpredictable inflation causing procurement delays, and delayed supply chains.

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 2022 CNI. MDOT MTA has made significant investments in guideway, facilities, stations, and vehicles, addressing priority State of Good Repair needs including Light RailLink interlocking replacements, replacement of buses and MobilityLink vehicles, and renewed Metro SubwayLink interlockings. MDOT MTA continues to progress the high-priority replacement of Metro SubwayLink railcars and the related signaling system through the current CTP. MDOT MTA also has 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. Since 2019, MDOT MTA also has continually improved its transit asset management program, which has generated more accurate asset information and more closely aligned capital investments with the agency's strategic goals. Additionally, the Central Maryland Regional Transit Plan (RTP) and the MDOT MTA Strategic Plan: Rebuilding Better, have been adopted and are guiding the capital investment priorities.

## Appendix

### *CNI Requirements*

Table A 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 CY2022-CY2031 10-Year Capital Needs Inventory & Prioritization* (2022 CNI), which drew upon MDOT MTA's 2021 State of Good Repair analyses as part of its annual transit asset management planning process in addition to its 2021 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 A: Summary of 2019 Capital Needs Inventory Requirements*

<b>Chapter 352 Ref.</b>	<b>Requirement</b>	<b>Strategy for Compliance</b>
<b>7-309 (A)</b>	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 CNI by July 1, 2022
<b>7-309 (B)</b>	In undertaking the assessment required under subsection (A) of this section, the Administration shall:	
<b>7-309 (B)(1)</b>	Compile and prioritize capital needs without regard to cost	2022 MDOT MTA's 10-Year CNI Section 5.2, Prioritization
<b>7-309 (B)(2)</b>	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	2022 MDOT MTA's 10-Year CNI Section 3, State of Good Repair needs, for forecasts over the next 10-year period; State of Good Repair needs are prioritized under Section 5.2
<b>7-309 (B)(3)</b>	Identify the needs to be met in order to enhance service and achieve system performance goals	2022 MDOT MTA's 10-Year CNI Section 4, Enhancement Needs, for forecasts over the next 10-year period; Enhancement needs are prioritized under Section 5.2
<b>7-309 (C)</b>	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	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
	Budget and Taxation Committee, the House 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>