

Eastern Bus Division Reconstruction Project Technical Appendix

The Eastern Bus Division Reconstruction Project (“the Project”) will enable MTA’s transition to an entirely zero-emission bus (ZEB) fleet by replacing the aged Eastern Bus Division in Greentown with a new facility purpose-built for up to 197 battery-electric buses (BEBs). This technical appendix details the assumptions and methods used to develop the Project’s effect on emissions of greenhouse gases (GHG) and criteria air pollutants. This analysis is focused on the criteria pollutants of most concern from diesel vehicles: oxides of nitrogen (NO_x), particulate matter less than 10 microns in diameter (PM₁₀), and particulate matter less than 2.5 microns in diameter (PM_{2.5}).

Activity Assumptions

Emission reductions were estimated by comparing emissions from BEBs that could be deployed due to the Project to emissions from a reference case. The reference case assumes that if no BEBs were purchased, diesel buses would operate in their place. Emission rates for each pollutant were developed for 4 scenarios, as shown in Table 1.

Table 1. Vehicle Assumptions

Vehicle Type	40-foot Diesel Bus	60-foot Diesel Bus	40-foot BEB	60-foot BEB
Fuel Efficiency	4.5 mpdge	3.2 mpdge	2.38 kWh/mi	3.3 kWh/mi
Annual miles	30,091	30,091	30,091	30,091

Note: mpdge = miles per diesel gallon equivalent, kWh/mi = kilowatt-hours per mile

Emissions were calculated assuming that in 2031, BEBs will begin to be phased in. This is summarized in Table 2. Each new BEB has a useful life of 12 years, but it was assumed that once the infrastructure is in place that future operations will continue to use BEB. The details of 40-foot BEB and 60-foot BEB operating assumptions for each year are shown in the Attachment 1 spreadsheet.

Table 2. Vehicle Purchase Summary

Vehicle Type	2031	2032	2033
40-foot BEB	70	49	40
60-foot BEB	0	21	0

Emission Factor Development

The reduction of GHG, NO_x, PM₁₀, and PM_{2.5} emissions due to implementation of the project were estimated using the Argonne National Laboratory’s Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET). AFLEET is a Microsoft Excel-based spreadsheet tool that allows users to estimate the lifecycle GHG emissions from a variety of light-duty and heavy-duty vehicles. Users can input the vehicle details, including annual mileage and fuel economy, and AFLEET calculates annual direct and indirect GHG emissions in units of short tons of carbon dioxide equivalent (CO₂e). AFLEET also estimates emissions of criteria air pollutants. AFLEET estimates criteria pollutant emissions during

EASTERN BUS DIVISION RECONSTRUCTION PROJECT– IMPLEMENTATION GRANT

vehicle operations, including exhaust, brake wear, tire wear, and evaporation. AFLEET emissions estimates incorporate federal emission standards and fuel economy standards.

AFLEET version 2023 was used to determine the total emissions from diesel vehicles that would be replaced, as well as the emission from BEB traveling an equivalent number of miles per year. The difference in these values is considered the reduction in emissions due to the project.

Emission factors in units of grams per mile were developed by using AFLEET to determine the total emissions for one transit bus with the combination of fuel types and fuel efficiencies from Table 1. The total emissions were converted to grams and divided by 30,091 miles. AFLEET includes default emission factors for upstream electricity generation, based on the EPA's Emissions and Generation Resource Integrated Database (eGRID) regional averages; however, the Maryland Department of Transportation provided resource-specific information for the utility that will serve BEB charging. A GHG emission factor of 0.404 grams per kilowatt-hour (g/kWh) was calculated based on a resource profile of 21% natural gas, 10% petroleum, and 69% nuclear. Emission factors used for the analysis are summarized in Table 3.

Table 3. Emission Factors in grams/mile

Pollutant	40-foot Diesel Bus	60-foot Diesel Bus	40-foot BEB	60-foot BEB
CO ₂ e (tailpipe)	2,427.777	3,338.193	0.000	0.000
CO ₂ e (upstream)	410.725	564.747	436.253	604.889
NO _x	2.656	2.656	0.00	0.00
PM ₁₀	0.110	0.110	0.104	0.104
PM _{2.5}	0.017	0.017	0.013	0.013

Note: CO₂e = carbon dioxide equivalent, NO_x = nitrogen oxides, PM₁₀ = particulate matter less than 10 microns in diameter, PM_{2.5} = particulate matter less than 2.5 microns in diameter

Emissions Results

Annual lifecycle GHG emissions are presented in Table 4, which include tailpipe emissions and upstream emissions from fuel or electricity production. For each analysis year, project emissions represent the emission from BEBs in service. The reference case emissions represent the emissions of traditional diesel buses operating for the same annual miles as if the Project did not occur. The emissions values presented are limited to the vehicles affected by the project and do not include emission from the entire fleet.

Criteria pollutant emissions were calculated similarly, and they are summarized in Table 5. Criteria pollutant emissions only include direct emissions from the tailpipe, brake wear, and tire wear. When operating BEBs, tailpipe emissions of NO_x, PM₁₀, and PM_{2.5} are eliminated; however, PM₁₀ and PM_{2.5} emissions from brake wear and tire wear are unchanged when either diesel buses or BEBs are used.

Emissions calculations by year are provided within the supplemental spreadsheet attached named MDOT_Eastern_Vehicle Emissions Analysis_03.27.24v4.xlsx.

EASTERN BUS DIVISION RECONSTRUCTION PROJECT– IMPLEMENTATION GRANT

Table 4. Lifecycle GHG Emissions Reductions

Year	Number of BEB	Project Emissions (MTCO ₂ e/year)	Reference Case Emissions (MTCO ₂ e/year)	Emissions Reduction (MTCO ₂ e/year)
2031	70	919	5,979	5,060
2032	140	1,944	12,631	10,686
2033	180	2,469	16,047	13,578
2034	180	2,469	16,047	13,578
2035	180	2,469	16,047	13,578
Cumulative Reduction 2025-2035 (MTCO₂e/period)				56,479
2036	180	2,469	16,047	13,578
2037	180	2,469	16,047	13,578
2038	180	2,469	16,047	13,578
2039	180	2,469	16,047	13,578
2040	180	2,469	16,047	13,578
2041	180	2,469	16,047	13,578
2042	180*	2,469	16,047	13,578
2043	180*	2,469	16,047	13,578
2044	180*	2,469	16,047	13,578
2045	180*	2,469	16,047	13,578
2046	180*	2,469	16,047	13,578
2047	180*	2,469	16,047	13,578
2048	180*	2,469	16,047	13,578
2049	180*	2,469	16,047	13,578
2050	180*	2,469	16,047	13,578
Cumulative Reduction 2025-2050 (MTCO₂e/period)				260,142

*Note: MTCO₂e = metric tons of carbon dioxide equivalent, *BEB purchased for this Project will retire starting in 2041, but it was assumed that once infrastructure is in place that operations will continue to use BEB*

Table 5. Criteria Pollutant Emissions Reductions in Pounds Per Period

Time Period	2025-2035	2025-2050
NO _x with Project	0	0
NO _x Reference Case	132,147	607,877
NO_x Reduction	132,147	607,877
PM ₁₀ with Project	5,162	23,746
PM ₁₀ Reference Case	5,495	25,277
PM₁₀ Reduction	333	1,531
PM _{2.5} with Project	645	2,968
PM _{2.5} Reference Case	860	3,956
PM_{2.5} Reduction	215	988

Note: NO_x = nitrogen oxides, PM₁₀ = particulate matter less than 10 microns in diameter, PM_{2.5} = particulate matter less than 2.5 microns in diameter



Figure 1: A southeast-facing view of Oldham Street, showing landscaping, retaining walls, and other green elements and public-facing aesthetic improvements from the reconstruction of the Eastern Bus Division.

1. OVERALL PROJECT SUMMARY AND APPROACH

Description of GHG Reduction Measure – Project Features

The Eastern Bus Division Reconstruction Project (“the Project”) is a critical step in Maryland’s efforts to reduce greenhouse gas emissions from its transportation sector by enabling the electrification of MTA’s bus fleet through the deployment of battery-electric buses (BEBs). Resulting greenhouse gas emission reductions – amounting to 260,142 metric tons of carbon dioxide equivalent by 2050 – will help to improve air quality and community health outcomes for the immediately surrounding neighborhoods near the facility in Southeast Baltimore, as well as broadly across the entire Baltimore region as BEBs) are deployed to replace more heavily polluting diesel internal combustion engine buses.

More specifically, the Project will aid in the reduction of greenhouse gases by providing the space and infrastructure required for zero-emission bus (ZEB) charging, storage, and maintenance. As part of the property’s reconstruction and expansion of the site from six acres to approximately 8.5 acres, the Project will also incorporate nearby pedestrian safety improvements by reconstructing two intersections. These intersection improvements will reduce potential pedestrian-vehicle and bus-passenger vehicle conflicts. These elements are necessary to the completion of the Project, which will in turn be a critical step towards MTA’s full fleet electrification.

