



**Maryland Department of Transportation**  
The Secretary's Office

**Martin O'Malley**  
Governor

**Anthony G. Brown**  
Lt. Governor

**Beverly K. Swaim-Staley**  
Secretary

**Darrell B. Mobley**  
Deputy Secretary

November 29, 2011

The Honorable Edward J. Kasemeyer  
Chairman, Senate Budget and Taxation Committee  
5205 East Drive, Suite H  
Arbutus MD 21227

The Honorable Norman Conway  
Chairman, House Appropriations Committee  
1312 Whittier Drive  
Salisbury MD 21801-3241

Dear Chairmen Kasemeyer and Conway:

Attached is a report concerning the Maryland Transit Administration's *Purple Line Financial Plan* as required in the 2010 Joint Chairmen's Report (JCR), page 61. The language directs:

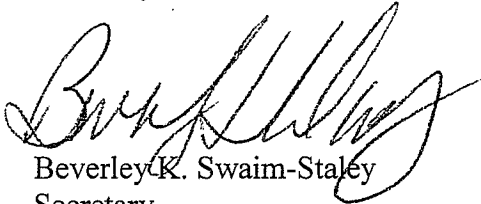
*"Currently, the Maryland Transit Administration (MTA) is moving forward with planning for three major transit lines, the corridor Cities Transitway, the Purple Line, and the Red Line. Due to the existing constraints facing the Transportation Trust Fund, a major revenue increase will be required to pay for one of the transit lines. As part of the federal approval process, MTA is required to submit a New Starts application that allows them to enter into preliminary engineering and that provides detailed information on ridership and the planning of the project. Preliminary financial information regarding how the State will pay for the project will also be provided. MTA should submit a report to the committees 45 days after each New Starts submission detailing how it will pay for the Red Line, Purple Line, and Corridor Cities Transitway. The report should include copies of the financial information provided to the Federal Transit Administration (FTA) as well as a discussion of the viability of the financial information presented.*

*This report is due 45 days after the New Starts application is submitted to FTA for each proposed project to enter into preliminary engineering."*

The Honorable Edward J. Kasemeyer  
The Honorable Norman Conway  
Page Two

If you have additional questions or concerns, please do not hesitate to contact Mr. Ralign Wells, Maryland Transit Administrator at 410-767-3943. Of course, you should always feel free to contact me directly.

Sincerely,



Beverley K. Swaim-Staley  
Secretary

Attachments

cc: The Honorable Thomas V. "Mike" Miller, Maryland Senate President  
The Honorable Michael E. Busch, Maryland House Speaker  
Members of the Senate Budget and Taxation Committee  
Members of the House Appropriations Committee  
Mr. Ralign Wells, Administrator, Maryland Transit Administration

The Honorable Edward J. Kasemeyer  
The Honorable Norman Conway  
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bcc: Ms. Sarah Albert, Library Associate, Mandated State Agency Reports, Library  
& Information Services Division, Department of Legislative Services (5 copies)  
Mr. Matthew J. Bennett, Committee Staff, Senate Budget and Taxation Committee  
Mr. Joe Bryce, Executive Director, Governor's Legislative Office  
Mr. Jack Cahalan, Director, Office of Public Affairs, Maryland Department of  
Transportation  
Mr. Dave Fleming, Director, Office of Finance, Maryland Department of Transportation  
Mr. Patrick Fleming, Director, External Affairs, Maryland Transit Administration  
Mr. Bruce W. Gartner, Director, Office of Policy & Governmental Affairs,  
Maryland Department of Transportation  
Ms. Chantelle Green, Committee Staff, House Appropriations Committee  
Ms. Vickie Gruber, Legislative Assistant to the President, Maryland General Assembly  
Mr. Martin L. Harris, State Legislative Officer, Maryland Department of Transportation  
Ms. Jaclyn Hartman, Legislative Analyst, Department of Legislative Services  
Ms. Kristin Jones, Chief of Staff, Speaker's Office, Maryland General Assembly  
Mr. Henry Kay, Deputy Administrator, Maryland Transit Administration  
Ms. Cathy Kramer, Department of Legislative Services  
Ms. Diane Lucas, Budget Analyst, Department of Budget and Management  
Mr. Jon Martin, Legislative Analyst, Department of Legislative Services  
Mr. Darrell B. Mobley, Deputy Secretary, Maryland Department of Transportation  
Ms. Shanetta J. Paskel, Deputy Legislative Officer, Governor's Legislative Office  
Ms. Wonza Spann-Nicholas, Deputy Director, Office of Finance, Maryland Department  
of Transportation  
Mr. Kurt Stolzenbach, Assistant Director, Office of Budget Analysis, Department of  
Budget and Management

**Report to the Maryland General Assembly**

**Senate Budget and Taxation Committee**

**And**

**House Appropriations Committee**

**Regarding**

**Purple Line Financial Plan  
(2010 Joint Chairmen's Report, Page 61)**

**The Maryland Transit Administration  
The Maryland Department of Transportation**

# The Purple Line Financial Plan (2010 JCR, p. 61)

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## Introduction

This report is in response to the 2010 Joint Chairmen's Report (p. 61) request that specifically states:

*"MTA should submit a report to the committees 45 days after each New Starts submission detailing how it will pay for the Red Line, Purple Line, and Corridor Cities Transitway. The report should include copies of the financial information provided to the Federal Transit Administration (FTA) as well as a discussion of the viability of the financial information presented."*

The Maryland Transit Administration's (MTA) statements about how it will pay for three proposed New Starts projects are contained in financial plans prepared for each project. As requested, the Purple Line Financial Plan is attached to this report. The Red Line plan and the Purple Line plan have been reviewed by FTA; both plans address all of Maryland's New Starts projects. The Purple Line plan includes a detailed discussion of the basis of the capital and operating cost estimates, a cash flow analysis that places the New Starts projects in the context of the Maryland Department of Transportation's (MDOT) overall budget and capital needs, and provides risk mitigation strategies.

"New Starts" refers to Federal funding available from the FTA through 49 USC §5309. Eligible projects include fixed guideway transit systems that utilize and occupy a separate right-of-way. This includes both rail and exclusive facilities for buses (such as bus rapid transit) and other high occupancy vehicles. The State of Maryland's New Starts program currently includes the Purple Line, a 16-mile light rail project in Montgomery and Prince George's Counties; the Red Line, a 14.5-mile light rail project in the Baltimore region; and the Corridor Cities Transitway (CCT), a 15-mile light rail or bus rapid transit project in Montgomery County.

FTA assigns a rating to projects when a project sponsor requests entry into New Starts Preliminary Engineering (PE). FTA has performed a formal review of the Purple Line Financial Plan and responded that the MTA has a reasonable plan to secure all construction and operating funds. FTA has assigned the Purple Line Financial Plan an acceptable rating and, on October 7th, 2011, notified MTA that its request to enter PE was approved.

The Purple Line Financial Plan will be updated during the PE stage. An updated plan is anticipated to be submitted to FTA by the summer of 2012. By the following spring, FTA will complete another review of the updated plan, at which time FTA update its rating of the plan.

## Purpose of the Financial Plan

The purpose of a New Starts financial plan is to demonstrate to the FTA that a transit agency can build and operate a proposed project while maintaining current transit service levels and an adequate state of repair for the existing transit system. This policy arises from FTA policy that 1) transit systems should place a priority on maintaining existing infrastructure, some of which may have been paid for with federal funds, before expanding their systems and 2) relatively scarce New Starts funds should be allocated to agencies that are ready to use them.

## The Purple Line Financial Plan (2010 JCR, p. 61)

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In order to characterize the status of funding in the future, New Starts financial plans involve a 20-year forecast of agency-wide costs and revenues. Because a New Starts financial plan involves a long-range forecast of a transit agency's costs and revenues, the Purple Line Financial Plan also includes cost and revenue assumptions for the other New Starts projects.

A financial plan is first submitted to FTA when a project applies for entry into PE. To obtain FTA permission to enter PE, the financial plan must demonstrate to FTA that the MTA has a "reasonable plan" to secure all construction and operating funds for the project. The financial plan is then periodically updated and reviewed as the project progresses through design and construction.

The Purple Line Financial Plan proposes an FTA New Starts grant for 50 percent of the Purple Line capital costs, with the remainder of capital costs and any net increase in MTA operating and maintenance costs assumed to be funded by the Transportation Trust Fund (TTF). Alternative financing tools and sources such as innovative financing and local contributions are not assumed in the Purple Line Financial Plan but will be explored before the plan is next updated in 2012.

### Sources of Input Data Used in the Plan

The Purple Line Financial Plan uses data from several sources. The primary data and their sources are as follows:

- Estimates of Purple Line capital costs, operating & maintenance (O&M) costs, and ridership and fare revenues. These estimates were developed by the MTA after the selection of the Locally Preferred Alternative in August 2009, reflecting minor refinements to the project during advanced conceptual engineering.
- Estimates of Red Line capital costs, O&M costs, and ridership and fare revenues used in the Red Line Financial Plan. These estimates were developed by MTA after the selection of the Locally Preferred Alternative in August 2009 Assumptions for CCT capital costs, O&M costs, and fare revenues. The CCT study is still underway, and as such, there is not yet a Locally Preferred Alternative or an estimate of that project's scope or capital costs. Solely for the purposes of the Purple Line Financial Plan, placeholder amounts of \$250 million (in year of expenditure dollars) and \$15 million (in 2010 dollars) were assumed for CCT construction costs and O&M costs, respectively. The MTA's statutory 35 percent farebox recovery requirement was applied to the O&M cost assumption to develop a placeholder estimate of CCT fare revenues.
- Other MTA costs and revenues. The FY 2011 Final Consolidated Transportation Program (CTP) was used for the MTA's capital budget during the 2011-2016 timeframe. Beyond the CTP timeframe, MTA estimates of future capital needs were used and long-term growth rates were assumed for revenues. Recent growth rates and trends were used for MTA O&M costs.
- MDOT costs and revenues. A November 2009 MDOT forecast developed for an update to the National Capital Region's financially Constrained Long Range Plan (CLRP) was used as the base estimate of MDOT's long-range operating costs, capital costs, and revenues.

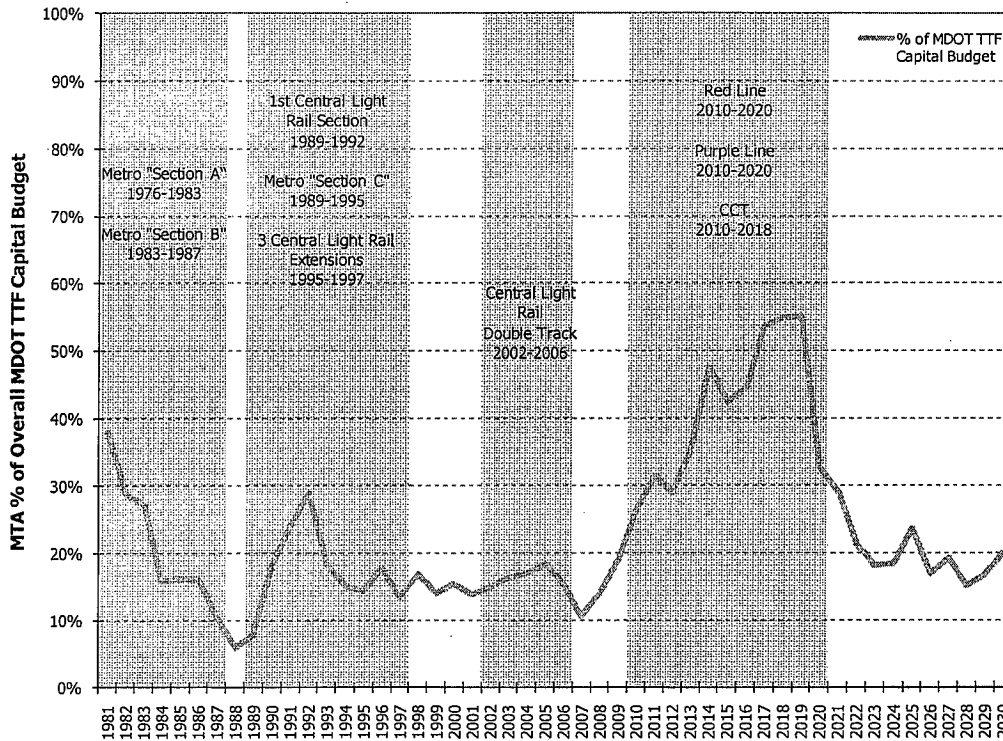
# The Purple Line Financial Plan (2010 JCR, p. 61)

- FTA New Starts grants. The MTA is proposing federal grants amounting to 50 percent of the capital cost of each New Starts project from FTA. Accordingly, these revenues are also assumed in the financial plan.

## Summary of the Financial Plan's Conclusions

Figure 1 illustrates how the New Starts projects will be accommodated within MDOT's total capital budget.

Figure 1



Over the long term the TTF has generally shown steady growth. The Purple Line Financial Plan demonstrates that, while the share of MDOT's capital expansion budgeted allocated to MTA rises above historical averages between 2014 and 2020, the MTA has a reasonable plan to build, operate and maintain the Purple Line using funding from the TTF and New Starts.

Table 1 provides cash flows for New Starts projects as indicated in the Purple Line Financial Plan.

Table 1

Costs per year (\$ millions) for New Starts

	FY-10	FY-11	FY-12	FY-13	FY-14	FY-15	FY-16	FY-17	FY-18	FY-19	FY-20	Total
Purple Line	\$ -	\$ -	\$ 30	\$ 38	\$ 154	\$ 237	\$ 215	\$ 354	\$ 442	\$ 378	\$ 79	\$ 1,925
Red Line	\$ -	\$ 13	\$ 34	\$ 54	\$ 73	\$ 154	\$ 451	\$ 410	\$ 445	\$ 449	\$ 136	\$ 2,219
CCT (Illustrative)	\$ 4	\$ 5	\$ 10	\$ 10	\$ 10	\$ -	\$ 83	\$ 83	\$ 83			\$ 289
<b>Total</b>	<b>\$ 4</b>	<b>\$ 18</b>	<b>\$ 74</b>	<b>\$ 101</b>	<b>\$ 237</b>	<b>\$ 391</b>	<b>\$ 749</b>	<b>\$ 848</b>	<b>\$ 969</b>	<b>\$ 826</b>	<b>\$ 215</b>	<b>\$ 4,430</b>

# The Purple Line Financial Plan (2010 JCR, p. 61)

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## FTA Review of Financial Plan

FTA's response to the plan was that the cash flow projections indicate that MTA has the financial capacity to build the Purple Line and other projects, and continue its capital program, as well as operate and maintain the existing transit system.

The overall financial rating for the Purple Line project is Medium-High, based on the weighted average of: 1) the Medium rating assigned to the Non-Section 5309 New Starts share of funding (weighted 20 percent); 2) the Medium-High rating assigned to the Project Capital Financial Plan (weighted 50 percent); and, 3) the Medium-High rating assigned to the Project Operating Financial Plan (weighted 30 percent).

FTA noted that the rating could be higher if the following information is provided in subsequent updates:

- Provide historical data to support all estimates and planning assumptions being made, both in the capital finance plan and in the operating finance plan.
- The ridership assumptions used to generate fare revenues in the financial plan should include a fare elasticity factor to account for potential losses in ridership when fares are increased.
- MTA and MDOT should come up with a plan to explore additional funding/financing options to reduce the anticipated annual levels of federal support for this project to under \$100 million and adjust the timing of the funding accordingly.

MTA intends to address these suggestions in future updates to the plan.

It is notable that the Purple Line received a higher rating than the Red Line despite the fact that the plans rely on the same source of funding for the non-federal share. MTA intends to seek clarification from FTA, but we assume this stems from an erroneous interpretation of the funding currently committed in the Consolidated Transportation Program.

## Conclusion

Maryland has a stable history of providing funding for large capital expansion projects, including several MTA expansion projects implemented since the 1980s. MDOT has also demonstrated a commitment to maintaining MTA service levels and funding MTA capital preservation needs. This was documented for FTA to its satisfaction, and FTA gave the plan an acceptable rating to proceed to the next phase of work.





# PURPLE LINE FINANCIAL PLAN

June 20, 2011 *WORKING DRAFT*

*Note: Contains preliminary information subject to future revision*

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## Purple Line Financial Plan

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## List of Acronyms

AA	Alternative Analysis
ARRA	American Recovery and Reinvestment Act
BMC	Baltimore Metropolitan Council
CAFR	Consolidated Annual Financial Report
CAGR	Compound Annual Growth Rate
CCI	Construction Cost Index
CCT	Corridor Cities Transitway
CLRP	Constrained Long Range Plan
CMAQ	Congestion Mitigation and Air Quality
CPI	Consumer Price Index
CPI-U	Consumer Price Index for all Urban Consumers
CTB	Consolidated Transportation Bonds
CTP	Consolidated Transportation Program
DEIS	Draft Environmental Impact Statement
EIS	Environmental Impact Statement
ENR	Engineering News Record
FFGA	Full-Funding Grant Agreement
FGM	Fixed Guideway Modernization
FTA	Federal Transit Administration
FY	Fiscal Year
LOS	Level of Service
LOTS	Locally Operated Transit Systems
LPA	Locally Preferred Alternative
LRT	Light Rail
MAA	Maryland Aviation Administration
MARC	Maryland Area Regional Commuter
MDBSF	Mean Distance Between Service Failures
MDOT	Maryland Department of Transportation
MdTA	Maryland Transportation Authority
MPA	Maryland Port Administration
MTA	Maryland Transit Administration
MVA	Motor Vehicle Administration
MWCOG	Metropolitan Washing Council of Governments
NTD	National Transit Database
O&M	Operating and Maintenance
PMOC	Project Management Oversight Consultant
ROW	Right-of-Way
RVH	Revenue Vehicle Hours
RVM	Revenue Vehicle Miles
SCC	Standard Cost Category
SHA	State Highway Administration
TSO	The Secretary's Office
TTF	Transportation Trust Fund
WMATA	Washington Metropolitan Area Transit Authority
YOE	Year of Expenditure



# 1 Introduction

## 1.1 General

The following analysis presents the financial capacity of the Maryland Transit Administration (MTA) to construct and subsequently operate the Purple Line project along with the remainder of its capital program. The Purple Line is a proposed 16.3-mile light rail transit line that extends between Bethesda in Montgomery County to New Carrollton in Prince George's County, connecting the major activity centers in this corridor inside the Capital Beltway. It would provide direct connections to four branches of the Metrorail system: both branches of the Red Line at Bethesda and Silver Spring, the Green Line at College Park, and the Orange Line at New Carrollton, as well as all three MARC commuter rail lines, and Amtrak's Northeast corridor.

The Financial Plan supports the MTA's New Starts submittal to the FTA for the Red Line project's application for New Starts Preliminary Engineering. It has been developed in consideration of FTA's "Guidance for Transit Financial Plans" issued in June, 2000, and subsequent guidance at New Starts workshops, as well as the "Guidelines and Standards for Assessing Local Financial Commitment," issued by FTA in June, 2007, and the "Reporting Instructions for the Section 5309 New Start Criteria," issued in July 2010. The Financial Plan presents:

- A summary of project stakeholders;
- An overview of the financial analysis methodology;
- Assumptions and analysis of capital and operating sources and uses of funds;
- Sensitivity analyses that examine the impacts of risk factors that may affect the financial plan, as well as mitigation strategies to address these risks; and
- The New Starts Local Financial Commitment Checklist, Finance Template, and supporting documentation

It should be noted that all dollar figures in this financial plan are presented in year-of-expenditure (YOE) dollars, unless stated otherwise. Further, unless stated otherwise all figures are presented on the basis of the MTA's fiscal year, which runs from July 1<sup>st</sup> through June 30<sup>th</sup>.

## 1.2 Projects Sponsor: Maryland Transit Administration

The Maryland Transit Administration (MTA) is the sponsor for and anticipated owner/operator of the proposed Purple Line. The MTA, a modal agency of the Maryland Department of Transportation (MDOT), is the designated recipient of federal transit grants with oversight responsibility for transit operating in all areas in Maryland except for the Washington, DC metropolitan area. The MTA also owns, operates and manages transit services in the Baltimore region while overseeing contracted commuter bus, commuter rail, and paratransit services.

The MTA is the 11th largest transit system in the United States, based on unlinked passenger miles. In Fiscal Year 2009, the MTA served over 105 million trips. It is one of the few U.S. systems that



operate local and commuter buses, heavy rail, light rail, commuter train, and a comprehensive paratransit system. The MTA's services are as follows:

- **Local Bus:** The MTA operates nearly 50 Local Bus lines in the Baltimore metropolitan area, many of which connect with Light Rail, Metro Subway and MARC Train service.
- **Commuter Bus:** The MTA maintains contracts that provide commuter bus service statewide. The commuter bus service provided 18 commuter bus routes in FY 2010 that use private contractors to operate over-the-road coaches on long distance routes serving downtown Baltimore and Washington employment destinations.
- **Metro Subway:** The MTA operates the Baltimore Metro system. The Metro was first opened in 1986 from Reisterstown Plaza to Charles Center in downtown Baltimore. Service has expanded twice since that time and the Metro now extends from Owings Mills station in Northwest Baltimore County to Johns Hopkins Hospital in East Baltimore. There are a total of 14 stations in operation today and 29 one-way directional route miles.
- **Light Rail:** The MTA operates the Light Rail, which serves the Baltimore region. Light Rail operates 2 routes on 37 route-miles, serving 33 stations. The system serves downtown Baltimore as it extends from Hunt Valley, an employment center in Baltimore County, to Cromwell in Anne Arundel County, and the BWI-Thurgood Marshall Airport. Service was initiated between Timonium to Camden yards in 1992, soon followed by increases in service to Patapsco and Cromwell in 1993. Service expansions to Hunt Valley, BWI Airport, and Penn Station followed in 1997. Light Rail offers high capacity service on tracks that are largely separated from motorized traffic. After operating largely on single tracks for a number of years, the MTA invested in a double-tracking of the system, which was completed in 2006.
- **Commuter Train (MARC):** MTA's MARC Train services enable long distance commutes from Maryland's rural communities in Western and North central Maryland to jobs in the Baltimore and Washington central business districts. Using contract agreements with Amtrak and CSX, Maryland operates three commuter rail lines: The Penn Line operates between Washington Union Station and Baltimore Penn Station with limited service to Perryville; the Camden Line operates between Washington Union Station and Camden Yards in downtown Baltimore; the Brunswick Line operates between Washington Union Station and Martinsburg, West Virginia, with a branch to Frederick, Maryland.
- **Paratransit (Mobility):** Mobility addresses the transportation needs of disabled and elderly populations, who are unable to ride fixed route services. The majority of the service is operated by three contractors.
- **Locally Operated Transit Systems (LOTS):** The MTA provides funding and assistance in support of LOTS in each of Maryland's 23 counties and Baltimore City. Maryland's LOTS provide a wide range of specialized services to meet the transportation needs of the State's rural and suburban residents. In addition to operating traditional bus services and paratransit services (that largely target elderly and disabled residents), many LOTS provide services designed to improve access to jobs that are not accessible by other forms of public transportation such as coordinating transportation services with a number of local human service agencies that provide



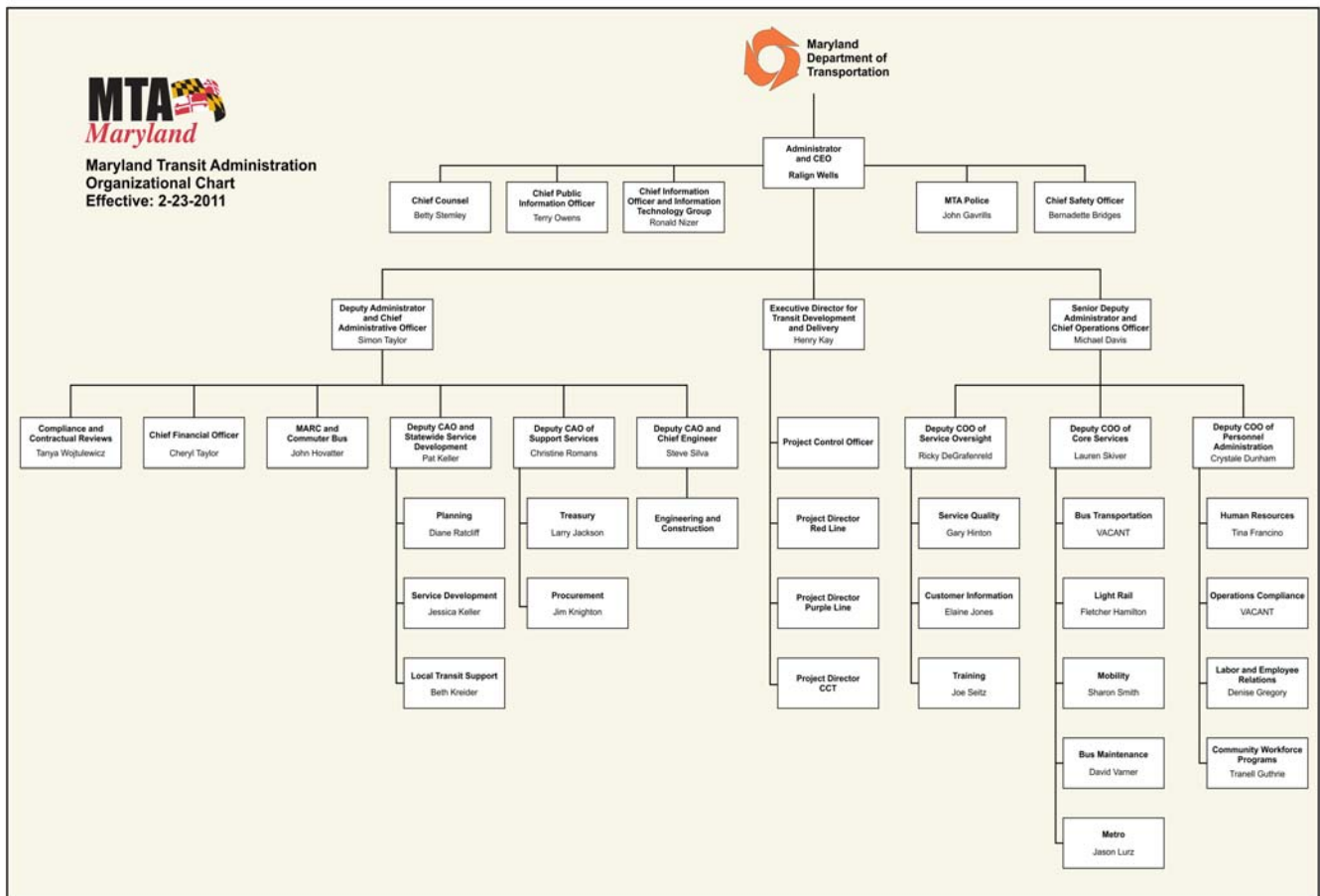


transportation to their constituencies. Some locally operated transit systems coordinate area rideshare and vanpooling services. Well over half of Maryland’s LOTS operate traditional bus services.

- Police: The MTA operates its own police force. The MTA Police Force is made up of more than one hundred forty-six sworn officers and approximately seventy-eight civilian employees, dedicated to providing high quality law enforcement to the State of Maryland. The MTA Police Force is multi-jurisdictional, as they patrol Baltimore and its surrounding counties. They are tasked with maintaining a safe transit system.
- Baltimore City Public School System: The MTA acts as a primary transportation outlet for Baltimore City Public School System. As such, students eligible for the Baltimore City Public School System that live beyond a predetermined area surrounding the school are given \$1.10 per trip vouchers from the MTA for MTA local service. The Public School System then reimburses the MTA for the vouchers.

The MTA’s organizational chart is depicted in Figure 1-1.

**Figure 1-1: Maryland Transit Administration Organization Chart**





### 1.3 Funding Partners

The Purple Line’s proposed funding partners are the Federal Transit Administration (FTA) and the Maryland Department of Transportation (MDOT). As is indicated in Table 1-1, approximately 50% of the total Purple Line capital funding is proposed to be funded by FTA Section 5309 New Starts funds, while the other 50% is assumed to be provided with funds from MDOT’s Transportation Trust Fund (TTF). During the Preliminary Engineering Phase the MTA and MDOT plan to explore additional funding/financing options that could reduce the amount of TTF revenues needed during the peak years of implementation (these options are briefly discussed in Section 1.5.2), but this plan assumes the full 50% of non-New Starts funds will be derived from the TTF on a pay-as-you-go basis to analyze the scenario with the highest annual draws on the TTF.

**Table 1-1: Purple Line Sources of Capital Funding (YOE \$ M)**

Source	Funding Level	Funding Share
State Transportation Trust Fund	\$ 963	50.01%
Total Non-Section 5309 Funding	\$ 963	50.01%
FTA Sec. 5309 New Starts Funds	\$ 963	49.99%
Total Section 5309 Funding	\$ 963	49.99%
<b>Estimated Total Project Cost</b>	<b>\$ 1,925</b>	<b>100.00%</b>

#### 1.3.1 Federal Transit Administration

FTA offers discretionary Section 5309 “New Starts” grants to state and local governments for the development of new and improved transit facilities. The MTA is requesting a total of \$962.6 million in capital funding from the New Starts program, representing 49.99% of the total Project Cost. The MTA has received past earmarks for the Purple Line. In FY 2010, it received a \$3 million earmark in Section 5309 appropriations, although these funds will not be spent until the project is in the New Starts Preliminary Engineering phase. Table 1-2 presents a summary of the annual pay-out assumed for New Starts funds.

**Table 1-2: Section 5309 Funding Assumptions (YOE \$ M)**

	FY-11	FY-12	FY-13	FY-14	FY-15	FY-16	FY-17	FY-18	FY-19	FY-20	Total
FTA Section 5309 Funding	\$ -	\$ 3	\$ -	\$ -	\$ 160	\$ 160	\$ 160	\$ 160	\$ 160	\$ 160	\$ 963

#### 1.3.2 Maryland Department of Transportation

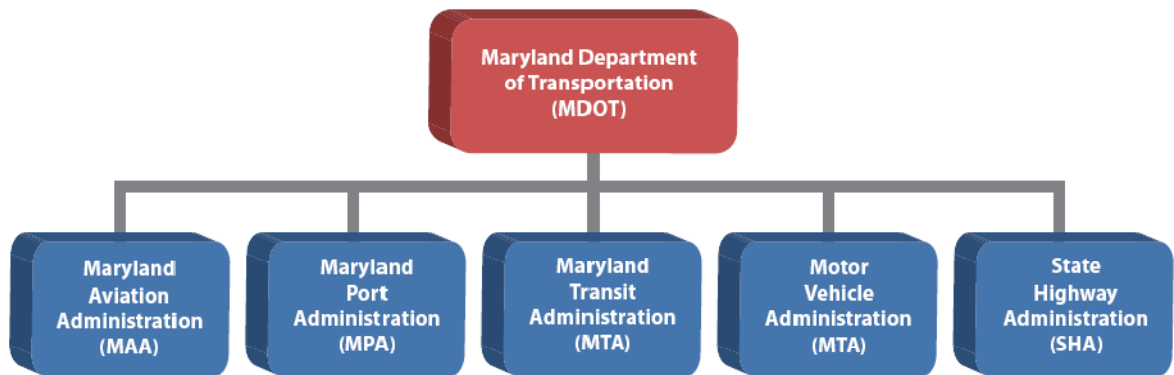
##### A) Organization

The Maryland Department of Transportation (MDOT) is one of the State’s largest agencies, with more than 9,000 employees committed to delivering a balanced and sustainable multimodal transportation

system for all Maryland’s residents and businesses. As a truly multimodal transportation agency, MDOT is responsible for coordinating Statewide transportation planning activities across all methods of transportation, including highways, bridges, railways, rail transit, buses, ports, airports, sidewalks, and trails, as well as driver services. MDOT provides oversight of, and coordinates with, the following five modal administrations that have unique functional responsibilities for the transportation facilities and services in Maryland:

- **Maryland Aviation Administration (MAA):** The MAA fosters the vitality of aviation statewide and promotes safe and efficient operations, economic viability and environmental stewardship. The MAA is responsible for the operation of Baltimore/Washington International Thurgood Marshall (BWI) and Martin State airports.
- **Maryland Port Administration (MPA):** The MPA oversees the operations and management of the State's public marine terminals, including the public terminals at the Port of Baltimore.
- **Maryland Transit Administration (MTA):** The MTA is the project sponsor and was previously described in section 1.2.
- **Motor Vehicle Administration (MVA):** The MVA is responsible for the registration of motor vehicles and the licensing of Maryland drivers. This includes the oversight of numerous public safety programs with respect to motor vehicle operation, in addition to the operation of miscellaneous programs including organ donations, vehicle emissions, and voter registration.
- **State Highway Administration (SHA):** The SHA owns, operates and maintains the Interstate, U.S. and Maryland numbered roads that represent the backbone of Maryland’s highway system. This infrastructure forms the majority of Maryland’s National Highway System that connects local and county roads to major activity centers and other modes of transportation such as mass transit, the port, airports and railroads.

**Figure 1-2: MDOT’s Modal Administrations**



The Department’s transportation policy is established by the Secretary’s Office (TSO), which oversees the five Modal Administrations. The Secretary of Transportation also serves as Chairman of the Maryland Transportation Authority (MdTA), which is responsible for managing, operating and improving the State’s seven toll facilities (the MdTA is a non-budgeted agency that relies solely on revenues generated from its transportation facilities, and as such, its funding sources and uses are not included in the overall MDOT numbers). Working as one, Maryland’s transportation agencies move



the State's transportation network forward toward a seamless transportation system that supports Maryland's economy and enhances the quality of life for all Marylanders.

### **B) MDOT's Current Financial Conditions**

MDOT's six-year transportation improvement plan called the Consolidated Transportation Program (CTP) serves as MDOT's capital budget. Because the anticipated Project construction extends beyond the timeframe of the CTP, a longer range forecast of MDOT costs and revenues is required. MDOT's expenditures for the FY 2010 to FY 2030 timeframe in this financial plan are based on MDOT's most recent (November 2009) long-range forecast (see Appendix E item 2). As is depicted in Table 1-3, MDOT's FY 2010 capital and operating and maintenance forecasts show an 8.57% increase from its FY 2009 budget. The overall increase is due largely to the impacts of additional Federal funds created by the American Recovery and Reinvestment Act of 2009 (ARRA). As with most State agencies, MDOT has not been immune to the financial strains afflicting the United States. Accordingly, its overall budget for subsequent years has been revised downward due to lower revenue projections in the near future. It should be noted that it is MDOT practice to establish more conservative budgets for the latter years of the CTP timeframe, with the expectation that those outer years will be adjusted upward as they are approached. As such, the figures below are less than the amounts that are ultimately likely to be available for MDOT's capital budget.

**Table 1-3: MDOT O&M and Capital Forecast FY 2009 – FY 2015 (YOE \$ M)**

Fiscal Year	O&M		Capital		MDOT Budget	
	Total	Annual Growth Rate	Total	Annual Growth Rate	Total	Annual Growth Rate
2009	\$ 1,561		\$ 1,402		\$ 2,963	
2010	\$ 1,546	-0.96%	\$ 1,671	19.19%	\$ 3,217	8.57%
2011	\$ 1,606	3.88%	\$ 1,208	-27.71%	\$ 2,814	-12.53%
2012	\$ 1,667	3.80%	\$ 1,430	18.38%	\$ 3,097	10.06%
2013	\$ 1,737	4.20%	\$ 1,326	-7.27%	\$ 3,063	-1.10%
2014	\$ 1,799	3.57%	\$ 1,208	-8.90%	\$ 3,007	-1.83%
2015	\$ 1,863	3.56%	\$ 1,441	19.29%	\$ 3,304	9.88%

While MDOT has had to reduce its budget outlook to reflect the current difficult economic environment, it should be noted that MDOT projects that it will maintain a \$100 million minimum fund balance in the Transportation Trust Fund. This amount helps to cushion the impact should revenues fall short of anticipated levels.

MDOT's debt ratings indicate that it is in sound financial condition. MDOT's latest debt issuance was \$140 million in Consolidated Transportation Bonds, Series 2010, in June 2010. The bonds were issued for the completion of miscellaneous capital improvements identified in the CTP document. This issuance was rated AAA by the Standard & Poors Corporation, Aa1 by Moody's, and AA+ by Fitch Ratings. Comparatively, the three previous bond issuances by MDOT were in April 2009, for \$110 million, in August 2008, for \$280 million, and in January 2008, for \$227 million. The April 2009,



August 2008, and January 2008 issuances were rated AAA by the Standard & Poors Corporation, Aa2 by Moody's, and AA by Fitch Ratings. While MDOT was upgraded by Moody's and Fitch Ratings, it should be noted that Moody's and Fitch Ratings recently recalibrated their municipal debt ratings to more closely track sovereign and corporate debt; this has resulted in many municipal bond issuers receiving ratings upgrades. Regardless, MDOT has maintained stable, high quality ratings from all three ratings agencies, thereby demonstrating MDOT's consistently strong financial health.

MDOT manages its debt outstanding by two coverage tests: pledged taxes and net revenues. The pledged taxes test captures MDOT's portion of the corporation income tax, the State motor fuel tax, the motor vehicle titling tax, the State's general sales tax, and a portion of the State's sales and use tax on rental vehicles as compared to maximum annual debt service. The net revenues test is a ratio of net MDOT receipts (total revenue excluding federal aid, bond proceeds, or other receipts not available for debt service less administration, operating and maintenance expenses) for the prior fiscal year divided by maximum debt service.

MDOT will not issue new bonds unless both the pledged taxes of the prior fiscal year and the net revenues of the prior fiscal year are each equal to at least two times maximum annual debt service. Although both tests require 2.0 times coverage, the Department's administrative policy is to provide 2.5 times coverage for both tests. The additional coverage acts as a cushion against revenue and expense variations and thus allows time to adjust the financial strategies while maintaining the capital program. MDOT also has a statutory limit on outstanding debt that is currently set at \$2.6 billion.

As of June 30, 2010, MDOT's total outstanding debt level was \$1,645,010,000. Given these current debt levels, MDOT's maximum annual debt service is \$210,723,300 in the fiscal year ending 2017. In the year 2017, MDOT's debt service coverage ratios based on FY 2009 revenues are 5.86 for pledged taxes, and 2.53 for net revenues; both well above MDOT's minimum required 2.5 coverage ratio. Based on current projections, MDOT's pledged tax coverage ratios are expected to range between 4.7 and 5.3 in the years 2011-2015, always above the 2.5 times coverage target. MDOT's net revenue ratio is projected to range between 2.2 and 2.7, dipping below the 2.5 times target coverage threshold in 2011 through 2013, but pushing back up to 2.5 in 2014. MDOT made the decision to go below the 2.5 target so that it could maintain spending on capital projects. Due to the economic climate at that time, MDOT decided it was better to keep funds flowing to support employment as much as possible, rather than adhere to the management policy. MDOT anticipates meeting its minimum required coverage ratio in all future years.

MDOT's current operating condition is satisfactory, as is evidenced by its ratio of current assets to current liabilities of 1.4, as reported in its most recent (2010) Consolidated Annual Financial Report (CAFR, see Appendix E). Table 1-4 provides MDOT's current assets to current liabilities ratios for FY 2006 through FY 2010.

**Table 1-4: MDOT Ratio of Current Assets to Liabilities (YOE \$ 000s)**

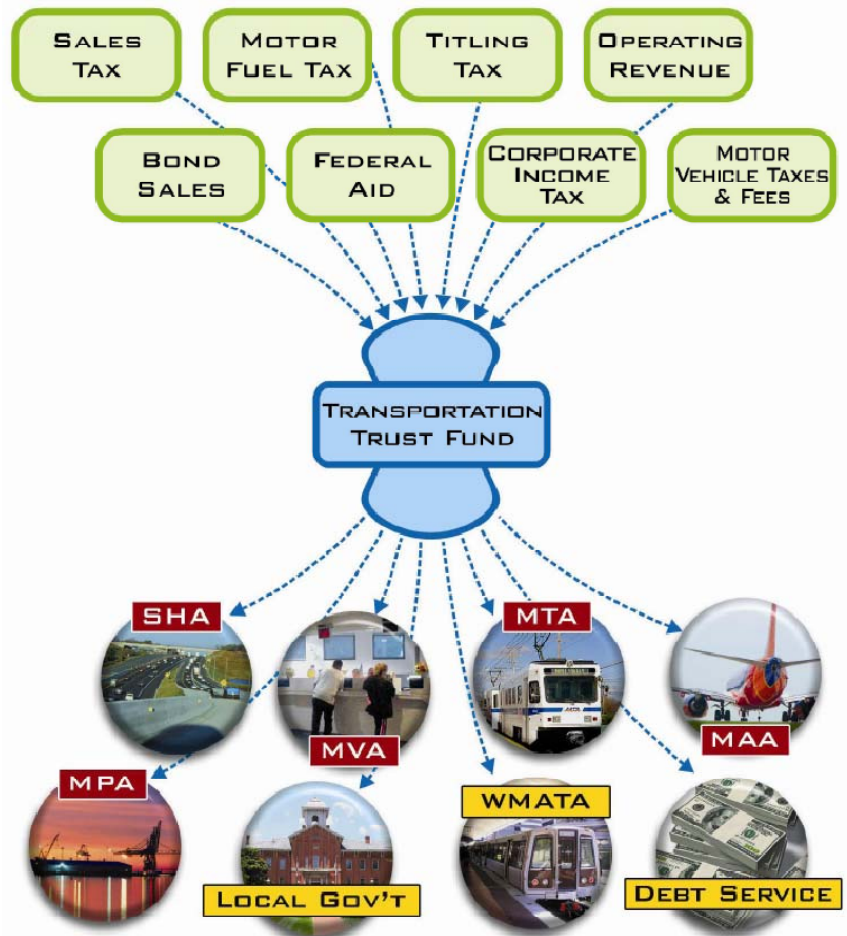
	FY-06	FY-07	FY-08	FY-09	FY-10
<b>Current Assets</b>					
Cash and Cash Equivalents	\$ 174,618	\$ 113,028	\$ 40,237	\$ 182,350	\$ 159,008
Cash and Cash Equivalents - restricted	\$ 54,126	\$ 37,138	\$ 26,004	\$ 45,442	\$ 28,563
Cash with Fiscal Agent	\$ 60	\$ 5	\$ -	\$ -	\$ -
Taxes receivable - net	\$ 91,773	\$ 115,183	\$ 82,432	\$ 74,982	\$ 73,281
Intergovernmental receivables	\$ 230,345	\$ 195,315	\$ 214,044	\$ 220,387	\$ 183,834
Other accounts receivable	\$ 45,170	\$ 68,068	\$ 76,566	\$ 43,296	\$ 40,127
Due from other state agencies	\$ 101,373	\$ 105,728	\$ 101,838	\$ 160,743	\$ 215,594
Loans receivable	\$ 7,748	\$ 6,730	\$ 3,760	\$ 2,644	\$ 1,466
Inventories	\$ 68,156	\$ 67,557	\$ 74,458	\$ 81,634	\$ 79,089
Prepays	\$ 52,204	\$ 64,347	\$ 74,570	\$ 74,372	\$ 99,618
Deferred charges	\$ 617	\$ 674	\$ 771	\$ 975	\$ 1,054
<b>TOTAL CURRENT ASSETS</b>	<b>\$ 826,190</b>	<b>\$ 773,773</b>	<b>\$ 694,680</b>	<b>\$ 886,825</b>	<b>\$ 881,634</b>
<b>Current Liabilities</b>					
Salaries Payable	\$ 14,599	\$ 14,003	\$ 17,532	\$ 17,428	\$ 24,974
Accounts payable and other current liabilities	\$ 274,264	\$ 303,227	\$ 359,294	\$ 392,254	\$ 391,963
Accounts payable to political subdivisions	\$ 79,960	\$ 79,312	\$ 75,517	\$ 69,665	\$ 41,946
Due to other state agencies	\$ 16,009	\$ 13,207	\$ 44,548	\$ 18,237	\$ 9,054
Unearned revenue	\$ 13,956	\$ 5,737	\$ 8,347	\$ 12,918	\$ 127,810
Matured bonds and interest coupons payable	\$ 60	\$ 5	\$ -	\$ -	\$ -
Accrued interest payable	\$ 19,750	\$ 20,609	\$ 23,766	\$ 27,584	\$ 28,617
<b>TOTAL CURRENT LIABILITIES</b>	<b>\$ 418,598</b>	<b>\$ 436,100</b>	<b>\$ 529,004</b>	<b>\$ 538,086</b>	<b>\$ 624,364</b>
<b>TOTAL RATIO OF CURRENT ASSETS TO LIABILITIES</b>	<b>2.0</b>	<b>1.8</b>	<b>1.3</b>	<b>1.6</b>	<b>1.4</b>

### C) Maryland Transportation Trust Fund

Transportation needs in Maryland are funded from an integrated account called the Transportation Trust Fund. The TTF was created in 1971 to establish a dedicated fund for transportation investments and operations. All of MDOT's activities are supported by the TTF, including debt service, maintenance, operations, administration, and capital projects. Unexpended funds remaining in the TTF at the close of the fiscal year are carried over and are not reverted to the State's General Fund. As illustrated in Figure 1-3, all funds dedicated to MDOT are deposited in the TTF and disbursements for all programs and projects are made from the Trust Fund.