The Project will enable MTA’s transition to an entirely ZEB fleet by replacing the aged Eastern Bus Division in Greektown with a new facility purpose-built for up to 197 BEBs. The facility will comprise:

- A transportation and maintenance building with 17 maintenance bays
- A bus storage building and charging positions for up to 180 BEBs
- Up to 160 pantograph chargers powered by eight Hitachi 2 mW charging cabinets, with provisions for 16 to 20 additional pantographs and two more 2 mW charging cabinets
- Training rooms and comfort facilities for operators and staff
- Vaulting, service, and wash lanes
- Expanded electrical infrastructure
- A total of 219 off-street employee parking spaces
- LEED Silver design, including photovoltaic panels and a green roof atop the transportation and maintenance facility and bus storage building.

EASTERN BUS DIVISION RECONSTRUCTION PROJECT— IMPLEMENTATION GRANT WORKPLAN

The facility reconstruction will resolve architectural, structural, mechanical, and electrical deficiencies that pose safety issues at the existing facility and preclude the accommodation of greenhouse gas emission-reducing BEBs. The Eastern Bus Division's maintenance building was built in the 1930s and was last renovated when the new transportation building and wash lanes were constructed in the 1960s. This facility is approaching the end of its useful life and is constrained in its ability to safely support employees and bus fleet needs. It has an asset rating of 3 based on the FTA's TERM scale, indicating it is moderately deteriorated or defective. While facilitating significant emissions reductions, the Project provides an opportunity to also restore the facility to a state of good repair while modernizing it to support ZEBs, train staff, and create new jobs.

In addition to laying the foundation for substantial greenhouse gas reductions via vast fleet electrification potential, other resulting improvements will include better site circulation, new administrative offices, creation of off-street employee parking, more storage space, and enhanced security. Facility improvements will allow for safe and efficient operations of bus service from a purpose-built division designed for 21st-century transit operations, relieving the challenges presented by a constrained division that has well exceeded its useful life.

Major Project Tasks and Milestones

Design: MTA completed 30% design for the Project in 2023 and is currently moving towards 100% design, with expected completion by October 2025. MTA coordinated closely with FTA on NEPA documentation and received a Categorical Exclusion (CE) determination in October 2023. An equity analysis report of the project's compliance with Title VI of the Civil Rights Act was submitted and signed by the MTA Administrator in December 2022. The project was registered with the U.S. Green Building Council to seek LEED Silver certification in March 2023.

ROW: MTA has developed a right-of-way acquisition strategy and is working with the Maryland Transportation Authority (MDTA), the Baltimore City Department of Transportation (BCDOT), and the Baltimore City Department of Planning (BCDOP) to complete right-of-way acquisition and subdivision processes. Land acquisition and transfers will be completed before the beginning of construction.

CMAR: The project will be delivered using a Construction Manager at Risk (CMAR) delivery method, with MTA partnering with Clark Construction. MTA began CM preconstruction services in October 2023. Final design is scheduled to be completed by October 2025 and construction is currently anticipated to take 41 months. MTA continues to coordinate with local stakeholders and agencies to obtain design approval and acquire required permits before the beginning of construction.

A full timeline of major tasks and milestones for the reconstruction project, both completed and planned, is included below (Figure 2). Completion of these steps will ensure the Project, as a greenhouse gas reduction measure under the CPRG Program, is fully delivered and ultimately successful in supporting MTA's ZEB transition.

EASTERN BUS DIVISION RECONSTRUCTION PROJECT– IMPLEMENTATION GRANT WORKPLAN

Timeline Item Description	Timeline Item Date
Kickoff for Project Planning	10/1/2021
Development of Conceptual Design (15% Design)	8/1/2022
Completion of Equity Analysis Report for Civil Rights Act Title VI Compliance	12/1/2022
Register Project with U.S. Green Building Council	3/1/2023
Completion of Preliminary Design (30% Design)	7/1/2023
Complete NEPA Process (Categorical Exclusion)	10/1/2023
CM Preconstruction Services NTP	10/31/2023
65% Design Completion	10/1/2024
Finalize Right-of-Way Acquisition	10/1/2025
85% Design Completion	6/1/2025
Final Design Plans (100%)	10/1/2025
Guaranteed Maximum Price (GMP) Submission and MTA Approval	12/1/2025
CMAR Contract Formation and Approval (3-month process)	3/1/2026
Construction NTP	3/1/2026
Acquisition of Approved Permits	3/1/2026
Construction Completion	7/1/2029
Site Construction Commissioning and Certificate of Occupancy	10/1/2029
Eastern Bus Division Project Close Out	12/1/2029

Figure 2: Timeline for Planning, Design, and Construction

EASTERN BUS DIVISION RECONSTRUCTION PROJECT– IMPLEMENTATION GRANT WORKPLAN

Underlying Assumptions and Risks

Figure 3 includes list of underlying risks that could reasonably lead to delays or interruptions in the implementation of the Project, as well as strategies MTA will undertake to plan for and mitigate each risk.

Risk	Mitigation Strategy
Site contamination and required remediation	Develop timely remediation procedures during preconstruction phase
Encountering unmarked utilities on site	Engage utility companies/agencies to confirm placement of utilities and MTA utility designations prior to construction; develop plans for reacting to unforeseen utilities during realignment of Ponca Street
Funding availability delays project start	Apply for federal competitive grant funding to help address any funding shortfalls and avoid project delays
Supply chain issues delay BEB or charger procurement	Engage vehicle manufacturers and develop working procurement agreements that will minimize need for vehicle customization and streamline production/procurement processes
Unexpected changes in Maryland Department of Environment design and code requirements	Expedite MDE approval of permits for design drawings during preconstruction phase to avoid delays resulting from future code changes
Difficulties meeting Build America, Buy America requirements	Develop detailed long-lead items list during preconstruction phase and verify selected equipment needs with Build America, Buy America program
Challenges with implementation of BEB-supporting technology	Engage other agencies and engineering consultants with experience working on BEB infrastructure projects (including Kirk Bus Division Pilot in Baltimore) to take advantage of lessons learned
Insufficient storm drain and sewer capacity to handle flows from new bus division	Confirm with Baltimore City DPW that existing infrastructure can handle new site capacity
Construction impacts to neighborhood	Coordinate with neighborhood groups via MTA public outreach to address concerns and minimize impacts; involve construction contractor in outreach process

Figure 3: Table of Potential Project Risks and Mitigation Strategies

EASTERN BUS DIVISION RECONSTRUCTION PROJECT— IMPLEMENTATION GRANT WORKPLAN

Meeting State Goals

The Project promises near- and long-term greenhouse gas emission reductions (see Section 2: Impact of GHG Reduction Measures) by creating a BEB maintenance, charging, and storage hub that will significantly reduce emissions by avoiding upstream and tailpipe emissions. MTA must complete the Project to create the necessary facility capacity to meet legislative mandates and achieve statewide targets for transition to ZEBs. Without completion of the Project, MTA will not have the maintenance, charging, and storage space for the target BEB fleet size in 2030. In 2021, MTA launched the Zero Emission Bus Transition Plan in accordance with Maryland's 2019 Greenhouse Gas Emissions Reduction Act (GGRA) and Maryland's Zero-Emission Bus Transition Act. The GGRA requires MTA to upgrade 50 percent of its fleet to zero-emission technology by 2030, a target also reiterated in the 2020 Central Maryland Regional Transit Plan prepared by MTA. Fleet electrification will advance statewide efforts to achieve net-zero emissions in Maryland by 2045, as mandated in the 2022 Maryland Climate Solutions Now Act.

Additional state policies and plans require Maryland to begin procuring BEBs as soon as possible, which necessitates the reconstruction of the Eastern Bus Division as a facility intended to house and maintain BEBs. The Zero-Emission Bus Transition Act of 2021 prohibits MTA from procuring internal combustion engine vehicles after FY 2022. In 2021, MTA launched a phased plan to equip its four bus divisions with ZEB-supporting infrastructure and give the agency time to convert its fleet without disrupting existing service. Two bus divisions will be retrofitted for ZEBs, while the Eastern Bus Division in Greentown will be reconstructed. MTA has already begun retrofitting one of these facilities, the Kirk Bus Division, and in February 2024 debuted seven new BEBs at the division.



Figure 4: Governor Wes Moore, FTA Regional Administrator Terry Garcia-Crews, Baltimore Gas and Electric leadership, and other regional project partners at the March 2024 ribbon-cutting for the Kirk Bus Division BEB Pilot.

Relation to PCAP Reduction Measure

The Project is included in PCAP Measure 8 of the Maryland Transportation Plan and Carbon Reduction Strategies included in the State of Maryland's Priority Climate Action Plan, prepared by the Maryland Department of the Environment. This document is attached with this application, and is also available here:

EASTERN BUS DIVISION RECONSTRUCTION PROJECT– IMPLEMENTATION GRANT WORKPLAN

<https://mde.maryland.gov/programs/air/ClimateChange/CLIMATE%20POLLUTION%20GRANTS/State%20of%20Maryland%20CPRG%20Priority%20Climate%20Action%20Plan%20%28PCAP%29.pdf>.

The Project is referenced specifically on p. 49 of the MDE PCAP: “Additionally, MDOT will seek federal funding support for the Maryland Transit Administration’s Zero-Emission Bus procurement and facilities conversion program, which seeks to convert 50% of its bus fleet to zero emission by 2030 as well as a complete reconstruction of the Eastern Bus Division to support this zero-emission transition.”

Demonstration of Funding Need to PCAP Reduction Measure

Pursuit of other federal and state grants, tax incentives, and other funding sources

The State of Maryland has secured \$213 million of the total Project budget of \$517.4 million for planning, design, and construction through federal formula funding and state funding. MTA has yet to fund the approximately \$304.4 million gap for construction and equipment costs, and faces a budget shortfall that will prevent the state from filling in this gap without federal assistance. This budget gap has led MTA to pursue \$97.5 million in CPRG funding in support of the Project. (See Section 7: Budget.)

MTA has previously sought funding through the Federal Transit Administration’s Bus and Bus Facilities/Low-or-No Emissions Program, including an application for \$104.5 million in the FY 2023 funding round that was rated highly recommended, but was not selected for an award. MTA plans to apply for Bus and Bus Facilities/Low-or-No Emissions funding again in the ongoing FY 2024 funding round, and hopes to use the requested \$97,548,016 in CPRG implementation funding to help pay for the balance of the funding gap, including charging equipment and electrical infrastructure.

Partial funding explanation

As noted above, the State of Maryland has secured \$213 million in state and federal formula funding to help pay for planning, design and construction. MTA is applying to both the CPRG and the FY 2024 Bus and Bus Facilities/Low-or-No Emissions Grant application round in hopes of obtaining competitive funding to fill in the remainder of this gap. The requested \$97,548,016 through this application would pay for BEB charging infrastructure, including BEB charging cabinets, pantograph dispensers, photovoltaic solar panels, associated support equipment, and the installation costs to build out the electrical scope of the project. (See Section 7: Budget).

Transformative Impact

Replicable and scalable programs to increase deployment of GHG emission reduction technologies

The proposed Project advances a highly replicable and easily scalable model for jurisdictions seeking near- and long-term GHG reduction programs. The Project will create a BEB maintenance, charging, and storage hub that will significantly reduce emissions from transit buses across the Baltimore region by avoiding upstream and tailpipe emissions. Based on a lifecycle cost analysis conducted by MTA (separate from this application), when comparing the existing fleet of diesel buses with BEBs, overall emissions reductions will result from avoidance of upstream emissions, including CO₂ and CH₄ from diesel production, and avoidance of tailpipe emissions, including CO₂, NO_x, SO_x, VOC, PM_{2.5}, and PM₁₀. Reductions in diesel emissions will also benefit the health of the adjacent communities in Greektown and Oldham Crossing, which are currently exposed to harmful air pollutants from diesel bus operations. (See Section 2: Impact of Greenhouse Gas Reduction Measures.)

The transportation and maintenance facility and bus storage building will be LEED Silver certified and include photovoltaic panels, which will help to reduce emissions at the site itself by creating a sustainable

EASTERN BUS DIVISION RECONSTRUCTION PROJECT— IMPLEMENTATION GRANT WORKPLAN

energy source. Restoring the facility to a state of good repair, including more efficient mechanical and electrical systems, will also help to reduce emissions produced by the facility itself.

MTA will be phasing the installation of BEB-supporting infrastructure at its other divisions as part of its ZEB Transition Plan so that it can ultimately support a total fleet of 811 ZEBs to meet its Core Bus area of service needs. Completing the Project is a critical piece of this phased plan, and also offers an opportunity to replicate the success of the Project at other bus divisions that will be outfitted to support BEBs.

Market transformations that accelerate deployment and market adoption of reduction technologies

The transportation sector is the largest contributor of greenhouse gas emissions among sectors in the United States, accounting for nearly one-third of emissions in 2021, [per the EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990–2021](#). Diesel buses are among the many types of internal combustion engine-powered vehicles that are a significant contributor of greenhouse gas emissions. A diesel bus in MTA's existing fleet produces 85 tons of CO₂ equivalent per year, whereas a single BEB to be procured and housed at the reconstructed Eastern Bus Division produces 13 tons of CO₂ equivalent per year, attributed to upstream power production sources.

MTA aims to directly address this problem in the Baltimore region and will be at the forefront of a nationwide conversion to zero-emission buses by building one of the country's first bus maintenance and storage facilities purpose-built for BEBs. Completion of the Project will directly achieve this goal. Without the facility's reconstruction, MTA cannot keep pace with its state-mandated goals for adoption of BEBs and will be delayed in its ability reduce transportation-sector emissions from diesel-powered buses.

In connection with the Project (but separate from the facility-focused scope of this grant request), MTA will procure buses to be housed and maintained at the newly reconstructed Eastern Bus Division. These procurements will be based upon agreements with bus manufacturers (to be selected later) that include secured milestone payment arrangements and specifications that reduce the need for customization of parts and vehicle features.

2. IMPACT OF GHG REDUCTION MEASURES

Magnitude of GHG Reductions from 2025 through 2030

No GHG emissions reductions are anticipated during the construction of the facility, which is due to be complete in 2029. Emissions reductions are assumed beginning in 2031 as new BEBs enter the fleet to replace diesel buses.

Magnitude of GHG Reductions from 2025 through 2050

The proposed project would reduce GHG emissions by 56,479 metric tons of carbon dioxide equivalent (MTCO₂e) for the period 2031-2035 and 260,142 metric tons from 2031-2050. Emissions reductions are based on the difference in emissions from BEBs as compared to a reference case of buses fueled by diesel. Figure 5, below, presents the reference case emissions, the proposed project emissions, and the emissions reductions. Additional calculation details are included in the Technical Appendix attachment.

Cost Effectiveness of GHG Reductions

The cost-effectiveness of the GHG reduction measures demonstrates a strategic approach towards achieving significant environmental benefits within a financially viable framework. By dividing the total implementation grant dollars requested (\$97,548,016) by the cumulative GHG metric ton of CO₂-equivalent emission reductions (MTCO₂e) to be achieved from 2031 through 2050 of 260,142 MTCO₂e,

EASTERN BUS DIVISION RECONSTRUCTION PROJECT– IMPLEMENTATION GRANT WORKPLAN

the project presents a cost of \$374.98 per MTCO₂e reduced. This calculation serves as a critical benchmark for evaluating the project's financial efficiency against its potential to mitigate climate change impacts.

Documentation of GHG Reduction Assumptions

(See **Technical Appendix** for more a more detailed explanation.)

Time Period	Reference Case Emissions (MTCO ₂ e) ¹	Project Emissions (MTCO ₂ e) ²	Emissions Reduction (MTCO ₂ e) ³
2025-2030*	0	0	0
2031-2035	66,751	10,272	-56,479
2031-2050	307,456	30,028	-260,142
Total Grant Request (2023 \$s)	N/A		\$97,548,016
Cost Effectiveness (\$/MTCO₂e reduced from 2031-2050)	N/A		\$374.98

Figure 5: Documentation of GHG Reduction Assumptions

* Emissions benefits will not be incurred until after 2030 when the facility is operational and supports the transition to zero emission vehicles.

3. ENVIRONMENTAL RESULTS – OUTPUTS, OUTCOMES, AND PERFORMANCE MEASURES

Expected Outputs and Outcomes

Expected outputs and outcomes are detailed in the below table in Section 3(b): Performance Measures and Plan.

Performance Measures and Plan

MTA is preparing for a 12-month air quality monitoring assessment to track emissions from the internal combustion engine bus fleet. Assessment findings will inform the anticipated annual reduction of emissions to be observed upon deployment of the ZEB fleet. MTA will coordinate with state and Federal entities to monitor emissions reduction from zero-emissions buses upon their deployment. Local utility partner Baltimore Gas and Electric (BGE) will assist MTA with baseline air quality monitoring assessments to compare air quality surrounding the facility before and after its reconstruction.

¹ Represents emissions if diesel buses were to operate service from Eastern Division during this timeframe.

² Represents PM₁₀ and PM_{2.5} emissions from brake wear and tire wear, which are unchanged when either diesel buses or BEBs are used.

³ Represents emissions avoided from Reference Case less Project Emissions from brake wear and tire wear.

EASTERN BUS DIVISION RECONSTRUCTION PROJECT– IMPLEMENTATION GRANT WORKPLAN

Performance Measure in PCAP

As noted on p. 49 of the State of Maryland Priority Climate Action Plan (included in attachments), the Maryland Transportation Plan aims to reduce vehicle miles traveled per capita by 20% through infrastructure and programmatic investments. Implementation of zero-emission off-road/non-road electric equipment will be measured in terms of number of pieces of electric equipment or electric off-road vehicles procured by MDOT. MTA will also track the percentage of zero-emission buses in its fleet and number of bus facilities equipped for ZEB operations.

Performance Measures for Eastern Bus Division Reconstruction Project

Deployment of ZEBs at Eastern Bus Division will immediately reduce greenhouse gas and noise emissions, both in the Greektown neighborhood and in the residential and industrial districts of Greater Baltimore that the 180-bus fleet from Eastern Division will serve. BEBs are quieter than diesel-fuel vehicles thanks to their lack of internal combustion engines. Altoona noise testing of BEBs and diesel vehicles conducted for MTA in 2021 and 2019, respectively, showed an approximate 10 dB(A) variance between the models.