As described further in Section 2.2.3, the TTF's sources of funds are diverse and include motor fuel taxes, motor vehicle excise (titling) taxes, motor vehicle fees (registrations, licenses and other fees), and federal aid. In addition, the TTF also includes corporate income taxes, operating revenues (e.g., transit fares, port fees, airport fees), and bond proceeds.

**Figure 1-3: Maryland Transportation Trust Fund Schematic**



Certain TTF revenues are shared with other state agencies and local governments based on statutory requirements. [The funds in the Gasoline and Motor Vehicle Revenue Account are on average distributed 90 percent to MDOT and 10 percent to local governments, which include Baltimore City, the counties, and the municipalities.](#)

After local government deductions, the remaining funds are allocated for debt service, MDOT operating expenditures, and MDOT capital expenditures. MDOT expenditures are for various agencies that receive financial assistance from the TTF: SHA, MTA, WMATA, MPA, MAA, and MVA.

**D) MDOT Capital Programming**

The state’s integrated Transportation Trust Fund is a valuable tool for transportation programming. Revenues are not earmarked for specific programs or modes, giving MDOT flexibility to adjust funding levels as priorities and needs change over time. As an example, in 2009 MDOT “flexed” \$17.1 million in Title 23 (Highway) ARRA Funds to the MTA for transit investments.

MDOT is committed to taking care of its existing transportation assets, thereby ensuring its good state of financial health. This is evidenced by its practice of funding operating and maintenance (O&M) expenditures first, followed by system preservation capital needs. Any remaining TTF funds are then



allocated to new capital expansion or enhancement projects. This capital programming approach helps the state ensure that all modes of transportation under the MDOT umbrella are maintained and expanded, as necessary, to best serve the citizens that utilize them.

In MDOT's most recently adopted budget (FY2011-2016), a total of \$237 million is programmed for the Purple Line for years FY 2011 to FY 2014. Accordingly, full funding for the Preliminary Engineering phase and a considerable amount of funding for the Final Design phase is included in the current budget. It should be noted that, relative to last year's budget, MDOT increased the amount of State TTF funds for FY 2011 to FY 2014 by more than \$39 million, reflecting the State's increasing financial commitment to the Project.

Although the current MDOT budget includes programmed State and Federal funding for the next three years, this financial plan uses more conservative assumptions about the near-term availability of discretionary Federal funds. In light of recent developments at the Federal level, the financial plan assumes that the Purple Line receives no Federal New Starts funding until FY 2015 (although an existing \$3 million New Starts allocation is assumed to be spent in FY 2012). It is anticipated that MDOT will provide sufficient additional State TTF funding to meet the cash flow requirements for FY 2012 to FY 2014, although Federal funds will be sought for these years to the extent that they may be available. While the capital programming practices of MDOT indicate that existing system performance and preservation are paramount priorities next to system expansion, the Purple Line has been identified as a high priority expansion project. Appendix E includes a letter of support from Maryland Transportation Secretary, Beverley Swaim-Staley, which highlights the Purple Line as a high priority project for Maryland and expresses the state's commitment to provide the funding necessary to complete the project.

## **1.4 Description of the Purple Line Project**

### ***1.4.1 Purple Line***

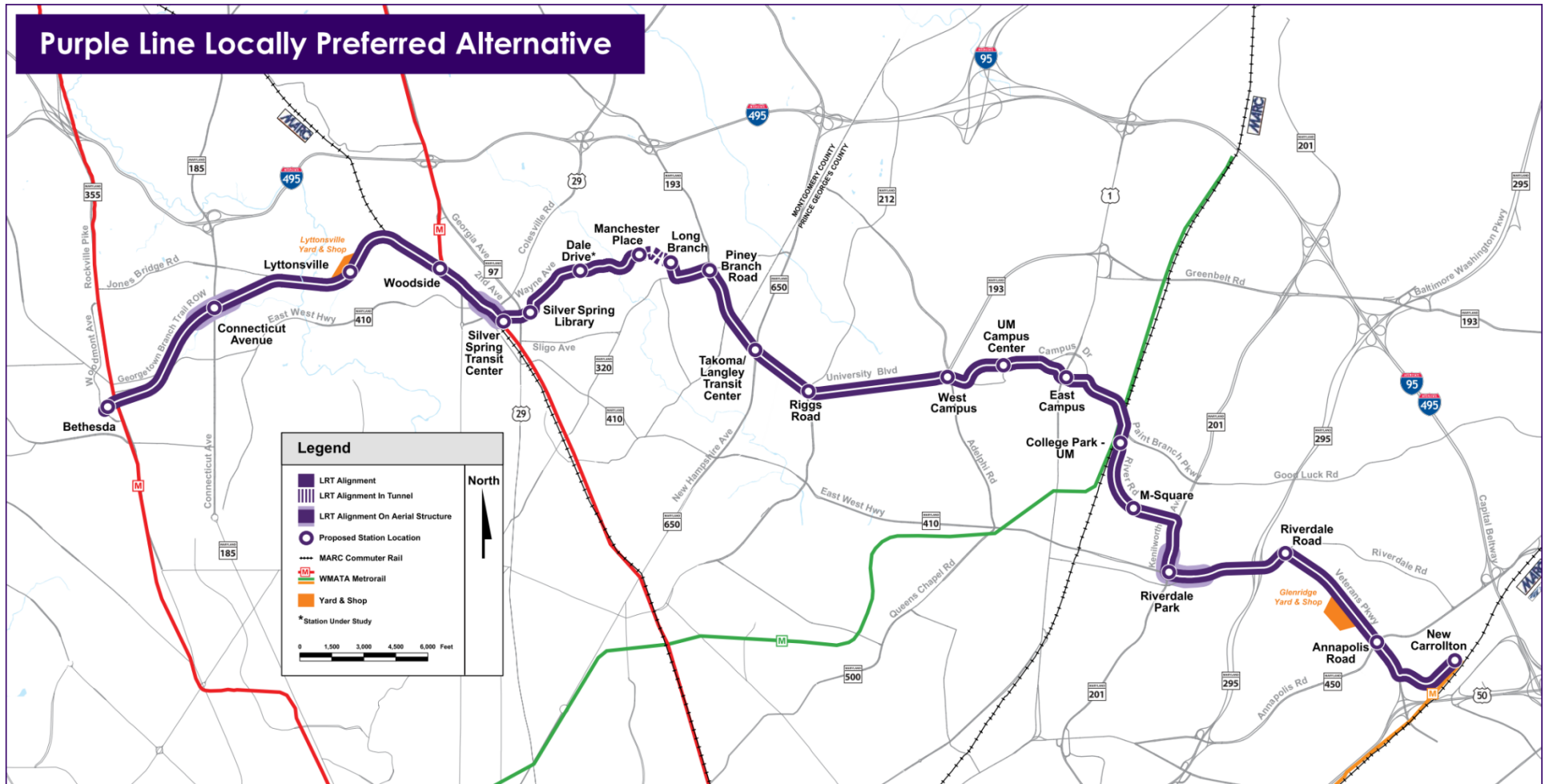
The Purple Line Locally Preferred Alternative (LPA) is a 16.3-mile east-west light rail line that will extend from the Bethesda Metrorail Station in Montgomery County to the New Carrollton Metrorail Station in Prince George's County. The Purple Line is currently assumed to be delivered utilizing a traditional design-bid-build procurement method.

The Purple Line will provide convenient connections to four Metrorail lines, Amtrak's northeast corridor, all three MARC commuter rail lines and many local bus routes to further increase the regional transit network's connectivity. The Purple Line will not only serve existing dense residential neighborhoods, employment and education centers and attractions, it will also serve a number of areas that would benefit from economic development and investment and provide opportunities for transit oriented development. The LPA will support transit-oriented revitalization plans at locations such as Bethesda, Silver Spring, Takoma-Langley, the US 1 and central Annapolis Road corridors, and New Carrollton. Figure 1-4 illustrates the Purple Line route within the Washington Region.





Figure 1-4: Purple Line Project Map





The Purple Line has been identified in the region’s constrained and conforming long-range transportation plan and the financially constrained transportation improvement programs. It is also part of the recently approved and adopted Montgomery County Purple Line Functional Master Plan and the Prince George’s County Approved Countywide Master Plan of Transportation.

The Purple Line will operate in a 0.7-mile tunnel under Plymouth Avenue and Arliss Street due to steep grades. It will also travel along three separate aerial segments at Connecticut Avenue, the Silver Spring Transit Center, and Riverdale Park, totaling 1.9 miles. The remainder of the route (13.7 miles) will operate on surface alignments primarily in exclusive or dedicated lanes. The Purple Line will be served by 21 stations. No stations will feature new parking facilities, though the Purple Line will connect to WMATA Metrorail stations with existing parking.

**Table 1-5: Purple Line Project Details**

<b>Purple Line Alignment</b>	
Total Project Length	16.3 miles
Surface	13.7 miles
Dedicated alignment on existing roadway (allows cross-traffic)	8.7 miles
New guideway, retained cut or fill	6.0 miles
At-grade exclusive guideway	1.5 miles
Tunnel	0.7 miles
Aerial	1.9 miles
Stations	21
<b>Purple Line Effectiveness</b>	
End-to-end Travel Time	56 minutes
Headways	6 minutes peak, 10 minutes off-peak
Vehicles	53
Average Weekday Ridership (2030)	60,000

**1.4.2 Key Schedule Milestones**

Table 1-6 illustrates the key schedule milestones for the Purple Line project.

**Table 1-6: Purple Line Project Key Schedule Milestones**

Milestone	Begin Month	End Month
Preliminary Engineering	July-11	June-13
Final Design	June-13	July-18
FFGA	July-15	July-15
Construction	January-15	December-19
Testing	January-17	December-19
Revenue Operations	June-20	-

### ***1.4.3 Status of Purple Line Project***

The MTA is currently seeking entry into the New Starts Preliminary Engineering phase for the Purple Line. An Alternatives Analysis / Draft Environmental Impact Statement (AA/DEIS) has been completed and a Locally Preferred Alternative (LPA) was selected in August 2009. A NEPA Record of Decision is expected in the PE phase, after completion of the Purple Line's Final Environmental Impact Statement.

The Purple Line has budgeted funding for the PE phase of the project and for a portion of final design, and it has identified non-Section 5309 funds for the remainder of final design and construction phases.

## **1.5 Summary of the Financial Plan**

### ***1.5.1 Financial Planning Approach***

All MTA expenditures are financed by MDOT through the TTF. Because of the priority that MDOT places on taking care of the existing system, MDOT ensures that all necessary O&M and capital preservation needs are addressed by the agencies under its umbrella prior to funding system expansion. This planning approach ensures that system expansion will not be pursued at the expense of existing transportation assets. Further, this approach ensures that future assets, such as the Purple Line, will be adequately preserved prior to funding further expansion projects. In short, MDOT will not provide funding for the Purple Line project if it means ignoring preservation or maintenance needs for its existing system.

The Trust Fund approach is beneficial for MDOT, as it provides flexibility for allocating funding among different expenditure types and modes of transportation on an as needed basis. This broad-based funding approach allows MDOT to fund large, high priority projects as necessary.

By modeling the aforementioned capital planning approach, this financial analysis demonstrates that the MTA has the financial capacity, both capital and operating, through FY 2030 to build and operate the Purple Line project in addition to continuing the preservation and O&M of its baseline (existing) system.

The process emphasizes a comprehensive approach to the integration of expenses and revenues, both capital and operating, for major transportation investments and is considered prudent given the magnitude of revenues to be applied.



The financial analysis is performed in year-of-expenditure dollars. Inflation assumptions are applied to all capital and O&M costs and revenues. Applied inflation assumptions are discussed throughout the financial plan and are summarized in Appendix D.

The following major analysis components describe the manner in which funds flow through the MTA to fund the Purple Line project and serve as the basis of the analysis.

#### **A) MTA Operating and Maintenance Costs**

Operations and Maintenance costs were developed consistent with FTA's draft guidance for the estimation of operating and maintenance costs (update published in 2008), which is part of FTA's *Procedures and Technical Methods for Transit Project Planning*. As such, the cost model is based on a resource build-up approach that fully allocates each unit cost factor to a supply (Level of Service) variable for all directly operated MTA modes. Unit costs are further broken down by object class (operator's wages, other wages and salaries, fringe benefits, services, fuel & lubricants, tires and tubes, other materials and supplies, utilities, casualty/liability, miscellaneous expenses and expense transfer) so as to allow for the flexibility to inflate each object class differently. The financial analysis then multiplies each unit cost factor by the appropriate Level of Service (LOS) variable and applies inflation rates to each cost factor to bring the total O&M cost to year of expenditure dollars.

#### **B) MTA Operating and Maintenance Revenues and Assistance**

The MTA's operating revenues come in the form of fare revenues from each of the MTA's modes and other miscellaneous revenues. These revenues are assumed to directly fund MTA O&M expenditures. As the MTA's past, present, and projected fare revenues are not sufficient to fund the entirety of MTA's O&M costs, the MTA receives financial assistance to fund the annual shortfall. The MTA receives FTA Section 5307 Urban Area Formula and FTA Section 5309 Fixed Guideway Modernization grants annually and allocates a portion of those grants to funding eligible preventative maintenance expenses in the MTA's O&M budget. This practice of using some Federal grant money for preventative maintenance expenditures is assumed to continue through the year 2030 planning horizon. The remaining revenue required to meet the MTA's annual O&M cost is anticipated to come in the form of funding from the O&M budget of MDOT's Transportation Trust Fund. MDOT's O&M budget forecast was developed by MDOT and is discussed in detail in Section 2.

#### **C) MTA Capital Preservation Costs**

The MTA capital preservation program forecast through FY 2030 was developed to meet the MTA's goals of ensuring system reliability, system performance, and customer and employee safety. In particular, the capital preservation forecast includes all projects necessary to meet normal replacement cycles for all infrastructure, vehicles, equipment, facility, and other components throughout the MTA's modes during the forecasting period. This process is discussed in more detail in Section 2. The capital preservation program is funded through a combination of Federal formula grants and grants from the capital preservation budget of MDOT's TTF.

#### **D) MTA Capital Preservation Revenues**

The MTA's capital preservation revenues come in the form of Federal formula grants and grants from the capital preservation budget of MDOT's TTF. Annual Federal grants are forecasted according to the latest information available to the MTA. MDOT's TTF capital preservation budget projection is determined by MDOT. Both the Federal grant projection methodology and MDOT's capital preservation budget forecasting methodology are discussed in detail in Section 2.

#### **E) MTA Capital Expansion Costs**

The MTA's capital expansion costs were forecast for existing expansion projects, the Purple Line project, and other New Starts projects expected by the MTA. A detailed explanation of the components of the MTA's capital expansion plan is provided in Section 2. The MTA's capital expansion program is funded through a combination of anticipated FTA Section 5309 New Starts funds and grants from MDOT's TTF capital expansion budget.

#### **F) MTA Capital Expansion Revenues**

The MTA's annual capital expansion revenues are assumed to come from two sources: FTA Section 5309 New Starts funding and grants from the capital expansion budget of MDOT's TTF. MDOT's annual TTF capital expansion budget is determined by projecting MDOT's annual revenue and subtracting MDOT's O&M and capital preservation budgets for that year from MDOT's projected annual revenue. Hence, all O&M and capital preservation expenditures are funded prior to funding capital expansion. A detailed discussion on MDOT's capital expansion revenues is provided in Section 2.

#### ***1.5.2 Funding Strategy***

It is the MTA's intent to fund 49.99% of the Purple Line project with FTA Section 5309 New Starts funding. For the other 50.01%, it is currently assumed that these funds will be derived from MDOT's TTF capital expansion budget, although the MTA and MDOT plan to investigate other funding/financing options and finalize the funding and financing approach during the Preliminary Engineering phase. The other funding/financing options that will be investigated include USDOT TIFIA loans, a public-private-partnership concession agreement, and local contributions that may include value capture funding/financing tools.

MDOT has identified the Purple Line as a high-priority project, and as such, intends to allocate a large portion of its annual capital expansion budget to the Purple Line. The MTA has far more flexibility than most transit agencies, as they are under the MDOT umbrella, whose broad funding base grants the MTA the ability to fund large, high-priority capital projects as needs arise. The identification of the Purple Line as a high-priority project for MDOT is evident in the letters of support for the project from Maryland Transportation Secretary, Beverley Swaim-Staley (located in Appendix E).

#### ***1.5.3 Summary of the Financial Plan***

The MTA's Purple Line project has the full support of the State of Maryland and MDOT. This support, coupled with MDOT's unique TTF funding protocol ensures that the MTA, in



conjunction with FTA Section 5309 New Starts funding support, will have adequate funding to construct, operate and maintain the Purple Line project. MDOT’s capital planning approach also guarantees that the remaining MDOT assets will not suffer adverse effects due to the MTA’s system expansion.

Table 1-7 shows the Purple Line project capital expenditures from 2011 until 2020 (the last year of Purple Line construction) and compares the project cost with the budgets of the MTA’s funding partner, MDOT. As is shown, after funding projected O&M and capital preservation expenditures during those years, MDOT still has the capacity to fund the Purple Line as well as other capital expansion projects. The Purple Line is a large project but it would represent only a portion of MDOT’s budget. From 2011 through 2020, the Purple Line would require an average annual amount of less than 25% of MDOT’s capital expansion budget, and only 5% of MDOT’s total capital & operations budget.

**Table 1-7: Purple Line Funding in Relation to the MDOT Budget (YOE \$ M)**

	FY-11	FY-12	FY-13	FY-14	FY-15	FY-16	FY-17	FY-18	FY-19	FY-20*	Total
<b>Purple Line Capital Cost</b>											
Purple Line Capital Cost	\$ -	\$ 30	\$ 38	\$ 154	\$ 237	\$ 215	\$ 354	\$ 442	\$ 378	\$ 79	\$ 1,925
<b>Sources of Funds</b>											
FTA Sec. 5309 New Starts Funds	\$ -	\$ 3	\$ -	\$ -	\$ 160	\$ 160	\$ 160	\$ 160	\$ 160	\$ 160	\$ 963
State Transportation Trust Fund	\$ -	\$ 27	\$ 38	\$ 154	\$ 77	\$ 55	\$ 194	\$ 282	\$ 218	\$ (81)	\$ 963
<b>MDOT Capital Expansion Budget</b>											
MDOT Capital Expansion Budget	\$ 625	\$ 624	\$ 439	\$ 434	\$ 682	\$ 1,205	\$ 1,227	\$ 1,271	\$ 1,275	\$ 1,325	\$ 9,106
% of MDOT Capital Expansion Budget allocated to the Purple Line	-	4.80%	8.61%	35.49%	34.69%	17.82%	28.88%	34.75%	29.61%	5.96%	21.15%
<b>MDOT TTF Budget</b>											
MDOT TTF Budget	\$ 2,814	\$ 3,097	\$ 3,063	\$ 3,007	\$ 3,304	\$ 4,031	\$ 4,154	\$ 4,302	\$ 4,414	\$ 4,574	\$ 36,759
% of MDOT TTF Budget allocated to the Purple Line	-	0.97%	1.23%	5.12%	7.16%	5.33%	8.53%	10.27%	8.55%	1.73%	5.24%

\* The FY-20 negative value for the State Transportation Trust Funding Sources of Funds reflects the delayed reimbursement of New Starts Funds.



## 2 Capital Plan

### 2.1 Capital Plan for the Purple Line

The Purple Line Capital Plan reflects the latest cost estimate and schedule for the Purple Line project. It describes anticipated funding sources, amounts anticipated from each source, and the level of commitment for non-federal sources of funds.

#### *2.1.1 Purple Line Capital Cost and Schedule Estimating Methodology*

The total Purple Line project cost is estimated to be \$1,925 million (YOE \$). The cost estimate also includes 30% in contingencies (measured as a percentage of base year dollars). The methodology used for preparing the capital cost estimate is in general conformance with FTA guidelines for estimating capital costs.

The capital cost estimate was developed from conceptual engineering drawings, typical sections, station locations and definitions of each of the major construction cost components. These planning documents form the basis for the identification of the various facility elements used to prepare the capital cost estimate. These facility elements were classified into one of two broad groups, either typical or non typical facilities.

Typical facility costs were developed for elements that could be defined by a typical cross-section and applied over a given length of alignment, or based on a conceptual scope of work developed as appropriate for a specific typical facility. The typical facility composite unit cost was then developed by combining the costs for all of the individual construction elements applicable to a given typical section or facility and creating a representative composite unit cost.

Non-typical facility costs were developed based on conceptual engineering and design related to the unique facility under consideration. For non-typical facility elements that are necessary for overall system operation, but whose costs are not allocated to a specific geographic segment of the system (e.g., vehicles, maintenance and storage facility, etc.), these costs were included in at the summary level.

After details were prepared for both typical and non-typical facilities and the cost data was developed, costs per section of the Purple Line were determined based on the stationing of the alignment. This format relates the cost directly to the plan and profile drawings and assisted in summarizing costs. Finally, capital costs were rolled up to the FTA Standard Cost Category (SCC) work breakdown in strict compliance with FTA cost estimating guidelines.

All Purple Line construction costs, including contingencies, were estimated in 2010 dollars and inflated to YOE dollars. Construction of fixed infrastructure is expected to take place from FY 2015 through FY 2020, with revenue service beginning in FY 2020.

The following escalation factor categories were utilized to escalate capital costs for the Purple Line project to YOE dollars. Additional details are provided in Appendix D.



- Construction Cost Escalation Factor:* This financial plan utilizes construction escalation factors developed by MDOT for FY 2011 to FY 2015. The FY 2011 construction escalation rate (2.5%) represents cost escalation from FY 2010 to FY 2011. The FY 2015 construction cost escalation rate (3.25%) was assumed to be constant for FY 2016 through FY 2030. MDOT’s forecasted construction escalation rates were used to escalate all Standard Cost Categories for the Red Line with the exception of Standard Cost Category 60 (ROW, Land, Existing Improvements).
- Real Estate Escalation Factor:* This financial plan utilizes MDOT’s real estate escalation factors for fiscal years 2011 through 2015. The real estate escalation factor was used to inflate costs in SCC category 60 (ROW, Land, Existing Improvements). The FY 2015 real estate escalation rate was assumed to remain constant for FY 2016 through FY 2030 (although the Project’s real estate acquisition is currently anticipated to be completed before 2016).

Table 2-1 delineates the rates utilized in this financial plan. Additional information and justification for use of these rates can be found in Appendix D.

**Table 2-1: Purple Line Capital Cost Escalation Rates**

FTA Standard Cost Category	FY-11	FY-12	FY-13	FY-14	FY-15	FY16 - FY30	Source
10 - Guideway and Track Elements	2.50%	2.50%	2.75%	3.00%	3.25%	3.25%	MDOT Capital Esc.
20 - Stations, Stops, Terminals, Intermodal	2.50%	2.50%	2.75%	3.00%	3.25%	3.25%	MDOT Capital Esc.
30 - Support Facilities: Yards, Shops, Admin. Bldgs	2.50%	2.50%	2.75%	3.00%	3.25%	3.25%	MDOT Capital Esc.
40 - Sitework & Special Conditions	2.50%	2.50%	2.75%	3.00%	3.25%	3.25%	MDOT Capital Esc.
50 - Systems	2.50%	2.50%	2.75%	3.00%	3.25%	3.25%	MDOT Capital Esc.
60 - ROW, Land, Existing Improvements	3.00%	4.00%	5.00%	6.00%	6.25%	6.25%	MDOT Real Estate Esc.
70 - Vehicles	2.50%	2.50%	2.75%	3.00%	3.25%	3.25%	MDOT Capital Esc.
80 - Professional Services	2.50%	2.50%	2.75%	3.00%	3.25%	3.25%	MDOT Capital Esc.
90 - Unallocated Contingency	2.50%	2.50%	2.75%	3.00%	3.25%	3.25%	MDOT Capital Esc.

As previously stated, included in the Purple Line capital cost estimate is 30% in contingencies to account for uncertainties in design, right-of-way acquisition, and economic conditions at the time of design and construction. As the Purple Line project proceeds through its various phases, the financial plan and associated capital cost estimates will be regularly evaluated and updated with the latest cost and project scope information. As the details of the project are developed, the contingencies within the capital cost estimate will be reduced. Value Engineering will be undertaken in the Preliminary Engineering phase and will examine cost savings opportunities. During construction, should the actual costs exceed the budget, a plan for bringing costs back in line with the budget will be devised. Cost and schedule will be monitored during construction through the issuance of monthly reports summarizing cost and schedule information as well as an overall update on all aspects of the report. A detailed Purple Line capital cost estimate according to FTA’s SCCs is presented in Table 2-2, and a buildup of the project’s capital cost estimate by year is presented in Table 2-3.





A master schedule for the Purple Line project has been developed using Primavera P6. The schedule covers all activities from the end of planning through preliminary and final design and all construction contracts. Anticipated durations for all of the design-related activities have been included in the schedule based on previous MTA experience with projects of similar complexity, including some contingency. A preliminary breakout of construction contracts and approximate durations are also included to establish the feasibility of the proposed construction completion date. The limits, scope and sequencing of the construction contracts will be further refined throughout the Preliminary Engineering phase with the master schedule forming the basis for all further refinements. In the event that durations of certain activities increase beyond those shown in the master schedule, the durations and sequence of subsequent activities on the schedule will be evaluated to mitigate time lost and hold the major project milestones fixed in time.

As portions of the project enter construction, the detailed scheduling required for construction will be the responsibility of the contractor. An initial baseline schedule reflecting zero progress on the contract will be required at the outset of the project. Subsequently, the contractor will be required to submit progress schedule updates by the seventh of each month including a narrative of current and anticipated problems, delays and proposed mitigating steps, changes to durations and interdependencies of activities, and anticipated progress for the next period.

A summary of the Purple Line schedule is presented in Table 2-4.



**Table 2-2: Purple Line Capital Costs by SCC**

MAIN WORKSHEET - BUILD ALTERNATIVE									
								(Rev.13, June 1, 2010)	
Maryland Transit Administration								Today's Date <b>3/17/11</b>	
Purple Line								Yr of Base Year \$ 2010	
Pre-PE Risk Assessment								Yr of Revenue Ops 2020	
	Quantity	Base Year Dollars w/o Contingency (X000)	Base Year Dollars Allocated Contingency (X000)	Base Year Dollars TOTAL (X000)	Base Year Dollars Unit Cost (X000)	Base Year Dollars Percentage of Construction Cost	Base Year Dollars Percentage of Total Project Cost	YOE Dollars Total (X000)	
<b>10 GUIDEWAY &amp; TRACK ELEMENTS (route miles)</b>	<b>16.34</b>	<b>244,975</b>	<b>55,300</b>	<b>300,275</b>	<b>\$ 18,379</b>	<b>35%</b>	<b>19%</b>	<b>375,979</b>	
10.01 Guideway: At-grade exclusive right-of-way	0.15	3,982	996	4,978	\$ 33,740			6,233	
10.02 Guideway: At-grade semi-exclusive (allows cross-traffic)	8.74	20,015	5,004	25,019	\$ 2,861			31,327	
10.03 Guideway: At-grade in mixed traffic		4,883	1,221	6,104				7,643	
10.04 Guideway: Aerial structure	0.97	29,803	7,498	37,301	\$ 38,339			46,705	
10.05 Guideway: Built-up fill		0	0	0				0	
10.06 Guideway: Underground cut & cover	0.31	28,483	8,545	37,028	\$ 121,057			46,363	
10.07 Guideway: Underground tunnel	0.38	21,799	6,540	28,339	\$ 73,891			35,484	
10.08 Guideway: Retained cut or fill	5.78	50,941	12,735	63,676	\$ 11,009			79,730	
10.09 Track: Direct fixation		8,977	1,347	10,324				12,927	
10.10 Track: Embedded		45,467	6,820	52,287				65,469	
10.11 Track: Ballasted		15,701	2,355	18,056				22,608	
10.12 Track: Special (switches, turnouts)		13,974	2,096	16,070				20,122	
10.13 Track: Vibration and noise dampening		950	143	1,093				1,369	
<b>20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)</b>	<b>21</b>	<b>105,653</b>	<b>26,414</b>	<b>132,067</b>	<b>\$ 6,289</b>	<b>15%</b>	<b>8%</b>	<b>167,226</b>	
20.01 At-grade station, stop, shelter, mall, terminal, platform	16	16,303	4,076	20,379	\$ 1,274			25,804	
20.02 Aerial station, stop, shelter, mall, terminal, platform	3	53,168	13,292	66,460	\$ 22,153			84,153	
20.03 Underground station, stop, shelter, mall, terminal, platform	2	27,402	6,851	34,253	\$ 17,127			43,372	
20.04 Other stations, landings, terminals: Intermodal, ferry, trolley, etc.		0	0	0				0	
20.05 Joint development		0	0	0				0	
20.06 Automobile parking multi-story structure		6,647	1,662	8,309				10,521	
20.07 Elevators, escalators		2,133	533	2,666				3,376	
<b>30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS</b>	<b>16.34</b>	<b>73,058</b>	<b>17,215</b>	<b>90,273</b>	<b>\$ 5,525</b>	<b>11%</b>	<b>6%</b>	<b>116,010</b>	
30.01 Administration Building: Office, sales, storage, revenue counting		0	0	0				0	
30.02 Light Maintenance Facility		0	0	0				0	
30.03 Heavy Maintenance Facility		62,560	15,640	78,200				100,495	
30.04 Storage or Maintenance of Way Building		0	0	0				0	
30.05 Yard and Yard Track		10,498	1,575	12,073				15,515	
<b>40 SITEWORK &amp; SPECIAL CONDITIONS</b>	<b>16.34</b>	<b>171,594</b>	<b>51,379</b>	<b>222,973</b>	<b>\$ 13,648</b>	<b>26%</b>	<b>14%</b>	<b>270,025</b>	
40.01 Demolition, Clearing, Earthwork		13,239	3,972	17,211				20,843	
40.02 Site Utilities, Utility Relocation		40,401	12,120	52,521				63,604	
40.03 Haz. mat'l, contam'd soil removal/mitigation, ground water treatments		4,486	1,346	5,832				7,063	
40.04 Environmental mitigation, e.g. wetlands, historic/archeologic, parks		5,301	1,590	6,891				8,345	
40.05 Site structures including retaining walls, sound walls		16,011	4,803	20,814				25,206	
40.06 Pedestrian / bike access and accommodation, landscaping		11,289	3,288	14,577				17,653	
40.07 Automobile, bus, van accessways including roads, parking lots		77,188	23,156	100,344				121,519	
40.08 Temporary Facilities and other indirect costs during construction		3,679	1,104	4,783				5,792	
<b>50 SYSTEMS</b>	<b>16.34</b>	<b>96,252</b>	<b>14,438</b>	<b>110,690</b>	<b>\$ 6,775</b>	<b>13%</b>	<b>7%</b>	<b>139,730</b>	
50.01 Train control and signals		28,124	4,219	32,343				40,828	
50.02 Traffic signals and crossing protection		4,176	626	4,802				6,062	
50.03 Traction power supply: substations		20,119	3,018	23,137				29,207	
50.04 Traction power distribution: catenary and third rail		25,974	3,896	29,870				37,707	
50.05 Communications		11,240	1,686	12,926				16,317	
50.06 Fare collection system and equipment		6,619	993	7,612				9,609	
50.07 Central Control		0	0	0				0	
<b>Construction Subtotal (10 - 50)</b>	<b>16.34</b>	<b>691,532</b>	<b>164,746</b>	<b>856,278</b>	<b>\$ 52,411</b>	<b>100%</b>	<b>55%</b>	<b>1,068,970</b>	
<b>60 ROW, LAND, EXISTING IMPROVEMENTS</b>	<b>16.34</b>	<b>128,750</b>	<b>64,375</b>	<b>193,125</b>	<b>\$ 11,821</b>		<b>12%</b>	<b>229,565</b>	
60.01 Purchase or lease of real estate		128,750	64,375	193,125				229,565	
60.02 Relocation of existing households and businesses		0	0	0				0	
<b>70 VEHICLES (number)</b>	<b>53</b>	<b>156,558</b>	<b>23,484</b>	<b>180,042</b>	<b>\$ 3,397</b>		<b>12%</b>	<b>233,092</b>	
70.01 Light Rail	53	156,558	23,484	180,042	\$ 3,397			233,092	
70.02 Heavy Rail		0	0	0				0	
70.03 Commuter Rail		0	0	0				0	
70.04 Bus		0	0	0				0	
70.05 Other		0	0	0				0	
70.06 Non-revenue vehicles		0	0	0				0	
70.07 Spare parts		0	0	0				0	
<b>80 PROFESSIONAL SERVICES (applies to Cats. 10-50)</b>	<b>16.34</b>	<b>221,291</b>	<b>52,721</b>	<b>274,012</b>	<b>\$ 16,772</b>	<b>32%</b>	<b>18%</b>	<b>324,010</b>	
80.01 Preliminary Engineering		31,119	7,413	38,532				45,563	
80.02 Final Design		38,034	9,061	47,095				55,688	
80.03 Project Management for Design and Construction		34,577	8,238	42,815				50,627	
80.04 Construction Administration & Management		55,323	13,180	68,503				81,002	
80.05 Professional Liability and other Non-Construction Insurance		13,831	3,295	17,126				20,251	
80.06 Legal; Permits; Review Fees by other agencies, cities, etc.		20,746	4,943	25,689				30,376	
80.07 Surveys, Testing, Investigation, Inspection		20,746	4,943	25,689				30,376	
80.08 Start up		6,915	1,648	8,563				10,125	
<b>Subtotal (10 - 80)</b>	<b>16.34</b>	<b>1,198,131</b>	<b>305,326</b>	<b>1,503,457</b>	<b>\$ 92,024</b>		<b>96%</b>	<b>1,855,637</b>	
<b>90 UNALLOCATED CONTINGENCY</b>				<b>55,758</b>			<b>4%</b>	<b>69,819</b>	
<b>Subtotal (10 - 90)</b>	<b>16.34</b>			<b>1,559,215</b>	<b>\$ 95,437</b>		<b>100%</b>	<b>1,925,455</b>	
<b>100 FINANCE CHARGES</b>				<b>0</b>			<b>0%</b>	<b>0</b>	
<b>Total Project Cost (10 - 100)</b>	<b>16.34</b>			<b>1,559,215</b>	<b>\$ 95,437</b>		<b>100%</b>	<b>1,925,455</b>	
Allocated Contingency as % of Base Yr Dollars w/o Contingency				25.48%					
Unallocated Contingency as % of Base Yr Dollars w/o Contingency				4.65%					
Total Contingency as % of Base Yr Dollars w/o Contingency				30.14%					
Unallocated Contingency as % of Subtotal (10 - 80)				3.71%					
YOE Construction Cost per Mile (X000)								\$65,430	
YOE Total Project Cost per Mile Not Including Vehicles (X000)								\$103,586	
YOE Total Project Cost per Mile (X000)								\$117,854	



**Table 2-3: Purple Line Capital Cost Inflation Worksheet**

INFLATION WORKSHEET																				
Maryland Transit Administration		(Rev.13, June 1, 2010)																		
Purple Line		Today's Date <b>3/17/11</b>																		
Pre-PE Risk Assessment		Yr of Base Year \$ 2010																		
		Yr of Revenue Ops 2020																		
All figures are presented according to the MTA's fiscal years (e.g., FY12 is 7/1/2011-6/30/2012). The inflation rate presented here is the effective inflation rate associated with the inflation factor for each year's mix of expenditures--different inflation rates were used for different SCCs (see the Purple Line Capital Cost Escalation Methodology report for more details).																				
BASE YEAR DOLLARS (X\$000)	Base Yr Dollars	Double-Check Total	2002	2003						2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
10 GUIDEWAY & TRACK ELEMENTS (route miles)	300,275	300,275	0	0						0	0	0	0	0	0	24,022	108,099	105,096	60,055	3,003
20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)	132,067	132,067	0	0						0	0	0	0	0	0	6,603	26,413	59,430	33,017	6,603
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	90,273	90,273	0	0						0	0	0	0	0	0	4,514	36,109	47,845	1,805	
40 SITEWORK & SPECIAL CONDITIONS	222,973	222,973	0	0						0	0	0	0	0	44,595	89,189	66,892	11,149	11,149	0
50 SYSTEMS	110,690	110,690	0	0						0	0	0	0	0	9,962	29,886	32,100	33,207	5,535	
60 ROW, LAND, EXISTING IMPROVEMENTS	193,125	193,125	0	0						0	0	0	0	96,563	96,563	0	0	0	0	0
70 VEHICLES (number)	180,042	180,042	0	0						0	0	0	0	0	0	0	0	72,017	81,019	27,006
80 PROFESSIONAL SERVICES (applies to Cats. 10-50)	274,012	274,012	0	0						0	0	28,500	35,000	35,000	48,000	45,000	42,000	18,000	10,000	12,512
90 UNALLOCATED CONTINGENCY	55,758	55,758	0	0						0	0	0	0	6,947	6,387	11,606	15,548	13,106	2,163	
100 FINANCE CHARGES	0	0	0	0						0	0	0	0	0	0	0	0	0	0	0
<b>Total Project Cost (10 - 100)</b>	<b>1,559,215</b>	<b>1,559,215</b>	<b>0</b>	<b>0</b>						<b>0</b>	<b>0</b>	<b>28,500</b>	<b>35,000</b>	<b>131,563</b>	<b>196,105</b>	<b>181,164</b>	<b>289,410</b>	<b>349,449</b>	<b>289,397</b>	<b>58,628</b>
<b>Inflation Rate</b>			0.000	0.000						0.000	0.025	0.025	0.028	0.085	0.030	-0.018	0.032	0.033	0.033	0.033
<b>Compounded Inflation Factor</b>			1.000	1.000						1.000	1.025	1.051	1.080	1.171	1.206	1.185	1.224	1.264	1.305	1.347
YEAR OF EXPENDITURE DOLLARS (X\$000)	YOE Dollars		2002	2003						2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
10 GUIDEWAY & TRACK ELEMENTS (route miles)	375,979		0	0						0	0	0	0	0	0	28,474	132,300	132,805	78,355	4,045
20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)	167,226		0	0						0	0	0	0	0	0	7,827	32,327	75,099	43,078	8,896
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	116,010		0	0						0	0	0	0	0	0	5,524	45,629	62,424	2,432	
40 SITEWORK & SPECIAL CONDITIONS	270,025		0	0						0	0	0	0	0	53,803	105,720	81,867	14,088	14,546	0
50 SYSTEMS	139,730		0	0						0	0	0	0	0	11,809	36,577	40,563	43,326	7,456	
60 ROW, LAND, EXISTING IMPROVEMENTS	229,565		0	0						0	0	0	0	113,062	116,502	0	0	0	0	0
70 VEHICLES (number)	233,092		0	0						0	0	0	0	0	0	0	0	91,004	105,707	36,381
80 PROFESSIONAL SERVICES (applies to Cats. 10-50)	324,010		0	0						0	0	29,943	37,783	40,981	57,912	53,341	51,403	22,746	13,047	16,855
90 UNALLOCATED CONTINGENCY	69,819		0	0						0	0	0	0	8,382	7,571	14,204	19,647	17,100	2,914	
100 FINANCE CHARGES	0		0	0						0	0	0	0	0	0	0	0	0	0	0
<b>Total Project Cost (10 - 100)</b>	<b>1,925,455</b>		<b>0</b>	<b>0</b>						<b>0</b>	<b>0</b>	<b>29,943</b>	<b>37,783</b>	<b>154,043</b>	<b>236,600</b>	<b>214,743</b>	<b>354,202</b>	<b>441,582</b>	<b>377,582</b>	<b>78,979</b>



**Table 2-4: Purple Line Schedule**

SCHEDULE		(Rev.13, June 1, 2010)																	
Maryland Transit Administration		Today's Date		3/17/11															
Purple Line		Yr of Base Year \$		2010															
Pre-PE Risk Assessment		Yr of Revenue Ops		2020															
Although the MTA's fiscal year is used elsewhere in this notebook, the years in this row are in terms of the calendar year.		Start Date	End Date	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
<b>Preliminary Engineering</b>		07/05/11	06/14/13																
Design																			
Develop cost estimate, schedule, ridership forecast																			
Conduct reviews																			
Develop FEIS, receive Record of Decision																			
Submit request / receive FTA approval to enter Final Design																			
<b>Final Design</b>		06/14/13	07/04/18																
Develop the contract documents for the Build Alternative																			
Develop cost estimate, schedule																			
Acquire real estate; relocate households and businesses																			
Conduct reviews																			
Submit request / receive FTA approval for FFGA																			
Issue requests for bids, make awards of construction contracts																			
<b>Construction</b>		01/06/15	12/19/19																
Construct fixed infrastructure																			
Finalize real estate acquisitions and relocations																			
Acquire and test vehicles																			
<b>Revenue Ops / Closeout of Project</b>		06/19/20																	
Revenue Operations																			
Before and After Study: Two years post Rev Ops																			
Fulfillment of the New Starts funding commitment																			
Completion of project close-out, resolution of claims																			



### 2.1.2 Purple Line Sources and Uses of Funds

The proposed sources of funds, by year, for the Purple Line Project are summarized in Table 2-5. The capital plan relies upon two sources of funds for the project: Federal Section 5309 New Starts funds and funding from the MDOT Transportation Trust Fund (TTF).

Federal Section 5309 New Starts funds requested for the Purple Line project total \$962.6 million, an amount equal to 49.99% of the total Red Line capital cost.

The remaining \$962.9 million will be funded by the MTA’s funding partner, MDOT, through its capital expansion budget that is supported by the state’s TTF. Hence, 50.01% of the project capital cost is to be covered through non-federal commitments. The TTF’s sources of funds are discussed in Section 2.2.3.

The use of this integrated trust fund approach grants MDOT the flexibility to meet varying transportation service and infrastructure needs as required. Because revenues are not earmarked for specific programs and because these revenues are within MDOT’s control, MDOT allocates funds to high-priority projects on an as needed basis to meet its project funding commitments.