Figure 6 addresses 3a, 3b and 3c of the Notice of Funding Opportunity in guidance and provides a roadmap for tracking project success. The Project includes short- and long-term GHG reductions as well as key performance indicators. Monetized values are based on U.S. Department of Transportation recommended benefit-cost analysis unit values as of December 2023.⁴

Outputs	Outcomes	Performance Measures	Monetized Benefit of Vehicle Emissions (\$)
<ul style="list-style-type: none"> (159) 40-foot BEBs (21) 60-foot BEB Installation of (8) Hitachi 2 mW charging cabinets Installation of (160) pantograph dispensers, with provisions for 16 to 20 more 	<ul style="list-style-type: none"> GHG reduced: 56,479 MTCO₂e (2031-2035) and 260,142 MTCO₂e (2031-2050) Co-pollutants reduced (2031-2050): 607,877 pounds NO_x; 1,531 pounds PM₁₀; 988 pounds PM_{2.5} Reduced rates of asthma and lung damage in LIDAC communities 	<ul style="list-style-type: none"> GHGs, HAPs and CAPs reduced Total funds deployed in low-income and disadvantaged communities (\$) # of BEBs purchased # of diesel buses taken out of service Number of charging stations installed Noise testing of facility activity (dB(A)) Annual reports submitted to Maryland General Assembly and EPA, as required 	<ul style="list-style-type: none"> GHG reduced: \$3.7 million (2031-2035) and \$17.7 million (2031-2050) Co-pollutants reduced (2031-2050): NO_x \$5.1 million; PM₁₀ \$0.1 million; PM_{2.5} \$0.4 million

Figure 6: Outputs, Outcomes and Performance Measures

⁴ U.S. Department of Transportation, Benefit-Cost Analysis Guidance for Discretionary Grant Programs, December 2023. Table A-6. <https://www.transportation.gov/sites/dot.gov/files/2023-12/Benefit%20Cost%20Analysis%20Guidance%202024%20Update.pdf>

EASTERN BUS DIVISION RECONSTRUCTION PROJECT– IMPLEMENTATION GRANT WORKPLAN

Authorities, Implementation Timeline, and Milestones

In addition to MTA as the administering agency for the Project, other responsible parties will be Baltimore Gas and Electric (BGE) for installing utility upgrades, city and state agencies for right-of-way acquisition, and contractors for completing design, timely installation, and reliable service of operations and maintenance. Selected bus and charger manufacturers, to be chosen through separate procurement processes, will be responsible for timely deliveries and service of vehicles and infrastructure, respectively. The Maryland Department of Transportation will be responsible for providing local support and oversight of the Project.

Below (Figure 7) is table of major tasks and milestones, including bus procurement and other key components of the Project.

Task	Responsible Party	Timeline	Milestone
Project planning	Design consultant(s): Whitman Requardt Associates (WRA) MTA PM: Jamie Richardson, Project Development	2021-2022	Completion of conceptual design (30%) – achieved 7/1/2023
Project Design	Design consultant(s): STV inc., Whitman Requardt & Associates, Sowinski Sullivan Architects, Johnson, Mirmiran & Thompson, Inc., RK&K, AECOM, MIn Engineering, WSP, Gannett-Fleming MTA PM: Albie Esposito, AIA-NCARB	2021-2025	Completion of 65% design – anticipated 10/1/2024 Completion of 85% design – anticipated 6/1/2025 Completion of 100% design – anticipated 10/1/2025 Completion of the bidding documents including plans and specifications.
Environmental Review	Environmental Review Consultant(s): STV inc., Whitman Requardt & Associates; Johnson, Mirmiran & Thompson, Inc., RK&K, AECOM, Min Engineering, Straughan Environmental, Inc. WSP MTA PM: Albie Esposito, AIA-NCARB	2021-2029	Completion of NEPA Process and obtaining of Categorical Exclusion – achieved 10/1/2023 Commissioning for LEED Silver Certification – anticipated 7/1/2029
Outreach	Outreach Consultant(s): WSP Website Design: Clark Concepts	2022-present	Community flyer distribution – 9/1/2022; completion of 65% design, 100%, and groundbreaking for project

EASTERN BUS DIVISION RECONSTRUCTION PROJECT– IMPLEMENTATION GRANT WORKPLAN

	MTA PM: Veronica Battisti, Director of Communications		Community touchpoint meetings – 50% construction completion milestone and completion of construction milestone (ribbon-cutting)
Right-of-Way Acquisition	MTA PM: Matthew Lattin, Director of Real Estate Baltimore City DOT PM: WRA Maryland Transportation Authority (MDTA) PM: John F. Wedemeyer, Real Estate Services (RES) Manager	2021 to 2025	Completion of necessary ROW for site footprint expansion and roadway and intersection redesign – 10/1/2025
Approval of Construction Contract	MTA PM: MTA Office of Procurement Clark Construction: Jim Ansari, Project Executive	2025 to 2026	Signing of contract with Construction Manager At-Risk – 3/1/2026
Workforce Development and Participation	MTA Office of Human Resources MTA Office of Safety and Training Amalgamated Transit Union Local 1300 Community College of Baltimore County Maryland Department of Labor Maryland New Directions	2024-Ongoing	Launch of apprenticeship program – 7/14/2024 Full staffing of reconstructed Eastern Bus Division – 12/1/2029
Construction Permitting	MTA PM: Albie Esposito, AIA-NCARB MDE, NPDES, Electrical, NEPA, ROW, Sprinkler, Plumbing, Roofing, Grading, Foundation, Framing, Excavation Baltimore City permitting agencies	2025-2026	Receipt of construction permits – 3/1/2026
Facility Construction	Contractor: Clark Construction MTA Construction Manager: George Bell, Area Manager Utilities Engineering Manager: George Bell, Area Manager	2026 to 2029	50% construction completion – 11/1/2027 Ribbon-cutting for newly constructed facility – July 1, 2029

EASTERN BUS DIVISION RECONSTRUCTION PROJECT– IMPLEMENTATION GRANT WORKPLAN

Operation of New Bus Division	<p>MTA Director of Bus Maintenance: Mark Burkhardt</p> <p>MTA Director of Bus Transportation: Bob Bennett</p> <p>MTA DCOO Operations Support: Wayne Morse</p> <p>MTA Director of Transit Support: Donald Norfolk</p>	2029- Ongoing	Ongoing operation and management of newly reconstructed bus division
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Figure 7: Project Milestone Table

4. LOW-INCOME AND DISADVANTAGED COMMUNITIES

Community Benefits

List of Disadvantaged Communities Affected by Project

The Project will directly impact multiple disadvantaged communities bordering the site, according to the Climate and Economic Justice Screening Tool. These include (also noted in the attached Excel table of CEJST-identified disadvantaged communities):

Census Tract 2607, which meets thresholds for being disadvantaged in housing, legacy pollution, transportation, and workforce development metrics:

- Lack of green space (97th percentile)
- Proximity to hazardous waste facilities (98th percentile)
- Proximity to Risk Management Plan facilities (98th percentile)
- Proximity to Superfund sites (97th percentile)
- Diesel PM exposure (90th percentile)
- Traffic proximity/volume (95th percentile)
- Linguistic isolation (92nd percentile)
- Share of adults with less than a high school diploma (24%).

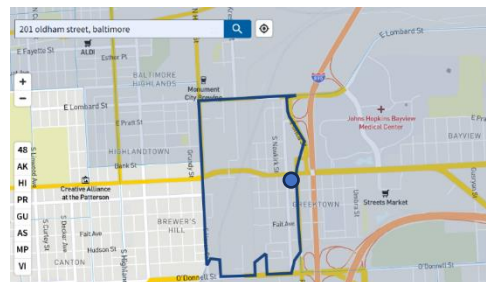


Figure 8: Census Tract 2607. The blue circle shows the location of the Project.

Census Tract 2605.01, which meets thresholds for being disadvantaged in housing, legacy pollution, transportation, and workforce development metrics:

- Share of homes with lead paint (96th percentile)
- Share of households with low incomes (70th percentile)
- Proximity to hazardous waste facilities (98th percentile)
- Proximity to Risk Management Plan facilities (97th percentile)
- Proximity to Superfund sites (99th percentile)
- Traffic proximity and volume (97th percentile)
- Linguistic isolation (92nd percentile)

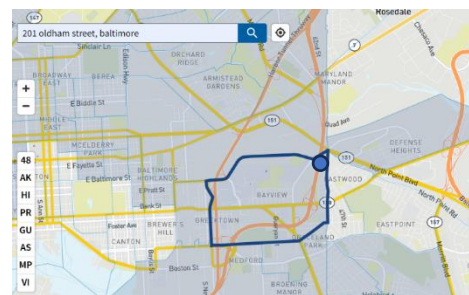


Figure 9: Census Tract 2605.01. The blue circle shows the location of the Project.

EASTERN BUS DIVISION RECONSTRUCTION PROJECT— IMPLEMENTATION GRANT WORKPLAN

- Share of adults with less than a high school diploma (22%).

Census Tract 2604.04, which meets thresholds for being disadvantaged in health, housing, legacy pollution, transportation, and workforce development metrics:

- Asthma rate (93rd percentile)
- Housing cost (96th percentile)
- Lack of green space (90th percentile)
- Lack of indoor plumbing (92nd percentile)
- Lead paint (95th percentile)
- Low income (89th percentile)
- Proximity to hazardous waste facilities (96th percentile)
- Proximity to Risk Management Plan facilities (99th percentile)
- Proximity to Superfund sites (96th percentile)
- Diesel PM exposure (90th percentile)
- Linguistic isolation (94th percentile)
- Share of adults with less than a high school diploma (44%).

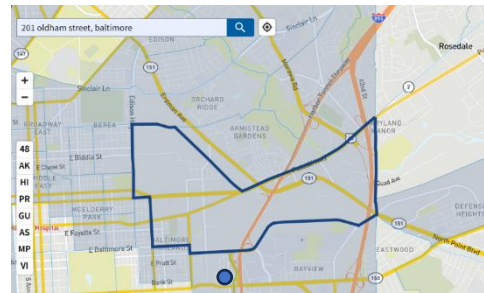


Figure 10: Census Tract 2604.04. The blue circle shows the location of the Project.

Direct and Indirect Benefits to Adjacent Disadvantaged Communities

The Project will provide the following benefits to these adjacent disadvantaged communities:

Increased resilience to climate change from GHG reduction measures

The inclusion of site features that support LEED Silver certification of its design, such as a green roof and photovoltaic panels atop the division's new transportation and maintenance facility and bus storage building, will help to mitigate the urban heat island effect created by the existing, aged facility. The incorporation of street trees at the perimeter of the property will also contribute towards this benefit to the immediately adjacent area.

The reduced emissions from BEBs charged, maintained, or otherwise stored at the facility, compared to the emissions resulting from the current fleet of diesel internal combustion engine buses, will also reduce air pollution, including diesel exhaust. This will improve the air quality of the neighborhoods immediately abutting the facility and across the greater Baltimore area in places served by MTA bus routes operating out of this division.

These benefits will help to directly address above-noted disadvantaged factors in each census tract, including lack of green space, diesel PM exposure, and asthma rates.

Improved public health resulting from pollutant reductions

The planting of street trees and the incorporation of a green roof will help to absorb CO₂ from the air in the immediately surrounding area, contributing to emissions reductions and improved air quality. Resulting pollution reductions from the replacement of diesel internal combustion engine buses with BEBs will significantly improve air quality.

These benefits will contribute to improved public health outcomes and directly address above-noted disadvantaged factors in each census tract, including lack of green space, diesel particulate matter (PM) exposure, and asthma rates.

Reduced noise pollution

The design of the reconstructed Eastern Bus Division will minimize noise impacts on nearby sensitive receptors such as adjacent residential areas west of Oldham Street and south of Eastern Avenue, as well as the Johns Hopkins Bayview Medical Center immediately to the east. Altoona noise testing for MTA comparing BEBs and diesel buses has showed an approximate 10 dB(A) difference between the vehicles, with BEBs producing lower ambient noise levels during operations compared to diesel buses. Retaining walls along the western site frontage will absorb the sound of bus maintenance, charging, and other functions within the site. Specifically, the construction of 12-foot retaining walls along the western site frontage will help to absorb sound. The retaining walls will also help to reduce noise pollution emanating to outside of the facility from the operations of the reconstructed bus wash station; the existing facility has only a chain-link fence between the bus wash equipment and the sidewalk on Oldham Street, whereas the new facility will have solid walls and an eight-foot grade difference to help absorb noise from the bus-wash equipment.

The Project will facilitate the replacement of diesel internal combustion engine buses with BEBs, which will also help to reduce long-term ambient noise levels for surrounding communities.



Figure 11: The view of the reconstructed Eastern Bus Division facing south along Oldham Street, including new street trees and other landscaping surrounding the facility in a low-scale residential, rowhome neighborhood.

New green space and/or community beautification

The Project's incorporation of street trees and context-sensitive decorative retaining walls will contribute to an improved aesthetic relationship between the Eastern Bus Division and the immediately surrounding commercial and residential spaces in Greektown. Since the building is located in a low-scale residential neighborhood, it is essential that the façade and material development provide scale shifting elements to have such a large volume relate in scale to the existing neighborhood rowhouses. This was achieved using deep reveals between each west-facing maintenance bay to suggest the width of the rowhouses while the division of the façade takes on a tripartite organization of a CMU masonry base element that balances ribbed metal panels and translucent bay window elements on the body, culminating in a perforated cornice that doubles as a sun shading device. That layered material system will be applied to the south and east faces of the building. The north face transitions the metal panels to be the main façade element with brick masonry details to ground and add warmth at the front of the building.

More broadly, the replacement of the bus division will also return it to a state of good repair, modernizing a facility constructed nearly a century ago and improving its overall aesthetic.

EASTERN BUS DIVISION RECONSTRUCTION PROJECT— IMPLEMENTATION GRANT WORKPLAN

Other benefits noted by residents of disadvantaged communities

As noted below in “Community Engagement,” the Project’s incorporation of 219 dedicated off-street parking spaces for MTA employees (see Figure 8) will address legacy shortages of parking and conflicts over finding on-street parking in residential areas. The reconfiguration of the site’s layout will also require buses and large vehicles to enter and leave the site exclusively on Ponca Street, removing these vehicles from potential conflicts on Oldham Street, addressing another legacy safety hazard noted by community members. (See “Employee Parking Above” in below site plan)

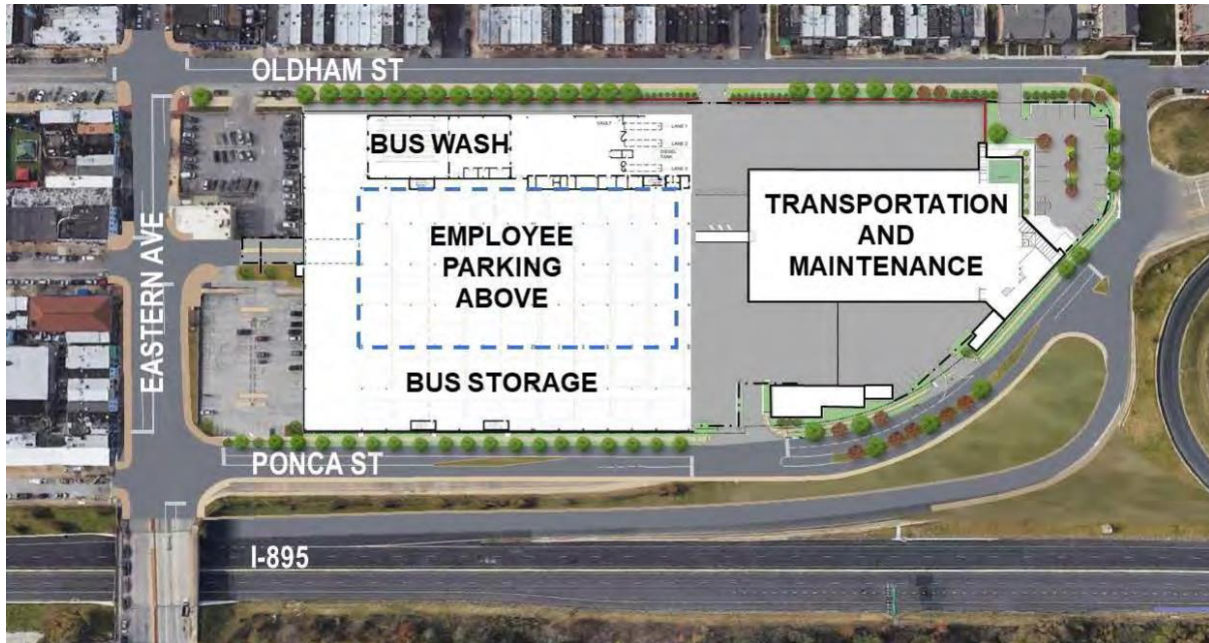


Figure 8: Eastern Bus Division Reconstruction Project site plan.

Process for Assessing, Quantifying, and Reporting Benefits and Avoided Disbenefits to Adjacent Disadvantaged Communities

MTA will conduct an air quality study to determine the levels of emissions currently generated by the existing internal combustion diesel engine fleet. The study will focus on the 12-year useful span of internal combustion diesel engine buses in order to inform the level of emissions forecasted to be avoided through the transition to a BEB fleet. If awarded CPRG implementation funds, MTA will issue incremental progress reports about emissions avoided via the transition of the BEB fleet, including in adjacent disadvantaged communities. MTA is required under the Maryland Zero-Emission Transition Act to provide reports to the state legislature about forecasted and actual reduced emissions resulting from the ZEB transition. This will ensure ongoing assessment, quantification, and reporting of benefits and avoided disbenefits. These findings will also be shared with the general public, including the immediately adjacent disadvantaged communities.

Co-pollution benefits to downwind communities

While the Project itself is occurring in the Greektown neighborhood of Southeast Baltimore, its completion will bring benefits to communities across the Baltimore area served by MTA buses, including Baltimore City and areas of Baltimore County and Anne Arundel County. (See Figure 9 for view of Baltimore region.) This is because the Project will create the necessary capacity to replace 197 existing diesel buses with

EASTERN BUS DIVISION RECONSTRUCTION PROJECT— IMPLEMENTATION GRANT WORKPLAN

BEBs, which produce significantly lower emissions and pollution compared to internal combustion engine buses.

Improved public health resulting from pollutant reduction

The reduced emissions resulting from the Project, amounting to 260,142 metric tons of carbon dioxide equivalent by 2050, will improve air quality and public health outcomes in populations prone to respiratory illnesses, such as asthma.