Table 2-5 presents the sources and uses of funds for the Purple Line. As previously noted by the letter from the MDOT Secretary of Transportation, the state has planned and budgeted funds for the Purple Line. Accordingly, **100% of the Non-Section 5309 New Starts funds are either planned or budgeted for the project.**

**Table 2-5: Purple Line Sources and Uses of Funds by Year (YOE \$ M)**

	FY-11	FY-12	FY-13	FY-14	FY-15	FY-16	FY-17	FY-18	FY-19	FY-20*	Total	Percent of Total
<b>Uses of Funds</b>												
Purple Line Project	\$ -	\$ 30	\$ 38	\$ 154	\$ 237	\$ 215	\$ 354	\$ 442	\$ 378	\$ 79	\$ 1,925	100.00%
<b>TOTAL USES OF FUNDS</b>	\$ -	\$ 30	\$ 38	\$ 154	\$ 237	\$ 215	\$ 354	\$ 442	\$ 378	\$ 79	\$ 1,925	100.00%
<b>Sources of Funds</b>												
FTA Sec. 5309 New Starts Funds	\$ -	\$ 3	\$ -	\$ -	\$ 160	\$ 160	\$ 160	\$ 160	\$ 160	\$ 160	\$ 963	49.99%
State Transportation Trust Fund	\$ -	\$ 27	\$ 38	\$ 154	\$ 77	\$ 55	\$ 194	\$ 282	\$ 218	\$ (81)	\$ 963	50.01%
<b>TOTAL SOURCES OF FUNDS</b>	\$ -	\$ 30	\$ 38	\$ 154	\$ 237	\$ 215	\$ 354	\$ 442	\$ 378	\$ 79	\$ 1,925	100.00%

\* The FY-20 negative value for the State Transportation Trust Funding Sources of Funds reflects the delayed reimbursement of New Starts Funds.

### 2.1.3 Funding Source Availability

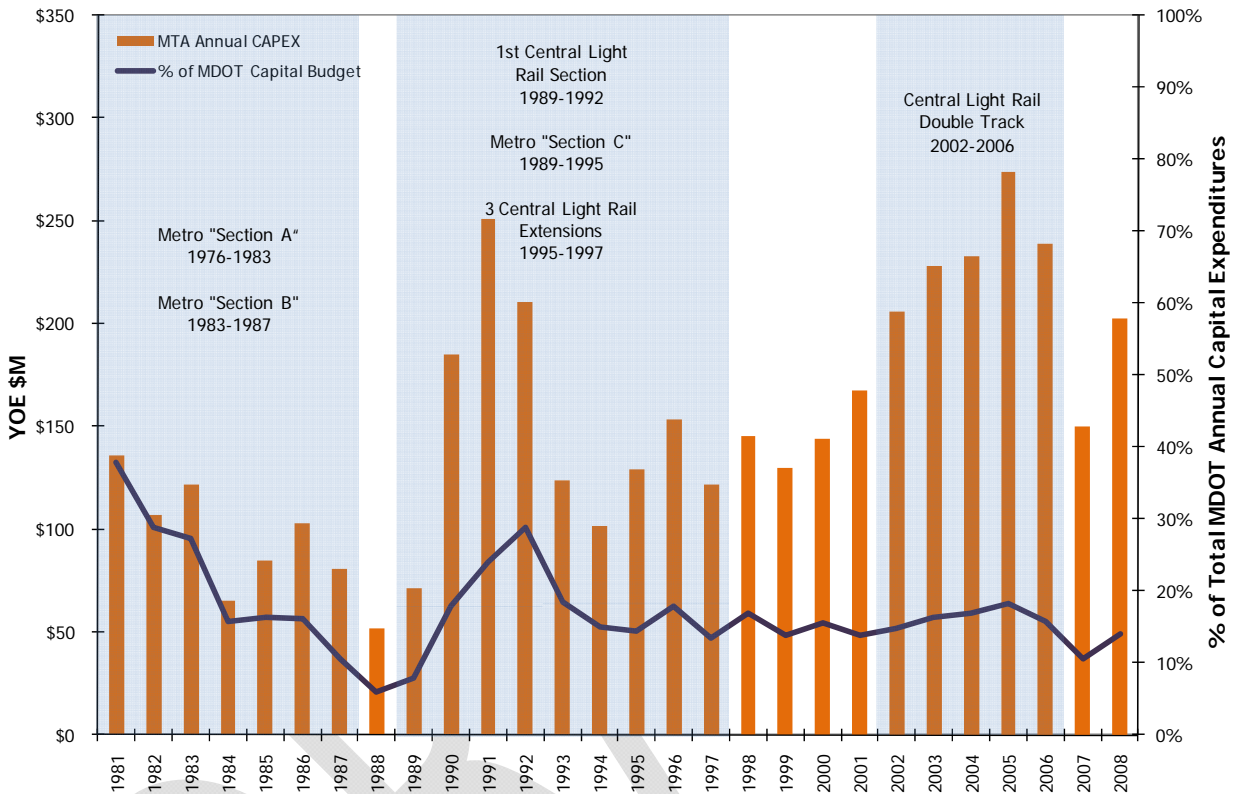
Historical precedent supports MDOT’s pledge to allocate the necessary funding to the MTA for the Purple Line project, and its revenue projections indicate that it has the capacity to follow through with this commitment.

MDOT has a proven history of allocating large portions of capital funding for MTA capital expansion projects. As is depicted in Figure 2-1 below, during previous large capital expansion projects, the MTA’s capital expenditures have spiked. In particular, the MTA’s percentage of MDOT’s capital budget reached nearly 40% in 1981 during construction of the Metro subway “Section A” and reached nearly 30% of MDOT’s capital budget during the construction of Metro



“Section C” and the first leg of the Central Light Rail in 1992. Therefore, as precedent indicates, the TTF structure has afforded MDOT the ability to allocate funding as necessary toward high priority projects.

**Figure 2-1: MTA Historical Capital Expenditures and Major Projects**



As described more fully in section 2.2.4, this financial plan utilizes MDOT’s forecast of funds that it will have available for capital projects through the fiscal year 2030. MDOT’s forecast of its revenues and costs projects that there will be adequate funding available to implement the Purple Line during the timeline proposed. As shown in Table 2-6, the Purple Line capital expenditures are projected to account for 21.2% of MDOT’s total projected capital expansion budget during the FY 2011-2020 time period (and 5.2% of MDOT’s total projected capital and operating budget during the same time period).

**Table 2-6: TTF Capacity to Fund the Purple Line Project (YOE \$ M)**

	FY-11	FY-12	FY-13	FY-14	FY-15	FY-16	FY-17	FY-18	FY-19	FY-20*	Total
<b>Purple Line Cost</b>	\$ -	\$ 30	\$ 38	\$ 154	\$ 237	\$ 215	\$ 354	\$ 442	\$ 378	\$ 79	\$ 1,925
FTA Sec. 5309 New Starts Funds	\$ -	\$ 3	\$ -	\$ -	\$ 160	\$ 160	\$ 160	\$ 160	\$ 160	\$ 160	\$ 963
State Transportation Trust Fund	\$ -	\$ 27	\$ 38	\$ 154	\$ 77	\$ 55	\$ 194	\$ 282	\$ 218	\$ (81)	\$ 963
<b>MDOT Capital Expansion Budget</b>	\$ 625	\$ 624	\$ 439	\$ 434	\$ 682	\$ 1,205	\$ 1,227	\$ 1,271	\$ 1,275	\$ 1,325	\$ 9,106
% of MDOT Capital Expansion Budget allocated to the Purple Line	-	4.80%	8.61%	35.49%	34.69%	17.82%	28.88%	34.75%	29.61%	5.96%	21.15%
<b>MDOT TTF Budget</b>	\$ 2,814	\$ 3,097	\$ 3,063	\$ 3,007	\$ 3,304	\$ 4,031	\$ 4,154	\$ 4,302	\$ 4,414	\$ 4,574	\$ 36,759
% of MDOT TTF Budget allocated to the Purple Line	-	0.97%	1.23%	5.12%	7.16%	5.33%	8.53%	10.27%	8.55%	1.73%	5.24%

\* The FY-20 negative value for the State Transportation Trust Funding Sources of Funds reflects the delayed reimbursement of New Starts Funds.

Therefore, MDOT's history of allocating a larger portion of its capital expansion budget to the MTA's high-priority capital expansion projects coupled with MDOT's projected capacity to fund the Purple Line project indicates that MDOT can and will provide adequate funding for the MTA to successfully deliver the Purple Line project.

## 2.2 Capital Plan for the Maryland Transit Administration

### 2.2.1 MTA Current Condition and Capital Expenditure Forecasts

As noted earlier, MDOT's primary commitment is operating, maintaining, and rehabilitating its existing transportation investments. As will be described in Section 2.2.3, MDOT also has a long history of seeking and securing additional state revenues to fund transportation investments. Accordingly, the MTA has a long history of making significant investments that have promoted the state of good repair of the system. Recent ARRA Federal funds have also been used to help meet system preservation needs.

The MTA receives Federal transit funds to assist with its capital preservation needs. Additional funding, as necessary, has been and will continue to be provided by the MDOT TTF. This has ensured that the MTA's existing transportation assets have been maintained in a state of good repair. As one metric of the MTA's current capital condition, the current average age of the MTA's existing active bus fleet is seven years.

The MTA's underlying capital expenditure forecast incorporated into this financial plan is based on the FY 2011-2016 Final Consolidated Transportation Program (CTP) approved by the Maryland Legislature. The CTP is a six-year capital budget, and the MTA budget used for this financial plan is the most recent CTP approved by the Legislature. The CTP contains all major and minor capital projects budgeted over the next six years. The MTA's capital budget is determined in the formation of MDOT's CTP.

The 20-year underlying capital plan utilized in this financial plan was developed by identifying future capital rehabilitation needs for each MTA mode and projecting long-term funding requirements between FY 2011 and FY 2030. The capital needs were identified based on an understanding of the age of the existing vehicle fleets, asset conditions, trends in existing funding

programs, and service expansion plans. The future capital costs are based on the following assumptions:

- *Underlying System's Levels of Service:* The financial forecasts generally assume the underlying transit system experiences modest growth in the level of service (consistent with population and employment forecasts), and the capital plan reflects the capital expenditures needed for the service expansion assumed. MARC service growth is reflected in the currently programmed capital expansion projects in the latest CTP (including an increase to the MARC vehicle fleet size). Annual increases in the Mobility vehicle fleet are also included for the Federally-mandated paratransit program. The capital plan for the bus fleet reflects the procurement schedule and fleet sizes reflected in the current MTA bus fleet management plan.
- *CTP Time Period:* The FY 2011-2016 Final CTP approved by the Legislature was assumed to be the MTA's budget during this timeframe. However, one unprogrammed project, overhaul of the Metro rail cars, was recently identified and is considered necessary during the CTP timeframe. It was therefore included in the forecast, as it is necessary to maintain the MTA's safety and performance standards. The MTA is currently working with MDOT to ensure that adequate funding is included in future versions of the CTP for this project.
- *FY 2017 to FY 2030 Time Period:* From modal heads to facility engineers, MTA planning, engineering, and operations staff collaborated in an effort to identify projects in the FY 2017 to FY 2030 time period that are necessary to meet the normal replacement/rehabilitation cycles and performance standards for all MTA infrastructure, fleet, equipment, and facility components of their transit system. Future State funding for Locally Operated Transit Systems was also included in the forecast.

These funding requirements were used to develop the 20-year capital expenditure plan that was utilized in this financial plan. A 5% capital preservation cost contingency was added to the plan for FY 2021 to FY 2030, to capture potential unforeseen capital preservation needs that may arise in the future.

The capital program in the financial plan is divided in the following sub-categories: vehicles, infrastructure, facilities, equipment, and other projects. Annual expenditures were first identified in FY 2010 dollars and then escalated as follows:

- *Infrastructure and Facilities:* The infrastructure and facilities capital costs were escalated using capital escalation factors developed by MDOT for the years FY 2011 through FY 2015. The FY 2016 through FY 2030 escalation rates were assumed to be equal to the FY 2015 rate.
- *Equipment, Vehicles, and Other:* The equipment, vehicles, and other projects capital costs were escalated at 2.5% per year, consistent with long-term consumer price index.





Appendix D provides additional information on escalation projections and underlying assumptions.

**2.2.2 Other New Starts Projects**

In addition to the Purple Line project, the MTA is also planning to implement the Baltimore Red Line and Corridor Cities Transitway (CCT) projects during the same timeframe. The Red Line is a proposed light rail project in Baltimore. The CCT, located in Montgomery County, is still in the planning phases and a locally preferred alternative has not been selected. The CCT study’s alternatives include transit transportation system management, bus rapid transit and light rail transit alternatives.

The Baltimore Red Line is currently estimated to cost \$2.2 billion (YOE). The planned sources of funds, by year, for the Red Line Project are summarized in Table 2-7. It is currently assumed that the project will be funded by two sources: Federal Section 5309 New Starts funds and MDOT Capital Expansion funds from the MDOT TTF, although the MTA and MDOT plan to investigate other funding/financing options (including the potential for a USDOT TIFIA loan, public-private-partnership concession agreement, and local contributions such as value capture tools) during the PE phase of the project.

Federal Section 5309 New Starts funds for the Red Line project are currently assumed to total \$1,109 million (YOE), an amount equal to 49.97% of the total Red Line cost. The remaining \$1,110 million is assumed to be funded by the MDOT TTF, meaning that this forecast assumes 50.03% of the project cost is funded through MDOT’s Capital Expansion budget. This financial plan assumes the sources and uses of funds shown in Table 2-7.

**Table 2-7: Red Line Sources and Uses of Funds (YOE \$ M)**

	FY-11	FY-12	FY-13	FY-14	FY-15	FY-16	FY-17	FY-18	FY-19	FY-20*	Total	Percent of Total
<b>Uses of Funds</b>												
Red Line Project	\$ 13	\$ 34	\$ 54	\$ 73	\$ 154	\$ 451	\$ 410	\$ 445	\$ 449	\$ 136	\$ 2,219	100.00%
<b>TOTAL USES OF FUNDS</b>	\$ 13	\$ 34	\$ 54	\$ 73	\$ 154	\$ 451	\$ 410	\$ 445	\$ 449	\$ 136	\$ 2,219	100.00%
<b>Sources of Funds</b>												
FTA Sec. 5309 New Starts Funds	\$ 6	\$ 17	\$ 38	\$ 51	\$ 122	\$ 175	\$ 175	\$ 175	\$ 175	\$ 175	\$ 1,109	49.97%
State Transportation Trust Fund	\$ 7	\$ 17	\$ 16	\$ 22	\$ 32	\$ 276	\$ 235	\$ 270	\$ 274	\$ (39)	\$ 1,110	50.03%
<b>TOTAL SOURCES OF FUNDS</b>	\$ 13	\$ 34	\$ 54	\$ 73	\$ 154	\$ 451	\$ 410	\$ 445	\$ 449	\$ 136	\$ 2,219	100.00%

\* The FY-20 negative value for the State Transportation Trust Funding Sources of Funds reflects the delayed reimbursement of New Starts Funds.

The CCT study is still underway and, as such, there is not yet a Locally Preferred Alternative or an estimate of that potential project’s scope or capital costs. Solely for the purposes of the Purple Line draft financial plan, this forecast includes a placeholder amount of \$250 million in the FY 2016, FY 2017 and FY 2018 budget forecast for potential CCT construction costs, in addition to the \$39 million in planning and design costs for FY 2010 to FY 2014. Although the CCT study currently includes some alternatives with cost estimates in excess of \$250 million, this draft financial plan assumes that any CCT capital costs in excess of \$250 million would come from sources other than the MDOT TTF or the FTA New Starts program. The MTA and

MDOT plan to investigate the potential for a USDOT TIFIA loan, public-private partnerships, and local contributions. The illustrative sources of funds, by year, as assumed in this financial plan are summarized in Table 2-8.

**Table 2-8: CCT “Illustrative” Sources and Uses of Funds (YOE \$ M)**

	FY-10	FY-11	FY-12	FY-13	FY-14	FY-15	FY-16	FY-17	FY-18	FY-19	FY-20	Total	Percent of Total
<b>Uses of Funds</b>													
CCT Project (Illustrative)	\$ 4	\$ 5	\$ 10	\$ 10	\$ 10	\$ -	\$ 83	\$ 83	\$ 83	\$ -	\$ -	\$ 289	100.00%
<b>TOTAL USES OF FUNDS</b>	<b>\$ 4</b>	<b>\$ 5</b>	<b>\$ 10</b>	<b>\$ 10</b>	<b>\$ 10</b>	<b>\$ -</b>	<b>\$ 83</b>	<b>\$ 83</b>	<b>\$ 83</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 289</b>	<b>100.00%</b>
<b>Sources of Funds</b>													
FTA Sec. 5309 New Starts Funds	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 61	\$ 42	\$ 42	\$ -	\$ -	\$ 144	50.00%
State Transportation Trust Fund	\$ 4	\$ 5	\$ 10	\$ 10	\$ 10	\$ -	\$ 22	\$ 42	\$ 42	\$ -	\$ -	\$ 144	50.00%
<b>TOTAL SOURCES OF FUNDS</b>	<b>\$ 4</b>	<b>\$ 5</b>	<b>\$ 10</b>	<b>\$ 10</b>	<b>\$ 10</b>	<b>\$ -</b>	<b>\$ 83</b>	<b>\$ 83</b>	<b>\$ 83</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 289</b>	<b>100.00%</b>

### 2.2.3 MTA Historic Capital Sources of Funds

#### MDOT SOURCES OF FUNDS

Unlike most transit agencies, the MTA’s needs are reliably funded from a state-level trust fund dedicated to transportation uses. In the case of Maryland, the Transportation Trust Fund is supported by a wide range of revenue sources, with a long history of stability and growth. The information below reflects changes enacted during the 2011 Legislative Session. Revenue sources for the Trust Fund include the following:

- *Highway User Revenues:* The funds in the Gasoline and Motor Vehicle Revenue Account are on average distributed 90 percent to MDOT and 10 percent to local governments, which include Baltimore City, the counties, and the municipalities. They include the following taxes and fees:
  - *Motor Fuel Tax:* These taxes and fees consist of the following:
    - 23 1/2¢ on each gallon other than aviation gasoline and 24 1/4¢ on each gallon of special fuels other than turbine fuel after deductions for certain refunds and collection costs and a 2.3% distribution to the Chesapeake Bay 2010 Trust Fund.
    - The fee for a 15-day trip permit for a commercial vehicle at an amount equal to the tax rate on special fuel other than turbine fuel, in effect at the time the permit is issued, and payable on 174 gallons of motor vehicle fuel.
  - *Motor Vehicle Titling Tax:* As of July 1, 2008, two-thirds of the excise tax imposed at the rate of 6% of the fair market value, excluding trade in allowance, of certain motor vehicles for which certificates of title are



issued. Prior to July 1, 2008, 80% of the motor vehicle titling tax was highway user revenues.

- *Sales and Use Tax for Rental Vehicles*: 80% of 45% of the revenues from the collection of the sales and use tax on short-term vehicle rentals.
- *Motor Vehicle Registration Fees*: A registration fee on all motor vehicles that ranges from \$2.50 to \$1,800.00 per vehicle. Effective July 1, 2008, the fees attributed to personalized registration plates shall be distributed to the TTF and shall be highway user revenues.
- *Corporate Income Tax*: On average, 17% of the revenues derived from the State's 8.25% corporation income tax after certain General Fund reductions.
- *Sales and Use Tax*: Effective July 1, 2008 through June 30, 2011, MDOT received 5.3% of net sales and use tax revenues after the required distribution of the revenues necessary to pay refunds.
- *Operating Revenues*: All revenues from operations of the MPA, the MTA and the MAA.
- *Federal Revenues*: Federal revenues include all budgeted and non-budgeted capital and operating federal funds allocated to MDOT.
- *Other*: Includes investment income, reimbursements, miscellaneous revenues, reserve contributions, fund balance changes, and bond issuances.

The projected mix of funds for the TTF from FY 2012 to FY 2016 is presented in Figure 2-2. As illustrated in this figure, the TTF does not rely on any one source of revenue. The diversification of sources promotes the reliability and stability of the fund.

**Figure 2-2: TTF Sources of Funds**

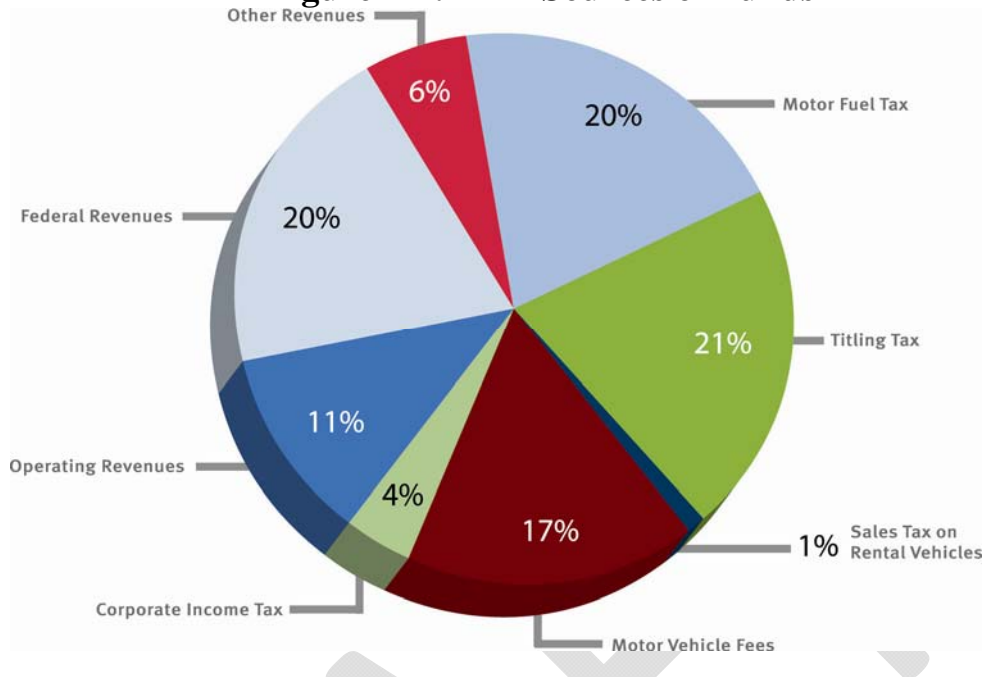


Table 2-9 shows the historical gross sources of funding for the TTF. It should be noted that this reflects gross revenues collected for the various TTF funding sources and does not represent the actual value available for MDOT’s discretion, as a portion of the revenues were distributed to Baltimore City and other counties and municipalities (the TTF amounts available solely for MDOT discretion are presented later in Table 2-11). From FY 2000 to FY 2010, TTF gross revenues increased at an average annual rate of 3.79%.



**Table 2-9: TTF Gross Sources of Revenue: FY 2000 to FY 2010 History and Trends (NOMINAL \$ M)**

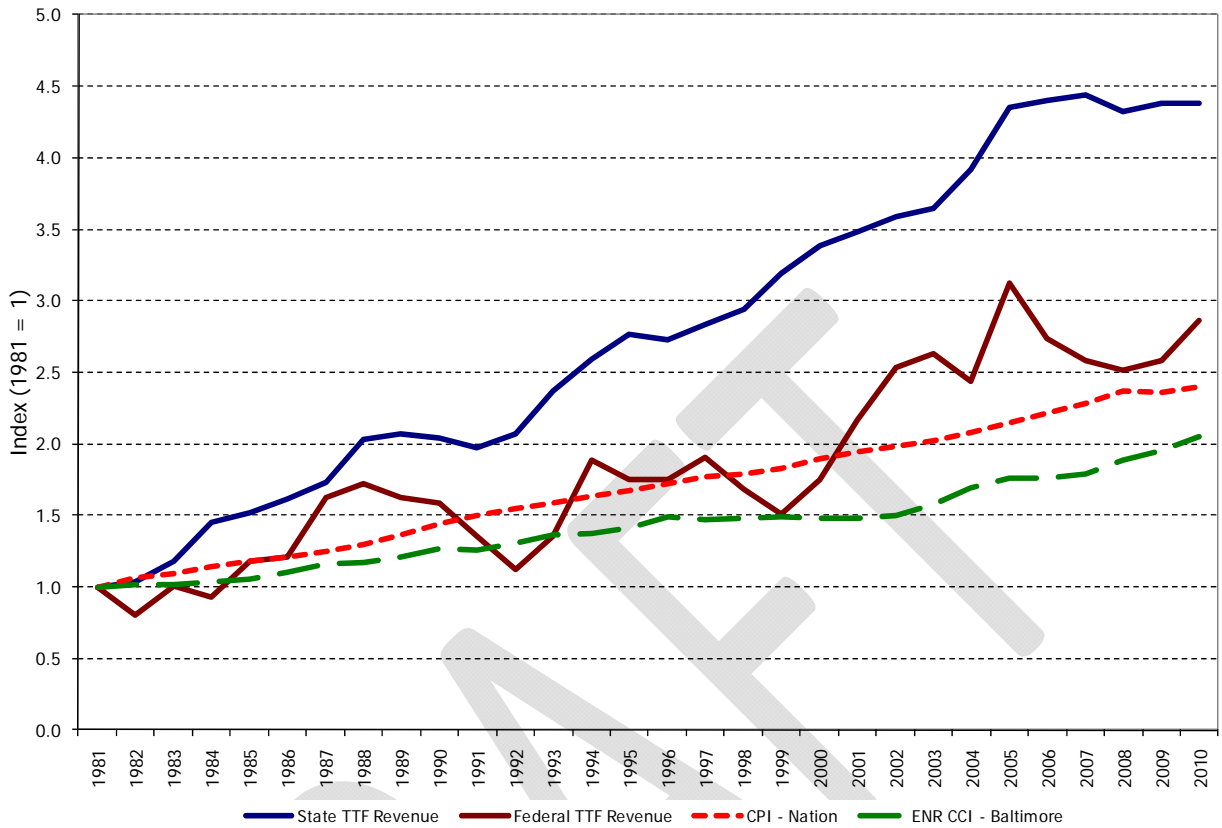
Sources of Funds	FY-00	FY-01	FY-02	FY-03	FY-04	FY-05	FY-06	FY-07	FY-08	FY-09	FY-10	Average
<b>Taxes and Fees</b>												
Motor Fuel Tax	\$ 646	\$ 687	\$ 704	\$ 716	\$ 746	\$ 753	\$ 758	\$ 756	\$ 755	\$ 736	\$ 721	\$ 725
Motor Vehicle Titling Tax	\$ 605	\$ 613	\$ 650	\$ 669	\$ 720	\$ 718	\$ 719	\$ 704	\$ 650	\$ 514	\$ 543	\$ 646
Sales and Use Tax for Rental Vehicles	\$ 19	\$ 19	\$ 35	\$ 23	\$ 23	\$ 24	\$ 27	\$ 28	\$ 24	\$ 22	\$ 22	\$ 24
Motor Vehicle Registration Fees	\$ 292	\$ 295	\$ 326	\$ 328	\$ 350	\$ 510	\$ 524	\$ 547	\$ 534	\$ 540	\$ 535	\$ 435
Corporate Income Tax	\$ 100	\$ 118	\$ 85	\$ 91	\$ 107	\$ 209	\$ 203	\$ 186	\$ 168	\$ 151	\$ 155	\$ 143
Sales and Use Tax - General	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 202	\$ 196	\$ 199
<b>Subtotal Taxes and Fees</b>	<b>\$ 1,662</b>	<b>\$ 1,732</b>	<b>\$ 1,800</b>	<b>\$ 1,827</b>	<b>\$ 1,946</b>	<b>\$ 2,214</b>	<b>\$ 2,231</b>	<b>\$ 2,221</b>	<b>\$ 2,131</b>	<b>\$ 2,165</b>	<b>\$ 2,172</b>	<b>\$ 2,009</b>
<b>Annual Growth Rate</b>	<b>4.14%</b>	<b>4.21%</b>	<b>3.93%</b>	<b>1.50%</b>	<b>6.51%</b>	<b>13.77%</b>	<b>0.77%</b>	<b>-0.45%</b>	<b>-4.05%</b>	<b>1.60%</b>	<b>0.32%</b>	<b>2.71%</b>
<b>Operating Revenues</b>												
Maryland Transit Administration	\$ 102	\$ 96	\$ 97	\$ 98	\$ 109	\$ 107	\$ 110	\$ 123	\$ 118	\$ 117	\$ 125	\$ 109
Maryland Port Administration	\$ 75	\$ 77	\$ 77	\$ 92	\$ 91	\$ 94	\$ 91	\$ 94	\$ 97	\$ 94	\$ 69	\$ 86
Maryland Aviation Administration	\$ 135	\$ 130	\$ 124	\$ 110	\$ 140	\$ 127	\$ 140	\$ 152	\$ 180	\$ 182	\$ 194	\$ 147
<b>Subtotal Operating Revenues</b>	<b>\$ 312</b>	<b>\$ 303</b>	<b>\$ 298</b>	<b>\$ 300</b>	<b>\$ 340</b>	<b>\$ 328</b>	<b>\$ 341</b>	<b>\$ 369</b>	<b>\$ 395</b>	<b>\$ 393</b>	<b>\$ 388</b>	<b>\$ 342</b>
<b>Annual Growth Rate</b>	<b>16.42%</b>	<b>-2.88%</b>	<b>-1.65%</b>	<b>0.67%</b>	<b>13.33%</b>	<b>-3.53%</b>	<b>3.96%</b>	<b>8.21%</b>	<b>7.05%</b>	<b>-0.51%</b>	<b>-1.27%</b>	<b>2.20%</b>
<b>Federal Revenues</b>												
Federal Operating Revenues	\$ 25	\$ 30	\$ 51	\$ 77	\$ 77	\$ 80	\$ 71	\$ 73	\$ 79	\$ 94	\$ 91	\$ 68
Federal Capital Revenues	\$ 525	\$ 650	\$ 746	\$ 749	\$ 688	\$ 902	\$ 787	\$ 738	\$ 710	\$ 718	\$ 808	\$ 729
<b>Subtotal Federal Revenues</b>	<b>\$ 550</b>	<b>\$ 680</b>	<b>\$ 797</b>	<b>\$ 826</b>	<b>\$ 765</b>	<b>\$ 982</b>	<b>\$ 858</b>	<b>\$ 811</b>	<b>\$ 789</b>	<b>\$ 812</b>	<b>\$ 899</b>	<b>\$ 797</b>
<b>Annual Growth Rate</b>	<b>15.79%</b>	<b>23.64%</b>	<b>17.21%</b>	<b>3.64%</b>	<b>-7.38%</b>	<b>28.37%</b>	<b>-12.63%</b>	<b>-5.48%</b>	<b>-2.71%</b>	<b>2.92%</b>	<b>10.71%</b>	<b>5.04%</b>
<b>Other Revenues</b>												
Other Revenues*	\$ 14	\$ 163	\$ 335	\$ 556	\$ 498	\$ 338	\$ 290	\$ 283	\$ 473	\$ 301	\$ 222	\$ 316
<b>Subtotal Other Revenues</b>	<b>\$ 14</b>	<b>\$ 163</b>	<b>\$ 335</b>	<b>\$ 556</b>	<b>\$ 498</b>	<b>\$ 338</b>	<b>\$ 290</b>	<b>\$ 283</b>	<b>\$ 473</b>	<b>\$ 301</b>	<b>\$ 222</b>	<b>\$ 316</b>
<b>Annual Growth Rate</b>	<b>-89.78%</b>	<b>1064.29%</b>	<b>105.52%</b>	<b>65.97%</b>	<b>-10.43%</b>	<b>-32.13%</b>	<b>-14.20%</b>	<b>-2.41%</b>	<b>67.14%</b>	<b>-36.36%</b>	<b>-26.25%</b>	<b>31.83%</b>
<b>Gross Sources of Funds</b>	<b>\$ 2,538</b>	<b>\$ 2,878</b>	<b>\$ 3,230</b>	<b>\$ 3,509</b>	<b>\$ 3,549</b>	<b>\$ 3,862</b>	<b>\$ 3,720</b>	<b>\$ 3,684</b>	<b>\$ 3,788</b>	<b>\$ 3,671</b>	<b>\$ 3,681</b>	<b>\$ 3,465</b>
<b>Annual Growth Rate</b>		<b>13.40%</b>	<b>12.23%</b>	<b>8.64%</b>	<b>1.14%</b>	<b>8.82%</b>	<b>-3.68%</b>	<b>-0.97%</b>	<b>2.82%</b>	<b>-3.09%</b>	<b>0.27%</b>	<b>3.79%</b>

\*Includes investment income, reimbursements, miscellaneous revenues, transfers and fund balance changes, bond sales, and special financing

TTF revenues have outpaced inflation since 1981, due in large part to legislative actions that have raised rates and fees. These actions have been taken to provide adequate support for the operating programs and sufficient funding for system preservation and capital expansion for the last thirty years. As shown in Figure 2-3, since 1981, gross TTF revenues generated at the state level have grown at a steady pace at nearly double the pace of CPI and ENR’s Construction Cost Index (CCI) for the Baltimore Region. This growth illustrates a long history of generating revenues at the state level to fund transportation needs. The growth of Federal funds deposited into the TTF, while sporadic, has slightly exceeded the growth of the CPI and has outpaced ENR’s CCI since 1981.



**Figure 2-3: TTF Indexed Annual Revenue Growth vs. Inflation**



Overall, TTF revenues have demonstrated steady growth. The average annual growth rate for TTF gross revenues is 3.79% since 2000 and 4.80% since 1981. Taxes, fees and operating revenues represent more than 60% of the TTF gross revenues, and these revenues have grown at an average annual rate of 0.14% since 2005 despite recent reductions in tax and fee revenues due to the economic downturn.

The MTA’s portion of Federal revenues is shown in Table 2-10. The MTA’s Federal revenues have grown at an average rate of 6.82% between FY 2002 and FY 2009. It should be noted that Table 2-9 contains Federal funding that was utilized for operating and maintenance (O&M) expenses in the MTA’s O&M budget. This is represented by the “Transfer to O&M Budget” line on the table. The use of Federal funding for eligible O&M costs will be discussed further in Section 3.

**Table 2-10: MTA Federal Revenue: History Since 2002 (NOMINAL \$ M)**

Sources of Funds	FY-02	FY-03	FY-04	FY-05	FY-06	FY-07	FY-08	FY-09	Average
<b>FTA Section 5307</b>	\$ 49	\$ 53	\$ 53	\$ 55	\$ 69	\$ 71	\$ 79	\$ 88	\$ 65
<b>Annual Growth Rate</b>		7.16%	0.34%	4.66%	25.36%	3.02%	10.97%	10.69%	8.63%
<b>FTA Section 5309 Fixed Guideway Modernization</b>	\$ 27	\$ 29	\$ 28	\$ 27	\$ 30	\$ 32	\$ 35	\$ 45	\$ 32
<b>Annual Growth Rate</b>		6.93%	-2.57%	-1.91%	11.18%	6.73%	9.47%	27.66%	7.83%
<b>FTA Section 5309 Bus and Bus Facilities</b>	\$ 8	\$ 8	\$ 7	\$ 4	\$ 6	\$ 6	\$ 7	\$ 9	\$ 7
<b>Annual Growth Rate</b>		-6.49%	-7.46%	-46.62%	52.82%	-3.20%	25.83%	26.47%	1.20%
<b>Other Federal Funds (LOTS, CMAQ, Non-Urbanized Areas, Other)</b>	\$ 66	\$ 83	\$ 74	\$ 58	\$ 5	\$ 14	\$ 42	\$ 97	\$ 55
<b>Annual Growth Rate</b>		25.13%	-11.01%	-21.75%	-91.24%	169.28%	204.96%	133.22%	5.57%
<b>Total MTA Federal Funds</b>	\$ 151	\$ 172	\$ 162	\$ 144	\$ 111	\$ 123	\$ 164	\$ 239	\$ 158
<b>Annual Growth Rate</b>		14.28%	-5.98%	-10.84%	-23.34%	11.32%	32.76%	46.25%	6.82%
<b>Transfer to O&amp;M Budget</b>	\$ (30)	\$ (52)	\$ (52)	\$ (52)	\$ (50)	\$ (52)	\$ (54)	\$ (66)	\$ (51)
<b>Annual Growth Rate</b>		72.38%	0.09%	-0.07%	-2.98%	3.38%	4.44%	21.15%	11.84%
<b>Total MTA Capital Federal Funds</b>	\$ 121	\$ 120	\$ 110	\$ 92	\$ 60	\$ 71	\$ 109	\$ 173	\$ 107
<b>Annual Growth Rate</b>		-0.23%	-8.60%	-15.93%	-34.77%	17.95%	53.49%	58.76%	5.32%

### 2.2.4 MTA Capital Sources of Funds Forecast

#### A) MDOT Transportation Trust Fund Net Revenues

The MTA's capital needs are funded by the TTF through MDOT, the MTA's funding partner. This financial plan utilizes MDOT's most recent long-term forecast of funds that it developed for updates to the fiscally-constrained long-range transportation plans in the DC and Baltimore metropolitan areas. More detail on this long-term forecast's assumptions and approach is provided in Appendix E; however, a summary is presented in this section.

The forecast presented below is a projection of the net amount of funds MDOT will receive from the Transportation Trust Fund, subtracting TTF revenues used to support debt service as well as the TTF revenues that are allocated to local governments. To derive an estimate for the amount of funding that will be available for new capital expansion projects, MDOT first forecasted O&M costs and system preservation capital costs for the entities funded in MDOT's budget. The annual amount of funds remaining after these costs represents MDOT's estimate of funds that will be available for new capital expansion or enhancement projects. To add a layer of conservatism to the forecast, the only discretionary Federal grants included in the forecast beyond 2015 are the amounts of New Starts funds that this financial plan assumes for the Purple Line, Red Line, and CCT.

The MDOT forecast utilizes the following growth assumptions:

- **MDOT Net TTF Revenues:** The forecast utilized MDOT CTP forecast values for FY 2010 through FY 2015. For FY 2016 through FY 2030, the forecast uses historical annual average growth rates of 3.5% for state funds, 5.3% for Federal highway formula funds, and 4.7% for Federal transit formula funds. With the exception of New Starts funding, discretionary federal grants are excluded from the forecast for all years beyond 2015.

- *MDOT Operating Expenditures:* The forecast utilized CTP forecast values for FY 2010 through FY 2015. For FY 2016 through FY 2030, the MDOT forecast utilizes annual percentage change of projected Consumer Price Index for all urban consumers (CPI-U) plus 2%. MDOT's CPI-U forecast is from Economy.com, a division of Moody's Analytics, and a leading independent provider of economic and financial forecasts.
- *MDOT Capital Preservation Expenditures:* The forecast utilizes CTP forecast values for FY 2010 through FY 2015. For FY 2016 through FY 2030, the MDOT forecast utilizes an annual growth rate of 2.5%.

As indicated earlier in Table 2-9, since 2000, the TTF's gross taxes and fees and operating revenues have grown at average annual rates of 2.71% and 2.20%, respectively (2.63% combined). Further, Federal revenues have grown at an average annual rate of 5.04% over the same time period. These are comparable to the revenue growth assumptions used in this plan, of 3.5% per year for state revenue and 5.3% and 4.7% for Federal highway and transit program funds, respectively.

Table 2-11 presents MDOT's annual figures for net TTF revenues, capital expenditures, and operating expenditures. The values provided for FY 1999 to FY 2009 are actual historical values. The values presented for FY 2010 to FY 2015 are budgeted CTP amounts. The values presented for FY 2016 to FY 2030 are MDOT's long-range forecast using the aforementioned methodology and assumptions.