Creation of high-quality jobs and new workforce training opportunities

As detailed further below in Section 5: Job Quality, the Project is accompanied by the creation of a registered apprenticeship program that will create at least eight apprenticeships per year, amounting to an estimated 20 to 30 apprentices at Eastern Division over a 5-year period. This program will develop a set of modules to train new apprentices as well as existing MTA staff. The facility's reconstruction will also create new types of jobs that do not currently exist, including in the areas of charge management, yard management, and the operation of new dashboards. MTA has developed this registered apprenticeship program in collaboration with the Amalgamated Transition Union (ATU) Local 1300, the Maryland Department of Labor (MDOL), the Community College of Baltimore County (CCBC), and Maryland New Directions (MND).

- MND will provide supportive services, including industry-specific training and a comprehensive supportive service model with hard and soft skill training, individual case management and job coaching, career planning, and individual counseling.
- MTA and ATU will provide on-the-job training, technical instruction, and supportive services.
- CCBC has developed a High Voltage training course to supplement on-the-job training.
- MDOL has developed a Workforce Reentry Program for returning citizens

Improved access to services and amenities

The replacement of aged diesel internal combustion engine buses with BEBs – to be facilitated by completion of the Project -- will bring MTA's bus fleet into a state of good repair, improving the daily functioning and efficiency of bus routes and thereby improving access and mobility for bus riders around the region. There are 17 bus routes operating out of Eastern Bus Division, with a total ridership of 15,076,063 in calendar year 2023. This represented about one-third of total ridership (47,389,190) across all MTA bus routes in 2023.

Reduced noise pollution

Altoona noise testing conducted for MTA comparing BEBs and diesel buses has showed an approximate 10 dB(A) difference between the vehicles, with BEBs producing lower ambient noise levels during operations compared to diesel buses. The eventual replacement of 197 diesel buses at Eastern Bus Division with BEBs, to be facilitated by the Project, will thus help to reduce noise pollution during daily operations of buses throughout the Baltimore region.

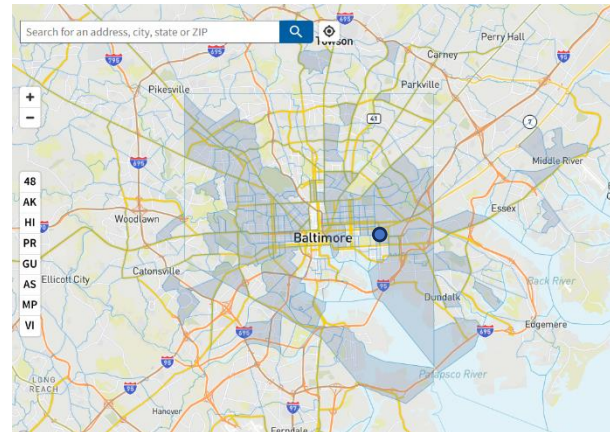


Figure 9: A view of the Baltimore region, serviced by MTA buses, from the CEIST. Downwind communities across this region will benefit from the Project. The blue circle shows the location of the Project.

Community Engagement

Incorporation of Input from Low-Income and Disadvantaged Communities

MTA's prior engagement with nearby disadvantaged communities included flyering, door-knocking/surveying residents, hosting public meetings, presentations at community organizations' regular gatherings, and walking tours with neighborhood groups. Among the recorded community engagement events and metrics used in planning for the Project were:

- In September of 2022, MTA distributed flyers to 315 homes in the immediately surrounding neighborhoods.
 - Through this effort, MTA made direct contact with 51 residents or business owners to request their input and provide them with information about the Project.
 - Requested input included asking community members what would improve their experiences at the bus stop directly outside of the site on Eastern Avenue, and what pedestrian infrastructure improvements they would like to see implemented nearby. MTA used translators to communicate with Spanish- and Greek-speaking residents.
- MTA conducted two public meetings, one in September of 2021 and one in June of 2022, informing local residents about the Project goals and benefits.
- MTA attended six community meetings hosted by neighborhood organizations where MTA staff spoke about the Project
- MTA participated in walking tours with the Oldham Crossing Homeowners Association and the Greektown Neighborhood Association

Examples of the incorporation of community feedback from these events into the Project design include:

- Community members identified existing conditions for bus and large vehicle ingress and egress as problematic safety hazards; the Project will directly address these issues. The realignment of Ponca Street (as part of the widening of the site footprint from six to 8.5 acres), will require buses and large vehicles to enter and leave the site exclusively on Ponca Street, removing these vehicles from potential conflicts on Oldham Street.
- Community members noted frequent difficulties finding on-street parking due to the shortage of available spaces for residents and MTA employees alike outside the facility, a problem worsened by the limited availability of on-site parking at the existing, legacy Eastern Bus Division. The creation of 219 off-street parking spaces dedicated for MTA employees at the bus division will reduce local traffic generated by the search for on-street parking and enhance safety as a result.
- Community members noted concerns about unsightly visual impacts and noise pollution resulting from the existing Eastern Bus Division. The inclusion of 12-foot retaining walls along the western site frontage to absorb sound within the site, as well as a context-sensitive, decorative retaining wall and street trees between the sidewalk and complex interior along the Oldham Street site border, will help to address these concerns. These components will minimize visual impacts and noise pollution resulting from operations and maintenance activities at the new facility. The replacement of diesel buses with BEBs at the bus division will further help to reduce long-term ambient noise levels for surrounding communities.

Ongoing Engagement During Lifespan of Grant

MTA will continue to engage with community organizations -- including groups such as the Greektown Neighborhood Association, the Oldham Crossing Homeowners Association, the Southeast Community

EASTERN BUS DIVISION RECONSTRUCTION PROJECT— IMPLEMENTATION GRANT WORKPLAN

Development Corporation, and the Highlandtown Community Association – as the agency approaches the beginning of construction in 2026. MTA will continue to engage families wherever possible prior to the beginning of Project construction. For example, the agency will participate in a STEAM Night in April 2024 hosted by John Ruhrah Elementary/Middle School in Greektown, where MTA will bring a battery-electric bus for demonstration activities and speak with students and parents about MTA's ongoing ZEB Transition Plan and related projects, including the Eastern Bus Division Reconstruction Project. Additionally, MTA will continue to spread awareness about BEBs through events such as Touch-a-Bus activities where staff can engage with students and families.

MTA maintains an active website for its ZEB Transition Plan, including a Project-specific webpage about the Eastern Bus Division Reconstruction Project: <https://zeb.mta.maryland.gov/eastern/>

This webpage includes a “Contact Us” button where visitors can reach out directly to the MTA ZEB Transition Team at zeb@maryland.mta.com, as well as a link for visitors to sign up to automatically receive updates about the Project.

Ongoing Reporting About Community Engagement

MTA maintains an existing outreach and engagement strategy that is centered around providing timely project updates on the Project [webpage](#). MTA will continue to regularly engage with community organizations and other stakeholders over the lifespan of the construction project and executed grant agreement. A list of planned community engagement opportunities, including public meetings hosted by MTA, neighborhood association meetings where MTA will present project updates, and other community input opportunities, will be posted and updated on the Project webpage. MTA will conduct additional door-to-door flyering to ensure it reaches houses that may not have readily available access to high-quality internet.

MTA will continue to present and distribute information about the Project at farmer’s markets, festivals, and community events throughout Baltimore City. Examples of major events include the Maryland State Fair every August and September; the annual outdoor summertime arts and music festival, Artscape; and the African American Cultural Festival (AFRAM), that occurs at Druid Hill Park every June.

Community presentations and flyering will be scheduled upon the completion of 65% design, 100% design, and leading up to groundbreaking for the Project. Additional community touchpoints are planned for the 50% construction completion milestone and upon completion of construction (ribbon-cutting).

MTA will use public meetings and engagement opportunities to gather input from community members about their biggest priorities for public benefits resulting from the project.

MTA will provide updates about community engagement to EPA as required under the resulting grant agreement. This will include an annual summary report about MTA’s outreach efforts for the Project from the previous year.

Letters of support and commitment are included in the attachments to this application.

5. JOB QUALITY

The Project’s workforce development plan benefits Baltimore residents working for MTA amid its ZEB fleet conversion. MTA has coordinated with the ATU Local 1300; in alignment with the ATU’s goals, MTA anticipates that the current workforce will not be displaced during the transition to ZEVs. The facility reconstruction will also enable the creation of new jobs in areas such as charge management, yard management, and operation of new dashboards.

EASTERN BUS DIVISION RECONSTRUCTION PROJECT– IMPLEMENTATION GRANT WORKPLAN

MTA's Apprenticeship Program was developed with ATU Local 1300, the Maryland Department of Labor, and the Community College of Baltimore County. In addition to offsetting workforce impacts of the transition, the program promotes equitable creation of jobs for Baltimore City's vulnerable and underserved communities.

The Apprenticeship Program will include on-the-job training and classroom instruction to promote workers' skills to advance their careers and develop a workforce that is trained for zero-emissions technology. Eight apprentices per year, amounting to an estimated 20 to 30 apprentices at Eastern Bus Division over a 5-year period, will be partnered with an incumbent employee union trainer and mentor to support them. The program's curriculum addresses ZEB technology maintenance, repair, and safety; will pay apprentices a progressive wage; and permits their membership with an international labor union.

MTA is partnering with Maryland New Directions (MND), an award-winning nonprofit organization that will provide employment coaching to apprentices. MND offers industry-specific training and a comprehensive supportive service model, which includes hard and soft skill training, individual case management and job coaching, career planning, and individual counseling, all designed to promote and support long-term job outcomes and self-sufficiency. MND will also assist with the recruitment of minority and socially vulnerable community members.

According to the Bureau of Labor Statistics (BLS), union workers earn more on average than their non-union counterparts. Maryland is a strong union state, ranking in the top 10th percentile nationally in workforce union membership rate. States like Maryland with strong unionization maintain higher-on-average wages than states with lower unionization rates. Maryland maintains robust collective bargaining access and protections for public sector workers. Md. Code Annotated Code, State Personnel and Pensions § 3-301:306, provides state employees the right to form, join, or participate in unions; maintain fair union representation before the State; engage in concerted activities for the purposes of collective bargaining; and be free from undue interference or coercion in the exercise of their rights. As new job- and wealth-building opportunities are created by the transition to cleaner medium- and heavy-duty vehicles, Maryland will continue to lead the nation in ensuring free and fair access to collective bargaining and collective representation for workers.

Prevailing wage is governed by Md. Annotated Code State Finance and Procurement § II-17-201:226 and regulates the hours of labor, rates of pay, conditions of employment, employer obligations, and the powers and duties of public officials under contracts and subcontracts for public works in Maryland. Coverage extends to any contract of \$250,000 or greater with State funding of 25% or more. Contractors on State-funded construction projects covered by the law must submit certified payroll statements for regular and overtime work. A wage determination is issued for each project that specifies the wage and fringe benefit rates for each classification of worker. MDOL's Prevailing Wage Unit compiles an annual Prevailing Wage Rate Survey to ensure compliance with the law and may issue fines to any contractor deemed out of compliance.

In 1978, the Maryland General Assembly enacted legislation creating the Minority Business Enterprise (MBE) Program to ensure that small, minority- and women-owned firms can participate fully and fairly in both state and USDOT federally funded projects. Current regulations set the MBE Program's statewide aspirational goal at 29% across 70 participating agencies and departments, including MTA. Believed to be the oldest in the country, Maryland's Disadvantaged Business Enterprise (DBE) program is recognized as a national model for minority inclusion.

EASTERN BUS DIVISION RECONSTRUCTION PROJECT— IMPLEMENTATION GRANT WORKPLAN

In 2014, the Small Business Enterprise (SBE) program was introduced as a race-and-gender neutral program designed to provide contracting opportunities to small businesses on USDOT federally aided projects with State Highway Administration (SHA), MTA, and the Maryland Aviation Administration (MAA).

MTA DBE Goals, FYs 2023-2025	
Overall	30.0%
Race Conscious	26.98%
Race Neutral	3.02%

Figure 12: DBE Goals Set by MTA, FY 2023-25

MDOT's Planning Division has proposed the following DBE Goal for fiscal years 2022-2024 for the Unified Planning Work Programs (UPWPs) of each of the Metropolitan Planning Organizations (MPOs), and USDOT-funded projects.

In March of 2024, the Baltimore City Council approved legislation creating the new Office of Returning Citizens to be housed in the Baltimore City Mayor's Office. The new office will connect formerly incarcerated citizens with a variety of resources including connections to new job

opportunities, especially those created by state and local governments.

MTA has a dedicated Office of Safety Management and Risk Control that is responsible for creating safety plans. The office has created a plan for MTA's broader ZEB program that takes into account new BEB technologies and associated risks. As it does with all MTA projects, this office will collaborate with other departments to create a site-specific plan for the Project prior to commencement.

6. PROGRAMMATIC CAPABILITY AND PAST PERFORMANCE

As lead agency and grant recipient, MTA will coordinate with key participants to ensure that all federal grant regulatory standards are met. MTA and any hired consultants have the qualifications, experience, and resource capacity to complete design, construction, public engagement, procurement of vehicles, and implementation of workforce development activities for the Project. As MTA transitions to ZEBs, the agency continues to develop its comprehensive workforce and training plan. MTA has attorneys on staff to produce and review any required agreements.

MTA has no outstanding Federal legal, technical, or financial compliance issues. MTA is supported by the Maryland Transportation Trust Fund, is the 13th-largest transit operator in the country, and has extensive experience executing and successfully completing FTA grants and projects in compliance with federal grant requirements. From 2019 through 2023, MTA has closed over 50 federal grants (including formula funding) and continues to proactively manage further FTA grants from prior years. MTA has been awarded grants through the 5339 Bus and Bus Facilities and Low or No Emission Vehicle programs in prior years and has executed and successfully completed these projects in compliance with federal grant requirements.

MTA is separately applying for Bus and Bus Facilities/Low-or-No Emissions Grant funding in support of the Project in April 2024, and will manage execution of all grant requirements for both the BBF/Low-No and CPRG grant programs if funding is awarded for each of the agency's applications.

Past Performance

MTA has a long, demonstrated history of working with Federal partners to execute grant agreements that have (and will) provide measurable benefits to the region. (See Figure 13 for details on recent grant awards and agreements.)

EASTERN BUS DIVISION RECONSTRUCTION PROJECT– IMPLEMENTATION GRANT WORKPLAN

Project Title	Funding Agency + ALN	Description	How was applicant able to complete agreement?
Anne Arundel Low/No Emissions Program Application	FHWA 20.526	\$1,890,000 received in FY 2022 on behalf of Anne Arundel County to purchase diesel-electric hybrid buses.	MTA provided technical and administrative support to the locally operated transit service in Anne Arundel County and provided regular grant reporting as required.
MTA Penn-Camden Corridor Connector (PCC) CRISI Grant Application	FRA 20.325	\$8.8 million to support a new rail connection between the Penn and Camden Lines, improving operations and reliability for passenger & freight rail service.	MTA's PCC has been a top unfunded priority for many years and will be overseen directly by the agency and follow regular grant reporting procedures.
MTA Rail Vehicle Replacement Program	FTA 20.525	\$213,696,341 awarded in 2024 to help MTA replace all 52 aging Light Rail vehicles in its fleet with new, modern, low-floor railcars.	This project will be directly overseen by MTA and follow regular grant reporting procedures.
MTA Building Baltimore Penn Station Connections RAISE Grant	USDOT 20.933	\$6 million awarded to help redevelop Penn Station and improve access in and around the station.	As the grant-funded portion of this project nears completion, MTA's Capital Programming and Finance teams have met all USDOT reporting requirements to date with no significant problems.
MTA Cloud Based TSP SMART Grant Application	USDOT 20.941	The \$1.276 million grant will help install and test new cloud-based transit signal priority (TSP) technology at 90 intersections on four high-frequency bus lines in Baltimore City.	This project will be directly overseen by MTA and follow regular grant reporting procedures.

Figure 13: Federal Grant Agreement Table

Reporting Requirements

MTA has no grant funded projects that have been executed and completed within the last three years. However, there are two ongoing projects, several recently awarded (but not executed) projects, and a long history of successfully overseeing over \$1 billion of federally funded infrastructure and transit projects. Throughout its long history with federal partners, MTA has a proven track record of timely and accurate reporting handled by a well-established system and experienced, dedicated staff (see Staff Experience section below).

MTA remains in compliance with FTA's requirement for annual reporting on the financial status of all active and open projects. This is completed by the office of Capitol and Programming in conjunction with MTA's Finance team. The Capital and Finance teams spend time gathering information from project

EASTERN BUS DIVISION RECONSTRUCTION PROJECT— IMPLEMENTATION GRANT WORKPLAN

managers, along with milestone dates of deliverables in order to submit regular Milestone Progress Reports. These reports are then uploaded to FTA's Transit Award Management System (TrAMS) for their review and approval.

Awarded in 2022, MTA's Rebuilding America's Infrastructure with Sustainability and Equity (RAISE) grant funded project, Building Baltimore Penn Station Connections, is currently underway and meeting all appropriate grant reporting requirements, following MTA's standard procedures described above. Each of the recently awarded grants listed in Figure 13 will be managed by the same team using the same proven process.

MTA also remains current on all certifications, assurances, and reporting requirements, including ADA, DBE, EEO, Title VI, and lobbying disclosure reports.

Staff Expertise

Please refer to the attached resumes included as part of this application for full biographies of the staff mentioned below.

Albert Esposito – Project Manager, Eastern Bus Division Reconstruction Project

Albert has over 25 years of architectural design and management experience. He has led diversified teams of internal and external professionals to provide complete architectural and engineering services for various transportation projects, including commuter rail, bus, and aviation. His responsibilities include project management, performing property condition assessments, preparing scope reports, feasibility studies, basis of design and design criteria manuals, construction administration, and close-out services. He also prepares concept designs and oversees the preparation of construction drawings and specifications. Albert also assists in developing and maintaining client relationships and delivering projects using Design-Build alternative project delivery.

Mark Griffiths – BEB Engineer Lead, Eastern Bus Division Reconstruction Project

Mark is a chief engineer with more than 40 years of experience in the design and construction of rail and bus transit systems. He is highly skilled in engineering management and supervision for the design and construction of bus depot charging infrastructure and major rail transit systems, including signaling, communications, traction electrification, operations control, facility power, emergency power, station electrical, lighting, fire alarm, fire suppression, and corrosion control. Mark has managed systems design for some of the largest transit and commuter rail projects in the United States in recent years. This has included responsibility for design, construction phase services, and specialty subconsultants from project definition through substantial completion.