**Table 2-11: MDOT Net TTF Revenues, Capital Expenditures, and Operating Expenditures Forecast (YOE \$ M)**

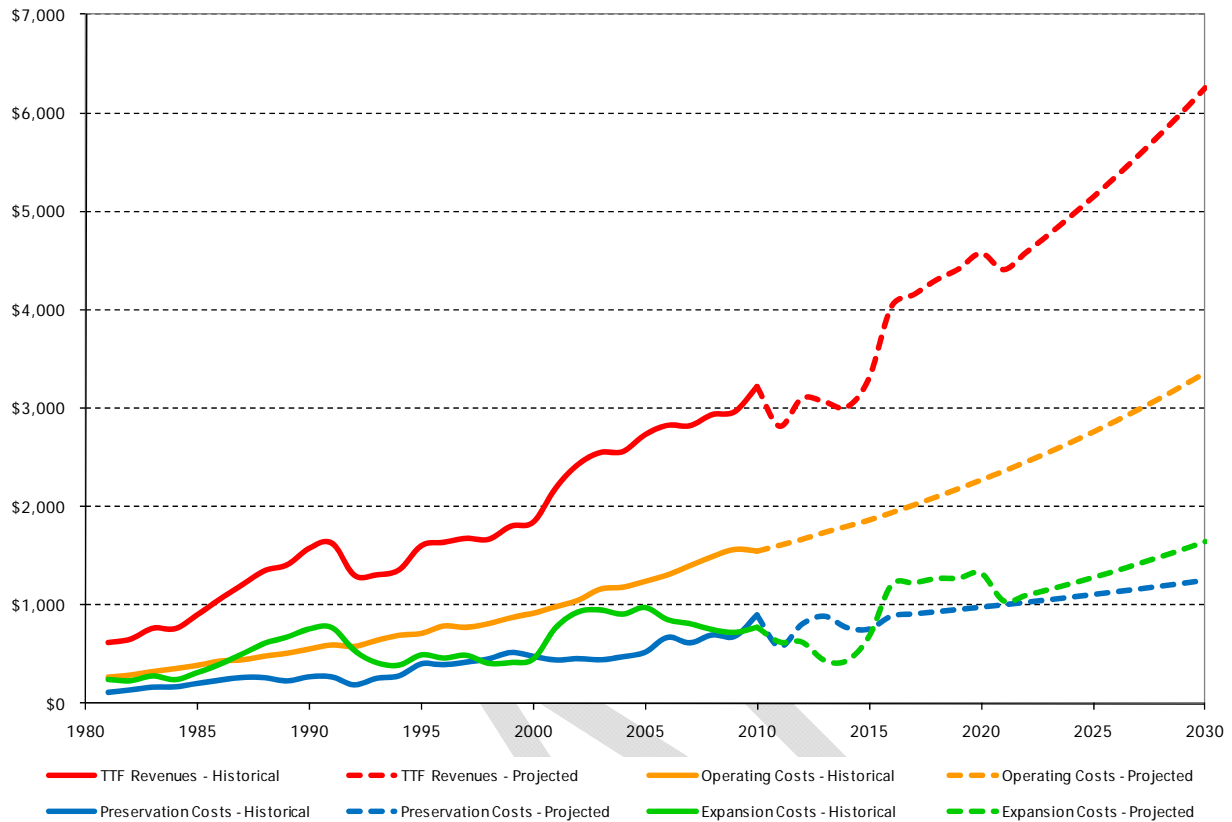
Fiscal Year	Operating		Capital Preservation		Capital Expansion		MDOT TTF Net Revenue / Total Expenditures	
	Total	Annual Growth Rate	Total	Annual Growth Rate	Total	Annual Growth Rate	Total	Annual Growth Rate
1999	\$ 868		\$ 515		\$ 420		\$ 1,803	
2000	\$ 913	5.18%	\$ 476	-7.60%	\$ 455	8.37%	\$ 1,844	2.27%
2001	\$ 979	7.23%	\$ 439	-7.80%	\$ 771	69.51%	\$ 2,189	18.71%
2002	\$ 1,045	6.74%	\$ 453	3.19%	\$ 931	20.75%	\$ 2,429	10.96%
2003	\$ 1,158	10.81%	\$ 441	-2.65%	\$ 951	2.15%	\$ 2,550	4.98%
2004	\$ 1,178	1.73%	\$ 472	7.03%	\$ 909	-4.42%	\$ 2,559	0.35%
2005	\$ 1,237	5.01%	\$ 518	9.75%	\$ 976	7.37%	\$ 2,731	6.72%
2006	\$ 1,303	5.34%	\$ 669	29.11%	\$ 853	-12.58%	\$ 2,825	3.44%
2007	\$ 1,396	7.14%	\$ 613	-8.41%	\$ 812	-4.78%	\$ 2,821	-0.14%
2008	\$ 1,488	6.59%	\$ 693	13.21%	\$ 753	-7.37%	\$ 2,934	4.01%
2009	\$ 1,561	4.91%	\$ 678	-2.23%	\$ 724	-3.79%	\$ 2,963	0.99%
2010	\$ 1,546	-0.96%	\$ 896	32.15%	\$ 775	7.04%	\$ 3,217	8.57%
2011	\$ 1,606	3.88%	\$ 583	-34.93%	\$ 625	-19.35%	\$ 2,814	-12.53%
2012	\$ 1,667	3.80%	\$ 806	38.25%	\$ 624	-0.16%	\$ 3,097	10.06%
2013	\$ 1,737	4.20%	\$ 887	10.05%	\$ 439	-29.65%	\$ 3,063	-1.10%
2014	\$ 1,799	3.57%	\$ 774	-12.74%	\$ 434	-1.14%	\$ 3,007	-1.83%
2015	\$ 1,863	3.56%	\$ 759	-1.94%	\$ 682	57.14%	\$ 3,304	9.88%
2016	\$ 1,938	4.03%	\$ 888	17.00%	\$ 1,205	76.67%	\$ 4,031	22.00%
2017	\$ 2,017	4.08%	\$ 910	2.48%	\$ 1,227	1.80%	\$ 4,154	3.05%
2018	\$ 2,099	4.07%	\$ 932	2.42%	\$ 1,271	3.59%	\$ 4,302	3.56%
2019	\$ 2,184	4.05%	\$ 955	2.47%	\$ 1,275	0.34%	\$ 4,414	2.61%
2020	\$ 2,271	3.98%	\$ 978	2.41%	\$ 1,325	3.89%	\$ 4,574	3.62%
2021	\$ 2,361	3.96%	\$ 1,002	2.45%	\$ 1,044	-21.18%	\$ 4,407	-3.64%
2022	\$ 2,455	3.98%	\$ 1,027	2.50%	\$ 1,099	5.27%	\$ 4,581	3.95%
2023	\$ 2,552	3.95%	\$ 1,052	2.43%	\$ 1,157	5.28%	\$ 4,761	3.93%
2024	\$ 2,654	4.00%	\$ 1,078	2.47%	\$ 1,218	5.27%	\$ 4,950	3.97%
2025	\$ 2,760	3.99%	\$ 1,105	2.50%	\$ 1,281	5.17%	\$ 5,146	3.96%
2026	\$ 2,871	4.02%	\$ 1,132	2.44%	\$ 1,348	5.23%	\$ 5,351	3.98%
2027	\$ 2,986	4.01%	\$ 1,159	2.39%	\$ 1,419	5.27%	\$ 5,564	3.98%
2028	\$ 3,106	4.02%	\$ 1,188	2.50%	\$ 1,492	5.14%	\$ 5,786	3.99%
2029	\$ 3,232	4.06%	\$ 1,217	2.44%	\$ 1,567	5.03%	\$ 6,016	3.98%
2030	\$ 3,363	4.05%	\$ 1,247	2.47%	\$ 1,647	5.11%	\$ 6,257	4.01%

A notable increase in TTF revenue between FY 2015 and FY 2016 is shown in Table 2-11. This is due to MDOT’s CTP budgeting practices. Historically, MDOT has been very conservative in budgeting the outer years of its CTP timeframe. Consistent with this practice, the later years of the CTP timeframe in this financial plan show negative or low growth. It is expected that as FY 2013, 2014, and 2015 are approached, MDOT’s CTP budget for those years will be revised upward to reduce the percentage increase associated with the projected FY 2016 revenue.

Figure 2-4 shows the MDOT forecast along with historical values dating back to FY 1981. This chart includes the aforementioned cost and revenue figures for the Purple Line, Red Line, and CCT. As indicated on the graph, the future revenue, operating, and capital cost projections are strongly consistent with past trends.



**Figure 2-4: MDOT Net Revenues and Expenditures (YOE \$ M)**



**B) MTA Federal Funds**

The forecast of the MTA’s future Federal funds used in this financial plan is conservative relative to the growth experienced in prior years. The MTA’s total Federal transit funds (excluding New Starts) were assumed to stay flat at their 2010 levels until FY 2015, and then they were escalated at an annual growth rate of 4.7% in FY 2016 and beyond (the MTA’s CMAQ funds were assumed to remain flat in the CTP timeframe and then grow at MDOT’s forecasted highway program annual growth rate of 5.3% beginning in FY 2016). As was shown in Table 2-10, Federal funds grew at an average annual growth rate of 6.82% from FY 2002 to FY 2009. This reinforces that the assumed growth rate of 4.7% (utilized by MDOT and the MTA) for these Federal transit funds is comparable to historical trends.

The MTA is also the designated recipient of Federal grants for Maryland’s Locally Operated Transit Systems (LOTS), as the MTA passes these funds on to the LOTS in addition to some State financial assistance. Table 2-12 delineates the MTA’s projected Federal fund receipts (including Federal funding utilized for operating and maintenance assistance that is categorized as an operating expense in the MTA budget).



**Table 2-12: MTA Federal Funds Forecast (NOMINAL \$ M)**

Fiscal Year	FTA Section 5307		FTA Section 5309 - FGM		FTA Section 5309 - Bus		Other Federal Funds*	
	Total	Annual Growth Rate	Total	Annual Growth Rate	Total	Annual Growth Rate	Total	Annual Growth Rate
2010	\$ 83		\$ 31		\$ 9		\$ 78	
2011	\$ 83	-	\$ 31	-	\$ 9	-	\$ 87	11.13%
2012	\$ 83	-	\$ 31	-	\$ 9	-	\$ 53	-38.66%
2013	\$ 83	-	\$ 31	-	\$ 9	-	\$ 54	1.39%
2014	\$ 83	-	\$ 31	-	\$ 9	-	\$ 55	1.44%
2015	\$ 83	-	\$ 31	-	\$ 9	-	\$ 56	1.48%
2016	\$ 86	4.70%	\$ 33	4.70%	\$ 10	4.70%	\$ 58	3.72%
2017	\$ 90	4.70%	\$ 34	4.70%	\$ 10	4.70%	\$ 60	3.74%
2018	\$ 95	4.70%	\$ 36	4.70%	\$ 11	4.70%	\$ 62	3.75%
2019	\$ 99	4.70%	\$ 38	4.70%	\$ 11	4.70%	\$ 64	3.77%
2020	\$ 104	4.70%	\$ 39	4.70%	\$ 12	4.70%	\$ 67	3.78%
2021	\$ 109	4.70%	\$ 41	4.70%	\$ 12	4.70%	\$ 69	3.80%
2022	\$ 114	4.70%	\$ 43	4.70%	\$ 13	4.70%	\$ 72	3.81%
2023	\$ 119	4.70%	\$ 45	4.70%	\$ 13	4.70%	\$ 75	3.83%
2024	\$ 125	4.70%	\$ 47	4.70%	\$ 14	4.70%	\$ 78	3.84%
2025	\$ 131	4.70%	\$ 49	4.70%	\$ 14	4.70%	\$ 81	3.86%
2026	\$ 137	4.70%	\$ 52	4.70%	\$ 15	4.70%	\$ 84	3.87%
2027	\$ 143	4.70%	\$ 54	4.70%	\$ 16	4.70%	\$ 87	3.89%
2028	\$ 150	4.70%	\$ 57	4.70%	\$ 17	4.70%	\$ 91	3.91%
2029	\$ 157	4.70%	\$ 59	4.70%	\$ 17	4.70%	\$ 94	3.92%
2030	\$ 164	4.70%	\$ 62	4.70%	\$ 18	4.70%	\$ 98	3.94%

\* Includes LOTS, CMAQ, Non-Urbanized Areas, and Other Miscellaneous Federal Funds

**2.2.5 MTA Capital Sources and Uses of Funds Forecast**

Figure 2-5 presents the MTA’s capital budget as a percentage of MDOT’s overall capital budget from FY 1981 to FY 2030. As was previously mentioned, MDOT has a strong history of allocating additional capital funding to the MTA during the construction of high priority capital projects as is evidenced during the construction of Metro’s “Section A” in 1981 and the simultaneous construction of Metro’s “Section C” and the Central Light Rail in 1992. Figure 2-5 indicates that the MTA’s projected percentage of the TTF’s capital budget during the construction of the Purple Line, Red Line, and CCT is reasonable when compared with historic precedent.



**Figure 2-5: MTA’s Percent Allocation of MDOT’s Capital Budget**

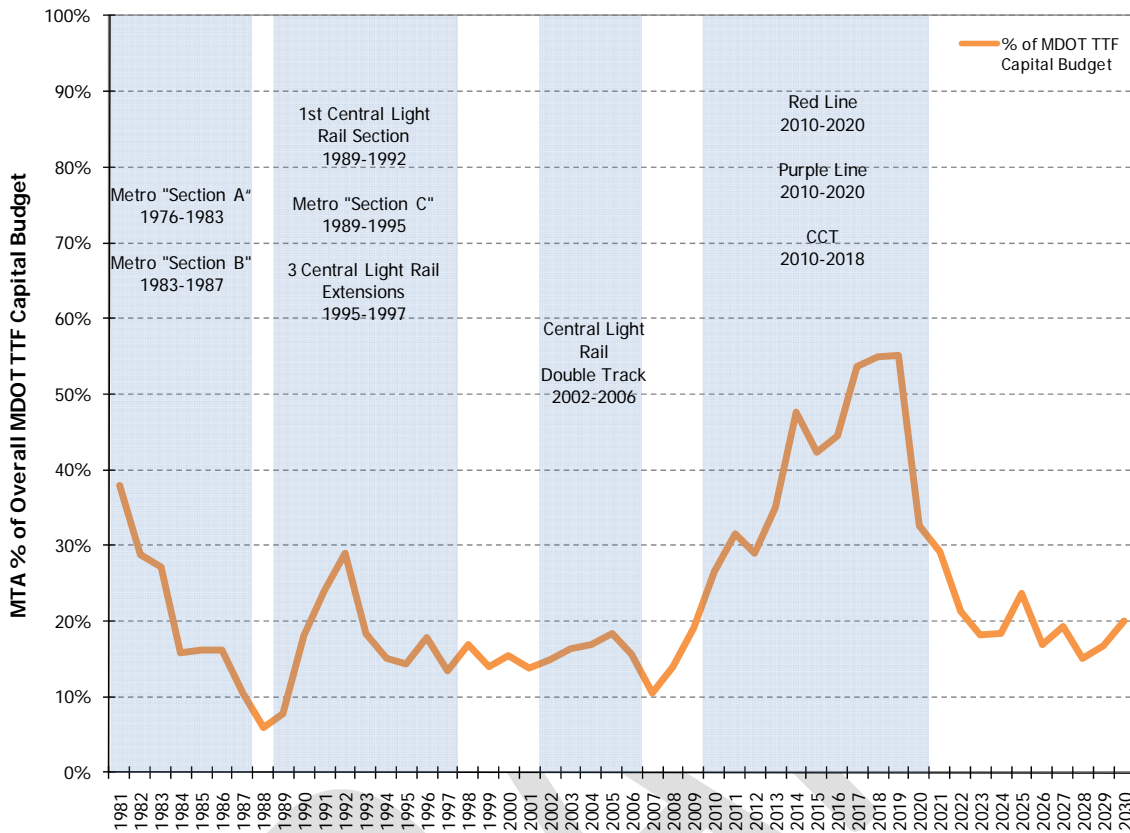


Table 2-13 delineates the MTA’s overall capital sources and uses of funds forecast through 2030. It should be noted that given MDOT’s practice of funding all operating and capital preservation needs prior to funding capital expansion projects, these MTA needs would be addressed in both the build and no build scenario.



**Table 2-13: MTA Capital Sources and Uses of Funds Through 2030 (YOE \$ M)**

CAPITAL SOURCES OF FUNDS	FY-10	FY-11	FY-12	FY-13	FY-14	FY-15	FY-16	FY-17	FY-18	FY-19	FY-20*	FY-21	FY-22	FY-23	FY-24	FY-25	FY-26	FY-27	FY-28	FY-29	FY-30	Total
<b>Federal Funding</b>																						
New Starts Grants for Purple Line	\$ -	\$ -	\$ 3	\$ -	\$ -	\$ 160	\$ 160	\$ 160	\$ 160	\$ 160	\$ 160	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 963
New Starts Grants for Red Line	\$ -	\$ 6	\$ 17	\$ 38	\$ 51	\$ 122	\$ 175	\$ 175	\$ 175	\$ 175	\$ 175	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,109
New Starts Grants for CCT (Illustrative)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 61	\$ 42	\$ 42	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 144
FTA Section 5307	\$ 83	\$ 83	\$ 83	\$ 83	\$ 83	\$ 83	\$ 86	\$ 90	\$ 95	\$ 99	\$ 104	\$ 109	\$ 114	\$ 119	\$ 125	\$ 131	\$ 137	\$ 143	\$ 150	\$ 157	\$ 164	\$ 2,319
FTA Section 5309 - Fixed Guideway Modernization	\$ 31	\$ 31	\$ 31	\$ 31	\$ 31	\$ 31	\$ 33	\$ 34	\$ 36	\$ 38	\$ 39	\$ 41	\$ 43	\$ 45	\$ 47	\$ 49	\$ 52	\$ 54	\$ 57	\$ 59	\$ 62	\$ 878
FTA Section 5309 Bus and Bus Facilities	\$ 9	\$ 9	\$ 9	\$ 9	\$ 9	\$ 9	\$ 10	\$ 10	\$ 11	\$ 11	\$ 12	\$ 12	\$ 13	\$ 13	\$ 14	\$ 14	\$ 15	\$ 16	\$ 17	\$ 17	\$ 18	\$ 257
Other Federal Formula Funds (LOTS, CMAQ, Non-Urbanized Areas, Other)	\$ 78	\$ 87	\$ 53	\$ 54	\$ 55	\$ 56	\$ 58	\$ 60	\$ 62	\$ 64	\$ 67	\$ 69	\$ 72	\$ 75	\$ 78	\$ 81	\$ 84	\$ 87	\$ 91	\$ 94	\$ 98	\$ 1,523
Transfer to O&M Budget	\$ (60)	\$ (60)	\$ (60)	\$ (61)	\$ (61)	\$ (61)	\$ (64)	\$ (67)	\$ (69)	\$ (72)	\$ (75)	\$ (79)	\$ (82)	\$ (86)	\$ (89)	\$ (93)	\$ (97)	\$ (101)	\$ (106)	\$ (110)	\$ (115)	\$ (1,668)
<b>Total Federal Funding</b>	<b>\$ 141</b>	<b>\$ 156</b>	<b>\$ 136</b>	<b>\$ 154</b>	<b>\$ 168</b>	<b>\$ 399</b>	<b>\$ 519</b>	<b>\$ 505</b>	<b>\$ 511</b>	<b>\$ 475</b>	<b>\$ 481</b>	<b>\$ 153</b>	<b>\$ 160</b>	<b>\$ 167</b>	<b>\$ 174</b>	<b>\$ 182</b>	<b>\$ 191</b>	<b>\$ 199</b>	<b>\$ 208</b>	<b>\$ 218</b>	<b>\$ 228</b>	<b>\$ 5,524</b>
<b>State Funding</b>																						
MTA System Preservation Funding from MDOT	\$ 287	\$ 166	\$ 194	\$ 161	\$ 120	\$ 102	\$ 56	\$ 170	\$ 107	\$ 263	\$ 355	\$ 412	\$ 292	\$ 235	\$ 246	\$ 383	\$ 231	\$ 296	\$ 195	\$ 248	\$ 351	\$ 4,870
MTA System Expansion Funding from MDOT	\$ 16	\$ 55	\$ 84	\$ 149	\$ 287	\$ 109	\$ 357	\$ 471	\$ 593	\$ 491	\$ (83)	\$ 32	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,561
<b>Total State Funding</b>	<b>\$ 303</b>	<b>\$ 221</b>	<b>\$ 278</b>	<b>\$ 310</b>	<b>\$ 407</b>	<b>\$ 211</b>	<b>\$ 413</b>	<b>\$ 641</b>	<b>\$ 700</b>	<b>\$ 754</b>	<b>\$ 272</b>	<b>\$ 444</b>	<b>\$ 292</b>	<b>\$ 235</b>	<b>\$ 246</b>	<b>\$ 383</b>	<b>\$ 231</b>	<b>\$ 296</b>	<b>\$ 195</b>	<b>\$ 248</b>	<b>\$ 351</b>	<b>\$ 7,431</b>
<b>TOTAL CAPITAL SOURCES OF FUNDS</b>	<b>\$ 445</b>	<b>\$ 377</b>	<b>\$ 414</b>	<b>\$ 464</b>	<b>\$ 575</b>	<b>\$ 610</b>	<b>\$ 931</b>	<b>\$ 1,146</b>	<b>\$ 1,211</b>	<b>\$ 1,229</b>	<b>\$ 753</b>	<b>\$ 596</b>	<b>\$ 452</b>	<b>\$ 402</b>	<b>\$ 421</b>	<b>\$ 565</b>	<b>\$ 421</b>	<b>\$ 495</b>	<b>\$ 403</b>	<b>\$ 466</b>	<b>\$ 579</b>	<b>\$ 12,955</b>
<b>CAPITAL USES OF FUNDS</b>																						
<b>Capital Preservation</b>																						
MTA System Preservation Capital Cost	\$ 428	\$ 316	\$ 310	\$ 277	\$ 237	\$ 220	\$ 179	\$ 298	\$ 241	\$ 403	\$ 501	\$ 564	\$ 452	\$ 402	\$ 421	\$ 565	\$ 421	\$ 495	\$ 403	\$ 466	\$ 579	\$ 8,178
<b>Total Capital Preservation</b>	<b>\$ 428</b>	<b>\$ 316</b>	<b>\$ 310</b>	<b>\$ 277</b>	<b>\$ 237</b>	<b>\$ 220</b>	<b>\$ 179</b>	<b>\$ 298</b>	<b>\$ 241</b>	<b>\$ 403</b>	<b>\$ 501</b>	<b>\$ 564</b>	<b>\$ 452</b>	<b>\$ 402</b>	<b>\$ 421</b>	<b>\$ 565</b>	<b>\$ 421</b>	<b>\$ 495</b>	<b>\$ 403</b>	<b>\$ 466</b>	<b>\$ 579</b>	<b>\$ 8,178</b>
<b>Capital Expansion</b>																						
Purple Line Capital Cost	\$ -	\$ -	\$ 30	\$ 38	\$ 154	\$ 237	\$ 215	\$ 354	\$ 442	\$ 378	\$ 79	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,925
Red Line Capital Cost	\$ -	\$ 13	\$ 34	\$ 54	\$ 73	\$ 154	\$ 451	\$ 410	\$ 445	\$ 449	\$ 136	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,219
CCT Capital Cost (Illustrative)	\$ 4	\$ 5	\$ 10	\$ 10	\$ 10	\$ -	\$ 83	\$ 83	\$ 83	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 289
MTA System Expansion Capital Cost	\$ 13	\$ 43	\$ 30	\$ 86	\$ 101	\$ -	\$ 3	\$ -	\$ -	\$ -	\$ 36	\$ 32	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 344
<b>Total Capital Expansion</b>	<b>\$ 16</b>	<b>\$ 61</b>	<b>\$ 104</b>	<b>\$ 187</b>	<b>\$ 338</b>	<b>\$ 391</b>	<b>\$ 753</b>	<b>\$ 848</b>	<b>\$ 969</b>	<b>\$ 826</b>	<b>\$ 252</b>	<b>\$ 32</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 4,777</b>
<b>TOTAL CAPITAL USES OF FUNDS</b>	<b>\$ 445</b>	<b>\$ 377</b>	<b>\$ 414</b>	<b>\$ 464</b>	<b>\$ 575</b>	<b>\$ 610</b>	<b>\$ 931</b>	<b>\$ 1,146</b>	<b>\$ 1,211</b>	<b>\$ 1,229</b>	<b>\$ 753</b>	<b>\$ 596</b>	<b>\$ 452</b>	<b>\$ 402</b>	<b>\$ 421</b>	<b>\$ 565</b>	<b>\$ 421</b>	<b>\$ 495</b>	<b>\$ 403</b>	<b>\$ 466</b>	<b>\$ 579</b>	<b>\$ 12,955</b>

\* The FY-20 negative value for the State Transportation Trust Funding Sources of Funds reflects the delayed reimbursement of New Starts Funds.

### 3 Operating Plan

This chapter describes how the MTA intends to fund the operating and maintenance costs associated with the Purple Line, the rest of the light rail system, and the other modes in the MTA's system. This discussion begins with a presentation of operating and maintenance costs estimates for the Purple Line and the rest of the MTA transit system. This is followed by a summary of ridership and operating revenues. Finally, this chapter presents the planned operating funding required from MDOT. Consistent with the Capital Plan presented in the previous chapter, this Operating Plan takes into account the impacts of the Red Line and the CCT on fare revenues and Operating and Maintenance (O&M) costs.

#### 3.1 Operating and Maintenance Costs for the Purple Line and the MTA

##### 3.1.1 Methodology

The O&M costs presented in this Financial Plan are based on the O&M cost models developed for the Purple Line. Details regarding the Purple Line O&M cost model and O&M costs results can be found in the *Purple Line Operations and Maintenance Cost Models report* and the *Purple Line Forecasts of O&M Costs report* (both dated August 16, 2010). The O&M cost model was developed consistent with FTA's (spring 2008) draft guidance for the estimation of operating and maintenance costs that is part of FTA's *Procedures and Technical Methods for Transit Project Planning*. As such, the cost model is based on a resource build-up approach that fully allocates each unit cost factor to a supply (Level of Service) variable for all directly operated MTA modes. Unit costs are further broken down by object class (operator's wages, other wages and salaries, fringe benefits, services, fuel & lubricants, tires and tubes, other materials and supplies, utilities, casualty/liability, miscellaneous expenses and expense transfer) so as to allow for the flexibility to inflate each object class differently. The financial analysis then multiplies each unit cost factor by the appropriate Level of Service (LOS) variable and applies inflation rates to each cost factor to bring the total O&M cost to YOE dollars. A similar methodology is used to calculate O&M cost resulting from the implementation of the Red Line.

##### 3.1.2 Purple Line Operating Plan

###### A) Purple Line Operating Assumptions

O&M costs for the Purple Line are based on the Locally Preferred Alternative (LPA) as presented in the Purple Line *Final Definition of Alternatives and Operating Plans* report (version 4, dated December 27, 2010). The Purple Line would be largely surface-running with one short (1/4 mile) tunnel section, one aerial section, and several underpasses and overpasses of busy roadways. It would operate mainly in dedicated or exclusive lanes. There are 21 stations planned for the project, three of which would be below grade, and three of which would be above grade. Purple Line service will operate every 6 minutes during peak hours and every 10 minutes off peak. The payment system would be an off-board fare collection with roving inspectors. Vehicles are assumed to be low-floor LRT vehicles with a capacity of 140 passengers. Table 3-1 summarizes the Purple Line LRT level of service.



**Table 3-1: Summary of Levels of Service for the Purple Line in FY 2020 and FY 2030**

	FY-20	FY-30
Annual Revenue Vehicles Miles	2,431,680	2,431,680
Annual Revenue Train Hours	74,500	74,500
Directional Track Miles	32.4	32.4
Daily Peak Vehicles	44	44

**B) Marginal Impact of Other Projects on Level of Service**

Four other projects are assumed to result in changes in LOS on the MTA system:

- The Red Line, which is assumed to affect the total amount of light rail and local bus service the MTA provides.
- The Corridor Cities Transitway (CCT), which is still in the planning process and for which a specific alternative, technology and operating plan are not yet defined.
- The addition of 25 peak period MARC vehicles in FY 2015 (the capital plan includes 54 new MARC railcars that are scheduled to be purchased in FY 2013 and FY 2014, 30 of which are for service expansion; this is expected to result in an increase of 25 peak vehicles).
- The addition of 18 peak period commuter buses in FY2011.

Table 3-2 below summarizes the changes in service levels for the MTA’s light rail and bus operations resulting from the implementation of the Red Line. More information on the Red Line operating plan is provided in the *Baltimore Red Line Definition of Alternatives and Operating Plans*, dated April 21, 2010.



**Table 3-2: Summary of Changes in MTA Levels of Service Resulting From the Red Line Implementation in FY 2020 and FY 2030**

	FY-20	FY-30
<b>Light Rail</b>		
Annual Revenue Vehicles Miles	1,908,756	2,019,302
Annual Revenue Train Hours	58,841	62,249
Directional Route Miles	29	32
Daily Peak Vehicles	28	32
Underground Stations	5	5
Moving Walkways	4	4
<b>MTA Local Bus</b>		
Annual Revenue Vehicles Miles	296,792	200,373
Annual Revenue Vehicles Hours	(19,101)	(30,194)
Daily Peak Vehicles	(37)	(46)

**C) Baseline Service Growth**

Based on forecasts of future demand, MTA local bus service and light rail baseline service are both expected to grow modestly through FY 2030, at annual rates that average 0.4% and 0.6%, respectively. Baseline service on Metro subway and commuter bus are assumed to remain constant over time. MTA’s paratransit (“Mobility”) service has been the agency’s fastest growing in the recent past and is expected to continue on that trend, as demand for this service increases. The average annual rate of growth in ridership on Mobility is forecast at 5.2% per year between 2009 and 2030, and accordingly, the paratransit level of service is assumed to grow to meet this demand.

**3.1.3 Purple Line O&M Cost**

Table 3-3 presents a breakdown of O&M cost for light rail, which is the only mode expected to be affected by the implementation of the Purple Line. The total Purple Line O&M cost is expected to equal \$28.5 million (2010 \$) in FY 2030, which corresponds to 3.2% of the total MTA O&M costs for that year.

While the initiation of the Purple Line service may result in different needs for certain bus routes on the WMATA, Ride-On and Prince George’s County’s bus systems, potential changes in the cost of providing these services are not taken into account in this analysis, as these modes are not operated by the MTA.



**Table 3-3: Purple Line Light Rail O&M Cost in FY 2030 (2010 \$)**

	Level of Service		Unit Cost	O&M Cost (2010 \$M)	
	No Build	Build		No Build	Build
<b>Light Rail</b>					
Annual Revenue Vehicles Miles	3,546,063	5,977,743	\$ 5.25	\$ 18.61	\$ 31.37
Annual Revenue Train Hours	87,041	161,541	\$ 115.82	\$ 10.08	\$ 18.71
Directional Track Miles	58	90	\$ 186,509.96	\$ 10.74	\$ 16.79
Daily Peak Vehicles	37	81	\$ 25,345.63	\$ 0.94	\$ 2.05
<b>Total MTA LRT O&amp;M Cost</b>				<b>\$ 40.37</b>	<b>\$ 68.91</b>
<b>Total Purple Line O&amp;M Cost</b>					<b>\$ 28.55</b>

### Inflation assumptions

Various inflation rates were applied to O&M unit costs based on several factors further described in Appendix D. Cost factors were escalated using general CPI inflation assumed to equal 2.50% per year with the exception of the following:

- **Operators Wages:** assumed to grow at 2.75% through FY 2011, grow to 5.58% in FY 2012, and then decrease to a long-term average of 2.47% per year through FY 2030. These rates are based on recent labor agreements.
- **Fringe Benefits:** assumed to grow at 11.00% per year through FY 2013 and then decline steadily by 2.00% a year until reaching a long-term annual growth rate of 4.00% per year.
- **Fuel and Lubricants:** assumed to grow at the rate forecasted by the Energy Information Administration for diesel fuel through 2030, as published in its 2010 Annual Energy Outlook dated December 2009. The forecast for FY 2010, FY 2011, and FY2012 equals -5.23%, 5.54%, and 5.04% respectively. The growth rate then ranges from 7.27% in FY 2013 down to 3.6% in FY 2030.

The resulting cost to operate and maintain the Purple Line in YOE dollars is estimated at \$42.5 million in the opening year (FY 2020) and \$57.7 million in FY 2030. This corresponds to an average annual escalation rate of 3.09% between FY 2020 and FY 2030 for the Purple Line.

#### **3.1.4 Systemwide O&M Cost**

##### **A) Recent Trends**

From FY 2003 through FY 2010, O&M expenses increased at an average rate of 6.8% per year. Growth in paratransit (“Mobility”) O&M expenses far outpaced that of all other modes, with an average rate of 20.2% per year. In FY 2010, paratransit was the third largest component of the MTA’s total O&M expenses behind local bus and commuter rail but in front of Metro and light rail. Local bus constitutes the largest O&M expense, representing a little under half of the MTA’s total O&M expenses. Table 3-4 presents these trends and breaks down O&M costs by mode between FY 2003 and FY 2010.

**Table 3-4: MTA Historical O&M Costs by Mode  
(YOE \$ M)**

MTA Mode	FY-03	FY-04	FY-05	FY-06	FY-07	FY-08	FY-09	FY-10	FY03-FY10 CAGR
<b>Light Rail</b>	\$ 35	\$ 34	\$ 36	\$ 36	\$ 40	\$ 37	\$ 33	\$ 39	
Annual Growth Rate		-2.36%	7.80%	-1.01%	10.57%	-5.78%	-11.43%	18.77%	1.91%
<b>Local Bus</b>	\$ 187	\$ 177	\$ 198	\$ 202	\$ 212	\$ 248	\$ 256	\$ 271	
Annual Growth Rate		-5.42%	11.96%	1.97%	4.95%	16.61%	3.50%	5.71%	5.41%
<b>Metro</b>	\$ 41	\$ 42	\$ 40	\$ 43	\$ 51	\$ 55	\$ 52	\$ 54	
Annual Growth Rate		2.11%	-3.28%	5.28%	18.73%	8.76%	-5.02%	2.52%	3.91%
<b>MARC</b>	\$ 59	\$ 66	\$ 68	\$ 73	\$ 77	\$ 94	\$ 109	\$ 108	
Annual Growth Rate		12.63%	3.24%	6.71%	5.65%	21.68%	16.63%	-0.70%	9.17%
<b>Commuter Bus</b>	\$ 22	\$ 25	\$ 30	\$ 32	\$ 35	\$ 41	\$ 39	\$ 40	
Annual Growth Rate		12.88%	18.62%	7.52%	7.81%	17.44%	-3.52%	1.50%	8.63%
<b>Mobility</b>	\$ 16	\$ 20	\$ 28	\$ 43	\$ 49	\$ 54	\$ 60	\$ 59	
Annual Growth Rate		23.19%	39.34%	52.07%	14.48%	11.76%	10.18%	-1.31%	20.23%
<b>Total O&amp;M Costs</b>	\$ 360	\$ 364	\$ 401	\$ 429	\$ 463	\$ 529	\$ 550	\$ 571	
Annual Growth Rate		1.10%	10.22%	6.75%	8.07%	14.23%	4.03%	3.85%	6.81%

Table 3-5 presents the historical level of service (measured in revenue vehicle hours) for the various MTA modes during the FY 2003 to FY 2010 time frame. This table demonstrates that while the historical compound annual growth rates (CAGRs) for O&M totaled 6.8% per year, the total revenue vehicle hours on the entire system grew by 3.3%. While some variances can be observed at the modal level, this illustrates that a sizeable proportion of this growth can be attributed to historical service increases.

Table 3-5 also shows that MARC service grew by 0.77% between FY 2003 and FY 2010, implying a growth in cost per revenue vehicle hour of 8.3%. Similarly, the growth in cost per revenue vehicle hour for commuter bus was 8.6% per year.

Finally, it should be noted that the volatility in light rail service levels during the FY 2004 to FY 2007 timeframe was the result of the implementation of the MTA's 9.4-mile Central Light Rail double tracking project.

**Table 3-5: MTA Historical Revenue Vehicle Hours by Mode**

MTA Mode	FY-03	FY-04	FY-05	FY-06	FY-07	FY-08	FY-09	FY-10	FY03-FY10 CAGR
<b>Light Rail</b>	176,887	122,634	89,811	110,722	139,783	137,628	139,189	159,693	
Annual Growth Rate		-30.67%	-26.77%	23.28%	26.25%	-1.54%	1.13%	14.73%	-1.45%
<b>Local Bus</b>	1,720,142	1,748,322	1,771,229	1,685,263	1,657,001	1,679,335	1,750,111	1,745,774	
Annual Growth Rate		1.64%	1.31%	-4.85%	-1.68%	1.35%	4.21%	-0.25%	0.21%
<b>Metro</b>	182,946	182,749	189,819	188,589	190,559	214,285	216,112	183,616	
Annual Growth Rate		-0.11%	3.87%	-0.65%	1.04%	12.45%	0.85%	-15.04%	0.05%
<b>MARC</b>	118,146	121,265	122,184	126,247	123,884	127,311	127,311	124,645	
Annual Growth Rate		2.64%	0.76%	3.33%	-1.87%	2.77%	0.00%	-2.09%	0.77%
<b>Commuter Bus</b>	150,605	146,512	150,500	157,694	169,010	168,766	156,363	150,796	
Annual Growth Rate		-2.72%	2.72%	4.78%	7.18%	-0.14%	-7.35%	-3.56%	0.02%
<b>Mobility</b>	300,966	295,742	426,088	642,584	786,742	906,829	932,219	961,725	
Annual Growth Rate		-1.74%	44.07%	50.81%	22.43%	15.26%	2.80%	3.17%	18.05%
<b>Total RVH</b>	<b>2,649,692</b>	<b>2,617,224</b>	<b>2,749,631</b>	<b>2,911,099</b>	<b>3,066,979</b>	<b>3,234,154</b>	<b>3,321,305</b>	<b>3,326,249</b>	
Annual Growth Rate		-1.23%	5.06%	5.87%	5.35%	5.45%	2.69%	0.15%	3.30%

Despite the economic downturn, the MTA was able to avoid core service cuts in FY 2008 and FY 2009 by taking aggressive steps to limit spending. In early FY 2009, the MTA eliminated over 60 positions, all from administrative functions. Also in FY 2009, the MTA implemented an overtime control program designed to reduce unscheduled overtime and increase operating efficiency. Through the end of the fiscal year, total overtime was reduced nearly 50% and regular time hours were increased, all while running more revenue miles of service. This trend continued through FY 2010 and FY 2011 as the program was fully implemented.

The Service Development department has made a goal of reducing scheduled overtime and non-revenue service time as part of their regular schedule revision process. From February 2008 to February 2009, the MTA cut deadhead mileage by 10% and increased revenue mileage 3%, while reducing scheduled overtime significantly.

Paratransit riders, who represent the largest marginal cost of service, have been educated on opportunities to use the MTA fixed-route system when possible; paratransit spending has slowed in FY2009 and even decreased in FY 2010. MTA's Operations management team has also implemented OpStat, a monthly statistics-driven session aimed at improving management and efficiency at the shift level.

### **B) MTA Systemwide O&M Cost Forecast**

Table 3-6 presents a summary of the unit costs fully allocated to the appropriate supply variables for all MTA modes. Unit costs for all modes were derived by using actual FY 2009 agency operating cost data, adjusted to 2010 dollars based on the inflation assumptions described above. All unit costs are presented in Table 3-6.



**Table 3-6: Fully Allocated Unit O&M Costs and Total MTA O&M Costs (2010 \$ M)**

	Total Unit Cost	FY-20		FY-30		Difference with No Build
		No Build	Build	No Build	Build	
<b>Local Bus</b>						
Annual Revenue Vehicles Miles	\$ 4.38	\$ 90.26	\$ 90.26	\$ 92.10	\$ 92.10	\$ -
Annual Revenue Vehicles Hours	\$ 62.03	\$ 114.95	\$ 114.95	\$ 119.65	\$ 119.65	\$ -
Daily Peak Vehicles	\$ 131,989.89	\$ 87.25	\$ 87.25	\$ 93.32	\$ 93.32	\$ -
<b>Total Local Bus O&amp;M Cost</b>		<b>\$ 292.46</b>	<b>\$ 292.46</b>	<b>\$ 305.07</b>	<b>\$ 305.07</b>	<b>\$ -</b>
<b>Light Rail</b>						
Annual Revenue Vehicles Miles	\$ 5.25	\$ 18.61	\$ 31.37	\$ 18.61	\$ 31.37	\$ 12.76
Annual Revenue Vehicles Hours	\$ 115.82	\$ 10.08	\$ 18.71	\$ 10.08	\$ 18.71	\$ 8.63
Directional Track Miles	\$ 186,509.96	\$ 10.74	\$ 16.79	\$ 10.74	\$ 16.79	\$ 6.04
Daily Peak Vehicles	\$ 25,345.63	\$ 0.94	\$ 2.05	\$ 0.94	\$ 2.05	\$ 1.12
<b>Total Light Rail O&amp;M Cost</b>		<b>\$ 40.37</b>	<b>\$ 68.91</b>	<b>\$ 40.37</b>	<b>\$ 68.91</b>	<b>\$ 28.55</b>
<b>Metro</b>						
Revenue Vehicle Miles	\$ 3.32	\$ 17.53	\$ 17.53	\$ 17.53	\$ 17.53	\$ -
Revenue Vehicle Hours	\$ 57.05	\$ 12.33	\$ 12.33	\$ 12.33	\$ 12.33	\$ -
Peak Vehicles	\$ 85,098.27	\$ 4.60	\$ 4.60	\$ 4.60	\$ 4.60	\$ -
Track Miles	\$ 707,185.59	\$ 20.79	\$ 20.79	\$ 20.79	\$ 20.79	\$ -
<b>Total Heavy Rail O&amp;M Cost</b>		<b>\$ 55.25</b>	<b>\$ 55.25</b>	<b>\$ 55.25</b>	<b>\$ 55.25</b>	<b>\$ -</b>
<b>Commuter Rail (MARC)</b>						
Revenue Vehicle Miles	\$ 1.24	\$ 7.08	\$ 7.08	\$ 7.08	\$ 7.08	\$ -
Revenue Vehicle Hours	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Peak Vehicles	\$ 130,292.14	\$ 19.15	\$ 19.15	\$ 19.15	\$ 19.15	\$ -
Purchased Transportation	N/A	\$ 109.20	\$ 109.20	\$ 109.20	\$ 109.20	\$ -
<b>Total MARC O&amp;M Cost</b>		<b>\$ 135.43</b>	<b>\$ 135.43</b>	<b>\$ 135.43</b>	<b>\$ 135.43</b>	<b>\$ -</b>
<b>Commuter Bus</b>						
Revenue Vehicle Miles	\$ 0.00	\$ 0.01	\$ 0.01	\$ 0.01	\$ 0.01	\$ -
Revenue Vehicle Hours	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Peak Vehicles	\$ 9,440.91	\$ 0.64	\$ 0.64	\$ 0.64	\$ 0.64	\$ -
Purchased Transportation	N/A	\$ 53.30	\$ 53.30	\$ 53.30	\$ 53.30	\$ -
<b>Total Commuter Bus O&amp;M Cost</b>		<b>\$ 53.95</b>	<b>\$ 53.95</b>	<b>\$ 53.95</b>	<b>\$ 53.95</b>	<b>\$ -</b>
<b>Paratransit ("Mobility")</b>						
Revenue Vehicle Miles	\$ 0.26	\$ 6.56	\$ 6.56	\$ 9.26	\$ 9.26	\$ -
Revenue Vehicle Hours	\$ 12.60	\$ 25.18	\$ 25.18	\$ 35.51	\$ 35.51	\$ -
Peak Vehicles	\$ 9,466.94	\$ 4.55	\$ 4.55	\$ 5.97	\$ 5.97	\$ -
Purchased Transportation	N/A	\$ 80.46	\$ 80.46	\$ 113.50	\$ 113.50	\$ -
<b>Total Paratransit ("Mobility") O&amp;M Cost</b>		<b>\$ 116.75</b>	<b>\$ 116.75</b>	<b>\$ 164.24</b>	<b>\$ 164.24</b>	<b>\$ -</b>
<b>Total MTA O&amp;M Cost</b>		<b>\$ 694.21</b>	<b>\$ 722.76</b>	<b>\$ 754.31</b>	<b>\$ 782.85</b>	<b>\$ 28.55</b>

Note: This Table excludes the impact of the Red Line and CCT projects. These are however included in the overall systemwide cash flows.

It should be noted that the MTA recently began converting its local bus fleet from older style diesel and clean diesel buses to diesel electric hybrid buses. The fleet conversion is scheduled to be completed by FY 2019. Based on performance to date, the hybrid buses have demonstrated excellent reliability and improved fuel economy, which has translated directly into lower operating costs. The hybrid buses are performing with approximately 30% better fuel economy than the diesel buses, resulting in significant savings in fuel. Based on Mean Distance Between



Service Failures (MDBSF) to date, the hybrid buses are more than twice as reliable as a diesel bus, resulting in lower maintenance costs. There are also significant savings from increased brake life (a factor of 3-4 times) and reduced engine wear due to the lower duty cycle. The MTA's bus operations department estimates that the operating cost savings to the MTA is \$8,000-\$10,000 per year (in 2010 \$) for a hybrid bus. For the purposes of being conservative, however, the future O&M cost savings of a more efficient bus fleet due to the hybrid buses is not factored into this financial plan.

The forecast of agency-wide O&M costs takes into account the impact of the Red Line, expected to open the same year as the Purple Line (FY 2020). The O&M cost of the Red Line is expected to be \$40.1 million (YOE) in FY 2020 increasing to \$56.5 million by FY 2030. Unlike the Purple Line, this Project does affect local bus service that is operated by the MTA in Baltimore. As such, the net O&M cost of the Red Line after taking into account local bus cost savings is estimated at \$32.9 million (YOE) in FY 2020 and \$41.8 million (YOE) in FY 2030.

Finally, solely for the purpose of this financial plan, a CCT is assumed to open in FY 2019, with an assumed O&M cost of \$19 million in YOE dollars (\$15 million in 2010 \$). The LPA, operating plan, and federal-state-local cost sharing arrangements for the CCT are not yet defined. As such, the O&M figures presented in this financial plan are merely a placeholder assumption until a CCT Locally Preferred Alternative is developed, and any financial impact of a potential CCT project will be refined in future iterations as the CCT project advances through the project planning and development process.

### **C) Purchased Transportation**

The MTA contracts with vendors for operating and maintaining a variety of its transportation services, including its commuter buses, commuter rail (MARC) and paratransit services. Below is a brief description of each service along with the assumption used in this Financial Plan for forecasting corresponding O&M costs.

#### *Commuter Rail (MARC)*

Commuter rail service is provided by CSX (on the Brunswick and Camden lines) and Amtrak (on the Penn line) under contract to the MTA. The MTA provides the equipment, and the contractors use their crews and personnel to operate the service on their private rail right-of-way. The MTA is charged for right-of-way access, crew and maintenance hours, replacement equipment and parts, and storage of vehicles in Baltimore, Washington, and Western Maryland. MARC service consists of three lines: the Penn Line from Perryville to Washington (DC), the Camden Line from Baltimore Camden Station to Washington (DC), and the Brunswick Line from Martinsburg (WV) to Washington (DC).

Based on travel demand modeling performed to date, this Financial Plan assumes that no increase in MARC service is required following the implementation of the New Starts projects. However, the overall demand forecasted for this service necessitates the addition of 25 vehicles in peak service in FY 2015. Other than this increase in service, the growth in future MARC O&M cost is driven entirely by inflation and by contractually defined change orders and surcharges. In FY 2008 and FY 2009, the MTA faced increasing MARC contract cost, mostly resulting from contract renegotiation, the implementation of various surcharges and inflation.

Despite a 0.7% decrease in total MARC O&M costs in FY 2010, this financial plan assumes that similar increases in MARC contract costs will continue to occur in the near term, with annual growth rates of 15% in FY 2011. In FY 2012, the MTA is expected to enter into renegotiation with one of its vendors, at which point this financial plan assumes that growth rates in MARC contract cost would decrease by about 2.00% per year until it reaches a level of 4.38%. This level corresponds to the six-year historical annual average growth rate in the Association of American Railroads railroad cost index. This assumption is consistent with the escalation clauses included in the contracts between MTA and Amtrak. It is important to note that this assumption is subject to contract renegotiations and can therefore vary depending on a number of factors. Overall, the compound annual growth rate in MARC cost is forecast to equal 5.88% between 2010 and 2030 excluding the increase in peak vehicles in FY 2015. When including the increase in service in FY 2015, the compound annual growth rate increases to 6.69%.

#### *Commuter Buses*

MTA contracts with three bus operators to provide commuter bus service statewide. The commuter bus service provides 18 commuter bus routes that use private contractors to operate over-the-road coaches on long distance routes serving downtown Baltimore and Washington employment destinations.

No significant changes in LOS are envisioned for commuter buses, except for the additional 18 peak vehicles in FY 2011. A baseline 6.97% annual growth rate was applied throughout the financial planning horizon to the actual FY 2009 O&M cost amount. This corresponds to the rate of growth in O&M cost per revenue vehicle hours experienced between 2002 and 2009. Most of this cost growth can be explained by fuel costs and increased per mile trip costs.

#### *Paratransit (Mobility)*

MTA operates a paratransit system, consistent with the federal mandate of the Americans with Disabilities Act of 1990. Mobility currently contracts for 80% of paratransit service with three third-party providers. These vendors provide labor resources for paratransit service, while also maintaining MTA-owned equipment leased to them. The remaining 20% of the service is provided by in-house MTA operators. Certification, scheduling, and maintenance overhead are provided by MTA. This delivery mix has helped to create competition and is a key component to the overall performance enhancements.

In 2007-2008, MTA completely overhauled the paratransit system with additional vehicles, improved operations technology, real-time data collection for enhanced service reporting and planning, and increased staffing in the call and control centers. This overhaul included the purchase of 64 new transit buses, 26 of which were used to retire old vehicles, and 38 were added to the fleet.

In the past four years, Mobility purchased transportation has experienced double digits growth rates in ridership. In FY 2009, it increased by 13%, from 860,000 riders to 970,000. Given this dramatic increase, the associated O&M cost is also assumed to grow at the rate of ridership plus an additional 2.50% to account for general inflation. Ridership for Mobility is forecasted to increase by 12% through FY 2011, followed by 10% in FY 2012 and FY 2013, 7.5% in FY 2014



and FY 2015, 5% in FY 2016 and FY 2017 and then stabilize at a long-term growth rate of 3.5% through FY 2030. These estimates reflect the increase in service over time, as well as the general demographic trend of increased travel market size for this service.

#### **D) Other O&M Cost Items**

The O&M cost forecast presented in the Operating Plan also includes the following two items:

- Statewide assistance to Locally Operated Transit Systems (LOTS): The MTA provides funding and statewide assistance in support of LOTS in each of Maryland's 23 counties Baltimore City, Annapolis and Ocean City. Additional information on LOTS was presented in Section 1.2. Consistent with MTA's past experience, federal grants that the MTA receives on behalf of the LOTS are assumed to be passed through to the respective locally operated transit systems. It is also assumed that the MTA will continue to provide the LOTS with State TTF funds for capital preservation expenditures, consistent with historical practice.
- Union Past Pension: this O&M expense represents pension benefits paid to retired MTA union employees that are not included in the Purple Line project's O&M cost model (the project is not expected to have an impact on these expenses). Actual union past pension expenses for FY 2009 totaled \$23 million. The Financial Plan assumes that this expense will grow at the historical average annual rate of 8.35% per year experienced between FY 2000 and FY 2009.

MTA systemwide O&M costs are presented in Figure 3-1 where they are broken down by mode. Excluding LOTS assistance, total O&M expenses are forecasted to increase by an average annual rate of 6.17% between FY 2010 and FY 2030. This growth rate is just 0.64% lower than the 6.81% growth in O&M cost experienced between FY 2003 and FY 2010, even though the MTA plans less service expansion going forward and plans to continue implementing the combination of cost containment measures described above. Moreover, as further described in Appendix D, many inflation assumptions assumed in this Financial Plan are considered to be reasonably conservative by historical standards.



**Figure 3-1: MTA O&M Costs, 2010-2030 (YOE \$ M)**

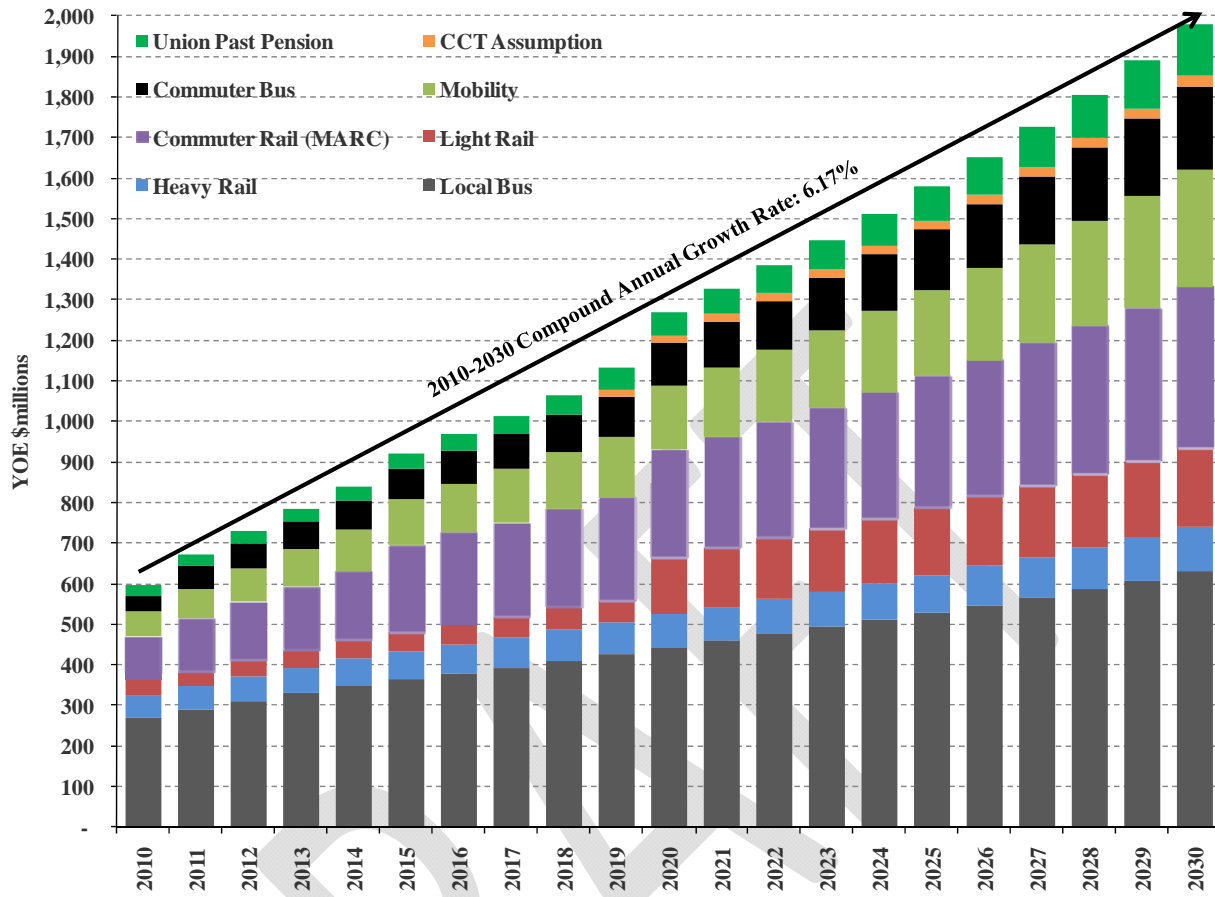


Table 3-12 at the end of this chapter complements the above chart and provides the year by year O&M cost forecast through FY 2030.





## **3.2 Ridership and Operating Revenues**

The Purple Line is expected to open for revenue service in FY 2020. Ridership and fare revenues resulting from the implementation of the Purple Line are presented below and are based on outputs from the Metropolitan Washington Council of Governments (MWCOG) travel demand model. The ridership impacts of the Red Line were also taken into account and are based on results from the Baltimore Metropolitan Council (BMC) travel demand model as the project is located in Baltimore. A placeholder assumption is used for CCT fare revenue impacts. More information on ridership forecast results and methodology can be found in the *Purple Line Travel Forecasting Reports*.

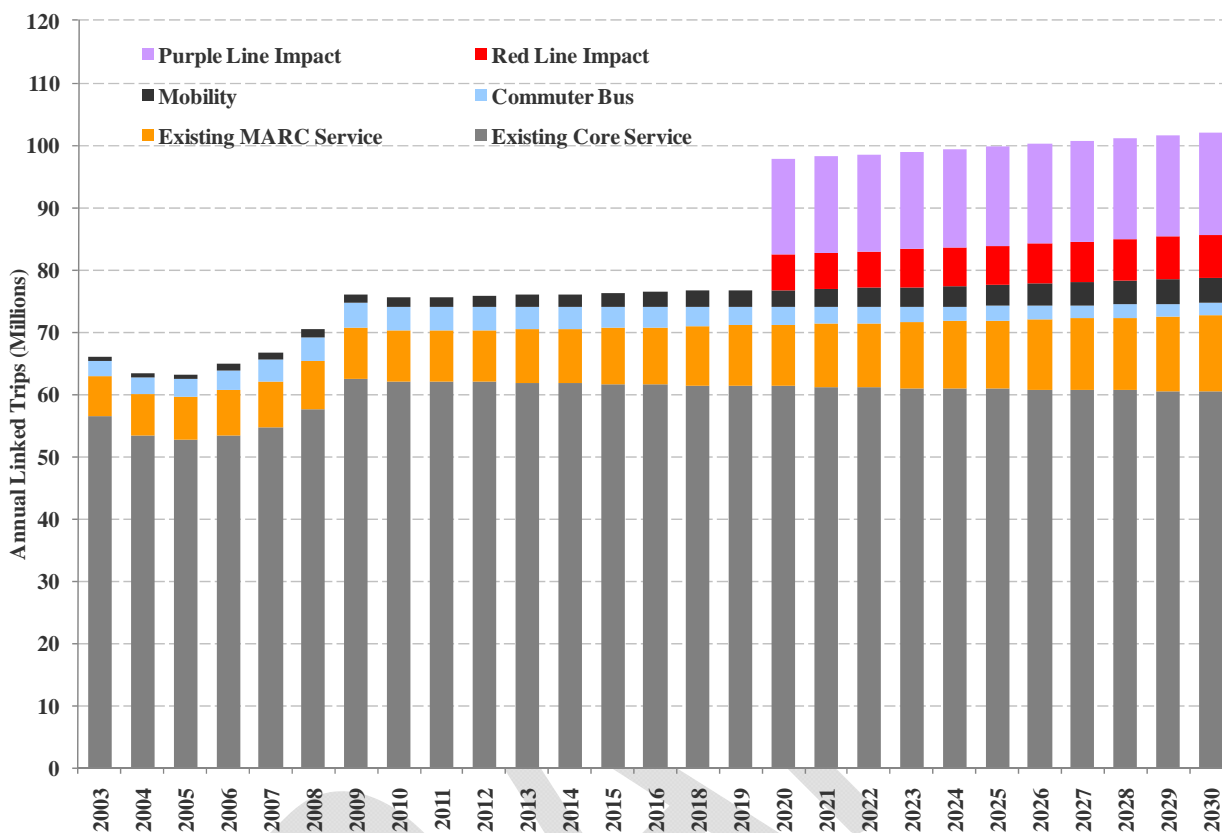
### ***3.2.1 Ridership Forecast***

The impact of the Purple Line on MTA ridership is presented in Figure 3-2. Its implementation is expected to result in a net gain in ridership, with annual boardings (excluding the special event trips) in 2030 forecasted at 16.5 million.

Figure 3-2 also includes incremental ridership resulting from the Red Line. This project will improve connectivity between the east-west corridor and existing transit services like the Metro Subway, Central Light Rail, and MARC. As such, the number of boardings on heavy rail and commuter rail modes are both expected to increase modestly after the Red Line is placed into service. Some of the MTA's local bus routes will also be restructured into routes that feed into the Red Line. The net impact of the Red Line is an increase in annual linked trips on the MTA system of about 6 million trips in the opening year and 8 million trips by 2030.



**Figure 3-2: MTA Systemwide Annual Linked Trips, 2003-2030**



Note: Annual linked trips on core service between 2003 and 2009 was obtained by applying the growth rate in unlinked passenger trips for MTA local bus, light rail and Metro (Heavy rail) during the same time period.

### 3.2.2 Fare Revenues

#### A) Fare Revenues from the Purple Line

The implementation of the Purple Line is expected to result in incremental ridership and fare revenues on the MTA system. The fare policy and fare structure of the Purple Line is assumed to be consistent with WMATA’s Metrobus system. For the purposes of this financial plan, light rail fare revenues received by the MTA include the following trips and average fare assumptions:

- People using the Purple Line as the first or only segment of their trip will be charged a full fare, assumed to equal \$1.30 in 2010 dollars.
- People using Metrobus, TheBus in Prince George’s County or Ride-On in Montgomery County as the first segment of their trip will have free transfers to the Purple Line and not be charged a fare.
- People using Metrorail as the first segment of their trip and transferring to the Purple Line will be charged a transfer fare of \$0.50 in 2010 dollars.



The average fare assumptions above are consistent with those used in the travel demand model used to develop the Purple Line ridership forecast. Table 3-7 summarizes ridership and fare revenue estimates from the regional travel demand model for the Purple Line in FY 2020 and FY 2030. As shown in this table, the opening year ridership is expected to be equal to 93% of the ridership in the forecast year, showing a strong demand in the existing travel market in this area.

**Table 3-7: 2020 and 2030 Purple Line Ridership and Fare Revenues**

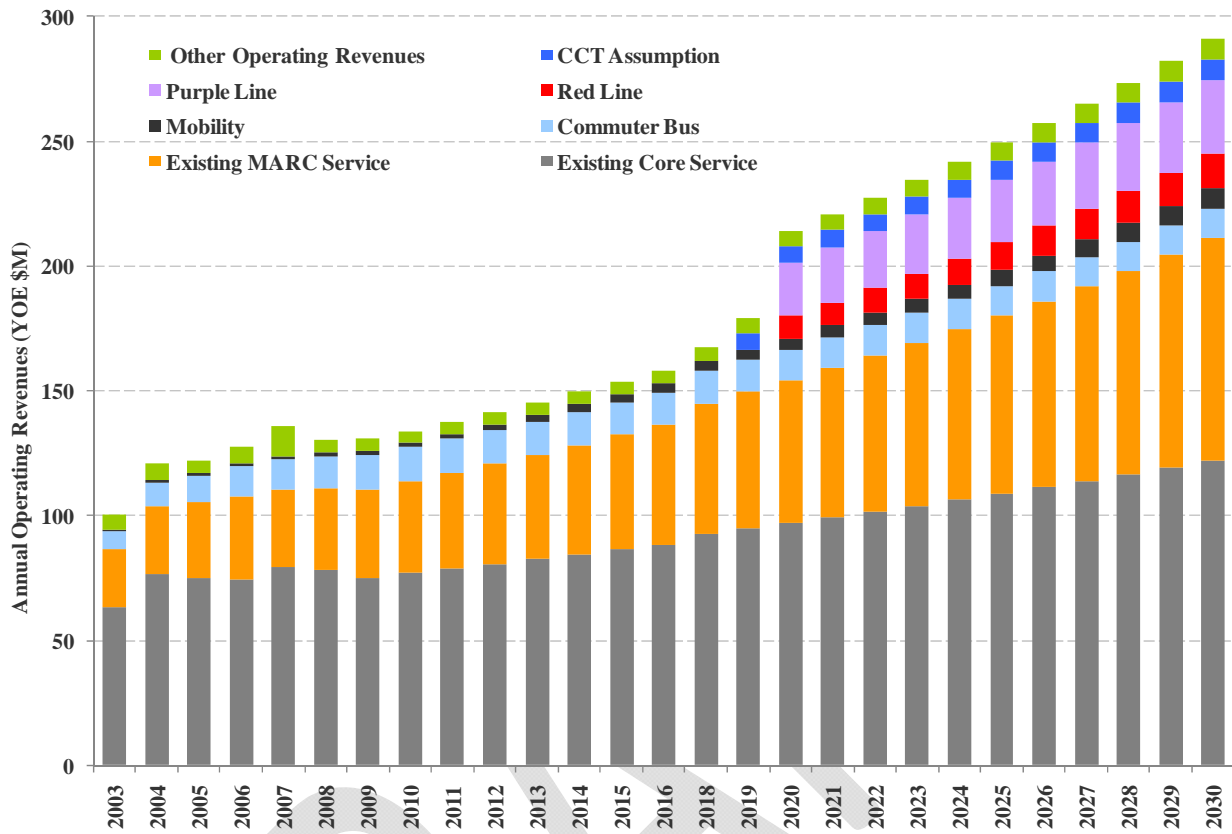
	FY-2020	FY-2030
<b>Annual Boardings (millions)</b>	15.37	16.50
<b>MTA Fare Revenues (2010 \$ M)</b>	\$ 16.69	\$ 18.18
<b>Fare Revenues to MTA (YOE \$ M)</b>	\$ 21.27	\$ 29.19

*Note: Ridership and revenues derived from special event trips are not included in the figures above.*

In this financial plan, all average fares were assumed to increase each year with general inflation of 2.50% per year. This is in line with the trend of past experience, as the MTA has a long history of increasing fares over time and the current regular fares for MTA core service are approximately equal to the inflation adjusted values of 1989 fares. Regular fares on MTA core service were raised in 1989, 1991, 1993, and 1996. The last fare increase on MTA's core service occurred in 2003 when regular fares increased by about 20% for the three modes. The last fare increase for MARC and commuter bus was also in 2003, when fares were raised by 23.5%. Figure 3-3 presents revenues generated following the implementation of the Purple Line in nominal terms on an annual basis. Figure 3-3 also presents operating revenues broken down by service.



**Figure 3-3: Annual Operating Revenues, 2002-2030 (NOMINAL \$ M)**



**B) MTA Core System Fare Revenues**

MTA’s core system is comprised of local bus, Metro, and light rail operating in the City of Baltimore. Table 3-7 presents the fare structure on the core system, which has been in place since July 1, 2003. One-way fares can only be used once but passes can be used for all local transit service and may be used multiple times on multiple modes over the course of a passenger trip.

**Table 3-8: MTA Core Service Existing Fare Structure**

ONE-WAY		DAY PASS		WEEKLY PASS	MONTHLY PASS	
Full Fare	Sr./Dis.	Full Fare	Sr./Dis.	Full Fare	Full Fare	Sr./Dis.
\$ 1.60	\$ 0.55	\$ 3.50	\$ 1.20	\$ 16.50	\$ 64.00	\$ 16.50

Since 76% of MTA core system fare revenues are generated from passes, fare revenue projections for the core system are based on forecasted linked trips, which aggregate revenues from the three core service modes. Fare revenue projections for commuter rail, commuter bus and paratransit are calculated separately using the number of boarding and an average fare per boarding.

### C) Incremental Fare Revenues from Other Projects

#### *Red Line*

Consistent with the travel demand model methodology, the financial plan assumes that the fare policy for the Red Line is identical to the one currently in place on the MTA's core service. In its opening year (FY 2020), the Red Line is expected to increase MTA fare revenues by \$12.1 million (YOE).

#### *Corridor Cities Transitway*

Because there is not yet an LPA for the CCT, a placeholder assumption was used for the CCT's fare revenues. The MTA's statutory 35% farebox recovery requirement was applied to the placeholder assumption of the CCT's O&M cost figure (described in the previous Section). This assumption will continue to be refined in future iterations of this Financial Plan and as the CCT progresses through the project development process.

Table 3-9 presents an annual forecast of fare revenues, trips and average fare for the various services described above.

#### **3.2.3 Other Operating Revenues**

The MTA also receives operating revenues from a variety of other sources including advertising, citations, building rentals, BWI airport parking lease and other parking facilities. In 2008, revenues from these sources totaled about \$5 million, which corresponds to about 4% of total operating revenues in that year. The financial plan assumes that revenues from each of these sources will increase at the rate of general inflation assumed to equal 2.50% per year with the exception of advertising revenues, which is assumed to equal 1% of total annual fare revenues. This assumption is consistent with recent historical experience. Along with fare revenues, these other operating revenues are shown in Figure 3-3.

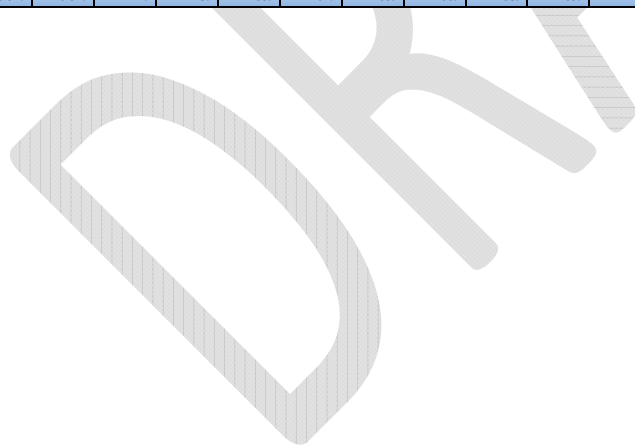


**Table 3-9: Ridership and Fare Revenues: Historical and Forecast (NOMINAL \$ M)**

	FY-03*	FY-04*	FY-05*	FY-06*	FY-07*	FY-08*	FY-09*	FY-10	FY-11	FY-12	FY-13	FY-14	FY-15	FY-16	FY-17	FY-18	FY-19	FY-20	FY-21	FY-22	FY-23	FY-24	FY-25	FY-26	FY-27	FY-28	FY-29	FY-30	
<b>Fare Revenues</b>																													
Core Service (Existing System)	\$63.44	\$76.43	\$75.04	\$74.27	\$79.43	\$78.59	\$75.26	\$77.02	\$78.81	\$80.65	\$82.53	\$84.46	\$86.43	\$88.44	\$90.51	\$92.62	\$94.78	\$96.99	\$99.25	\$101.57	\$103.94	\$106.36	\$108.85	\$111.39	\$113.98	\$116.64	\$119.36	\$122.15	
MARC (Existing System)	\$23.23	\$27.26	\$30.50	\$33.62	\$30.83	\$32.44	\$35.24	\$36.83	\$38.50	\$40.24	\$42.06	\$43.96	\$45.95	\$48.03	\$50.20	\$52.47	\$54.84	\$57.32	\$59.91	\$62.62	\$65.45	\$68.41	\$71.51	\$74.74	\$78.12	\$81.65	\$85.34	\$89.20	
Commuter Bus	\$7.20	\$9.60	\$10.38	\$11.98	\$12.25	\$12.85	\$13.64	\$13.55	\$13.46	\$13.36	\$13.27	\$13.18	\$13.09	\$13.00	\$12.91	\$12.82	\$12.73	\$12.64	\$12.55	\$12.46	\$12.37	\$12.28	\$12.19	\$12.10	\$12.01	\$11.92	\$11.83	\$11.74	
Paratransit ("Mobility")	\$0.79	\$0.91	\$0.99	\$1.40	\$1.43	\$1.63	\$1.62	\$1.86	\$2.13	\$2.40	\$2.71	\$2.99	\$3.29	\$3.54	\$3.81	\$4.04	\$4.29	\$4.55	\$4.83	\$5.12	\$5.43	\$5.76	\$6.11	\$6.48	\$6.88	\$7.30	\$7.74	\$8.21	
Red Line Impact on System	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
Purple Line	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
CCT Assumption (Illustrative)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$6.56	\$6.72	\$6.89	\$7.06	\$7.24	\$7.42	\$7.60	\$7.79	\$7.99	\$8.39	\$8.60	
<b>Total Fare Revenues</b>	<b>\$ 94.67</b>	<b>\$ 114.20</b>	<b>\$ 116.90</b>	<b>\$ 121.27</b>	<b>\$ 123.95</b>	<b>\$ 125.51</b>	<b>\$ 125.76</b>	<b>\$ 129.25</b>	<b>\$ 132.90</b>	<b>\$ 136.66</b>	<b>\$ 140.57</b>	<b>\$ 144.58</b>	<b>\$ 148.76</b>	<b>\$ 153.01</b>	<b>\$ 157.43</b>	<b>\$ 161.95</b>	<b>\$ 173.20</b>	<b>\$ 211.28</b>	<b>\$ 217.78</b>	<b>\$ 224.52</b>	<b>\$ 231.50</b>	<b>\$ 238.75</b>	<b>\$ 246.26</b>	<b>\$ 254.05</b>	<b>\$ 262.13</b>	<b>\$ 270.51</b>	<b>\$ 279.20</b>	<b>\$ 288.22</b>	
<b>Annual Growth Rate</b>		<b>20.64%</b>	<b>2.36%</b>	<b>3.74%</b>	<b>2.21%</b>	<b>1.26%</b>	<b>0.20%</b>	<b>2.78%</b>	<b>2.82%</b>	<b>2.83%</b>	<b>2.87%</b>	<b>2.85%</b>	<b>2.89%</b>	<b>2.86%</b>	<b>2.89%</b>	<b>2.87%</b>	<b>6.95%</b>	<b>21.99%</b>	<b>3.08%</b>	<b>3.09%</b>	<b>3.11%</b>	<b>3.13%</b>	<b>3.15%</b>	<b>3.16%</b>	<b>3.18%</b>	<b>3.20%</b>	<b>3.21%</b>	<b>3.23%</b>	
<b>Ridership</b>																													
Passenger Trips																													
Existing Core Service	56.5	53.4	52.7	53.4	54.6	57.5	62.5	62.4	62.3	62.2	62.1	62.0	61.9	61.8	61.7	61.6	61.5	61.4	61.3	61.2	61.1	61.0	60.9	60.8	60.7	60.6	60.5	60.4	
MARC (Existing Service)	6.3	6.7	6.9	7.3	7.5	7.9	8.1	8.2	8.4	8.6	8.7	8.9	9.1	9.3	9.4	9.6	9.8	10.0	10.2	10.4	10.6	10.8	11.0	11.3	11.5	11.7	11.9	12.2	
Commuter Bus	2.6	2.7	2.9	3.2	3.4	3.7	4.0	3.8	3.7	3.6	3.5	3.4	3.3	3.2	3.1	3.0	2.9	2.7	2.6	2.6	2.5	2.4	2.3	2.3	2.2	2.1	2.0	2.0	
Paratransit ("Mobility")	0.6	0.6	0.6	1.1	1.2	1.4	1.4	1.6	1.8	2.0	2.2	2.4	2.5	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.6	3.7	3.8	4.0	4.1	4.2	4.4	
Red Line Impact on System	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2	6.4	6.5	6.7	6.8	7.0	7.1	7.3	7.4	7.6	7.7	
Purple Line	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.4	15.5	15.6	15.7	15.8	15.9	16.0	16.1	16.3	16.4	16.5	
<b>Total Passenger Trips</b>	<b>66.1</b>	<b>63.4</b>	<b>63.2</b>	<b>64.9</b>	<b>66.7</b>	<b>70.5</b>	<b>76.0</b>	<b>76.1</b>	<b>76.3</b>	<b>76.4</b>	<b>76.6</b>	<b>76.7</b>	<b>76.8</b>	<b>76.9</b>	<b>77.1</b>	<b>77.1</b>	<b>77.2</b>	<b>98.9</b>	<b>99.2</b>	<b>99.6</b>	<b>100.0</b>	<b>100.4</b>	<b>100.9</b>	<b>101.3</b>	<b>101.8</b>	<b>102.2</b>	<b>102.7</b>	<b>103.2</b>	
<b>Annual Growth Rate</b>		<b>-4.10%</b>	<b>-0.33%</b>	<b>2.77%</b>	<b>2.73%</b>	<b>5.64%</b>	<b>7.91%</b>	<b>0.14%</b>	<b>0.18%</b>	<b>0.17%</b>	<b>0.20%</b>	<b>0.17%</b>	<b>0.19%</b>	<b>0.13%</b>	<b>0.15%</b>	<b>0.11%</b>	<b>0.13%</b>	<b>27.98%</b>	<b>0.38%</b>	<b>0.39%</b>	<b>0.40%</b>	<b>0.41%</b>	<b>0.42%</b>	<b>0.43%</b>	<b>0.44%</b>	<b>0.45%</b>	<b>0.47%</b>	<b>0.48%</b>	
<b>Average Fare**</b>																													
Core Service	\$1.12	\$1.43	\$1.42	\$1.39	\$1.45	\$1.37	\$1.20	\$1.23	\$1.26	\$1.30	\$1.33	\$1.36	\$1.40	\$1.43	\$1.47	\$1.50	\$1.54	\$1.58	\$1.62	\$1.66	\$1.70	\$1.74	\$1.79	\$1.83	\$1.88	\$1.92	\$1.97	\$2.02	
Commuter Rail (MARC)	\$3.67	\$4.07	\$4.43	\$4.62	\$4.11	\$4.11	\$4.36	\$4.47	\$4.58	\$4.70	\$4.81	\$4.93	\$5.06	\$5.18	\$5.31	\$5.45	\$5.58	\$5.72	\$5.86	\$6.01	\$6.16	\$6.32	\$6.47	\$6.64	\$6.80	\$6.97	\$7.15	\$7.32	
Commuter Bus	\$2.79	\$3.56	\$3.52	\$3.75	\$3.64	\$3.46	\$3.44	\$3.52	\$3.61	\$3.70	\$3.79	\$3.89	\$3.99	\$4.09	\$4.19	\$4.29	\$4.40	\$4.51	\$4.62	\$4.74	\$4.86	\$4.98	\$5.10	\$5.23	\$5.36	\$5.49	\$5.63	\$5.77	
Paratransit ("Mobility")	\$1.22	\$1.47	\$1.61	\$1.32	\$1.16	\$1.17	\$1.12	\$1.14	\$1.17	\$1.20	\$1.23	\$1.26	\$1.29	\$1.33	\$1.36	\$1.39	\$1.43	\$1.46	\$1.50	\$1.54	\$1.58	\$1.62	\$1.66	\$1.70	\$1.74	\$1.78	\$1.83	\$1.87	
Purple Line	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1.38	\$1.42	\$1.45	\$1.49	\$1.53	\$1.56	\$1.60	\$1.64	\$1.68	\$1.73	\$1.77	
<b>Total Average Fare</b>	<b>\$ 1.43</b>	<b>\$ 1.80</b>	<b>\$ 1.85</b>	<b>\$ 1.87</b>	<b>\$ 1.86</b>	<b>\$ 1.78</b>	<b>\$ 1.65</b>	<b>\$ 1.70</b>	<b>\$ 1.74</b>	<b>\$ 1.79</b>	<b>\$ 1.84</b>	<b>\$ 1.89</b>	<b>\$ 1.94</b>	<b>\$ 1.99</b>	<b>\$ 2.04</b>	<b>\$ 2.10</b>	<b>\$ 2.24</b>	<b>\$ 2.14</b>	<b>\$ 2.19</b>	<b>\$ 2.25</b>	<b>\$ 2.31</b>	<b>\$ 2.38</b>	<b>\$ 2.44</b>	<b>\$ 2.51</b>	<b>\$ 2.58</b>	<b>\$ 2.65</b>	<b>\$ 2.72</b>	<b>\$ 2.79</b>	
<b>Annual Growth Rate</b>		<b>25.80%</b>	<b>2.70%</b>	<b>0.94%</b>	<b>-0.51%</b>	<b>-4.14%</b>	<b>-7.15%</b>	<b>2.63%</b>	<b>2.64%</b>	<b>2.65%</b>	<b>2.66%</b>	<b>2.68%</b>	<b>2.69%</b>	<b>2.72%</b>	<b>2.73%</b>	<b>2.76%</b>	<b>6.81%</b>	<b>-4.69%</b>	<b>2.68%</b>	<b>2.69%</b>	<b>2.70%</b>	<b>2.70%</b>	<b>2.71%</b>	<b>2.72%</b>	<b>2.72%</b>	<b>2.73%</b>	<b>2.74%</b>	<b>2.74%</b>	

\*Actual Historic Data

\*\*Actual Dollar Amount; Not in Millions





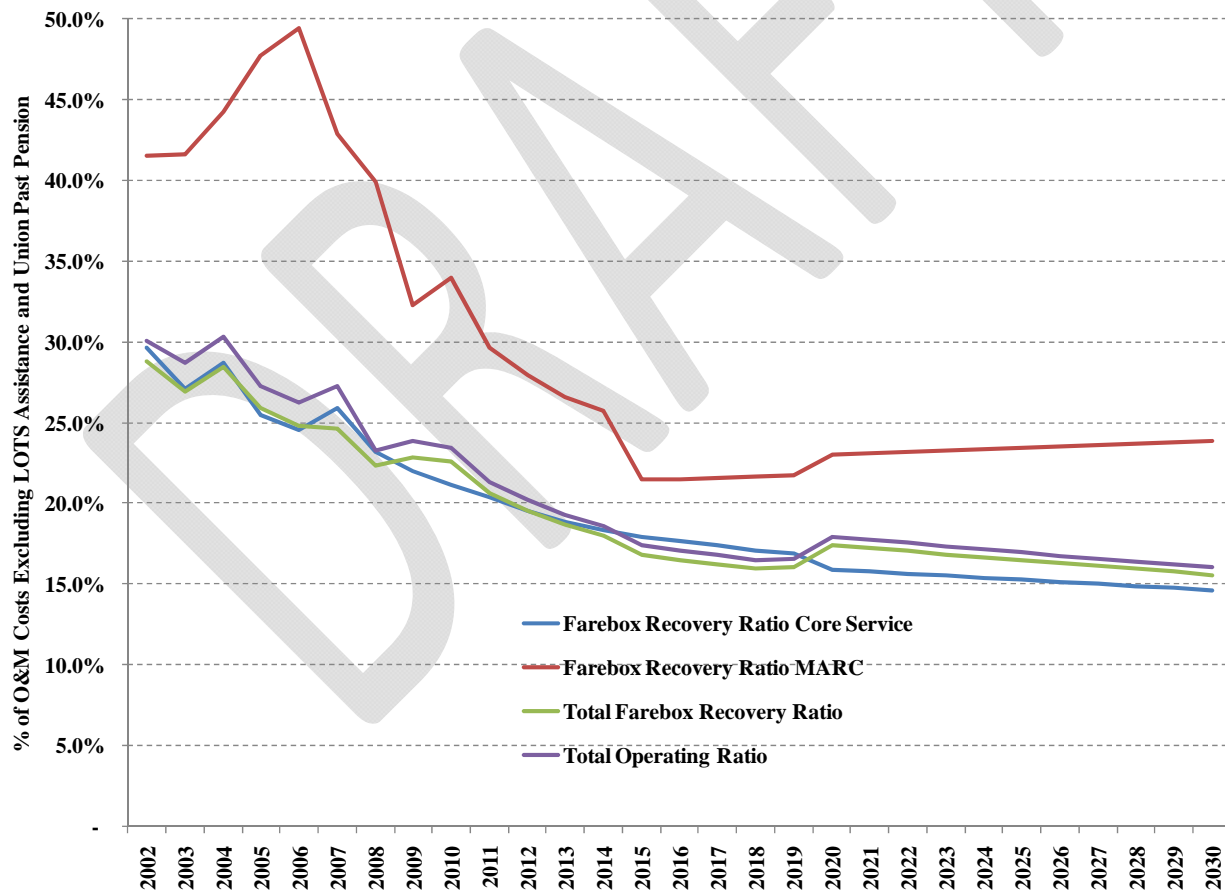
### 3.3 Operating Plan for the Maryland Transit Administration

As mentioned previously, the MTA was able to avoid core service cuts despite the economic downturn through aggressive cost containment measures. Combined with reliable operating subsidies from MDOT, the MTA did not need to raise fares in FY 2010 despite a challenging economic environment in most metropolitan areas around the country.

#### 3.3.1 Farebox Recovery Ratio

In FY 2009, the MTA’s operating revenues (described in the previous section) are estimated to have covered approximately 23% of total O&M expenses (excluding LOTS assistance and past pension liability). Figure 3-4 presents the historical and forecasted farebox recovery ratio for MTA core service, MARC and the agency-wide total (which includes paratransit). The declining recovery ratio for core service (which drives in large part the agency-wide ratio) illustrates how this Financial Plan forecasts O&M expenses to grow at a faster rate than operating revenues.

**Figure 3-4: Farebox Recovery and Operating Ratios (Measured as % of Primary O&M Expenses)**



*Note: The measurement of farebox recovery ratios may differ from that used by MTA for statutory requirement purposes in its report to the General Assembly*

The remainder of the MTA's operating and maintenance funds come from non-operating revenues. A presentation and forecast for those sources of funds is described below.

### ***3.3.2 MTA Non-Operating Revenue Forecast***

The MTA's non-operating revenue is obtained from Federal funds and funding from the MDOT TTF. The Federal funds utilized by the MTA for O&M come from the portion of MTA's annual FTA Section 5307 and FTA Section 5309 Fixed Guideway Modernization formula funds that is allocated annually for preventative maintenance. The funding from MDOT's TTF addresses all remaining MTA O&M costs.

#### **A) Federal Funds**

As stated previously, the MTA allocates a certain portion of its Federal funds (including FTA Section 5307 and FTA Section 5309 Fixed Guideway Modernization funds) for preventative maintenance and operations assistance (for the LOTS program). As such, those funds are included under the O&M portion of the MTA's annual budget. The MTA's overall Federal fund forecast, as discussed in Section 2, was used to project the MTA's Federal O&M Assistance funds out to 2030. As with the overall Federal Funds forecast, the Federal O&M Assistance forecast was projected utilizing the MTA's FY 2009 allocations. As with the total Federal revenue projection, revenues were assumed to remain flat during the FY 2010 to FY 2015 CTP time period. After FY 2015, revenues were then escalated utilizing MDOT's assumed 4.7% annual growth rate for Federal transit program formula funds.

As indicated earlier, the average annual growth rates from FY 2002 to FY 2009 for FTA Section 5307 and FTA Section 5309 Fixed Guideway Modernization funds was 8.63% and 7.83%, respectively. The overall Federal fund average annual growth rate was 6.82% for the same period. As such, the assumed 4.7% annual growth rate utilized is conservative. The projected MTA Federal funds allocated to preventative maintenance are presented in Table 3-10.



**Table 3-10: MTA Projected Federal Funds for O&M (NOMINAL \$ M)**

Fiscal Year	Federal O&M Assistance	
	Total	Annual Growth Rate
2010	\$ 60	
2011	\$ 60	0.48%
2012	\$ 60	0.49%
2013	\$ 61	0.50%
2014	\$ 61	0.51%
2015	\$ 61	0.52%
2016	\$ 64	4.23%
2017	\$ 67	4.24%
2018	\$ 69	4.25%
2019	\$ 72	4.26%
2020	\$ 75	4.26%
2021	\$ 79	4.27%
2022	\$ 82	4.28%
2023	\$ 86	4.29%
2024	\$ 89	4.29%
2025	\$ 93	4.30%
2026	\$ 97	4.31%
2027	\$ 101	4.31%
2028	\$ 106	4.32%
2029	\$ 110	4.33%
2030	\$ 115	4.33%

**B) Maryland Transportation Trust Fund Revenues**

As outlined previously, MDOT funds all operating and maintenance expenditures for its modes prior to funding any capital preservation or capital expansion projects. Thus, MDOT always ensures that the state's operating, maintenance, and preservation needs are satisfied prior to funding further system expansion. In the future this practice will ensure that the O&M and preservation needs of the Purple Line project will be met prior to funding future system expansion.

At the MTA level, all O&M expenditures not covered by operating revenues and Federal preventative maintenance funds are paid from the Transportation Trust Fund. As such, the MTA's O&M expenditures not covered by operating revenues and Federal preventative maintenance funding have a guaranteed local commitment for funding from the State's TTF.



In this Financial Plan, it is assumed that all fare revenues generated by the MTA are utilized to directly fund MTA O&M expenditures. As such, MTA O&M expenditures are funded by a combination of Federal preventative maintenance, fare, and MDOT TTF revenues. The projected annual MDOT TTF funding amounts were determined by subtracting the projected Federal preventative maintenance and projected fare revenues from the projected overall O&M expenditures. Table 3-11 delineates the historical and projected MDOT TTF funding amounts. The TTF is projected to continue funding well over 50% of the MTA's O&M expenditures, and an increasing share reflects the conservative assumptions used in the financial plan.

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**Table 3-11: MTA Historic and Projected O&M TTF Funding (NOMINAL \$ M)**

Fiscal Year	O&M TTF Funding from MDOT	MTA Total O&M Budget	TTF O&M Funding as a % of MTA Total O&M Budget
2003	\$ 252	\$ 405	62.30%
2004	\$ 235	\$ 408	57.64%
2005	\$ 272	\$ 446	61.00%
2006	\$ 293	\$ 470	62.20%
2007	\$ 318	\$ 506	62.87%
2008	\$ 372	\$ 557	66.79%
2009	\$ 390	\$ 592	65.87%
2010	\$ 461	\$ 654	70.42%
2011	\$ 534	\$ 732	73.00%
2012	\$ 588	\$ 789	74.44%
2013	\$ 642	\$ 848	75.68%
2014	\$ 692	\$ 903	76.68%
2015	\$ 773	\$ 988	78.22%
2016	\$ 814	\$ 1,036	78.56%
2017	\$ 854	\$ 1,083	78.82%
2018	\$ 898	\$ 1,135	79.12%
2019	\$ 953	\$ 1,204	79.12%
2020	\$ 1,050	\$ 1,343	78.19%
2021	\$ 1,099	\$ 1,401	78.39%
2022	\$ 1,149	\$ 1,462	78.58%
2023	\$ 1,202	\$ 1,526	78.77%
2024	\$ 1,258	\$ 1,593	78.97%
2025	\$ 1,316	\$ 1,663	79.16%
2026	\$ 1,378	\$ 1,737	79.36%
2027	\$ 1,443	\$ 1,814	79.55%
2028	\$ 1,512	\$ 1,896	79.75%
2029	\$ 1,584	\$ 1,981	79.94%
2030	\$ 1,661	\$ 2,073	80.15%

**3.3.1 Operating Plan Summary**

Table 3-12 presents a summary of the O&M costs and revenues forecast described above, which are based on the forecasting methodologies recommended by FTA for New Starts projects.



**Table 3-12: MTA Operating Plan (YOE \$ M)**

	FY-10	FY-11	FY-12	FY-13	FY-14	FY-15	FY-16	FY-17	FY-18	FY-19	FY-20	FY-21	FY-22	FY-23	FY-24	FY-25	FY-26	FY-27	FY-28	FY-29	FY-30	Total
<b>OPERATING SOURCES OF FUNDS</b>																						
<b>Operating Revenues</b>																						
Core Service (Existing System)	\$ 77	\$ 79	\$ 81	\$ 83	\$ 84	\$ 86	\$ 88	\$ 91	\$ 93	\$ 95	\$ 97	\$ 99	\$ 102	\$ 104	\$ 106	\$ 109	\$ 111	\$ 114	\$ 117	\$ 119	\$ 122	\$ 2,057
MARC (Existing System)	\$ 37	\$ 38	\$ 40	\$ 42	\$ 44	\$ 46	\$ 48	\$ 50	\$ 52	\$ 55	\$ 57	\$ 60	\$ 63	\$ 65	\$ 68	\$ 72	\$ 75	\$ 78	\$ 82	\$ 85	\$ 89	\$ 1,247
Commuter Bus	\$ 14	\$ 13	\$ 13	\$ 13	\$ 13	\$ 13	\$ 13	\$ 13	\$ 13	\$ 13	\$ 12	\$ 12	\$ 12	\$ 12	\$ 12	\$ 12	\$ 12	\$ 12	\$ 12	\$ 12	\$ 11	\$ 262
Paratransit ("Mobility")	\$ 2	\$ 2	\$ 2	\$ 3	\$ 3	\$ 3	\$ 4	\$ 4	\$ 4	\$ 4	\$ 5	\$ 5	\$ 5	\$ 5	\$ 6	\$ 6	\$ 6	\$ 7	\$ 7	\$ 8	\$ 8	\$ 99
Red Line Impact on System	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 12	\$ 13	\$ 13	\$ 14	\$ 15	\$ 15	\$ 16	\$ 17	\$ 18	\$ 19	\$ 19	\$ 171
Purple Line	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 21	\$ 22	\$ 23	\$ 23	\$ 24	\$ 25	\$ 26	\$ 27	\$ 27	\$ 28	\$ 29	\$ 275
CCT Assumption (Illustrative)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7	\$ 7	\$ 7	\$ 7	\$ 7	\$ 7	\$ 8	\$ 8	\$ 8	\$ 8	\$ 8	\$ 9	\$ 90
Other Operating Revenues	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 6	\$ 6	\$ 6	\$ 7	\$ 7	\$ 7	\$ 7	\$ 7	\$ 8	\$ 8	\$ 8	\$ 8	\$ 8	\$ 130
<b>Total Operating Revenues</b>	<b>\$ 134</b>	<b>\$ 138</b>	<b>\$ 141</b>	<b>\$ 145</b>	<b>\$ 150</b>	<b>\$ 154</b>	<b>\$ 158</b>	<b>\$ 163</b>	<b>\$ 168</b>	<b>\$ 179</b>	<b>\$ 218</b>	<b>\$ 224</b>	<b>\$ 231</b>	<b>\$ 238</b>	<b>\$ 246</b>	<b>\$ 253</b>	<b>\$ 261</b>	<b>\$ 270</b>	<b>\$ 278</b>	<b>\$ 287</b>	<b>\$ 296</b>	<b>\$ 4,333</b>
<b>Operating Assistance</b>																						
Federal O&M Assistance	\$ 60	\$ 60	\$ 60	\$ 61	\$ 61	\$ 61	\$ 64	\$ 67	\$ 69	\$ 72	\$ 75	\$ 79	\$ 82	\$ 86	\$ 89	\$ 93	\$ 97	\$ 101	\$ 106	\$ 110	\$ 115	\$ 1,668
MTA Operating Funding from MDOT	\$ 461	\$ 534	\$ 588	\$ 642	\$ 692	\$ 773	\$ 814	\$ 854	\$ 898	\$ 953	\$ 1,050	\$ 1,099	\$ 1,149	\$ 1,202	\$ 1,258	\$ 1,316	\$ 1,378	\$ 1,443	\$ 1,512	\$ 1,584	\$ 1,661	\$ 21,860
<b>Total Operating Assistance</b>	<b>\$ 521</b>	<b>\$ 594</b>	<b>\$ 648</b>	<b>\$ 702</b>	<b>\$ 753</b>	<b>\$ 834</b>	<b>\$ 878</b>	<b>\$ 921</b>	<b>\$ 967</b>	<b>\$ 1,025</b>	<b>\$ 1,126</b>	<b>\$ 1,177</b>	<b>\$ 1,231</b>	<b>\$ 1,287</b>	<b>\$ 1,347</b>	<b>\$ 1,410</b>	<b>\$ 1,475</b>	<b>\$ 1,545</b>	<b>\$ 1,617</b>	<b>\$ 1,694</b>	<b>\$ 1,776</b>	<b>\$ 23,529</b>
<b>TOTAL OPERATING SOURCES OF FUNDS</b>	<b>\$ 654</b>	<b>\$ 732</b>	<b>\$ 789</b>	<b>\$ 848</b>	<b>\$ 903</b>	<b>\$ 988</b>	<b>\$ 1,036</b>	<b>\$ 1,083</b>	<b>\$ 1,135</b>	<b>\$ 1,204</b>	<b>\$ 1,343</b>	<b>\$ 1,401</b>	<b>\$ 1,462</b>	<b>\$ 1,526</b>	<b>\$ 1,593</b>	<b>\$ 1,663</b>	<b>\$ 1,737</b>	<b>\$ 1,814</b>	<b>\$ 1,896</b>	<b>\$ 1,981</b>	<b>\$ 2,073</b>	<b>\$ 27,861</b>
<b>OPERATING USES OF FUNDS</b>																						
<b>Operating and Maintenance (O&amp;M) Costs</b>																						
Local Bus	\$ 271	\$ 291	\$ 311	\$ 331	\$ 349	\$ 365	\$ 380	\$ 394	\$ 411	\$ 426	\$ 444	\$ 460	\$ 476	\$ 493	\$ 511	\$ 529	\$ 548	\$ 567	\$ 587	\$ 609	\$ 631	\$ 9,385
Commuter Bus	\$ 40	\$ 58	\$ 62	\$ 66	\$ 71	\$ 75	\$ 81	\$ 86	\$ 92	\$ 99	\$ 105	\$ 113	\$ 121	\$ 129	\$ 138	\$ 147	\$ 158	\$ 169	\$ 180	\$ 193	\$ 206	\$ 2,388
Light Rail	\$ 39	\$ 38	\$ 40	\$ 43	\$ 45	\$ 48	\$ 50	\$ 52	\$ 55	\$ 57	\$ 61	\$ 64	\$ 67	\$ 71	\$ 75	\$ 79	\$ 83	\$ 88	\$ 91	\$ 96	\$ 102	\$ 1,707
Metro	\$ 54	\$ 58	\$ 61	\$ 64	\$ 67	\$ 69	\$ 72	\$ 74	\$ 76	\$ 78	\$ 81	\$ 83	\$ 86	\$ 88	\$ 91	\$ 94	\$ 96	\$ 99	\$ 102	\$ 106	\$ 109	\$ 1,707
Commuter Rail (MARC)	\$ 108	\$ 130	\$ 144	\$ 158	\$ 171	\$ 214	\$ 224	\$ 233	\$ 243	\$ 253	\$ 263	\$ 274	\$ 285	\$ 297	\$ 310	\$ 323	\$ 336	\$ 350	\$ 365	\$ 380	\$ 396	\$ 5,455
Paratransit ("Mobility")	\$ 59	\$ 71	\$ 81	\$ 92	\$ 102	\$ 113	\$ 122	\$ 132	\$ 140	\$ 149	\$ 158	\$ 168	\$ 179	\$ 190	\$ 202	\$ 215	\$ 228	\$ 243	\$ 258	\$ 274	\$ 292	\$ 3,469
CCT Assumption (Illustrative)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 19	\$ 19	\$ 20	\$ 20	\$ 21	\$ 21	\$ 22	\$ 22	\$ 23	\$ 23	\$ 24	\$ 25	\$ 258
Union Past Pension	\$ 25	\$ 28	\$ 30	\$ 32	\$ 35	\$ 38	\$ 41	\$ 45	\$ 48	\$ 52	\$ 57	\$ 61	\$ 67	\$ 72	\$ 78	\$ 85	\$ 92	\$ 99	\$ 108	\$ 117	\$ 126	\$ 1,336
LOTS Assistance	\$ 57	\$ 59	\$ 60	\$ 62	\$ 63	\$ 65	\$ 67	\$ 68	\$ 70	\$ 72	\$ 73	\$ 75	\$ 77	\$ 79	\$ 81	\$ 83	\$ 85	\$ 87	\$ 90	\$ 92	\$ 94	\$ 1,560
<b>Total O&amp;M Costs</b>	<b>\$ 654</b>	<b>\$ 732</b>	<b>\$ 789</b>	<b>\$ 848</b>	<b>\$ 903</b>	<b>\$ 988</b>	<b>\$ 1,036</b>	<b>\$ 1,083</b>	<b>\$ 1,135</b>	<b>\$ 1,204</b>	<b>\$ 1,343</b>	<b>\$ 1,401</b>	<b>\$ 1,462</b>	<b>\$ 1,526</b>	<b>\$ 1,593</b>	<b>\$ 1,663</b>	<b>\$ 1,737</b>	<b>\$ 1,814</b>	<b>\$ 1,896</b>	<b>\$ 1,981</b>	<b>\$ 2,073</b>	<b>\$ 27,861</b>
<b>TOTAL OPERATING USES OF FUNDS</b>	<b>\$ 654</b>	<b>\$ 732</b>	<b>\$ 789</b>	<b>\$ 848</b>	<b>\$ 903</b>	<b>\$ 988</b>	<b>\$ 1,036</b>	<b>\$ 1,083</b>	<b>\$ 1,135</b>	<b>\$ 1,204</b>	<b>\$ 1,343</b>	<b>\$ 1,401</b>	<b>\$ 1,462</b>	<b>\$ 1,526</b>	<b>\$ 1,593</b>	<b>\$ 1,663</b>	<b>\$ 1,737</b>	<b>\$ 1,814</b>	<b>\$ 1,896</b>	<b>\$ 1,981</b>	<b>\$ 2,073</b>	<b>\$ 27,861</b>
<b>RECOVERY RATIOS</b>																						
Farebox Recovery Ratio Core Service	21.2%	20.4%	19.6%	18.9%	18.3%	17.9%	17.6%	17.4%	17.1%	16.9%	15.9%	15.7%	15.6%	15.5%	15.4%	15.2%	15.1%	15.0%	14.9%	14.7%	14.6%	
Farebox Recovery Ratio MARC	34.0%	29.7%	27.9%	26.6%	25.8%	21.5%	21.5%	21.5%	21.6%	21.7%	23.0%	23.1%	23.2%	23.3%	23.4%	23.4%	23.5%	23.6%	23.7%	23.8%	23.9%	
Total Farebox Recovery Ratio	22.6%	20.6%	19.5%	18.7%	18.0%	16.8%	16.5%	16.2%	15.9%	16.0%	17.4%	17.2%	17.0%	16.8%	16.7%	16.5%	16.3%	16.1%	15.9%	15.7%	15.6%	
<b>Total Operating Ratio</b>	<b>23.4%</b>	<b>21.3%</b>	<b>20.2%</b>	<b>19.3%</b>	<b>18.6%</b>	<b>17.4%</b>	<b>17.1%</b>	<b>16.8%</b>	<b>16.5%</b>	<b>16.6%</b>	<b>17.9%</b>	<b>17.7%</b>	<b>17.5%</b>	<b>17.3%</b>	<b>17.1%</b>	<b>16.9%</b>	<b>16.8%</b>	<b>16.6%</b>	<b>16.4%</b>	<b>16.2%</b>	<b>16.0%</b>	

## 4 Cash Flow Analysis

The following cash flow analysis summarizes the sources and uses of funds analysis and demonstrates that the MTA has the financial capacity to implement the Purple Line project and operate and maintain this new service along with its baseline services and existing facilities. The main components of the MTA cash flow are detailed in Section 1.5. The financial analysis reflects the priorities used by MDOT to allocate funds to MTA, namely funding the O&M program first, funding capital preservation needs second, then finally funding new capital enhancement or expansion projects.

The analysis supporting this report was performed through the development and application of a spreadsheet financial model that integrates projections of capital cost, and O&M expenses and revenues. It permits the examination of alternative assumptions regarding policy and uncertainty variables, including:

- **Policy variables:** These variables reflect MTA decisions that would affect costs and revenues. These include service growth, construction schedules, and pricing of transit services.
- **Uncertainty variables:** These include factors beyond the immediate control of the MTA such as cost inflation and price fluctuations, interest rates, and regional economic conditions.

Consistent with the methodologies recommended by FTA, the financial analysis model includes the following important features, instrumental to a comprehensive analysis of costs and revenues in the context of the underlying service expansion:

- Projection of O&M costs by mode and by object class (e.g., wages and salaries, healthcare fringe benefits, other benefits, materials and supplies, energy costs, and other);
- Projection of system preservation costs by mode and by cost category (e.g., facilities, infrastructure, vehicles, equipment, and other);
- Projection of Purple Line capital costs by FTA Standard Cost Category (e.g., right-of-way, vehicles, guideway & track elements, systems, professional services, etc.);
- Projection of Federal funds based on conservative assumptions relative to historical allocations, and projection of state funds based on forecasted costs and in accordance with state funding policies; and
- Projection of interest rates and different inflation rates for different cost categories.

### 4.1 MTA Operating Cash Flow Analysis

Table 4-1 presents the MTA's operating cash flow through FY 2030. Throughout the forecast period through FY 2030, the MTA's O&M expenses exceed the MTA's operating revenues each year. As such, the MTA uses two additional sources of funding for its O&M: Federal funds (for



preventative maintenance) and funds from the O&M budget of MDOT's Transportation Trust Fund. The funding from MDOT's TTF O&M budget is the major source of O&M funding for the MTA. It is projected to fund more than half of the MTA's O&M costs for all years through FY 2030. For a more detailed explanation of these cash flows and assumptions, please see Section 3.

## 4.2 MTA Capital Cash Flow Analysis

This section describes the analysis performed to develop a long-term cash flow for funding MTA's capital preservation needs and capital expansion projects, including the Purple Line. The MTA's capital sources and uses of funds projections are presented in Table 2-14. The plan shows the timing and distribution of the sources of funds outlined in Section 2.2.4.

The capital uses of funds include the MTA's capital preservation program projection according to five categories (see Section 2.2.1). The total capital cost of the MTA capital preservation program from FY 2011 to FY 2030 is \$7,750 million (YOE), averaging \$387 million per year, with annual averages for each category as follows: \$39 million for infrastructure, \$159 million for vehicles, \$36 million for equipment, \$73 million for facilities, and \$80 million for other.

The capital uses of funds also include the MTA's existing capital expansion projects in addition to its proposed New Starts projects (see Section 2.2.1). The total cost of the MTA's existing capital expansion program for FY 2011 to FY 2030 is \$331 million (YOE). A majority of the existing capital expansion costs are allocated to vehicles (41%), while 34% is allocated to facilities investments, and 25% is budgeted for other enhancement/expansion projects. The majority of these capital expansion projects are programmed between 2011 and 2016, but two projects, representing \$69 million (YOE), are programmed for FY 2020 and FY 2021.

In this Financial Plan, projected capital revenues are generated from two sources: Federal funds and grants from the MDOT TTF. Capital preservation Federal revenues total \$3,167 million (YOE) from FY 2011 to FY 2030. As outlined in Section 2.2.4, this Financial Plan assumes that MTA will receive Federal funds for capital preservation at the 2010 spending levels through FY 2015. From 2015 to 2030 the funds would increase by 4.5% per year, which is the long-term average annual growth rate forecast by MDOT for Federal transit funds. The exception to this assumption is CMAQ funds, which were escalated at the MDOT highway program annual growth rate of 5.3% from 2015 to 2030. MDOT grants to the MTA from the TTF's capital preservation budget total \$4,583 million (YOE) from 2011 to 2030. The MDOT TTF capital preservation grant amount varies each year, depending on the projected capital preservation needs. MDOT's capital preservation grant funding averages \$229 million per year, with a peak of \$412 million in 2021.

The MTA's capital expansion Federal funds consist of anticipated FTA Section 5309 New Starts funds for 49.99% of the Purple Line capital cost, 49.97% of the Red Line capital cost, and a placeholder assumption of \$144 million for CCT capital costs. They total \$2,216 million (YOE) from MTA FY 2011 to FY 2020, averaging \$222 million per year. The MTA's TTF capital expansion grants from MDOT total \$2,545 million from FY 2011 to FY 2021 (including the MTA's existing capital expansion projects), with a maximum of \$593 million in 2018.



The year-by-year cash flow forecast for the MTA's capital plan is presented in Table 2-13.

### **4.3 MTA Cash Flow Summary**

Table 4-1 below presents a summary of the MTA's total sources and uses cash flow forecast. As illustrated in the table, the MTA has no negative cash balances, as MDOT is anticipated to provide the agency with the funds required in each fiscal year.

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**Table 4-1: MTA Capital and Operating Sources and Uses Cash Flow Through 2030 (YOE \$ M)**

	FY-10	FY-11	FY-12	FY-13	FY-14	FY-15	FY-16	FY-17	FY-18	FY-19	FY-20	FY-21	FY-22	FY-23	FY-24	FY-25	FY-26	FY-27	FY-28	FY-29	FY-30	Total
<b>OPERATING SOURCES OF FUNDS</b>																						
<b>Operating Revenues</b>																						
Core Service (Existing System)	\$ 77	\$ 79	\$ 81	\$ 83	\$ 84	\$ 86	\$ 88	\$ 91	\$ 93	\$ 95	\$ 97	\$ 99	\$ 102	\$ 104	\$ 106	\$ 109	\$ 111	\$ 114	\$ 117	\$ 119	\$ 122	\$ 2,057
MARC (Existing System)	\$ 37	\$ 38	\$ 40	\$ 42	\$ 44	\$ 46	\$ 48	\$ 50	\$ 52	\$ 55	\$ 57	\$ 60	\$ 63	\$ 65	\$ 68	\$ 72	\$ 75	\$ 78	\$ 82	\$ 85	\$ 89	\$ 1,247
Commuter Bus	\$ 14	\$ 13	\$ 13	\$ 13	\$ 13	\$ 13	\$ 13	\$ 13	\$ 13	\$ 13	\$ 12	\$ 12	\$ 12	\$ 12	\$ 12	\$ 12	\$ 12	\$ 12	\$ 12	\$ 12	\$ 11	\$ 262
Paratransit ("Mobility")	\$ 2	\$ 2	\$ 2	\$ 3	\$ 3	\$ 3	\$ 4	\$ 4	\$ 4	\$ 4	\$ 5	\$ 5	\$ 5	\$ 5	\$ 6	\$ 6	\$ 6	\$ 7	\$ 7	\$ 8	\$ 8	\$ 99
Purple Line	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 21	\$ 22	\$ 23	\$ 23	\$ 24	\$ 25	\$ 26	\$ 27	\$ 27	\$ 28	\$ 29	\$ 275
Other Fare Revenues	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7	\$ 19	\$ 20	\$ 20	\$ 21	\$ 22	\$ 23	\$ 24	\$ 25	\$ 26	\$ 27	\$ 28	\$ 262
Other Operating Revenues	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 6	\$ 6	\$ 6	\$ 6	\$ 7	\$ 7	\$ 7	\$ 7	\$ 7	\$ 8	\$ 8	\$ 8	\$ 8	\$ 130
<b>Total Operating Revenues</b>	<b>\$ 134</b>	<b>\$ 138</b>	<b>\$ 141</b>	<b>\$ 145</b>	<b>\$ 150</b>	<b>\$ 154</b>	<b>\$ 158</b>	<b>\$ 163</b>	<b>\$ 168</b>	<b>\$ 179</b>	<b>\$ 218</b>	<b>\$ 224</b>	<b>\$ 231</b>	<b>\$ 238</b>	<b>\$ 246</b>	<b>\$ 253</b>	<b>\$ 261</b>	<b>\$ 270</b>	<b>\$ 278</b>	<b>\$ 287</b>	<b>\$ 296</b>	<b>\$ 4,333</b>
<b>Operating Assistance</b>																						
Federal O&M Assistance	\$ 60	\$ 60	\$ 60	\$ 61	\$ 61	\$ 61	\$ 64	\$ 67	\$ 69	\$ 72	\$ 75	\$ 79	\$ 82	\$ 86	\$ 89	\$ 93	\$ 97	\$ 101	\$ 106	\$ 110	\$ 115	\$ 1,668
MTA Operating Funding from MDOT	\$ 461	\$ 534	\$ 588	\$ 642	\$ 692	\$ 773	\$ 814	\$ 854	\$ 898	\$ 953	\$ 1,050	\$ 1,099	\$ 1,149	\$ 1,202	\$ 1,258	\$ 1,316	\$ 1,378	\$ 1,443	\$ 1,512	\$ 1,584	\$ 1,661	\$ 21,860
<b>Total Operating Assistance</b>	<b>\$ 521</b>	<b>\$ 594</b>	<b>\$ 648</b>	<b>\$ 702</b>	<b>\$ 753</b>	<b>\$ 834</b>	<b>\$ 878</b>	<b>\$ 921</b>	<b>\$ 967</b>	<b>\$ 1,025</b>	<b>\$ 1,126</b>	<b>\$ 1,177</b>	<b>\$ 1,231</b>	<b>\$ 1,287</b>	<b>\$ 1,347</b>	<b>\$ 1,410</b>	<b>\$ 1,475</b>	<b>\$ 1,545</b>	<b>\$ 1,617</b>	<b>\$ 1,694</b>	<b>\$ 1,776</b>	<b>\$ 23,529</b>
<b>TOTAL OPERATING SOURCES OF FUNDS</b>	<b>\$ 654</b>	<b>\$ 732</b>	<b>\$ 789</b>	<b>\$ 848</b>	<b>\$ 903</b>	<b>\$ 988</b>	<b>\$ 1,036</b>	<b>\$ 1,083</b>	<b>\$ 1,135</b>	<b>\$ 1,204</b>	<b>\$ 1,343</b>	<b>\$ 1,401</b>	<b>\$ 1,462</b>	<b>\$ 1,526</b>	<b>\$ 1,593</b>	<b>\$ 1,663</b>	<b>\$ 1,737</b>	<b>\$ 1,814</b>	<b>\$ 1,896</b>	<b>\$ 1,981</b>	<b>\$ 2,073</b>	<b>\$ 27,861</b>
<b>OPERATING USES OF FUNDS</b>																						
<b>O&amp;M Costs</b>																						
Light Rail	\$ 39	\$ 38	\$ 40	\$ 43	\$ 45	\$ 48	\$ 50	\$ 52	\$ 55	\$ 57	\$ 142	\$ 147	\$ 151	\$ 156	\$ 161	\$ 166	\$ 171	\$ 176	\$ 182	\$ 187	\$ 194	\$ 2,301
Commuter Rail (MARC)	\$ 108	\$ 130	\$ 144	\$ 158	\$ 171	\$ 214	\$ 224	\$ 233	\$ 243	\$ 253	\$ 263	\$ 274	\$ 285	\$ 297	\$ 310	\$ 323	\$ 336	\$ 350	\$ 365	\$ 380	\$ 396	\$ 5,455
CCT Assumption (Illustrative)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 19	\$ 19	\$ 20	\$ 20	\$ 21	\$ 21	\$ 22	\$ 22	\$ 23	\$ 23	\$ 24	\$ 25	\$ 258
Other O&M Costs	\$ 507	\$ 564	\$ 605	\$ 647	\$ 687	\$ 726	\$ 762	\$ 798	\$ 838	\$ 876	\$ 919	\$ 961	\$ 1,005	\$ 1,052	\$ 1,101	\$ 1,153	\$ 1,207	\$ 1,265	\$ 1,326	\$ 1,390	\$ 1,458	\$ 19,846
<b>Total O&amp;M Costs</b>	<b>\$ 654</b>	<b>\$ 732</b>	<b>\$ 789</b>	<b>\$ 848</b>	<b>\$ 903</b>	<b>\$ 988</b>	<b>\$ 1,036</b>	<b>\$ 1,083</b>	<b>\$ 1,135</b>	<b>\$ 1,204</b>	<b>\$ 1,343</b>	<b>\$ 1,401</b>	<b>\$ 1,462</b>	<b>\$ 1,526</b>	<b>\$ 1,593</b>	<b>\$ 1,663</b>	<b>\$ 1,737</b>	<b>\$ 1,814</b>	<b>\$ 1,896</b>	<b>\$ 1,981</b>	<b>\$ 2,073</b>	<b>\$ 27,861</b>
<b>TOTAL OPERATING USES OF FUNDS</b>	<b>\$ 654</b>	<b>\$ 732</b>	<b>\$ 789</b>	<b>\$ 848</b>	<b>\$ 903</b>	<b>\$ 988</b>	<b>\$ 1,036</b>	<b>\$ 1,083</b>	<b>\$ 1,135</b>	<b>\$ 1,204</b>	<b>\$ 1,343</b>	<b>\$ 1,401</b>	<b>\$ 1,462</b>	<b>\$ 1,526</b>	<b>\$ 1,593</b>	<b>\$ 1,663</b>	<b>\$ 1,737</b>	<b>\$ 1,814</b>	<b>\$ 1,896</b>	<b>\$ 1,981</b>	<b>\$ 2,073</b>	<b>\$ 27,861</b>
<b>CAPITAL SOURCES OF FUNDS</b>																						
<b>Federal Funding</b>																						
New Starts Grants for Red Line	\$ -	\$ 6	\$ 17	\$ 38	\$ 51	\$ 122	\$ 175	\$ 175	\$ 175	\$ 175	\$ 175	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,109
New Starts Grants for Purple Line	\$ -	\$ -	\$ 3	\$ -	\$ -	\$ 160	\$ 160	\$ 160	\$ 160	\$ 160	\$ 160	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 963
New Starts Grants for CCT (Illustrative)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 61	\$ 42	\$ 42	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 144
Other Federal Funding	\$ 201	\$ 210	\$ 176	\$ 177	\$ 178	\$ 179	\$ 186	\$ 195	\$ 203	\$ 212	\$ 222	\$ 231	\$ 242	\$ 252	\$ 264	\$ 275	\$ 288	\$ 301	\$ 314	\$ 328	\$ 343	\$ 4,977
Transfer to O&M Budget	\$ (60)	\$ (60)	\$ (60)	\$ (61)	\$ (61)	\$ (61)	\$ (64)	\$ (67)	\$ (69)	\$ (72)	\$ (75)	\$ (79)	\$ (82)	\$ (86)	\$ (89)	\$ (93)	\$ (97)	\$ (101)	\$ (106)	\$ (110)	\$ (115)	\$ (1,668)
<b>Total Federal Funding</b>	<b>\$ 141</b>	<b>\$ 156</b>	<b>\$ 136</b>	<b>\$ 154</b>	<b>\$ 168</b>	<b>\$ 399</b>	<b>\$ 519</b>	<b>\$ 505</b>	<b>\$ 511</b>	<b>\$ 475</b>	<b>\$ 481</b>	<b>\$ 153</b>	<b>\$ 160</b>	<b>\$ 167</b>	<b>\$ 174</b>	<b>\$ 182</b>	<b>\$ 191</b>	<b>\$ 199</b>	<b>\$ 208</b>	<b>\$ 218</b>	<b>\$ 228</b>	<b>\$ 5,524</b>
<b>State Funding</b>																						
MTA System Preservation Funding from MDOT	\$ 287	\$ 166	\$ 194	\$ 161	\$ 120	\$ 102	\$ 56	\$ 170	\$ 107	\$ 263	\$ 355	\$ 412	\$ 292	\$ 235	\$ 246	\$ 383	\$ 231	\$ 296	\$ 195	\$ 248	\$ 351	\$ 4,870
MTA System Expansion Funding from MDOT	\$ 16	\$ 55	\$ 84	\$ 149	\$ 287	\$ 109	\$ 357	\$ 471	\$ 593	\$ 491	\$ (83)	\$ 32	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,561
<b>Total State Funding</b>	<b>\$ 303</b>	<b>\$ 221</b>	<b>\$ 278</b>	<b>\$ 310</b>	<b>\$ 407</b>	<b>\$ 211</b>	<b>\$ 413</b>	<b>\$ 641</b>	<b>\$ 700</b>	<b>\$ 754</b>	<b>\$ 272</b>	<b>\$ 444</b>	<b>\$ 292</b>	<b>\$ 235</b>	<b>\$ 246</b>	<b>\$ 383</b>	<b>\$ 231</b>	<b>\$ 296</b>	<b>\$ 195</b>	<b>\$ 248</b>	<b>\$ 351</b>	<b>\$ 7,431</b>
<b>TOTAL CAPITAL SOURCES OF FUNDS</b>	<b>\$ 445</b>	<b>\$ 377</b>	<b>\$ 414</b>	<b>\$ 464</b>	<b>\$ 575</b>	<b>\$ 610</b>	<b>\$ 931</b>	<b>\$ 1,146</b>	<b>\$ 1,211</b>	<b>\$ 1,229</b>	<b>\$ 753</b>	<b>\$ 596</b>	<b>\$ 452</b>	<b>\$ 402</b>	<b>\$ 421</b>	<b>\$ 565</b>	<b>\$ 421</b>	<b>\$ 495</b>	<b>\$ 403</b>	<b>\$ 466</b>	<b>\$ 579</b>	<b>\$ 12,955</b>
<b>CAPITAL USES OF FUNDS</b>																						
<b>Capital Preservation</b>																						
MTA System Preservation Capital Cost	\$ 428	\$ 316	\$ 310	\$ 277	\$ 237	\$ 220	\$ 179	\$ 298	\$ 241	\$ 403	\$ 501	\$ 564	\$ 452	\$ 402	\$ 421	\$ 565	\$ 421	\$ 495	\$ 403	\$ 466	\$ 579	\$ 8,178
<b>Total Capital Preservation</b>	<b>\$ 428</b>	<b>\$ 316</b>	<b>\$ 310</b>	<b>\$ 277</b>	<b>\$ 237</b>	<b>\$ 220</b>	<b>\$ 179</b>	<b>\$ 298</b>	<b>\$ 241</b>	<b>\$ 403</b>	<b>\$ 501</b>	<b>\$ 564</b>	<b>\$ 452</b>	<b>\$ 402</b>	<b>\$ 421</b>	<b>\$ 565</b>	<b>\$ 421</b>	<b>\$ 495</b>	<b>\$ 403</b>	<b>\$ 466</b>	<b>\$ 579</b>	<b>\$ 8,178</b>
<b>Capital Expansion</b>																						
Red Line Capital Cost	\$ -	\$ 13	\$ 34	\$ 54	\$ 73	\$ 154	\$ 451	\$ 410	\$ 445	\$ 449	\$ 136	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,219
Purple Line Capital Cost	\$ -	\$ -	\$ 30	\$ 38	\$ 154	\$ 237	\$ 215	\$ 354	\$ 442	\$ 378	\$ 79	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,925
CCT Capital Cost (Illustrative)	\$ 4	\$ 5	\$ 10	\$ 10	\$ 10	\$ -	\$ 83	\$ 83	\$ 83	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 289
MTA System Expansion Capital Cost	\$ 13	\$ 43	\$ 30	\$ 86	\$ 101	\$ -	\$ 3	\$ -	\$ -	\$ -	\$ 36	\$ 32	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 344
<b>Total Capital Expansion</b>	<b>\$ 16</b>	<b>\$ 61</b>	<b>\$ 104</b>	<b>\$ 187</b>	<b>\$ 338</b>	<b>\$ 391</b>	<b>\$ 753</b>	<b>\$ 848</b>	<b>\$ 969</b>	<b>\$ 826</b>	<b>\$ 252</b>	<b>\$ 32</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 4,777</b>
<b>TOTAL CAPITAL USES OF FUNDS</b>	<b>\$ 445</b>	<b>\$ 377</b>	<b>\$ 414</b>	<b>\$ 464</b>	<b>\$ 575</b>	<b>\$ 610</b>	<b>\$ 931</b>	<b>\$ 1,146</b>	<b>\$ 1,211</b>	<b>\$ 1,229</b>	<b>\$ 753</b>	<b>\$ 596</b>	<b>\$ 452</b>	<b>\$ 402</b>	<b>\$ 421</b>	<b>\$ 565</b>	<b>\$ 421</b>	<b>\$ 495</b>	<b>\$ 403</b>	<b>\$ 466</b>	<b>\$ 579</b>	<b>\$ 12,955</b>
<b>TOTAL MTA SOURCES AND USES OF FUNDS</b>	<b>\$ 1,099</b>	<b>\$ 1,109</b>	<b>\$ 1,204</b>	<b>\$ 1,312</b>	<b>\$ 1,478</b>	<b>\$ 1,598</b>	<b>\$ 1,967</b>	<b>\$ 2,229</b>	<b>\$ 2,346</b>	<b>\$ 2,433</b>	<b>\$ 2,096</b>	<b>\$ 1,998</b>	<b>\$ 1,914</b>	<b>\$ 1,928</b>	<b>\$ 2,014</b>	<b>\$ 2,228</b>	<b>\$ 2,158</b>	<b>\$ 2,310</b>	<b>\$ 2,299</b>	<b>\$ 2,447</b>	<b>\$ 2,652</b>	<b>\$ 40,816</b>





## 5 Risk Analysis

The foregoing analysis presented the Financial Plan with baseline assumptions for revenues and costs. As recommended by FTA, this chapter identifies and discusses the primary risks and uncertainties surrounding the key assumptions.

### 5.1 Discussion of Major Sources of Risk and Uncertainty

As with any large infrastructure project in its planning stages, the Purple Line project includes several sources of risks and uncertainties, which could potentially affect the Capital and Operating financial plans.

Capital Plan risks are associated with the capital cost and revenue components of the financial plan. From a capital cost perspective, they include inflationary risks, the Purple Line construction schedule, Purple Line scope, the cost and schedule of the other two New Starts projects, and MDOT / MTA’s O&M and capital preservation costs. On the revenue side, major risks include Transportation Trust Fund revenues and the availability and timing of FTA New Starts funds.

The Operating Plan risks can also be broken down into O&M cost and O&M revenue categories. Key areas of risk from an O&M cost perspective are related to cost escalation for labor or fuel and real increases in unit O&M costs for the Purple Line upon completion. From a revenue perspective, areas of uncertainty include ridership and fare revenue forecasts and Transportation Trust Fund revenues.

The primary sources of risk and uncertainty for the Purple Line project are outlined in Table 5-1. The following sections detail the aforementioned risks, outline risk mitigation measures that can be implemented should one of the aforementioned events occur, and provides a sensitivity analysis that identifies the impact of several risk scenarios.

**Table 5-1: Purple Line Project Primary Sources of Risk and Uncertainty**

Capital Plan Risks	
<b>Capital Cost</b>	
	Inflation
	Purple Line Schedule
	Purple Line Scope
	Cost/Schedule of Red Line & CCT
<b>Capital Revenue</b>	
	TTF Revenue
	MDOT O&M and Capital Preservation Cost
	FTA New Starts Funds
<b>O&amp;M Cost</b>	
<b>Cost Escalation</b>	
	New Project O&M Unit Cost Increase
	O&M Revenue
<b>Fare Revenue</b>	
	TTF Operating Revenue

## 5.2 Capital Plan

### 5.2.1 Capital Cost Risks

#### A) Inflation

Inflation is a key risk for mega-projects, as it typically represents a large share of the capital cost when project development is stretched over several years. A large part of cost inflation is driven by demand and supply at global and regional levels, factors that are beyond the control of project sponsors.

In general, commodity prices tend to be particularly sensitive to global economic pressures. A notable example is steel, whose price peaked in the third quarter of 2008 (after a steep run up), significantly dropped for three straight quarters, and then increased 5.7% between the second and third quarters of 2009. Steel prices have increased recently, showing a 15.3% growth from the first quarter in 2010 to the first quarter in 2011. Because steel is an easily transportable, high-value commodity that is essential for a wide range of manufacturing and construction uses, its price is influenced by changes in production as well as speculation of future economic demand. Crude oil, which after processing is used in one form or another for many elements of a construction project, is similar. Other commodity components (e.g., concrete) are less transportable so they tend to be influenced more by regional economic factors; however, they also represent a notable share of light rail transit construction costs and their price variations will impact the project costs.

Right-of-way costs are highly correlated with property values, which have recently declined after many years of growth at rates that were higher than historical averages. While the residential real estate market is expected to improve modestly in the near future, many observers anticipate that the commercial real estate market will continue to deteriorate in suburban markets. This, along with site-specific factors that can influence the cost of acquisitions, creates a considerable deal of uncertainty regarding right-of-way costs.

Although it is not anticipated to be an issue, the availability of qualified labor is another potential source of capital cost inflation. If there is insufficient qualified labor, capital cost escalation can occur through unit cost increases (due to insufficient competition or the need to bring qualified labor into the region) and/or schedule delays. To mitigate this risk, the MTA currently anticipates performing a more detailed study of market conditions and the availability of qualified labor in the PE phase of the project.

#### B) Purple Line Schedule

Scheduling delays can lead to cost increases that may impact the financial plan for a project, both in additional cost escalation and increased professional services costs. Schedule changes might result from scope changes, local permitting and approval processes, agreement negotiations, right-of-way acquisition, the availability of qualified labor, procurement delays, vehicle manufacturing delays, and construction delays. As a project becomes more complex, tasks become larger and they often have more dependencies. Task durations can be dependent on many factors, some of which are beyond a project manager's control.



### **C) Purple Line Scope**

The Purple Line cost estimate reflects a conceptual level of design prepared to support the selection of the locally preferred alternative, with supplemental conceptual engineering conducted to refine the alignment and cost estimate. As preliminary engineering and final design efforts proceed, there is the potential for MTA to make refinements to the scope of the project. While the fixed guideway alignment and station locations have been identified in the planning process, the design may be modified during PE or Final Design based on the results of additional site investigations and engineering work. Scope changes may also result from the following: physical barriers (such as unexpected utility locations or field conditions), environmental impacts and mitigation measures, federally mandated safety measures, and budget constraints that lead to scope reductions. All of these can affect the final project cost and construction schedule.

### **D) Cost and Schedule of other New Starts Projects**

Both the capital costs and schedules of the proposed Red Line and CCT are subject to the same uncertainties outlined above for the Purple Line project. As both projects are assumed to be constructed during the same time period as the Purple Line, cost increases or schedule modifications for either project could impact the availability of capital funds for the Purple Line project. With an increase in capital costs for the Red Line and/or CCT, the total funds required in one year might potentially exceed the funds available in the MDOT capital expansion budget.

## **5.2.2 *Capital Revenue Risks***

### **A) Transportation Trust Fund Revenues**

MDOT's TTF revenues are discussed in detail in Section 2. While the sources of revenue for the TTF are diverse, which helps promote stability of the overall fund, all sources are subject to the effects of external economic factors. For example, should projected annual growth rates experience a 1.5% decline per year, projected 2030 TTF Revenue would drop from \$6.3 billion to \$4.7 billion. Reduced TTF revenues ultimately result in reduced MDOT capital expansion budgets (as O&M and capital preservation costs are addressed prior to capital expansion). Although it is currently not anticipated in any scenario that MDOT anticipates, in a worst case scenario there is a risk that MDOT's capital expansion budget could be eliminated for a year if revenues were to experience an unprecedented decline.

### **B) MDOT / MTA O&M and Capital Preservation Costs**

As described in Section 1, MDOT funds all O&M and capital preservation costs prior to funding capital expansion projects. As such, MDOT's capital expansion budget will be directly impacted by changes in MDOT's O&M and capital preservation budget in any given year. In the event that O&M and/or capital preservation costs are higher than the amount forecasted, a risk is that MDOT's capital expansion budget may be reduced to the extent that they cannot cover the required capital expansion costs associated with the Purple Line project.

### **C) FTA Funds**

The Purple Line financial plan assumes certain levels of Federal funds through the Section 5307, Section 5309 New Starts, Section 5309 Fixed Guideway Modernization, and Section 5309 Bus

and Bus Facilities grant programs. Federal legislation that authorizes these programs (SAFETEA-LU) is currently operating on a short-term extension. While these programs have been in place for many years (the Section 5309 program has existed since the 1960s), through authorization and/or appropriations bills there is a possibility that Congress could increase or decrease the amount of funds available, impose new rules on project eligibility, or revise the criteria that FTA is directed to use for evaluating potential projects. The timing of new authorization legislation is also uncertain, as it depends on congressional action.

New Starts funding is also subject to appropriation uncertainties. The amount of the FTA Section 5309 contribution would be identified in a Full Funding Grant Agreement between FTA and the MTA. The FFGA would also identify the amount to be made available each year, subject to annual appropriations legislation. Although history has shown that Congress ultimately honors and appropriates the full amount spelled out in an FFGA, Congress could delay funding for the project by reducing or stretching out the annual appropriations. Any delay might necessitate additional borrowing or schedule delays, potentially increasing the project's capital cost.

### **5.3 Operating and Maintenance Plan**

#### ***5.3.1 Operating and Maintenance Cost Risks***

##### **A) Cost Escalation**

With exceptions for large costs such as labor, fringe benefits, fuel, and MARC expenses, the financial plan assumes that many operating expenditure categories would increase following general inflation. The MTA's labor and fuel operating cost components may increase at a higher or slower rate depending on local conditions. Increases in labor costs are subject to local union bargaining agreements. This also includes employee healthcare costs, fringes and other benefits. Fuel costs are driven largely by oil prices and are therefore subject to the same volatility as oil prices. As the MTA directly consumes nearly 8 million gallons of diesel fuel each year, volatile swings in the price of oil could have a notable impact on yearly MTA operating costs.

##### **B) New Project Unit O&M Cost Increase**

The O&M cost methodology used to calculate the Purple Line O&M costs is based on historic MTA light rail unit costs. It also assumes operating parameters that may be slightly revised and refined as the project advances through the development process. These factors are all potential risks that may have impacts on operating costs, either negative or positive.

Differences between unit costs and actual operating costs for the other New Starts projects (Red Line and CCT) could also have a positive or negative impact on operating costs.

#### ***5.3.2 Operating and Maintenance Revenue Risks***

##### **A) Fare Revenue**

Fare revenues make up a notable share of the MTA's revenues and a reduction in fare revenues will reduce MDOT's ability to provide revenues for capital expansion projects. Estimates of fare revenues presented in this financial plan are based on current demand forecasts for ridership and

a continuation of current fare levels in real terms that could change due to a number of short-term and long-term socio-economic variables such as:

- The state of the economy
- The local job market
- Population growth
- Traffic congestion on roads and main highways
- Fuel prices

While the existing travel demand forecast includes estimates and assumptions for each of these variables, there are uncertainties surrounding the timing and extent for each of them. Fare revenues are affected by the overall economic health of the local economy. Therefore, because fare revenues are heavily influenced by a variety of underlying economic factors that are outside of the MTA's control (short of fare increases or the creation of new revenue sources), they are a source of risk to the overall operating revenue stream. Fare revenues may result in a higher or lower projection than that utilized in the financial plan.

## **5.4 Mitigation Plan**

The aforementioned sections outlined project cost and revenue risks for both the capital and operating plans. While all risks are distinct, they each have the potential to result in one or more of the following impacts on the Purple Line project: limit MDOT's overall capital expansion budget for a given year (or period of years), increase the Purple Line's capital costs, and/or increase the amount of funding that the MTA would need to provide for the project. In each of these situations, the MTA would be required to raise more capital to complete the Purple Line project than is assumed under the baseline assumption. The following items represent potential mitigation strategies that could be implemented in the event that the MTA needs to raise additional capital. These mitigation items are generally listed in order of priority. As such, the MTA generally would plan to implement the first mitigation measure until its revenue sources are exhausted; the MTA would then implement the next mitigation measure until it has raised sufficient funds to complete the Purple Line project. This prioritization is based on the currently anticipated likelihood of each mitigation strategy being available should the project require additional capital funding, and the decision to implement a specific mitigation approach would consider the timing of when a risk would be identified and realized.

### ***5.4.1 Expend Remaining MDOT Capital Expansion Budget***

The first mitigation strategy to be considered would be for MDOT to reprogram its capital expansion funds to cover a shortfall. Table 5-2 presents the TTF funds available for capital expansion and includes the share of that budget projected to be used by the MTA in the base case. As shown in this table, up to \$3.8 billion additional TTF funds are available between 2012 and 2020. This source alone could potentially provide sufficient funds to cover Purple Line capital cost increases of up to 56% of the baseline cost estimate (in base year dollars) assuming that the Federal New Starts grant amount remained at its base case dollar level. The 56% figure implies that the MTA would require 100% of MDOT's capital expansion dollars in 2014.

**Table 5-2: MDOT and MTA Capital Expansion Budget (YOE \$ M)**

<b>Fiscal Year</b>	<b>MDOT STATEWIDE SYSTEM EXPANSION BUDGET</b>	<b>MTA SHARE OF MDOT SYSTEM EXPANSION BUDGET</b>	<b>REMAINING TTF EXPANSION FUNDS</b>
2012	\$ 624	16.63%	\$ 520
2013	\$ 439	42.64%	\$ 252
2014	\$ 434	77.88%	\$ 96
2015	\$ 682	57.28%	\$ 291
2016	\$ 1,205	62.47%	\$ 452
2017	\$ 1,227	69.13%	\$ 379
2018	\$ 1,271	76.30%	\$ 301
2019	\$ 1,275	64.80%	\$ 449
2020	\$ 1,325	18.99%	\$ 1,073
<b>Total</b>	<b>\$ 8,481</b>		<b>\$ 3,813</b>

In practice, the extent to which this mitigation strategy would be used is based largely on the amount of time between when the change in revenues or costs was identified and when the additional funds would be needed for the Purple Line. To the extent that this approach could be used, MDOT would plan to reallocate funds from other capital expansion uses to the Purple Line. This could be done through measures such as pausing design on lower priority expansion projects (until additional funds became available) and reallocating those funds to the Purple Line. Other measures would be taken if lead time were insufficient to reprogram MDOT capital funds.

#### **5.4.2 Debt Issuance**

MDOT is authorized to issue Consolidated Transportation Bonds (CTBs) under Sections 3.101 to 3.216, inclusive, of the Transportation Article of the Annotated Code of Maryland. CTBs are fixed rate bonds with maturities of up to 15 years. CTBs do not constitute a debt or a pledge of the faith and credit of the State of Maryland. The principal and interest are paid from the proceeds of certain pledged taxes, fees, and other revenues in the TTF. The aggregate amount of the outstanding and unpaid principal balance for CTBs is restricted by statute and by annual limits in the budget bill. For more information on MDOT's statutory limits on outstanding debt, please see Appendix B.

MDOT is also authorized to issue special transportation revenue bonds under Section 3.602 of the Transportation Article of the Annotated Code of Maryland. For these bonds, MDOT may pledge or use existing and anticipated Federal funds for the payment of special transportation project revenue bonds, provided that MDOT complies with the limitations set forth in Title 3, Subtitle 6 of the Transportation Article which states that the aggregate principal amount of debt secured by a pledge of future Federal aid may not exceed \$750 million and the date of maturity may not be later than 12 years after the date of issue. If future Federal aid is insufficient to pay the principal of and interest on the special transportation project revenue bonds, the taxes levied under the TTF and irrevocably pledged to the payment of the principal and interest on outstanding CTBs but not needed for such payment are pledged and will be available to pay the



special transportation project revenue bonds. The statutory lien and pledge created for the benefit of the special transportation project revenue bonds is at all times subordinate to the pledge and lien for the payment of the principal and interest on the outstanding CTBs.

Table 5-3 illustrates MDOT’s future debt issuance assumptions associated with the 2010 CTP. As is shown, MDOT projects that it will issue between \$165 million and \$360 million in debt annually over the FY 2010 to FY 2015 timeframe. All projected MDOT debt issuances are assumed to be 15-year CTBs. The projected debt service payments in Table 5-3 are inclusive of all existing MDOT debt service requirements. MDOT projects that it will stay above the 2.0 times coverage minimum in all future years.

**Table 5-3: Future MDOT Debt Issuance Assumptions (YOE \$ M)**

Year	PROJECTED MDOT DEBT ISSUANCE (YOE \$)	PROJECTED INTEREST RATE	ANNUAL DEBT SERVICE (YOE \$)	TOTAL BONDS OUTSTANDING (YOE \$)	DEBT SERVICE RATIO	
					Pledged Taxes	Net Revenues
2010	\$ 165	3.90%	\$ 151	\$ 1,670	5.8	2.7
2011	\$ 205	4.30%	\$ 164	\$ 1,792	5.2	2.2
2012	\$ 360	4.80%	\$ 193	\$ 2,049	4.7	2.2
2013	\$ 280	4.90%	\$ 210	\$ 2,220	4.8	2.3
2014	\$ 160	4.80%	\$ 241	\$ 2,244	5.0	2.5
2015	\$ 195	4.80%	\$ 268	\$ 2,279	5.3	2.7

In the event that the first mitigation measure was deemed to be inadequate, MDOT would consider issuing long-term debt. If short-term debt were a more effective measure for mitigating a risk, MDOT would also consider issuing short-term debt. Both mitigation measures are outlined below.

**A) Long-Term Bond Issuance**

In the event that MDOT would need additional funding for the project after the reallocation of capital expansion budget dollars, the second mitigation strategy available is to issue bonds backed by MDOT’s AAA bond rating. MDOT anticipates having the ability to issue CTBs as a risk mitigation measure, but if the TTF’s bonding capacity were limited, it is possible that MDOT would issue special transportation project bonds that are guaranteed by future Federal revenues. Debt could be issued against future Federal formula funds or in the form of FFGA Capital Grant Anticipation Notes (GANs).

For this analysis it has been assumed that should additional bonding be necessary, it would be most likely to occur in FY 2014 as project costs escalate from \$38 million in FY 2013 to \$156 million in FY 2014. This analysis evaluates the capacity of MDOT to issue additional debt in FY 2014 (in the form of a 15-year CTB with an interest rate of 4.8%) to provide additional funds for the Purple Line. If it is assumed that MDOT will issue \$227.5 million (the average of its projected FY 2010 to FY 2015 issuances) per year in 15-year CTBs at an interest rate of 4.8% for every year beyond 2015 for other (non Purple Line) purposes, it is estimated that MDOT’s



maximum capacity for additional debt issuance in FY 2014 (net of the \$160 million debt issuance that MDOT is currently anticipating for FY 2014) would be an additional \$211 million. The net revenue test including this additional issuance would result in a net revenue debt service ratio of 2.4 times coverage, a pledged taxes debt service ratio of 4.8 times coverage, and a total outstanding debt level of \$2.5 billion. Assuming a total cost of issuance equal to 1% of gross proceeds to pay for upfront fees such as the cost of issuance and underwriter's discount, the net funding that could be generated for the Purple Line project from this issuance is \$208 million. If it is assumed that MDOT will not issue any debt beyond 2015 for other (non Purple Line) purposes, then the net bond proceeds that could be generated for the Purple Line would be \$316 million. Table 5-4 presents the net bonding capacity of the pledged tax revenue stream for a scenario where additional bonding is necessary in FY 2014, under both sets of future issuance assumptions.

**Table 5-4: Estimated MDOT Debt Capacity in FY 2014 (YOE \$ M)**

	FY-14 Debt Capacity (Assuming Annual \$228M Debt Issuances Post FY-15)		FY-14 Debt Capacity (Assuming No Debt Issuances Post FY-15)	
Gross Bond Proceeds (15-Year Term)	\$	372	\$	481
Less Projected MDOT Bonding	\$	(160)	\$	(160)
Less Cost of Issuance @ 1%	\$	(4)	\$	(5)
<b>Net Bond Proceeds</b>	<b>\$</b>	<b>208</b>	<b>\$</b>	<b>316</b>

### **B) Short-Term Bond Issuance**

Should the MTA encounter cash flow challenges, a third mitigation factor available is short-term borrowing. This could entail taking a one-year loan and paying it off with any surplus in the MDOT capital expansion budget for the following year. This theoretical debt issuance might take the form of a CTB. If the TTF's bonding capacity were limited due to the restrictions described in Section 5.4.2 above, it is possible that MDOT would issue special transportation project bonds that are guaranteed by future Federal revenues, especially if those were to be delayed by a year or two.

## **5.5 Sensitivity Analysis**

Sensitivity analyses were run to assess the MTA's capacity to cover unexpected cost increases or revenue reductions. This section presents the results of the following scenarios.

### **5.5.1 Scenario 1: Capital Cost Increase**

#### **A) Scenario 1A: 25% Increase in Purple Line Capital Cost**

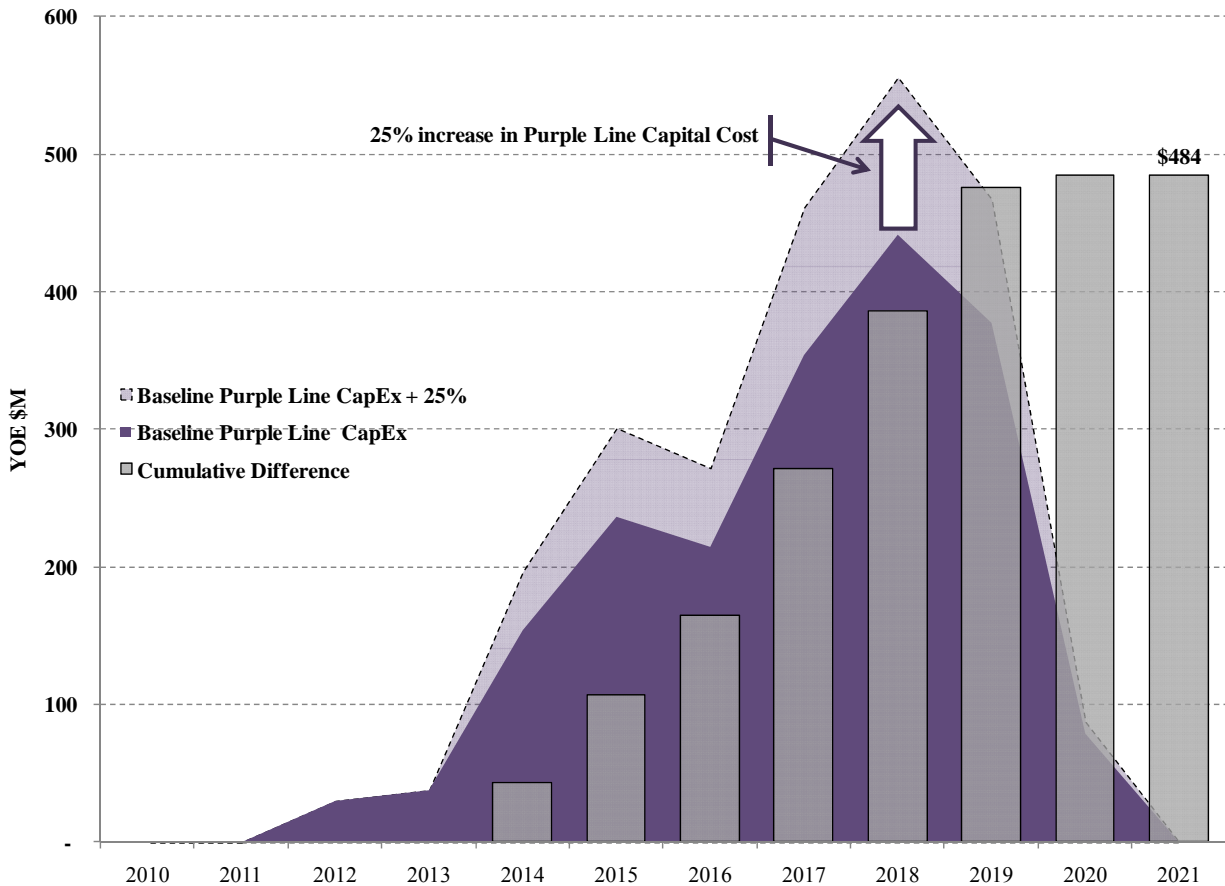
This scenario considers a 25% increase in the (base year dollar) capital cost estimate for the Purple Line. It is assumed that the 25% cost increase is identified near the end of 2013, during the final design phase when any cost increases are the sole responsibility of the project sponsor (per FTA policy, FFGA amounts cannot be increased after a New Starts project is admitted into





final design). As such, the additional 25% was spread over the right of way acquisition and construction phases of the project. The capital cost curve shown in Figure 5-1 was assumed for the distribution of the 25% capital cost increase during the project’s construction. The capital cost curve concentrates the majority of the capital cost increases during the peak construction period (FY 2015 to FY 2020), as these are the most active years in the Purple Line construction. This scenario assumes that FFGA revenues remain fixed at the dollar amounts presented in Table 1-2. The total increase in capital cost for this scenario is estimated at \$484 million (YOE).

**Figure 5-1: Capital Cost Increase Distribution and Cumulative Difference (YOE \$ M)**



As mentioned earlier, the remaining MDOT capital expansion funds could absorb up to a 56% increase in Purple Line capital costs (in base year dollar), well above the 25% increase assumed in this scenario. Additionally, should MDOT prefer not to absorb this hypothetical cost increase solely by reprogramming capital expansion funds, MDOT also has the capacity to raise additional funds for the project in FY 2014 with additional debt, as mentioned in Section 5.4.2.A.

**B) Scenario 1B: 10% Increase in Both Purple Line and Red Line Capital Cost**

This scenario considers a 10% capital cost increase for both Purple Line and Red Line projects. As with Scenario 1A, it is assumed that the 10% capital cost increase would be incurred after the initiation of final design. The same capital cost curve for the Purple Line, as shown in Figure 5-



1, was used in this scenario to distribute the capital cost increases to both the Red Line and Purple Line. Finally it was assumed that FFGA revenues would remain fixed at the dollar amounts presented in Table 1-2 and Table 2-7. The total increase in capital funds required under this scenario is estimated at \$418 million (YOE). Given that this shortfall is lower than the \$484 million amount presented in Scenario 1A, the various mitigation strategies outlined previously would be sufficient to fund the increase in capital cost.

**5.5.2 Scenario 2: TTF Revenue Decrease**

This scenario considers the impact of lower TTF revenues, which are the source of non-Federal capital funds for the Purple Line project. The scenario assumes that TTF revenues would grow at a rate that is 1.5 percentage points per year lower than the assumed annual growth rates for the Transportation Trust Fund. This lower growth rate has been applied to MDOT TTF net revenues between 2011 and 2030. The revised TTF revenues of Scenario 2 are depicted in Table 5-5.

**Table 5-5: Baseline and Reduced TTF Revenues (YOE \$ M)**

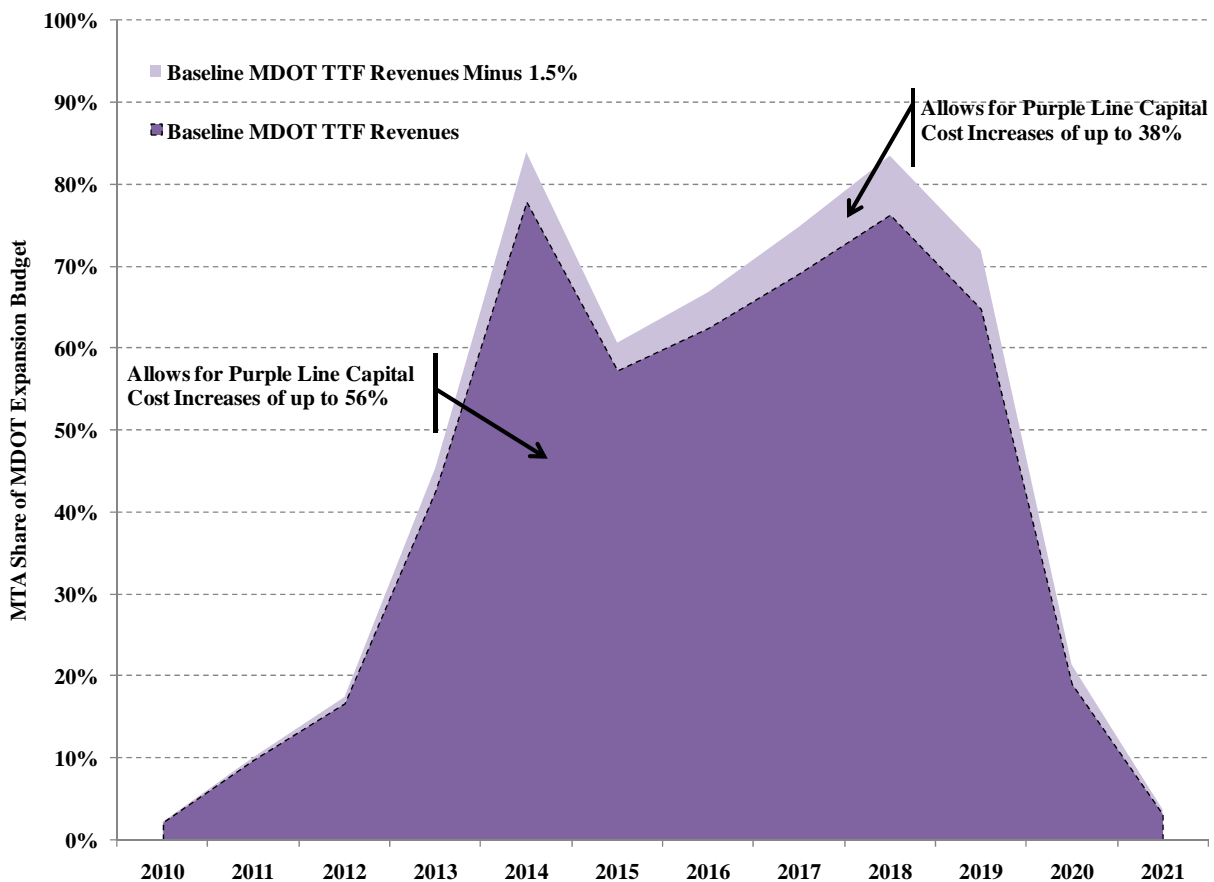
Fiscal Year	Baseline MDOT Revenue		Scenario 2 MDOT Revenue		Difference
	Total	Annual Growth Rate	Annual Growth Rate Minus 1.5%	Total Minus 1.5% Annual Growth	
2010	\$ 3,217			\$ 3,217	\$ -
2011	\$ 2,814	-12.53%	-14.03%	\$ 2,766	\$ 48
2012	\$ 3,097	10.06%	8.56%	\$ 3,002	\$ 95
2013	\$ 3,063	-1.10%	-2.60%	\$ 2,924	\$ 139
2014	\$ 3,007	-1.83%	-3.33%	\$ 2,827	\$ 180
2015	\$ 3,304	9.88%	8.38%	\$ 3,064	\$ 240
2016	\$ 4,031	22.00%	20.50%	\$ 3,692	\$ 339
2017	\$ 4,154	3.05%	1.55%	\$ 3,749	\$ 405
2018	\$ 4,302	3.56%	2.06%	\$ 3,826	\$ 475
2019	\$ 4,414	2.61%	1.11%	\$ 3,869	\$ 545
2020	\$ 4,574	3.62%	2.12%	\$ 3,951	\$ 623
2021	\$ 4,407	-3.64%	-5.14%	\$ 3,748	\$ 659
2022	\$ 4,581	3.95%	2.45%	\$ 3,839	\$ 742
2023	\$ 4,761	3.93%	2.43%	\$ 3,933	\$ 828
2024	\$ 4,950	3.97%	2.47%	\$ 4,030	\$ 920
2025	\$ 5,146	3.96%	2.46%	\$ 4,129	\$ 1,017
2026	\$ 5,351	3.98%	2.48%	\$ 4,231	\$ 1,120
2027	\$ 5,564	3.98%	2.48%	\$ 4,336	\$ 1,228
2028	\$ 5,786	3.99%	2.49%	\$ 4,444	\$ 1,342
2029	\$ 6,016	3.98%	2.48%	\$ 4,554	\$ 1,462
2030	\$ 6,257	4.01%	2.51%	\$ 4,669	\$ 1,588
<b>2010-2030 Total</b>	<b>\$ 92,795</b>			<b>\$ 78,801</b>	<b>\$ 13,993</b>
<b>2010-2020 Total</b>	<b>\$ 39,976</b>			<b>\$ 36,888</b>	<b>\$ 3,088</b>

For an explanation of the large change in TTF revenues shown between FY 2015 and FY 2016, please see Section 2.2.4.A

Figure 5-2 illustrates the impact of the decrease in MDOT TTF Revenues on the MTA share of total MDOT capital expansion budget. The maximum percentage share would still occur in FY 2014 and increase from 78% to 84%. This would still allow covering Purple Line capital cost increases of up to 38% (leaving the New Starts revenues equal to the base case levels).



**Figure 5-2: MTA Share of Statewide MDOT Expansion Budget with a 1.5% reduction in MDOT TTF Revenues, Compared to the Base Case**

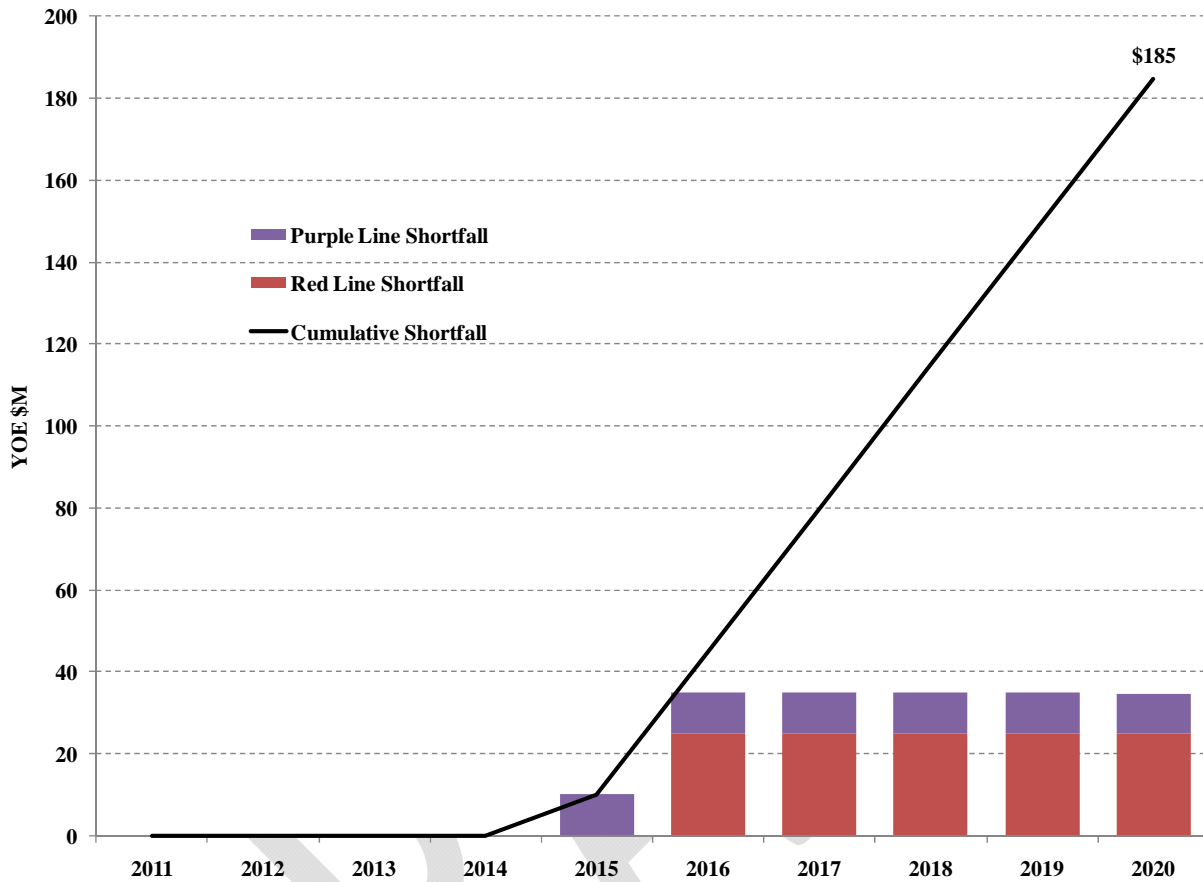


**5.5.3 Scenario 3: Annual Cap on Section 5309 New Starts Funding for the Purple Line and Red Line Projects**

Scenario 3 considers a case where the MTA would not receive more than \$150 million in 5309 New Starts funds in any given year for the Red Line and Purple Line projects. In this scenario, in years when the Red Line and Purple Line projects are projected to receive less than \$150 million in FTA Section 5309 New Starts funding, nothing is changed. In years when the Red Line and/or Purple Line projects are assumed to receive more than \$150 million in Section 5309 New Starts funding in the base case scenario, a cap of \$150 million in Section 5309 New Starts is applied in this sensitivity test and it is assumed that MDOT would be responsible for the “bridge” financing in that year. In this scenario, the final FFGA payout is delayed until one year beyond the completion of construction. Figure 5-3 presents the annual and cumulative funding shortfalls during the Red and Purple Line construction period based on this scenario. Since the Purple Line project is assumed to receive \$160 million (YOE) per year in New Starts funds in the base case, this scenario implies an annual shortfall of \$10 million (YOE) from FY 2015 through FY2020. Annual Red Line New Starts funds would be reduced from \$175 million to \$150 million beginning in FY 2016. The cumulative cash flow gap through the end of the construction periods would equal \$185 million (YOE).



**Figure 5-3: Shortfall with \$150 Million Annual Cap on Section 5309 New Starts for the Purple and Red Lines (YOE \$ M)**



In the event of this scenario, MDOT would first consider using the remaining TTF funds available from MDOT’s expansion budget. If those funds were not available, the \$208 million debt capacity in FY2014 would be sufficient to fund the \$185 million shortfall. Finally, MDOT could alternatively issue FFGA Capital Grant Anticipation Notes to address the one-year delay in the receipt of New Starts fund.

## 6 Conclusions

The present financial plan demonstrates the financial capacity of the Maryland Transit Administration to construct and operate the proposed Purple Line project while successfully operating, maintaining, and preserving the MTA's existing transit system. The financial plan supports the MTA's New Starts Criteria submittal to the FTA for Section 5309 New Starts funds for the Purple Line project. In this application the MTA is requesting \$962.6 million to complete the Purple Line project, accounting for 49.99% of the total project costs of \$1,925 million (YOE \$).

The MTA's Purple Line project has the full support of the State of Maryland and MDOT, as is evidenced by Maryland's commitment to provide 50% of total project capital costs, which complies with FTA funding criteria for Non-Section 5309 funding. MDOT is currently working to program full funding for the implementation of the Purple Line. This support, coupled with MDOT's unique TTF funding protocol, ensures that the MTA, in conjunction with FTA Section 5309 New Starts funding support, will have adequate funding to construct, operate and maintain the Purple Line project. The additional funding/financing options discussed in Section 1.5.2, if implemented, would further increase the MTA's financial capacity to construct the Purple Line. MDOT's capital planning approach also guarantees that the remaining MDOT assets will not suffer adverse effects due to the MTA's system expansion.

Figure 2-5 presents the MTA's capital budget from FY 1981 to FY 2030 and demonstrates that not only does the TTF have the funding capacity to build the Purple Line project, historical precedent shows that MDOT has a strong history of allocating additional capital funding to the MTA during the construction of high priority capital projects. Figure 2-1 shows this occurrence during the construction of Metro's "Section A" in 1981, and the simultaneous construction of Metro's "Section C" and the Central Light Rail in 1989-1992, and the more recent Central Light Rail Double Track project.

As the MTA's non-Section 5309 New Starts capital funding partner, the financial health of MDOT and its Transportation Trust Fund are imperative for the successful delivery and subsequent operation of the Purple Line project. As evidenced throughout this financial plan, MDOT and its TTF are in fine financial condition, reflected by MDOT's AAA bond rating. It has also been demonstrated that MDOT has the debt capacity to issue short- or long-term bonds should that become necessary to complete the project. Further, MDOT has the TTF at its disposal. The TTF's funding sources are diverse and include motor fuel taxes, motor vehicle excise (titling) taxes, a portion of sales tax, motor vehicle fees (registrations, licenses and other fees), and federal-aid. While the TTF levels and MDOT budgets have been impacted by recent economic conditions, the diversity of funding sources collected by the TTF have minimized the effects of the economic downturn. As such, the TTF has not been impacted as drastically as some transit agencies that rely on funding from one or two primary sources. This is evidenced by MDOT's current projection that the TTF will maintain at least a \$100 million cash minimum balance in every year.



## 6.1 Capital Plan

The MTA is currently seeking entry into New Starts Preliminary Engineering for the Purple Line. The Purple Line has secured budgeted funding for the PE phase of the project, and it has identified non-Section 5309 funds for the remaining final design and construction phases. MDOT is in the process of budgeting additional funds, and it plans to budget construction dollars for the project after the Purple Line during New Starts Preliminary Engineering. A 30% contingency is currently included in the capital cost estimate.

While the current financial challenges have the potential to impact the project financial plan, MDOT's positive economic health and the strength of the TTF is such that the MTA can deliver the Purple Line project despite a challenging near-term economic environment. This is evidenced in Section 5, as it was demonstrated that the MTA could deliver the project in unforeseen event such as a 25% increase in Purple Line capital costs, a 10% capital cost increase for both the Purple Line and Red Line, or a 1.5% per year decrease in projected TTF revenue growth rates.

The MTA's existing assets are maintained in a state of good repair, based on a long-standing MDOT commitment to addressing system preservation needs before capital expansion or enhancement projects. The MTA has undertaken an extensive effort to identify and prioritize future capital preservation needs between FY 2010 and FY 2030 to ensure that its system remains in a state of good repair and can meet the MTA's reliability, performance, and safety goals.

## 6.2 Operating and Maintenance Plan

The Purple Line is expected to have a modest impact on the MTA's operating budget, representing just 2.9% of the MTA's FY 2030 operating plan totals. Nevertheless, the MTA and MDOT are committed to providing 100% of the funds needed to operate and maintain the proposed Purple Line, as the state has a long history of funding its O&M needs and it plans to continue this practice. As evidence of this, the MTA has not implemented any core service cuts despite the challenging economic environment during the last two years.

While the MTA's O&M costs experienced relatively high growth (6.81%) from 2003 to 2010, a significant portion of this was related to service expansion. The MTA's revenue vehicle hours grew at an average annual growth rate of 3.30% during this timeframe. With modest growth projections for the underlying system in the future horizon, it is anticipated that the Purple Line, Red Line, and CCT will represent the MTA's primary service growth initiatives going forward. Further, the MTA has recently made a significant effort to address O&M unit cost growth, including an overtime control program. Nevertheless, conservative O&M cost escalation assumptions were incorporated into this financial plan.



## Appendix A – Summary of Regional Economic Conditions

### Overview

This section presents a summary of economic forecasts for the Washington DC region according to the following four economic indicators: population, employment, personal income, and inflation. These indicators provide additional information for evaluating the cost and revenue growth rates assumed in the financial plan, and are consistent with the assumptions utilized in the forecasts of ridership, service levels, and revenue growth in this financial plan. In general, the forecasts for the Washington DC region represent strong growth during the planning horizon. Future growth rates are generally assumed to be slightly higher than the rates experienced over the past ten years.

### Population

Table A-1 summarizes historic and forecasted population growth rates for the Washington DC region from 2000 to 2030. For the purposes of the population and employment figures, the Washington DC region is defined as the District of Columbia and the inner suburbs, which include Montgomery County, Prince George’s County, Fairfax County, Arlington County, and the cities of Alexandria, Fairfax, Rockville, Gaithersburg, and Falls Church. The population forecast is from the Metropolitan Washington Council of Governments (MWCOG) Round 7.1. MWCOG is an organization comprised of elected officials from 21 local governments, members of the Maryland and Virginia state legislatures, and members of the U.S. Congress. MWCOG provides technical and support staff for the National Capital Region Transportation Planning Board (TPB) which is the federally designated Metropolitan Planning Organization (MPO) for this region.

**Table A-1: 2000 to 2030 Population Growth for the Washington DC Region**

Year	Population - Washington DC Region	
	Total	5-Yr. Growth Rate
2000	3,572,800	
2005	3,780,200	5.80%
2010	4,023,000	6.42%
2015	4,228,400	5.11%
2020	4,412,900	4.36%
2025	4,546,100	3.02%
2030	4,641,400	2.10%
<b>2000 to 2010 CAGR</b>	<b>1.19%</b>	
<b>2010 to 2030 CAGR</b>	<b>0.72%</b>	



As shown in Table A-1, population growth in the Washington DC region is forecasted to grow approximately 0.72% from 2010 to 2030. This rate is conservative relative to the growth experienced from 2000 to 2010.

**Employment**

Table A-2 presents the historic and forecasted employment growth for the Washington DC region (DC and the inner suburbs) from 2000 to 2030. The employment forecast is from MWCOG Round 7.1.

**Table A-2: 2000 to 2030 Employment for the Washington DC Region**

Year	Employment - Washington DC Region	
	Total	5-Yr. Growth Rate
2000	2,443,300	
2005	2,536,500	3.81%
2010	2,744,000	8.18%
2015	2,914,800	6.22%
2020	3,081,300	5.71%
2025	3,239,000	5.12%
2030	3,377,000	4.26%
<b>2000 to 2010 CAGR</b>	<b>1.17%</b>	
<b>2010 to 2030 CAGR</b>	<b>1.04%</b>	

From 2010 to 2030, employment in the Washington DC region is forecast to increase at a compound average annual growth rate of 1.04%. This rate is slightly lower than the growth experienced from 2000 to 2010.

**Personal Income**

Table A-3 summarizes historic and forecasted personal income and per capita personal income for the Washington DC region from 2000 to 2030. The Washington DC region’s historic and forecasted personal income data was obtained from IHS Global Insight ([www.ihsglobalinsight.com](http://www.ihsglobalinsight.com), downloaded May 19, 2011).





**Table A-3: 2000 to 2030 Personal Income for the Washington DC Region**

Year	Personal Income - Washington DC Region (\$ M)		Personal Income Per Capita - Washington DC Region (\$ 1000s)	
	Total	5-Yr. Growth Rate	Total	5-Yr. Growth Rate
2000	\$ 199,452		\$ 41	
2005	\$ 262,197	31.46%	\$ 50	21.04%
2010	\$ 322,506	23.00%	\$ 57	14.88%
2015	\$ 422,155	30.90%	\$ 70	22.17%
2020	\$ 546,863	29.54%	\$ 85	21.57%
2025	\$ 698,267	27.69%	\$ 103	20.85%
2030	\$ 900,092	28.90%	\$ 126	22.56%
<b>2000 to 2010 CAGR</b>	<b>4.92%</b>		<b>3.35%</b>	
<b>2010 to 2030 CAGR</b>	<b>5.27%</b>		<b>4.02%</b>	

Both personal income and per capita personal income are forecasted to grow at rates that are higher than those experienced from 2000 to 2010.

***Inflation***

The Washington DC region’s historic and forecasted consumer price index (CPI) from the years 2000 to 2030 is shown in Table A-4. The historic and forecast CPI data were obtained from IHS Global Insight ([www.ihsglobalinsight.com](http://www.ihsglobalinsight.com), downloaded May 19, 2011).

**Table A-4: 2000 to 2030 CPI for the Washington DC Region**

Year	CPI - Washington DC Region	
	Total	5-Yr. Growth Rate
2000	108	
2005	124	15.53%
2010	142	14.39%
2015	165	15.91%
2020	184	11.57%
2025	205	11.47%
2030	230	11.98%
<b>2000 to 2010 CAGR</b>	<b>2.83%</b>	
<b>2010 to 2030 CAGR</b>	<b>2.42%</b>	



Within the Washington DC region, the CPI is forecast to increase at a compound average annual growth rate of 2.42% from 2010 to 2030. This is consistent with the CPI annual growth rate assumed in this financial plan (2.5%).

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## **Appendix B – Summary of MTA and MDOT Financial Conditions**

### ***Maryland Transit Administration***

Maryland Transit Administration expenditures are funded through a combination of operating revenues, Federal funds and allocations from MDOT's Transportation Trust Fund. In terms of Federal funding, the MTA has consistently met Federal grant matching requirements. It has also avoided any cash flow issues associated with delays in the apportionment of Federal transit formula funds.

The MTA reliably receives the O&M and capital preservation funding it needs from MDOT, which has allowed the MTA to practice a robust preventative maintenance program and maintain a state of good repair on its existing assets. The MTA's farebox recovery ratio ranged from approximately 24% to 32% since 2002, and it was approximately 23% in FY 2009. The MTA has not needed to enact any core service cuts or fare increases despite generally challenging economic conditions during the past several years.

### ***Maryland Department of Transportation***

As with most State agencies, MDOT has not been immune to the ongoing financial crisis that is afflicting the United States. As such, its overall budget has been revised downward due to lower revenue projections in the immediate future. Despite these adjustments, however, MDOT is still in a sound state of fiscal health, as described below.

MDOT has long maintained a minimum cash balance in the TTF to buffer against unexpected financial conditions. As shown in the six-year CTP, MDOT has budgeted a \$100 million minimum cash balance in the Transportation Trust Fund. This would cushion the impact should revenues fall short of anticipated levels, and continue to provide a buffer against future unexpected financial conditions.

MDOT's debt ratings indicate that it is in sound financial condition. MDOT's latest debt issuance was \$140 million in Consolidated Transportation Bonds, Series 2010, in June 2010. The bonds were issued for the completion of miscellaneous capital improvements identified in the CTP document. This issuance was rated AAA by the Standard & Poors Corporation, Aa1 by Moody's, and AA-plus by Fitch Ratings. Comparatively, the previous three previous bond issuances by MDOT were in April 2009, for \$110 million, in August 2008, for \$280 million, and in January 2008, for \$227 million. The April 2009, August 2008, and January 2008 issuances were rated AAA by the Standard & Poors Corporation, Aa2 by Moody's, and AA by Fitch Ratings. While MDOT was upgraded by Moody's and Fitch Ratings, it should be noted that Moody's and Fitch Ratings recently recalibrated their municipal debt ratings to more closely track sovereign and corporate debt; this has resulted in many municipal bond issuers receiving ratings upgrades. Regardless, MDOT has maintained stable, high quality ratings from all three ratings agencies, thereby demonstrating MDOT's consistently strong financial health. An excerpt of the official statement from the latest bond issuance has been enclosed in the supporting documentation in Appendix E.



MDOT manages its outstanding debt by two coverage tests: pledged taxes and net revenues. The pledged taxes test captures MDOT's portion of the corporation income tax, the State motor fuel tax, the motor vehicle titling tax, a portion of the State's general sales tax, and a portion of the State's sales and use tax on rental vehicles as compared to maximum annual debt service. The net revenues test is a ratio of net MDOT receipts (total revenue excluding federal aid, bond proceeds, or other receipts not available for debt service less administration, operating and maintenance expenses) for the prior fiscal year divided by maximum debt service.

MDOT will not issue new bonds unless both the pledged taxes of the prior fiscal year and the net revenues of the prior fiscal year are each equal to at least two times maximum annual debt service. Although both tests require 2.0 times coverage, the Department's administrative policy is to provide 2.5 times coverage. The additional coverage acts as a cushion against revenue and expense variations and thus allows time to adjust the financial strategies while maintaining the capital program. MDOT also has a statutory limit of \$2.6 billion that is placed on outstanding debt. This statutory limit has a history of being raised, as it was increased from \$1.2 billion to \$1.5 billion in 2002, then it was increased again to \$2 billion in 2004, and it was most recently increased to its current level of \$2.6 billion in 2007.

As of June 30, 2010, MDOT's total outstanding debt level was \$1,645,010,000, as referenced on page 19 of the aforementioned official statement for MDOT's latest debt issuance (see Appendix E). Given these current debt levels, MDOT's maximum annual debt service will be \$210,723,300 in the fiscal year ending 2017. In the year 2017, MDOT's debt service coverage ratios based on FY 2009 revenues are 5.86 for pledged taxes, and 2.53 for net revenues; both well above MDOT's minimum required 2.5 coverage ratio. Based on current projections, MDOT's pledged tax coverage ratios are expected to range between 4.7 and 5.3 in the years 2011-2015, always above the 2.5 times coverage target. MDOT's net revenue ratio is projected to range between 2.2 and 2.7, dipping below the 2.5 times coverage threshold in 2011 through 2013, but pushing back up to 2.5 in 2014. Note that MDOT anticipates meeting its minimum coverage ratio in all future years.

MDOT's current operating condition is satisfactory, as is evidenced by its ratio of current assets to current liabilities of 1.4, as reported in its most recent CAFR (dated FY 2010, see Appendix E).



# Appendix C – Summary of MTA Historical Sources and Uses of Funds

Table C-1 presents the MTA’s historical sources and uses of funds from 2002 to 2009.

**Table C-1: MTA Historical Sources and Uses**

	FY-02	FY-03	FY-04	FY-05	FY-06	FY-07	FY-08	FY-09
<b>OPERATING SOURCES OF FUNDS</b>								
<b>Operating Revenues</b>								
Core Service <sup>[1]</sup>	\$ 68	\$ 63	\$ 76	\$ 75	\$ 74	\$ 79	\$ 79	\$ 75
Commuter Rail (MARC)	\$ 21	\$ 23	\$ 27	\$ 30	\$ 34	\$ 31	\$ 32	\$ 35
Commuter Bus	\$ 5	\$ 7	\$ 10	\$ 10	\$ 12	\$ 12	\$ 13	\$ 14
Paratransit ("Mobility")	\$ 1	\$ 1	\$ 1	\$ 1	\$ 1	\$ 1	\$ 2	\$ 2
Other Operating Revenues <sup>[2]</sup>	\$ 4	\$ 6	\$ 7	\$ 5	\$ 6	\$ 12	\$ 5	\$ 5
<b>Total Operating Revenues</b>	<b>\$ 99</b>	<b>\$ 101</b>	<b>\$ 121</b>	<b>\$ 122</b>	<b>\$ 127</b>	<b>\$ 136</b>	<b>\$ 130</b>	<b>\$ 131</b>
<b>Annual Growth Rate</b>		<b>1.42%</b>	<b>20.19%</b>	<b>0.90%</b>	<b>4.28%</b>	<b>6.59%</b>	<b>-3.95%</b>	<b>0.60%</b>
<b>Operating Assistance</b>								
Federal O&M Assistance	\$ 30	\$ 52	\$ 52	\$ 52	\$ 50	\$ 52	\$ 54	\$ 66
MTA Operating Funding from MDOT <sup>[3]</sup>	\$ 243	\$ 260	\$ 246	\$ 281	\$ 302	\$ 330	\$ 400	\$ 410
<b>Total Operating Assistance</b>	<b>\$ 273</b>	<b>\$ 312</b>	<b>\$ 298</b>	<b>\$ 333</b>	<b>\$ 352</b>	<b>\$ 382</b>	<b>\$ 455</b>	<b>\$ 476</b>
<b>Annual Growth Rate</b>		<b>14.27%</b>	<b>-4.60%</b>	<b>11.85%</b>	<b>5.74%</b>	<b>8.37%</b>	<b>19.10%</b>	<b>4.68%</b>
<b>TOTAL OPERATING SOURCES OF FUNDS</b>	<b>\$ 373</b>	<b>\$ 413</b>	<b>\$ 419</b>	<b>\$ 455</b>	<b>\$ 480</b>	<b>\$ 518</b>	<b>\$ 585</b>	<b>\$ 607</b>
<b>Annual Growth Rate</b>		<b>10.84%</b>	<b>1.45%</b>	<b>8.68%</b>	<b>5.35%</b>	<b>7.90%</b>	<b>13.05%</b>	<b>3.77%</b>
<b>OPERATING USES OF FUNDS</b>								
<b>O&amp;M Costs</b>								
Light Rail	\$ 32	\$ 35	\$ 34	\$ 36	\$ 36	\$ 40	\$ 37	\$ 33
Local Bus	\$ 167	\$ 187	\$ 177	\$ 198	\$ 202	\$ 212	\$ 248	\$ 256
Metro	\$ 39	\$ 41	\$ 42	\$ 40	\$ 43	\$ 51	\$ 55	\$ 52
Commuter Rail (MARC)	\$ 54	\$ 59	\$ 66	\$ 68	\$ 73	\$ 77	\$ 94	\$ 109
Commuter Bus	\$ 19	\$ 22	\$ 25	\$ 30	\$ 32	\$ 35	\$ 41	\$ 39
Paratransit ("Mobility")	\$ 15	\$ 16	\$ 20	\$ 28	\$ 43	\$ 49	\$ 54	\$ 60
LOTS Assistance	\$ 47	\$ 53	\$ 55	\$ 54	\$ 51	\$ 54	\$ 56	\$ 57
<b>Total O&amp;M Cost</b>	<b>\$ 373</b>	<b>\$ 413</b>	<b>\$ 419</b>	<b>\$ 455</b>	<b>\$ 480</b>	<b>\$ 518</b>	<b>\$ 585</b>	<b>\$ 607</b>
<b>Annual Growth Rate</b>		<b>10.84%</b>	<b>1.45%</b>	<b>8.68%</b>	<b>5.35%</b>	<b>7.90%</b>	<b>13.05%</b>	<b>3.77%</b>
<b>TOTAL OPERATING USES OF FUNDS</b>	<b>\$ 373</b>	<b>\$ 413</b>	<b>\$ 419</b>	<b>\$ 455</b>	<b>\$ 480</b>	<b>\$ 518</b>	<b>\$ 585</b>	<b>\$ 607</b>
<b>Annual Growth Rate</b>		<b>10.84%</b>	<b>1.45%</b>	<b>8.68%</b>	<b>5.35%</b>	<b>7.90%</b>	<b>13.05%</b>	<b>3.77%</b>
<b>CAPITAL SOURCES OF FUNDS</b>								
<b>Federal Funding</b>								
FTA Section 5307	\$ 49	\$ 53	\$ 53	\$ 55	\$ 69	\$ 71	\$ 79	\$ 88
FTA Section 5309 Fixed Guideway Modernization	\$ 27	\$ 29	\$ 28	\$ 27	\$ 30	\$ 32	\$ 35	\$ 45
FTA Section 5309 Bus and Bus Facilities	\$ 8	\$ 8	\$ 7	\$ 4	\$ 6	\$ 6	\$ 7	\$ 9
Other Federal Funds (LOTS, CMAQ, Non-Urbanized Areas, Other)	\$ 66	\$ 83	\$ 74	\$ 58	\$ 5	\$ 14	\$ 42	\$ 97
Transfer for Federal O&M Assistance	\$ (30)	\$ (52)	\$ (52)	\$ (52)	\$ (50)	\$ (52)	\$ (54)	\$ (66)
<b>Total Federal Funding</b>	<b>\$ 121</b>	<b>\$ 120</b>	<b>\$ 110</b>	<b>\$ 92</b>	<b>\$ 60</b>	<b>\$ 71</b>	<b>\$ 109</b>	<b>\$ 173</b>
<b>Annual Growth Rate</b>		<b>-0.23%</b>	<b>-8.60%</b>	<b>-15.93%</b>	<b>-34.77%</b>	<b>17.95%</b>	<b>53.49%</b>	<b>58.76%</b>
<b>State Funding</b>								
MTA System Preservation Funding from MDOT	\$ 27	\$ 42	\$ 66	\$ 105	\$ 99	\$ 30	\$ 43	\$ 82
MTA System Expansion Funding from MDOT	\$ 58	\$ 65	\$ 57	\$ 77	\$ 79	\$ 49	\$ 50	\$ 13
<b>Total State Funding</b>	<b>\$ 85</b>	<b>\$ 107</b>	<b>\$ 123</b>	<b>\$ 182</b>	<b>\$ 179</b>	<b>\$ 79</b>	<b>\$ 93</b>	<b>\$ 95</b>
<b>Annual Growth Rate</b>		<b>26.46%</b>	<b>14.46%</b>	<b>47.73%</b>	<b>-1.69%</b>	<b>-55.78%</b>	<b>18.19%</b>	<b>1.30%</b>
<b>TOTAL CAPITAL SOURCES OF FUNDS</b>	<b>\$ 206</b>	<b>\$ 228</b>	<b>\$ 233</b>	<b>\$ 274</b>	<b>\$ 239</b>	<b>\$ 150</b>	<b>\$ 202</b>	<b>\$ 268</b>
<b>Annual Growth Rate</b>		<b>10.80%</b>	<b>2.28%</b>	<b>17.67%</b>	<b>-12.85%</b>	<b>-37.17%</b>	<b>34.92%</b>	<b>32.28%</b>
<b>CAPITAL USES OF FUNDS</b>								
<b>Capital Preservation</b>								
MTA System Preservation Capital Cost	\$ 88	\$ 104	\$ 109	\$ 153	\$ 137	\$ 57	\$ 91	\$ 224
<b>Total Capital Preservation</b>	<b>\$ 88</b>	<b>\$ 104</b>	<b>\$ 109</b>	<b>\$ 153</b>	<b>\$ 137</b>	<b>\$ 57</b>	<b>\$ 91</b>	<b>\$ 224</b>
<b>Annual Growth Rate</b>		<b>17.62%</b>	<b>4.82%</b>	<b>40.11%</b>	<b>-10.01%</b>	<b>-58.83%</b>	<b>60.29%</b>	<b>296.01%</b>
<b>Capital Expansion</b>								
MTA System Expansion Capital Cost	\$ 117	\$ 124	\$ 124	\$ 121	\$ 101	\$ 93	\$ 112	\$ 44
<b>Total Capital Expansion</b>	<b>\$ 117</b>	<b>\$ 124</b>	<b>\$ 124</b>	<b>\$ 121</b>	<b>\$ 101</b>	<b>\$ 93</b>	<b>\$ 112</b>	<b>\$ 44</b>
<b>Annual Growth Rate</b>		<b>5.65%</b>	<b>0.15%</b>	<b>-2.08%</b>	<b>-16.43%</b>	<b>-7.79%</b>	<b>19.56%</b>	<b>-60.88%</b>
<b>TOTAL CAPITAL USES OF FUNDS</b>	<b>\$ 206</b>	<b>\$ 228</b>	<b>\$ 233</b>	<b>\$ 274</b>	<b>\$ 239</b>	<b>\$ 150</b>	<b>\$ 202</b>	<b>\$ 268</b>
<b>Annual Growth Rate</b>		<b>10.80%</b>	<b>2.28%</b>	<b>17.67%</b>	<b>-12.85%</b>	<b>-37.17%</b>	<b>34.92%</b>	<b>32.28%</b>

[1]: MTA does not segregate core service revenue by mode because MTA's fare structure allows riders to cross modes

[2]: Includes advertising, real estate, parking, citations, building rentals, and other

[3]: May differ from other financial reports published by MDOT due to the fact that fare revenues presented in this table are gross revenues



## Appendix D – Summary of Cost Escalation Rates

### Capital Cost Escalation Rates

The construction costs for the proposed Purple Line project as well as the construction costs for the MTA's underlying capital plan through FY 2030 were escalated using capital cost escalation rates developed by the Maryland Department of Transportation. Right of way costs were escalated using MDOT rates developed specifically for real estate-related costs. These rates are used by MDOT to develop the statewide six-year capital program.

The capital cost escalation rates used for the Purple Line capital cost estimate, for the Red Line capital cost estimate, and for the MTA's other capital expenditures included in this financial plan, are summarized in Table D-1. Appendix E includes a memorandum dated May 8, 2009 on Capital and Real Estate Escalation Factors developed by MDOT (referred to hereafter as the MDOT memorandum). These escalation rates have been utilized in the financial plan.

**Table D-1: Annual Escalation Rates by SCC Categories and Financial Plan Capital Cost Categories**

FTA Standard Cost Category	FY-11	FY-12	FY-13	FY-14	FY-15	FY16 - FY30	Source
10 - Guideway and Track Elements	2.50%	2.50%	2.75%	3.00%	3.25%	3.25%	MDOT Capital Esc.
20 - Stations, Stops, Terminals, Intermodal	2.50%	2.50%	2.75%	3.00%	3.25%	3.25%	MDOT Capital Esc.
30 - Support Facilities: Yards, Shops, Admin. Bldgs	2.50%	2.50%	2.75%	3.00%	3.25%	3.25%	MDOT Capital Esc.
40 - Sitework & Special Conditions	2.50%	2.50%	2.75%	3.00%	3.25%	3.25%	MDOT Capital Esc.
50 - Systems	2.50%	2.50%	2.75%	3.00%	3.25%	3.25%	MDOT Capital Esc.
60 - ROW, Land, Existing Improvements	3.00%	4.00%	5.00%	6.00%	6.25%	6.25%	MDOT Real Estate Esc.
70 - Vehicles	2.50%	2.50%	2.75%	3.00%	3.25%	3.25%	MDOT Capital Esc.
80 - Professional Services	2.50%	2.50%	2.75%	3.00%	3.25%	3.25%	MDOT Capital Esc.
90 - Unallocated Contingency	2.50%	2.50%	2.75%	3.00%	3.25%	3.25%	MDOT Capital Esc.

Underlying MTA Capital Plan Cost Category	FY-11	FY-12	FY-13	FY-14	FY-15	FY16 - FY30	Source
Infrastructure	2.50%	2.50%	2.75%	3.00%	3.25%	3.25%	MDOT Capital Esc.
Vehicles	2.50%	2.50%	2.75%	3.00%	3.25%	3.25%	MDOT Capital Esc.
Facilities	2.50%	2.50%	2.75%	3.00%	3.25%	3.25%	MDOT Capital Esc.
Equipment	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	CPI
Other	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	CPI

\*MTA Capital Plan cost estimates were obtained in FY 2010 dollars.

The following sections describe the methodologies used to develop the escalation rates, and evaluate them based on current cost indices and economic conditions.



**Construction and Vehicles Cost Escalation Rates**

As described in the MDOT memorandum, MDOT developed capital escalation factors for fiscal years 2011 through 2015. The FY 2015 capital escalation rate was assumed to remain constant for the years 2016 through 2030.

MDOT’s capital escalation rate was used to inflate all of the FTA Standard Cost Categories with the exception of SCC 60 (ROW, Land, and Existing Improvements). In the financial plan, this rate was also used to inflate “Infrastructure”, “Vehicles”, and “Facilities” capital costs in the underlying MTA capital plan forecast through FY 2030. These rates are summarized in Table D-2.

**Table D-2: Annual Construction Cost Escalation Rates**

FY-11	FY-12	FY-13	FY-14	FY-15	FY16 - FY30
2.50%	2.50%	2.75%	3.00%	3.25%	3.25%

To forecast future capital cost escalation, MDOT uses an index model (described further in the MDOT memorandum) that is highly correlated to the Engineering News Record (ENR) Construction Cost Index (CCI). The CCI consists of the following components: labor, structure steel, lumber, and Portland cement. The economic variables used to forecast the aforementioned components in the MDOT index model are: average hourly earnings for construction workers, Producer Price Index (PPI) for fabricated structural metals, PPI for lumber and wood products, and PPI for hydraulic cement. MDOT’s model index variables are weighted to match the ENR CCI weighting (80% for labor, 13% for structural steel, 6% for lumber, and 1% for Portland cement). MDOT uses independent forecasts (from Economy.com) of the four model variables to develop a forecast of the model index.

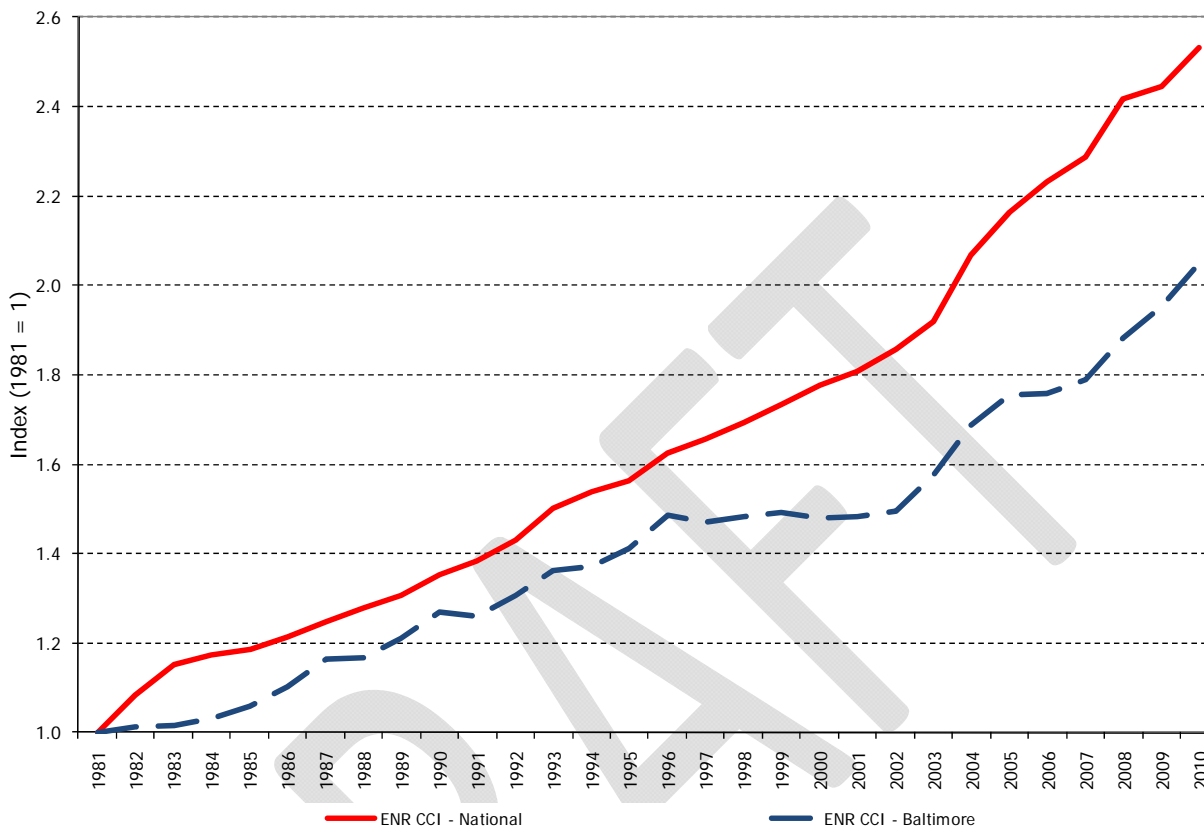
As a statistical check, a regression of the ENR CCI and the MDOT model indices calculated an R-Squared of 0.99. An R-Squared of 1.00 indicates perfect correlation; therefore, the model index tracks very closely to ENR’s CCI. The model index was then forecasted through 2015 by forecasting the four model variables. MDOT’s escalation rates were determined based on the annual percentage change of the model index plus an “error” factor. The error factor, which is the average annual difference between the annual changes of the CCI and the model indices, is 1.06%. This amount is added to the MDOT base model index annual percentage change. In addition, another factor was added to capture potential fuel cost escalation, which may continue to increase as the economic recovery strengthens. This helps to ensure a conservative estimate.

The MDOT CCI model was derived using national CCI rates. When comparing the growth of the national CCI against the growth of the Baltimore region CCI (the region closest to Washington, DC, that is tracked by ENR), it can be shown that historically, national CCI has grown at a larger rate than the Baltimore region CCI. Hence, the MDOT forecast is conservative in this respect. This is evidenced by the 15-year compound annual growth rate (CAGR) for the two CCI indices: 3.27% for the national CCI versus 2.51% for the Baltimore region CCI. Further, when indexing CCI indices back to 1981, it can be seen that CCI growth in the



Baltimore region has consistently been lower than national CCI growth. This is illustrated in Figure D-1.

**Figure D-1: Indexed National CCI versus Baltimore Region CCI**



MDOT’s capital cost escalation rates increase over time to reflect an anticipated economic recovery. The Project’s longer-term construction cost escalation rates are higher than the long-term historical construction cost escalation experienced in the Baltimore region. Specifically, the MDOT capital escalation rates for FY 2013, FY 2014, and FY 2015 through 2030 (2.75%, 3.00%, and 3.25%, respectively), are greater than the 20-year CAGR of 2.44% for the Baltimore CCI and 2.58% for the Baltimore BCI. In addition, the MDOT escalation rate for FY 2015 through FY 2030 is also comparable to the 15-year CAGRs of 3.27% and 2.85% for the national CCI and national BCI, respectively.

***CPI Escalation Rates***

A CPI escalation rate of 2.50% was utilized to inflate “equipment” and “other” categories in the underlying MTA capital plan forecast to FY 2030. These cost categories tend to be more closely linked to general inflation than civil construction; hence, the construction cost index may not be the most appropriate measure for forecasting these costs. This escalation rate was estimated using historic rates for the CPI for all urban customers at the national level (from the Bureau of Labor Statistics).





In the near term, consumer price inflation is expected to remain relatively flat. As such, actual rates may be lower than the 2.50% rate utilized for these cost categories.

### ***Real Estate Escalation Rates***

MDOT developed real estate escalation factors for fiscal years 2011 through 2015. The real estate escalation rates was used to inflate costs in SCC category 60 – ROW, Land, Existing Improvements, and was utilized for right of way costs in the financial plan. The FY 2015 real estate escalation rate was assumed to remain constant for the years 2016 through 2030. The assumed real estate escalation rates are as follows:

**Table D-3: Real Estate Escalation Rates**

FY-11	FY-12	FY-13	FY-14	FY-15	FY16 - FY30
3.00%	4.00%	5.00%	6.00%	6.25%	6.25%

The MDOT rates are based on the annual percentage change in Median Existing Home Price and the Conventional and Conforming Home Price Index for the State of Maryland, as computed by the Office of Federal Housing Enterprise Oversight. The projections from 2011 to 2015 were performed by MDOT and based on data that MDOT receives from two econometric firms to which they subscribe. To ensure a conservative estimate, MDOT added 10% of the absolute standard error for the 1992 through 2008 period.

It should be noted that many believe the outlook for the suburban commercial real estate market, as a result of falling rental rates, defaulting investors, and lack of buying interest, is not optimistic.<sup>1</sup> The MDOT methodology only takes into account home prices in the state of Maryland. However, the MTA will acquire both residential and commercial real estate right-of-way for the Purple Line. As such, the cost escalation rates assumed by MDOT are likely to be conservative, as the commercial right-of-way purchased for the Purple Line may experience declining costs or little growth for several more years.

In the long run, the historic 15-year CAGRs for Median Existing Home Price and the Home Price Index are 6.6% and 6.3%. Given the expected near-term stability or drop in commercial real estate values and the unprecedented real estate bubble that occurred during the last 15 years, it is expected that the real estate escalation factors are conservative.

### ***Operating and Maintenance Cost Escalation Rates***

Inflation rates applied to the various MTA O&M cost categories in this financial plan are presented below. It should be noted that these assumptions are all subject to change and further refinement in future iterations of this financial plan, as more actual O&M data is collected, as local and economic conditions change and as various vendor contracts are renegotiated.

<sup>1</sup>[http://online.wsj.com/article/SB10001424052748703521904574614833750873314.html?mod=WSJ\\_Real+Estate\\_LeftTopNews](http://online.wsj.com/article/SB10001424052748703521904574614833750873314.html?mod=WSJ_Real+Estate_LeftTopNews)

## ***Labor Costs***

### *Wages and salaries*

MTA's union labor segment represents the single largest cost of operations for the MTA, both in terms of the wage bill and fringe benefit costs. All unions have pension and health benefit plans for active members and retirees, and all require the MTA to make pension contributions for current members. Commuter bus and contracted paratransit service are operated by vendors using non-union labor, and MARC service is covered by union labor agreements with CSX and Amtrak, who provide service and maintenance to the MTA under contract.

Approximately 75% of the MTA workforce is governed by three long-standing union collective bargaining agreements. One of these agreements alone covers more than 90% of all MTA union employees, including all operators, maintenance personnel, and operations support personnel (dispatchers, schedulers, and fare collectors). Historically, the top operator rate has been the basis for the union pay scale for most employees. As such, this financial plan assumes that the growth in operator wages and other wages and salaries will be based on a forecast of the top operator wage rate. Table D-4 presents the historical top operator hourly wage rate from 1994 to 2009.

**Table D-4: MTA Historical Top Operator Wage Rate, 1994-2009**

<b>FISCAL YEAR</b>	<b>TOP OPERATOR WAGE RATE</b>	<b>ANNUAL GROWTH RATE</b>
1994	\$ 16.04	2.17%
1995	\$ 16.58	3.37%
1996	\$ 16.91	1.99%
1997	\$ 17.18	1.60%
1998	\$ 17.50	1.86%
1999	\$ 18.10	3.43%
2000	\$ 18.62	2.87%
2001	\$ 19.19	3.06%
2002	\$ 19.72	2.76%
2003	\$ 20.31	2.99%
2004	\$ 20.96	3.20%
2005	\$ 21.38	2.00%
2006	\$ 21.91	2.48%
2007	\$ 22.57	3.01%
2008	\$ 22.57	-
2009	\$ 22.57	-
<b>AVERAGE</b>		<b>2.30%</b>

It should be noted that a new labor agreement has recently been reached. Consistent with the latest labor agreement, the financial plan assumes a 2.75% annual increase in FY 2011 and FY



2012. In FY 2012, the financial plan assumes a growth rate of 5.58%, and from FY 2013 to FY 2030, annual growth rates of 2.47% are assumed.

*Fringe Benefits*

MTA assumes a portion of the cost of union pension and retiree health obligations. The agency provides pension fund contributions and health benefits to active union employees, union retirees, and management retirees who transitioned from union positions. MTA has typically covered 18-20% of union employee health premiums. From 2002-2008, the current costs of these benefits increased at an average annual rate of 11.06%, while the active union employee total declined 1.08% per year. Over the same time period, revenue vehicle hours (which corresponds to the supply variable that is assumed to drive most of fringe benefit costs in the O&M cost model) have stayed nearly constant, with a slight 0.06% decline on MTA’s core service plus part of Mobility that is directly operated. This information is summarized in Table D-5. As shown in this table, the resulting fringe benefits per revenue vehicle hour declined 11.12% per year on average. The financial plan assumes that the MTA would continue experiencing an 11.00% annual increase in fringe benefit costs through FY 2013. Starting in FY 2014 the growth rate is assumed to decrease by 2.00% per year until it reaches a long-term average conservatively assumed to equal 4.00% (still 1.50% above general inflation).

**Table D-5: MTA Union Employees, Level of Service, and Fringe Benefit Expenses**

	FY-02	FY-08	Average Annual Growth Rate
<b>Union Employees/Level of Service</b>			
Union Employees	2,620	2,454	-1.08%
Revenue Vehicle Hours (M)*	2	2	-0.06%
<b>Fringe Benefit Expenses</b>			
Healthcare Expenses (2009 \$ M)	\$ 13	\$ 28	13.47%
Pension Obligations (2009 \$M)	\$ 16	\$ 26	8.84%
<b>Total Fringe Benefit Expenses (2010 \$ M)</b>	<b>\$ 29</b>	<b>\$ 54</b>	<b>11.06%</b>
<b>Fringe Benefits per Revenue Vehicle Hour</b>	<b>\$ 14</b>	<b>\$ 26</b>	<b>11.12%</b>

\*Includes Light Rail, Local Bus, Metro, and the directly operated portion of Mobility

Sources: MTA and National Transit Database FY2002 and FY2008

Figures D-2 and D-3 at the end of this Appendix present the trend in growth rate in relative terms and cumulatively.

***Fuel and Lubricants***

MTA directly consumes nearly 8 million gallons of diesel fuel each year. Additionally, MTA reimburses contractors on its commuter bus, MARC, and Mobility services for diesel fuel usage. From January 2002 through April 2009, the wholesale price of diesel fuel rose 271%, according

to the Bureau of Labor Statistics' Producer Price Index. From July 2002 to July 2008, that change was 557% as oil futures passed \$100/barrel for crude oil.

This financial plan assumes that fuel and lubricants-related expenses would grow at the rate projected by the Energy Information Administration (EIA) for diesel fuel through 2030, as published in its 2010 Annual Energy Outlook dated December 2009. The financial plan converts EIA's calendar year based forecast into fiscal year the corresponding MTA fiscal year. For example, the FY2011 diesel fuel price was obtained by using the average forecast in EIA's forecast for calendar year 2011 was applied to MTA FY 2011 (which starts on July 1, 2010). The forecast for FY 2010 equals 9.11%, then drops to 2.27% for FY 2011, and then gradually changes from 7.75% in FY 2012 to 2.80% in FY 2030. Figures D-2 and D-3 at the end of this Appendix present the trend in growth rate in relative terms and cumulatively.

Given the volatility of this cost factor, future iterations of the financial plan will update this forecast based on more recent data.

### ***MARC Expenses***

As stated in the Section 3 (the operating plan), MARC commuter rail service is provided by CSX and Amtrak, operating under contract with the MTA. MTA provides the equipment, and the contractors use their crews and personnel to operate the service on their private rail right-of-way. MTA is charged for right of way access, crew and maintenance hours, replacement equipment and parts, and storage of vehicles in Baltimore, Washington, Western Maryland, and West Virginia. The contract with Amtrak was renewed in FY 2009 for five years. The contract with CSX expired at the end of FY 2010, but a tentative three year agreement has been reached.

MARC costs increased at an average annual rate of 9.17% between FY 2003 and FY 2010. FY 2009 experienced an increase of 16.63% from FY 2008 levels, due in part to the initiation of a new contract with Amtrak that year. Some of the increase since FY 2003 can be explained in part by the increase in service levels (measured in revenue vehicle hours), which averaged 0.77% per year between FY 2003 and FY 2010. A large part of the recent double digit increases observed was related to contractually defined change orders and various surcharges. However, the MTA eliminated revenue handling operations by CSX in the second half of FY 2009, which effectively ended their surcharges. These factors, combined with a minor (2%) reduction in service (during the off-peak), led to a 0.7% decrease in MARC O&M costs in FY 2010.

Despite the high growth rates experienced since FY 2003 and more particularly the FY 2008 and FY 2009 double-digit increases, the near-term inflation rates assumed in this financial plan remain very conservative. A 15% annual growth in MARC O&M contract costs was assumed for FY 2011. Starting in FY 2012, the annual growth rate of contract costs is assumed to gradually decrease by approximately 2.00% each year until it reaches 4.38% in FY 2017. The growth is assumed to remain constant thereafter through FY 2030. The 4.38% rate corresponds to the six-year historical annual average growth rate in the Association of American Railroads (AAR) railroad cost index. The use of this index is consistent with the escalation clause language in the agreements between the MTA and its vendors.



### ***Commuter Bus Expense***

As mentioned earlier, the MTA contracts with three bus operators to provide commuter bus service statewide. In FY 2010 the commuter bus service provided 18 commuter bus routes that use private contractors to operate over-the-road coaches on long distance routes serving downtown Baltimore and Washington employment destinations.

A historical analysis shows that O&M expenses on MTA's commuter bus system have increased by 9.56% per year between FY 2002 and FY 2009. At the same time, service (as measured by revenue vehicle hours), has increased at an annual rate of 2.42%. This yields an annual increase in unit cost per revenue vehicle mile of 6.97%. The financial plan applied this growth rate to the actual FY 2009 commuter bus expense through FY 2030.

### ***Other O&M Expenses and Cost Factors***

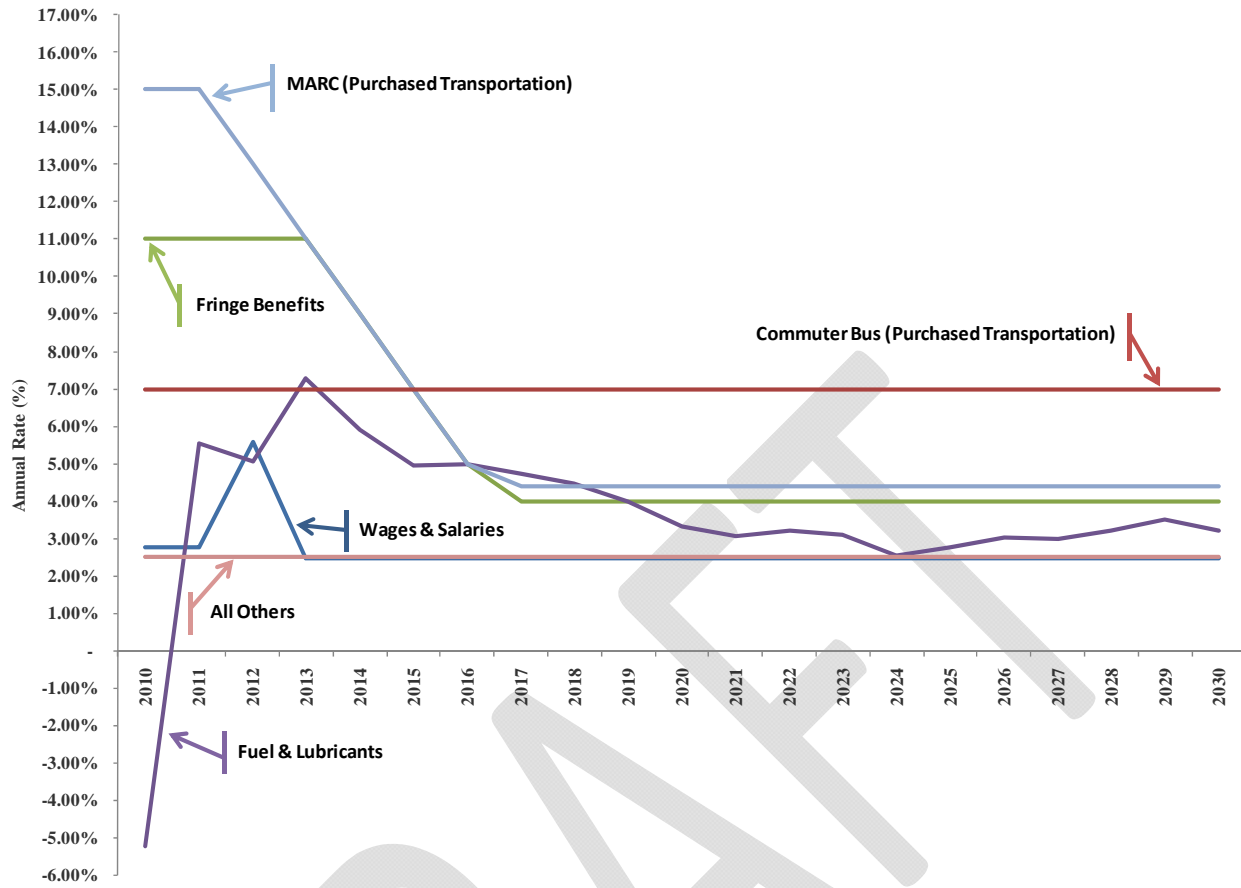
The Financial Plan assumes that all other O&M expense and cost factors will grow at general CPI inflation, currently assumed to equal 2.50% per year. This assumption is considered relatively conservative in the near term and may be refined in future versions of this financial plan.

### ***Summary of O&M Expenses Inflation Assumptions***

Figures D-2 and D-3 present a summary of the major inflation assumptions described above in graphical form, in relative and cumulative (indexed) terms, respectively. MARC and commuter bus contract costs are expected to grow the fastest, followed by fringe benefits. Overall inflation assumptions are considered to be conservative given historical trends. This outlook will evolve over time, as warranted by changes in economic conditions and other local and agency-specific factors.

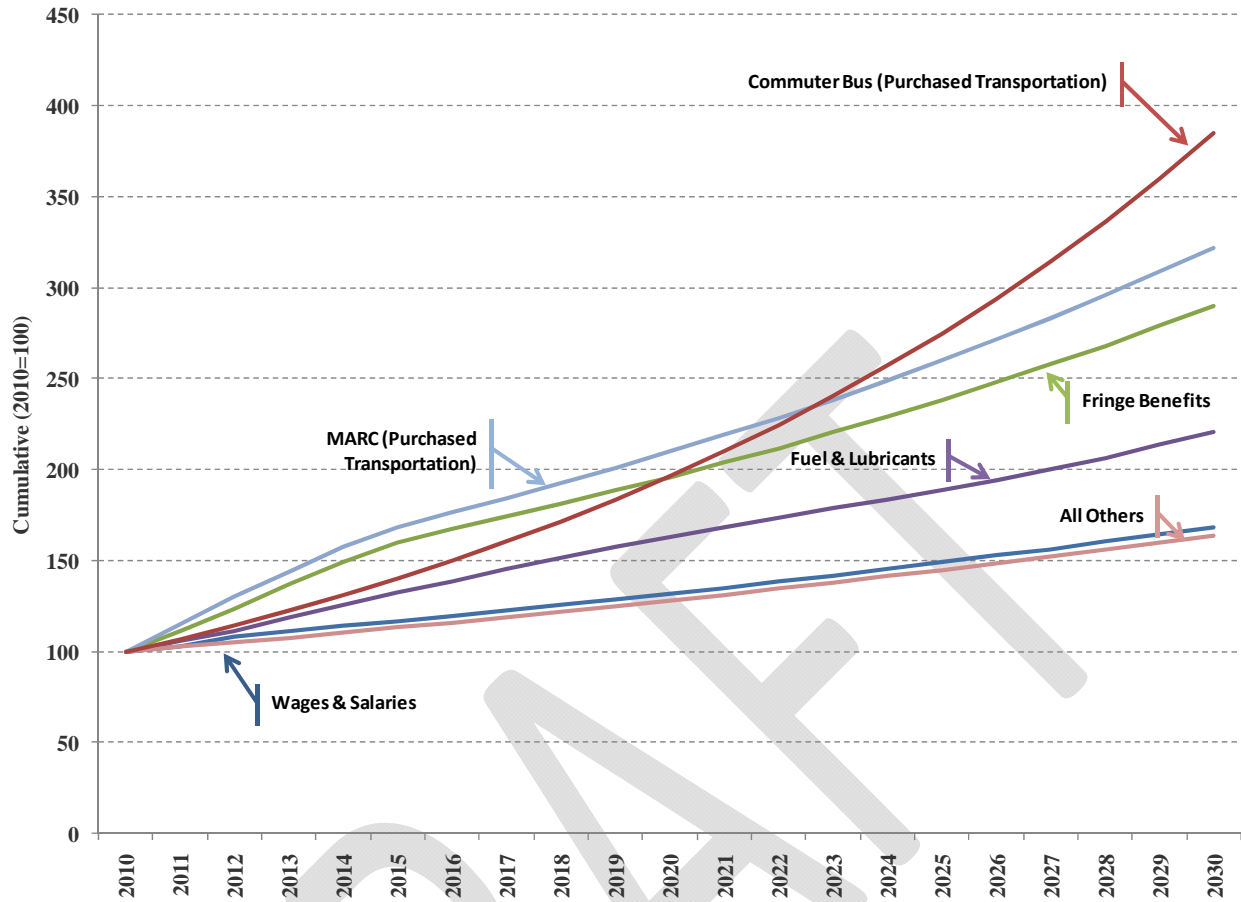


**Figure D-2: MTA Inflation Assumptions by Cost Category**





**Figure D-3: MTA Cumulative Inflation Assumptions by Cost Category (2010=100)**





## **Appendix E – List of Supporting Documents**

The following documents are provided in support of the financial plan:

- 1) Letter of Support for Non-Section 5309 New Starts Funding Commitment (January 2011)
- 2) MDOT Forecasts for Operating, Capital and Expansion Budgets for the Fiscally Constrained Long Range Plan (November 19, 2009)
- 3) MDOT Memorandum describing the Capital and Real Estate Inflation Factors (May 8, 2009)
- 4) Purple Line information in the MWCOG FY 2011 – 2016 Transportation Improvement Program (downloaded May 24, 2011) and MDOT Statewide Transportation Improvement Program (STIP) for FY 2011
- 5) Purple Line information in the MWCOG Constrained Long Range Plan (downloaded May 24, 2011)
- 6) Resolution from the MWCOG adopting the Purple Line's Locally Preferred Alternative (October 21, 2009)
- 7) Excerpt from MDOT/MTA Consolidated Transportation Program (FY 2011 to FY 2016)
- 8) MTA Bus Fleet Management Plan (Draft, dated December 20, 2010)
- 9) MTA Purple Line Light Rail Fleet Management Plan (Draft, dated January 18, 2011)
- 10) MDOT June 9, 2010, Consolidated Transportation Bond Debt Issuance (2010A and 2010B Series) Official Statement
- 11) Excerpts from MDOT Operating and Capital Budgets for FY 2011, FY 2010, and FY 2009
- 12) Excerpts from the MDOT Comprehensive Annual Financial Reports for FY 2010, FY 2009, FY 2008, FY 2007, and FY 2006





## **1) Letters of Support for Non-Section 5309 New Starts Funding Commitment**

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Attached is a letter of support from Maryland Transportation Secretary, Beverley Swaim-Staley, which highlights the Purple Line project as a high priority expansion project for Maryland and expresses the state's commitment to provide the funding necessary to complete the project.

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## **2) MDOT Forecasts for Operating, Capital and Expansion Budgets for the Fiscally Constrained Long Range Plan**

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This document is MDOT's historical and projected operations and maintenance, capital preservation, capital expansion, and overall budgets from FY 1981 to FY 2030. The first table is for the statewide level while the second table is the estimated amount of those funds that would go to just the Washington Metropolitan Area. The forecasts were produced by MDOT and the statewide table was utilized in this financial plan to document MDOT's forecast of its long-range O&M, capital preservation and capital expansion budgets. MDOT does not include discretionary New Starts grants in its forecast of statewide totals beyond 2015 so New Starts funds requested for the MTA's projects were added to the capital expansion figures. The major assumptions of this forecast are documented on the fourth and fifth pages. MDOT's forecast was developed in November 2009 and it is typically updated every other year.

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### **3) MDOT Memorandum describing the Capital and Real Estate Inflation Factors**

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This document is MDOT's Capital and Real Estate inflation factor memorandum. It was created by MDOT to document the forecasted capital and real estate inflation factors for the FY 2010 to FY 2015 time period and the methodology used to develop the forecasts, as part of its CTP development process. It was the basis for the inflation factors associated with capital construction and real estate acquisition cost escalation in the financial plan.

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#### **4) Purple Line Information in the MWCOG TIP & MDOT STIP**

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This section contains the Purple Line page from the Metropolitan Washington Council of Governments' (MWCOG) Transportation Improvement Plan (TIP) for FY 2011 to FY 2016 and pages 1 and 82 of the MDOT Statewide Transportation Improvement Program (STIP) for FY 2011. As required by SAFETEA-LU, the Purple Line project is included in the most recent versions of the (regional level) TIP as well as the (state level) STIP.

The MWCOG TIP page is located at:

[http://www.mwcog.org/clrp/projects/tip-report.asp?PHASE\\_ID=2795](http://www.mwcog.org/clrp/projects/tip-report.asp?PHASE_ID=2795)

The MDOT STIP is located at:

[http://www.mdot.maryland.gov/Planning/STIPandTIP/2011\\_STIP\\_Index/2011\\_STIP\\_Full\\_Document\\_FINAL.pdf](http://www.mdot.maryland.gov/Planning/STIPandTIP/2011_STIP_Index/2011_STIP_Full_Document_FINAL.pdf)

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## **5) Purple Line Information in the MWCOG Constrained Long Range Plan**

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The Metropolitan Washington Council of Governments' (MWCOG) Constrained Long Range Plan (CLRP) identifies all regionally significant transportation projects and programs that are planned in the Washington metropolitan area between 2010 and 2040. The CLRP can be found online. Attached are two sections from the MWCOG CLRP website. One section identifies the Purple Line as a major transit project in the CLRP. The other section identifies all Purple Line project information contained in the MWCOG CLRP.

The attached portions of the MWCOG CLRP website are located at:

<http://www.mwcog.org/clrp/projects/transithov.asp>

[http://www.mwcog.org/clrp/projects/clrp-report.asp?PROJECT\\_ID=1133](http://www.mwcog.org/clrp/projects/clrp-report.asp?PROJECT_ID=1133)

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## **6) MWCOG Resolution Adopting the Purple Line Locally Preferred Alternative**

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This contains the resolution from the Metropolitan Washington Council of Governments (MWCOG) adopting the Purple Line's Locally Preferred Alternative (LPA). It includes a detailed description of the current project's scope.

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## **7) MDOT/MTA Consolidated Transportation Program**

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Attached is the CTP Summary and page MTA-41 of the MTA's FY 2011 to FY 2016 Consolidated Transportation Program (CTP). As detailed in Section 2, the CTP is a planning document that represents the MDOT/MTA six-year capital improvement program. Funding for the Purple Line is included in the FY 2011 – 2016 CTP, which is the most recent CTP adopted by the Legislature.

The complete CTP is located at:

[http://www.mdot.maryland.gov/Planning/CTP/CTP\\_Documents/Final\\_CTP/MDOT\\_FY2011\\_2016\\_Final\\_CTP.pdf](http://www.mdot.maryland.gov/Planning/CTP/CTP_Documents/Final_CTP/MDOT_FY2011_2016_Final_CTP.pdf)

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## **8) MTA Bus Fleet Management Plan**

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Attached is the MTA's Bus Fleet Management Plan. This plan outlines the fleet management plan for the MTA's bus services, which are not impacted by the Purple Line.

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## **9) MTA Purple line Light Rail Fleet Management Plan**

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Attached is the MTA's Light Rail Fleet Management Plan for the Purple Line. This plan outlines the fleet management plan for the new light rail line.

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## **10) MDOT June 9, 2010, Consolidated Transportation Bond Debt Issuance (2010A and 2010B Series) Official Statement**

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Attached is the main body of the Official Statement from MDOT's June 9, 2010, \$140 million debt issuance. This document outlines the financial health of MDOT while also providing an overview of their current and future debt service requirements.

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## 11) MDOT Operating and Capital Budgets

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Attached are the MTA's portions of MDOT's operating and capital budget documents for FY 2011, FY 2010, and FY 2009. MDOT capital budget documents are from the State's Capital Improvement Plans for FY 2011 to FY 2015, FY 2010 to FY 2014, and FY 2009 to FY 2013. MDOT operating budget documents are from the State's Detailed Proposed Operating Budget documents for FY 2011, FY 2010, and FY 2009.

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**12) Excerpts from MDOT Comprehensive Annual Financial Reports for FY 2010, FY 2009, FY 2008, FY 2007, and FY 2006**

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Attached are relevant pages from MDOT's FY 2010, FY 2009, FY 2008, FY 2007 and FY 2006 Comprehensive Annual Financial Reports.

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