Ed Roethlein – Building Design Project Manager, Eastern Bus Division Reconstruction Project

Ed has 38 years of professional experience in design and construction projects, with particular expertise in transit and public sector facilities. He is currently serving as the Project Manager on the On-Call Architectural Contract for Pittsburgh Regional Transit and MTA's Eastern Bus Division Redevelopment Project. He also served as Project Manager for recently completed Ocean City Public Works and Transit Facility that was completed on time and on budget with >0.7% in design change orders.

Ryan Barth – Construction Manager At-Risk, Eastern Bus Division Reconstruction Project

Ryan is a civil engineer and project manager with more than 17 years of experience on a variety of transportation projects for Maryland SHA, MTA, and county or other municipal authorities. He also has experience in site design for land and mixed-use development projects and for railroad ROW, including the design of corridor, track, utility, and grade crossing improvements. Ryan's responsibilities have

EASTERN BUS DIVISION RECONSTRUCTION PROJECT– IMPLEMENTATION GRANT WORKPLAN

included field investigations, developing contract documents and cost estimates, providing document review, and project management. He is particularly knowledgeable about the specifications required to comply with ADA and other accessibility requirements and has been responsible for the design of ADA-compliant ramps and associated signing and pavement markings. In February 2014, Engineering News-Record selected Ryan as one of its top 20 professionals under age 40 in the Mid-Atlantic region.

Sean Powell – Environmental Engineer, Eastern Bus Division Reconstruction Project

Sean has over eight years of professional experience in the environmental industry and has served as a project engineer and environmental scientist, coordinating field personnel conducting site investigations, soil borings, monitoring well installations, UST inspections/closures, subsurface investigations, and natural resource surveys. He has prepared technical reports for a variety of projects and clients.

David Nichols – Certified Commissioning Agent, Eastern Bus Division Reconstruction Project

David is the lead commissioning agent and mechanical engineer for the Project, providing quality assurance and quality control and commissioning services to MTA. Services provided include the commissioning of several transit facilities; capital program technicians; and the development of standards, guidelines, and manuals. As Commissioning Services Vice President, David is responsible for the planning and coordination of activities concerned with the construction, commissioning, and maintenance of structures, facilities, and systems. He has intimate knowledge and a thorough understanding of contracts, applicable laws and codes, and scheduling, as well as familiarity with materials, methods, and processes of a construction project and the ability to oversee its organization, scheduling, and implementation.

Kisha Joyner – Acting Manager of Capital Programming-Grants, Maryland Transit Administration

Kisha has spent most of her 13-year career maintaining MTA's grant program to safely and reliably deliver innovative projects that contribute to a state of good repair and enhance quality of life. Kisha has overseen, contributed, developed, organized, and successfully completed many grants during her tenure. She started off simply reviewing coding, and moved on to developing, reporting, executing, and closing grants. During this process, Kisha has built countless partnerships with the FTA, Federal Highway Administration, local jurisdictions, and many internal customers. She also led a team to successfully complete MTA's grant cycle, which has brought over \$1 billion to the organization to foster some of MTA's core projects such as the Purple Line Metro Train, Fleet Control, and North Avenue Rising. With the support of her great team and supportive leadership, Kisha will continue to deliver great projects through MTA's well-tested grant process.

7. BUDGET NARRATIVE (BUDGET NARRATIVE & SPREADSHEET ATTACHED)

Budget Detail

The Eastern Division Reconstruction project has many components, multiple funding sources, and a wide range of benefits. Other funding sources aside from the requested CPRG Program funding include \$213 million from federal formula funding and state funding, as well as hopeful Bus and Bus Facilities/Low-No competitive grant funding, if awarded. The Project Team has identified specific equipment costs (detailed below) that will play a significant role in facilitating the projected GHG reductions: charging infrastructure for BEBs. MTA is requesting \$97,548,016 specifically to pay for these items as part of the broader, more wide-reaching project.

EASTERN BUS DIVISION RECONSTRUCTION PROJECT– IMPLEMENTATION GRANT WORKPLAN



Figure 14: A rendering of BEBs with pantograph chargers overhead in the interior of the reconstructed Eastern Bus Division.

ITEM	QUANTITY	UNIT COST	TOTAL COST
Pantographs w/ Control Boxes	176	\$151,300	\$26,628,800
BEB Chargers (2500 kW)	8	\$2,200,000	\$17,600,000
Electrical Framework	249,727	\$208/square foot	\$51,943,216
Photovoltaic Panels (POVs)	688	\$2,000	\$1,376,000

Pantographs offer an overhead charging option for the reconstructed Eastern Bus Division’s forthcoming BEBs and require associated Control Boxes to function. Initial design estimates called for 160 pantographs, but that number has since been revised to include an additional 16-20 units. This grant application requests funding for 176 pantographs. Likewise, the BEB chargers provide multiple, fixed-point charging for MTA’s expanded BEB fleet. Photovoltaic panels (POVs) round out the emissions-reducing technology requested through this grant application. Lastly, the budget includes the required electrical framework (including installation costs) that will assure reliable functionality for all of the site’s powered components.

Please refer to the attached Budget Narrative and Budget Calculations spreadsheet for a more detailed explanation of the Project budget.

Detailed Budget Table

This Excel Workbook is provided to aid applicants in developing the required budget table(s) within the budget narrative.

BUDGET BY YEAR							
COST-TYPE	CATEGORY	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
Direct Costs	Personnel						
							\$0
							\$0
							\$0
	TOTAL PERSONNEL	\$0	\$0	\$0	\$0	\$0	\$0
	Fringe Benefits						
							\$0
							\$0
							\$0
	TOTAL FRINGE BENEFITS	\$0	\$0	\$0	\$0	\$0	\$0
	Travel						
							\$0
							\$0
							\$0
							\$0
							\$0
							\$0
							\$0
	TOTAL TRAVEL	\$0	\$0	\$0	\$0	\$0	\$0
	Equipment						
	Pantographs w/ Control Boxes: 176 x \$151,300	\$26,628,800					\$26,628,800
	BEB Chargers (2500 kW): 8 x \$2,200,000	\$17,600,000					\$17,600,000
	POV: 688 x \$2,000	\$1,376,000					\$1,376,000
	Electrical Conduit (Incl. Fire Alarm) 249,727 x \$208	\$51,943,216					\$51,943,216
	TOTAL EQUIPMENT	\$97,548,016	\$0	\$0	\$0	\$0	\$97,548,016
	Supplies						
	Software						\$0
	Postage						\$0
	TOTAL SUPPLIES	\$0	\$0	\$0	\$0	\$0	\$0
	Contractual						
							\$0
							\$0
							\$0
	TOTAL CONTRACTUAL	\$0	\$0	\$0	\$0	\$0	\$0
	OTHER						
							\$0
							\$0
	TOTAL OTHER	\$0	\$0	\$0	\$0	\$0	\$0
	TOTAL DIRECT	\$97,548,016	\$0	\$0	\$0	\$0	\$97,548,016
Indirect Costs	Indirect Costs						
							\$0
							\$0
	TOTAL INDIRECT	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL FUNDING		\$97,548,016	\$0	\$0	\$0	\$0	\$97,548,016

NOTE: USE OF THIS EXAMPLE COVER PAGE IS OPTIONAL. IF THIS INFORMATION IS PROVIDED IN A DIFFERENT FORMAT, EPA WILL NOT REVIEW AN APPLICATION UNFAVORABLY.

**CPRG IMPLEMENTATION GRANTS COMPETITION
COVER PAGE FOR APPLICATION**

APPLICANT INFORMATION

Organization

Primary Contact Name

Phone Number

Email Address

TYPE OF APPLICATION

Individual Applicant

Lead Applicant for a Coalition

If lead applicant for a coalition, provide a list of the coalition members below.

FUNDING REQUESTED: *Provide total EPA CPRG Implementation Grant funding requested.*

APPLICATION TITLE: *Provide the title of your proposed project.*

BRIEF DESCRIPTION OF GHG MEASURES: *Describe each GHG reduction measure contained in the application (1-2 sentences each).*

SECTORS: *Identify the sector(s) associated with the GHG reduction measures included in the application.*

Industry	Commercial and Residential Buildings
Electricity Generation	Agriculture/Natural and Working Lands
Transportation	Waste and Materials Management
Other (please describe)	

EXPECTED TOTAL CUMULATIVE GHG EMISSION REDUCTIONS

For all proposed measures combined, provide the estimated cumulative GHG reductions:

Estimated cumulative GHG reductions for 2025-2030 (in metric tons)

Estimated cumulative GHG reductions from 2025-2050 (in metric tons)

LOCATIONS: *List the primary location(s) where the proposed measures will be implemented*

City

State; Territory; Federally recognized Tribe

APPLICABLE PRIORITY CLIMATE ACTION PLAN(S) (PCAP) ON WHICH MEASURES ARE BASED

PCAP Lead Organization(s):

PCAP Title(s):

PCAP Website link(s) (if applicable):

List of GHG reduction measures and PCAP page reference for each measure: