PMOC Monitoring Report

National Capital Purple Line Light Rail Transit Project
Montgomery and Prince George's Counties, MD

Maryland Transit Administration (MTA)

September 2018

PMOC Contract Number	DTFT60-15-D-00003		
Task Order Number	05	Project Number	FTA- DC-27-5312
Work Order Number	04		
OPs Referenced	25		

APTIM
17 Princess Road
Lawrenceville, NJ 08648

Deborah A. Boe
[redacted]

EXECUTIVE SUMMARY

Project Description

The National Capital Purple Line ("Purple Line") is a 16.2 mile east-west Light Rail Transit (LRT) line extending inside the Washington, DC Beltway from Bethesda in Montgomery County, MD to New Carrollton in Prince George's County, MD. The Purple Line will operate largely at street level in a combination of dedicated and semi-exclusive right-of-way, and also includes segments on elevated structures and in tunnels. The alignment for the Purple Line will provide direct connections to Washington Metropolitan Area Transit Authority (WMATA) at Bethesda, Silver Spring, College Park, and New Carrollton, MD. The project will also connect to all three Maryland Area Regional Commuter (MARC) commuter rail lines, Amtrak, and local bus routes. The project includes twenty-one stations, two storage and maintenance facilities, and 25 light rail vehicles (LRVs). MTA is executing the project using a Public-Private Partnership (P3) method of project delivery. As documented in the Full Funding Grant Agreement (FFGA), the estimated project cost is $2,407,030,288 and the scheduled Revenue Service Date (RSD) is December 31, 2022.

Project Status

Following the execution of the FFGA on August 22, 2017, the Purple Line Project is currently in the Construction phase, with Purple Line Transit Partners (PLTP) as the P3 Concessionaire.

Scope / Significant Activities

- MTA is forecasting PLTC design completion in April 2019, slipping another month since last month. However, PLTC's issuance of "Released for Construction" (RFC) packages for critical path construction activities has improved, facilitated by a significant effort from MTA project team members.
- MTA continued negotiations and has made progress with CSX on amendments to the existing third party agreement regarding station finishes details and required vertical clearance at the Silver Spring Transit Center (SSTC) mezzanine connector pedestrian bridge and final approvals for the new access road into the CSX yard.
- After accepting the Alternative Technical Concept (ATC) offered during the proposal process for the Baltimore-Washington Parkway bridge span widening construction methods, MTA is preparing documentation that this ATC has no impact on the project's environmental decision to submit to FTA for concurrence.
- The ATC offered during the proposal process for the use of jet fans at the Bethesda Station in lieu of vent shafts is nearing the final reviews for acceptance. PLTC has not yet submitted the final design package. Once it is received, it will be submitted to the State Fire Marshall for final approval. If the ATC is found to be acceptable by the Fire Marshall, it would eliminate the need for vent towers and their associated Right of Way (ROW) acquisition.
- Construction activities continued throughout the corridor. Demolition activities continued, including the property for first Traction Power Substation (TPSS) and the Spring Center Shopping Center, Rite Aid and FedEx buildings. Retaining wall installation and pile driving for the new bridge continued in Lyttonsville. Erosion and Sedimentation (E&S) controls were installed at the Columbia Golf Course underpass. The Bethesda shaft

excavation and lagging installation has progressed to approximately 27 feet deep. At Plymouth Tunnel west portal, secant piles were installed at Manchester station and sound walls were installed near Kenwood Place apartments. At Plymouth Tunnel east portal, tunneling continued at approximately two rounds (eight feet) per day, with 440 feet of the first heading completed to date. Partial closure of Campus Drive on the University of Maryland campus (UMD) was put in place, as was a year-long closure of Ellin Road. Preparations to install foundations for the Riverdale aerial structure commenced. Support of excavation (SOE) pile installation commenced at the Baltimore-Washington Parkway Bridge, and continued for the retaining wall along Veteran's Parkway.

- Vehicle carshell manufacturing activities, coordinated with design progress, continued in Spain. The carbody stress (crashworthiness) analysis, which was returned with comments, continues to undergo comment resolution by CAF. CAF's carbody structural test procedure for carbody shell structural testing, which will be conducted on the second vehicle shell in Spain, was reviewed by MTA and returned with comments. Shock and vibration tests continue to be performed by various manufacturers. Fire, smoke and toxicity testing has been re-scheduled from September 2018 until October 2018, with results expected in November 2018. Evaluations between the solar-powered wayside track lubricators as required by the P3 contract and the on-board lubricators as currently specified in CAF's design continue. Four of the five segments of the first Light Rail vehicle (LRV) carshell arrived at the Port of Baltimore on September 1, 2018. After the segments complete customs procedures, they will be transported to Elmira, NY. The fifth segment is scheduled to arrive in Baltimore in early October 2018.
- Vehicle final assembly will be taking place in CAF's facility in Elmira, NY. MTA rejected CAF's requested design deviation to utilize the environmental test chamber in Elmira, which is shorter than the overall vehicle, for a second time, but CAF has stated that it will resubmit its request with justification.
- The Purple Line project continues to prepare documentation of minor changes to the project to be submitted for FTA concurrence with MTA's assessment of no impact to the project's environmental clearance and Record of Decision, including:
  - MTA submitted a large package of several hundred Limits of Disturbance (LOD) changes to FTA on June 21, 2018, which was returned by FTA with several issues in the package (e.g., boundaries, acreages, etc.). MTA resolved the questions with PLTC and is finalizing the response for submittal to FTA, which is targeted for mid-October 2018 after completing internal MTA legal review.
  - MTA completed the work approved by FTA under an exception to the moratorium on tree clearing, to comply with a request from Rosemary Hills Elementary School to perform the planned tree removal before children return to school in the fall.
- The Purple Line team will also be submitting additional pending National Environmental Policy Act (NEPA) requests as follows:
  - LOD adjustments associated with the Montpelier stormwater management facility are in MTA legal review and will be submitted to FTA shortly.
  - Documentation of the change in construction approach represented in the recently approved ATC for the Baltimore-Washington (B-W) Bridge.

- Several LOD changes associated with B-W Parkway ATC arising from Section 4(f) accommodations.

- MTA is responsible for providing offsite streams, wetlands and stormwater mitigation:
  - For wetlands mitigation, MTA received site development approval from Maryland Department of the Environment (MDE) in July 2018, continues to finalize the plans to be included in the solicitation for the construction contract. MTA plans to advertise in early 2019, with NTP anticipated in June 2019.
  - For stream mitigation, MTA completed the 100% design packages in June 2017 and received approval from MDE in May 2018. MTA is preparing the solicitation package. The project team conducted a walking tour of the site during the week on September 17, 2018 and confirmed that existing conditions have not changed from that when the design was started. The targeted advertisement date for the construction contract is November 2018 with bids-due date in mid-January 2019. NTP is anticipated in May 2019.
  - MTA had received MDE approval for greater than the 5 acres required to be in place by June 30, 2018 in accordance with the P3 contract, and is awaiting PLTC's final approved on-site mitigation capacity, which is expected by the end of 2018, to determine if any off-site facilities need to be constructed.
  - The site development design package for the Prince George's County Montpelier Basin site for Stormwater Management (SWM) is advancing through review. The package received MDE Delegated Authority approval contingent on approval by the Maryland Soils Conservation District for the Montpelier Basin site, and Soils Conservation District approval is expected shortly. MTA will be submitting several LOD cases related to the Montpelier site for FTA concurrence.

- Right of Way acquisition activities continue for the required 468 private and 139 public parcels (607 parcels total). As of September 12, 2018, properties from only 6 private owners remain for which MTA does not yet have possession for construction activities. MTA is particularly focusing on five of the remaining parcels to prevent their acquisition from affecting construction.

- MTA also evaluated and reduced the approximately 280 additional small acquisitions initially identified by the P3 Concessionaire for utility relocations to a current total of approximately 168 parcels, of which 116 are private and 52 are public. To date, 18 of the private properties and 31 of the public properties are in MTA possession. The cost responsibility for these additional parcels has not yet been negotiated.

- The Design-Build Request for Proposal (RFP) for the Polk Street replacement for the Prince George's County Parks maintenance facility was advertised on August 28, 2018, with bids due on November 21, 2018. Notice to Proceed (NTP) is anticipated in February 2019 unless a Best and Final Offer request is necessary, in which case NTP is anticipated in March 2019.

- MTA continues to adapt its management capacity and capability consistent with project advancement and current challenges by adjusting its personnel resources, including the

addition of a Commercial/Financial Manager to the Project Management Consultant (PMC) team and a right of way acquisitions specialist to the MTA team in September 2018.

Cost

- The project's documented expenditures are $850.5 million through July 2018.
- Currently, all $149.35 million of the original $149.35 million contingency remains.
- Several Change Orders that have a potential cost impact on the project contingency are in process.
- Mitigation to recover the schedule may also result in added costs to the project.
- Refer to the Core Accountability Table below for additional project cost information.

Schedule

- PLTC currently does not have an approved recovery schedule. In response to a letter that FTA issued to MTA in early August 2018 expressing concern with the amount of time that the project has advanced without an approved schedule, MTA prepared a working schedule update of the master project schedule and submitted "MTA Master Schedule August 2018". The update is based on the current negotiations of the P3 contract schedule, which have been ongoing with PLTC since late 2017 and which have been detailed in prior PMOC Monthly Monitoring reports; but the update is not yet based on a mutually agreeable P3 contract schedule. See also the **Major Problems and/or Issues** subsection of this report, below.
- The following are the current key milestone dates for the project, showing both the last approved March 15, 2017 progress update of the master project schedule and the current working schedule, the MTA Master Schedule August 2018. (Previously actualized milestones are not shown here for brevity, but are presented in the body of the report.)

National Capital Purple Line LRT Key Milestone Dates		
Activity	**March 15, 2017 Approved Project Schedule**	**MTA Master Schedule August 2018**
All Significant ROW Acquisition & Relocation	As needed by construction	---
P3 Ready to Commence Revenue Service	TBD	October 28, 2022*
MTA Opens for Revenue Service	March 2022	---
Revenue Operations Date (includes contingency)	December 31, 2022	---
FFGA Revenue Service Date (includes contingency)	December 31, 2022	December 31, 2022

* P3 Revenue Service date is based on MTA's working version of an updated integrated master project schedule progressed through August 31, 2018 based on MTA/P3 Concessionaire negotiations to date, but for which final agreement with the P3 Concessionaire has not yet been reached.

Core Accountability

FFGA Core Accountability Items			
Project Status:		**Original at FFGA:**	**Current Estimate (EAC):**
Cost	Cost Estimate	$2,407,030,289	$2,407,030,289
Contingency	Unallocated Contingency	$90,535,748	$90,535,748
	Total Contingency (allocated plus Unallocated)	$149,349,825	$149,349,825
Schedule	Revenue Service Date (FFGA)	December 31, 2022	December 31, 2022
	MTA Target Revenue Service Date	March 31, 2022	October 28, 2022 **NOTE 5**
		Amount ($)	**Percent (as percent of total)**
P3 Planned Value to Date	Total budgeted cost of work scheduled to date (if available) **NOTE 1**	Not Available	---
P3 Earned Value to Date	Budgeted cost of work completed to date, i.e., actual total value of work earned or done (if available) **NOTE 1**	Not Available	---
P3 Actual Cost	Total cost of P3 work completed to date (actual total expenditures)	$480,898,817	26.6%
Total Project Actual Cost	Total cost of work completed to date (actual total expenditures)	$850,477,930	35.3%
Contracts		**Amount ($)**	**Percent**
	Total contracts awarded to date (**Note 2**)	$2,221,400,912	92.3%
	Total construction contract awarded to date (construction contracts only) (**Note 3**)	$1,043,378,886	99.5%
	Physical construction work completed (amount of construction contract work actually completed) (**Note 4**)	$138,747,535	13.2%
Major Issues	**Status**	**Comments / Action / Planned Action**	
	See discussion below		
Date of Next Quarterly Meeting (if known):		November 7, 2018	

NOTE 1 (Core Accountability Table). The Planned Value to Date and the Earned Value to Date are currently not available, since even approximated values have become unreliable and/or misleading until re-baselining of the P3 cost-loaded schedule is completed. This effort is ongoing with the P3 Contractor, and is anticipated by the end of CY2018.

NOTE 2 (Core Accountability Table). Amount includes value of all construction, right of way, vehicle and professional services contracts awarded to date (right of way "awarded" value is the cost of right of way to date). Percentage is calculated based on total project cost estimate of $2,407,030,289.

NOTE 3 (Core Accountability Table). Amount includes the SCC 10 through 50 values of all contracts awarded to date. Percentage is calculated based on total project planned SCC 10 through 50 costs contained in the latest project SCC Workbook.

NOTE 4 (Core Accountability Table). Amount includes the SCC 10 through 50 values expended to date. Percentage is calculated based on total project planned SCC 10 through 50 costs contained in the latest project SCC Workbook.

NOTE 5 (Core Accountability Table). The Current Estimate (EAC) for the Schedule (MTA Target Revenue Service Date) of October 28, 2022 is from MTA's working version of an updated integrated master project schedule progressed through August 31, 2018, which is based on MTA/P3 Concessionaire negotiations to date, but for which final agreement with the P3 Concessionaire has not yet been reached.

Major Problems and/or Issues

- [redacted]
- According to the PMP, the Master Schedule is to be updated monthly; however, the most recent approved Master Project Schedule update is as of March 15, 2017. Since the December 2016 baseline schedule no longer reflects project conditions, the project does not currently have a current approved resource-loaded Master Integrated Project Schedule to serve as a management tool.
- Although MTA and PLTP participated in extensive workshops in early 2018, proposed mitigated schedules submitted by PLTC did not incorporate the mitigations discussed in the workshops. In May, 2018, MTA issued a directive letter for PLTC to incorporate the workshop mitigations, but agreement on a mitigated project schedule was still not imminent. In summer 2018, the Maryland Secretary of Transportation strongly encouraged PLTP to negotiate in good faith, and in August 2018, FTA sent a letter expressing concern with the amount of time that the project has advanced without an approved schedule, and requested MTA's formal response by September 30, 2018. In response, MTA prepared a working schedule update of the master project schedule. The update is based on the schedule negotiations to date, but does not yet have the full mutual agreement of both parties.
- Mitigation to recover the schedule may potentially result in added costs to the project, which will need to be negotiated with PLTP.
- Both MTA's delivery of properties to Purple Line Transit Constructors (PLTC) and PLTC's progress toward needing those properties for construction are significantly behind the schedule anticipated in the P3 contract. MTA is managing this through weekly meetings of a MTA/PLTC right of way task force that evaluates the needs of the dynamic construction schedule "early start" and "late start" dates for construction activity on each property, and determines work around plans to avoid impacts to the extent possible.
- PLTC's forecasted completion of its design scope, now April 2019, is proceeding significantly behind the scheduled date of fall 2017 anticipated in the P3 contract. As a result, the construction schedule has also slipped, and therefore, PLTC's need for the properties discussed above has also slipped.

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MONTHLY MEETING REPORT

Introduction

The Project Management Oversight Contractor (PMOC) conducted a comprehensive monthly review of the Purple Line project via telephone conference call (due to unavailability of key Purple Line project personnel to conduct the usual on-site visit) on September 18, 2018. Updated information as of that date is reflected in this report.

A. Project Status

After the U.S. Court of Appeals reversed the vacation of the Record of Decision (ROD) in July 2017 (refer to the **Environmental** section of this report for details), the FFGA was executed on August 22, 2017, approximately one year later than planned. The Purple Line project is currently in the Construction phase.

MTA Design

MTA's General Engineering Consultant (GEC) completed the Purple Line project design to approximately 30% design level in fall 2013 with incremental enhancements through late 2015, and this design formed the basis of the Request for Proposal (RFP) for the P3 contract. See the **P3 (Purple Line Partnership Constructors) Design** section below for the further advancement of this design.

MTA continued to advance the design to 100% for the following scopes, to support construction contracts under a Design-Bid-Build delivery method separate from the P3 scope:

- Stream mitigation – MTA completed the 100% design packages in June 2017 and received approval from MDE in May 2018. *The project team conducted a walking tour of the site during the week on September 17, 2018 and confirmed that existing conditions have not changed from that when the design was started*. The project team is working with the MTA Procurement department to prepare the solicitation package, *with a targeted issue date in November 2018 and bids-due date in mid-January 2019. NTP is anticipated in May 2019.*
- Wetlands mitigation – MTA completed the 100% design packages in June 2017, and subsequently addressed several late-arriving comments from MDE. MTA received site development approval from MDE in July 2018, *and continues to finalize the plans to be included in the solicitation for the construction contract. MTA plans to advertise in early 2019, with NTP anticipated in June 2019.*
- Montgomery County off-site stormwater management (SWM) sites – MTA completed design and obtained MDE approval of more than the P3 contract-required 5 acres of off-site mitigation on May 29, 2018, ahead of the June 30, 2018 contract deadline, but may not need to actually construct the sites. See the **Environmental Mitigation** section of this report for the current requirements.

MTA also is performing the design to support a Design-Build contract for the replacement of the existing Prince George's County Parks Maintenance Facility with a facility on Polk Street. See the **Real Estate Activities** section of this report for further details.

P3 (Purple Line Transit Constructors) Design

Among the Purple Line Transit Partners (PLTP) partnership, Purple Line Transit Constructors (PLTC) is the partner responsible for the design and construction of the capital project.

PLTC also continues to incorporate two remaining Alternate Technical Concepts (ATCs) identified during the proposal process that were approved by MTA:

- Use of jet fans at the Bethesda Station in lieu of vent shafts. MTA and Carr Properties came to agreement on Carr providing for an underground box structure in which the Purple Line project activities can continue while Carr's redevelopment proceeds above it. MTA and Carr Properties executed the MOA March 2018. Due to other slippages in the project schedule, the date by which the box structure is needed to allow Purple Line work to continue unimpeded was revised from December 2018 until March 2019. Carr's contractor continues excavation and support of excavation installation for the Carr development parking garage, which will support the Purple Line construction box. MTA issued PLTC a Limited Notice to Proceed to review Carr's calculations during construction to eliminate any related issues at construction turnover to PLTC. The final determination of compliance with National Fire Protection Association (NFPA) Standard 130, which will establish acceptability of the ATC, is with the State Fire Marshall, who reviewed and had no comments on the intermediate design, but will not offer a final decision until the final design is reviewed. *As of mid-September 2018, PLTC has not yet submitted the final design package. Once it is received, it will be submitted to the State Fire Marshall for final approval.* If the jet fan ATC is found to be acceptable and is approved by the Fire Marshall, it would eliminate the need for vent towers and their associated Right of Way (ROW) acquisition. Also, if this ATC is accepted, PLTC will prepare the documentation substantiating that this change has no impact on the environmental decision on this project for MTA to submit for FTA's review and concurrence.
- Baltimore-Washington Parkway Bridge span widening construction methods. Final NPS approval of the ATC was through issuance of the Special Use Permit for work on the bridge, which was fully executed on June 7, 2018. [redacted]

CSX Railroad informed the project team that its updated design criteria, which were issued after the "setting date" of the P3 contract, are now applicable to the Purple Line design. MTA and CSX also continue to work on the Construction Agreement, and to resolve the applicable version of the design criteria and the following specific items:

- MTA continues to work with WMATA to resolve CSX comments that would disallow passenger amenities (fare gates and ticketing kiosks) on the Silver Spring

Transit Center (SSTC) Purple Line mezzanine connector pedestrian bridge above CSX tracks. [redacted]

- [redacted] The drainage is due to the separately funded Capital Crescent Trail project, but the Purple Line project team is evaluating the situation to manage any resultant effects that could impact the Purple Line FFGA budget or schedule.
- Details for a new access road into the CSX yard that would minimize impact to both Purple Line and CSX operations need to be finalized. CSX and MTA reached an agreeable solution, which was incorporated into the Purple Line construction amendment to the CSX agreement, *but Montgomery County and CSX both require acceptable design details before providing their formal concurrence.* [redacted]
- *The clear solid upper section of electrification crash barrier that was proposed by PLTC for the Talbot Avenue Bridge to meet community preferences, but which was met with CSX objections, is no longer a viable option. The supplier of the barrier relocated its manufacturing operations to Canada and the item no longer meets Buy America requirements. PLTC is investigating another solution that will satisfy both CSX and the community.*

Agreements for use of WMATA property at the four common station areas is discussed in the **Real Estate Activities** subsection of this report.

MTA's assessment of PLTC design progress is now forecasting design completion in April 2019, which has slipped an additional month since last month's update. The original Baseline Schedule anticipated design completion by late fall 2017. *However, in recent months, PLTC has been making improved progress in the advancement of critical design packages. This improvement has been greatly facilitated through a significant effort from MTA project team members, including combining some intermediate design submittals via alternative documentation, allowing the issuance of drawings that have "clouded" areas of uncertainty with the information to be provided later by drawing revision, and assisting with MDE approvals where required. The PMOC notes that the additional effort expended by MTA and its GEC and PMC members to assist PLTC may be manifested in additional SCC 80 project costs.*

In early 2018, PLTC realigned some of its design work to add resources and further expedite packages that have been slipping schedule. Specifically, PLTC added subcontractor HNTB to design some of the bridge and aerial structures that had previously been in subcontractor Atkin's scope. *HNTB's scope of design is currently at or near RFC.* MTA's continued assessment of this change is that it has had a net beneficial effect on design progress.

Construction

MTA Scope

Although the P3 concessionaire is responsible for the majority of the project construction, MTA also has construction responsibility in the areas of the new Prince George's County Parks Maintenance Facility, wetlands mitigation, stream mitigation and some *possibly* offsite stormwater management sites. Forest mitigation has been accomplished by MTA without the need for additional construction. None of these construction contracts have yet been awarded, but once awarded, they will be discussed in this section of the report.

P3 Scope

Recent (through mid-September 2018) construction activities throughout the alignment included:

> *Area 1: Tree clearing was completed at the Rosemary Hills Elementary school prior to the expiration of the limited Right of Entry on August 31, 2018; preparations for demolition of the Rad property acquired for first Traction Power Substation (TPSS) continued; ongoing work in Lyttonsville, including retaining wall installation and pile driving for the new bridge, continued; Erosion and Sedimentation (E&S) controls were installed at the Columbia Golf Course underpass; demolition of the building in the Spring Center Shopping Center continued; much of the Rite Aid and FedEx building demolition was completed.*
>
> *Area 2: To date, Bethesda shaft excavation and lagging installation has progressed to approximately 27 feet deep. At Plymouth Tunnel west portal, secant piles were installed at Manchester station and sound walls were installed near Kenwood Place apartments. At Plymouth Tunnel east portal, tunneling continued at approximately two rounds (eight feet) per day, with 440 feet of the first (top) heading completed as of the morning of September 18, 2018.*
>
> *Area 3: Demolition of buildings on acquired properties continued; Maintenance of Traffic (MOT) controls were installed through the University of Maryland (UMD) to enable partial closure of Campus Drive; preparations to install foundations for the Riverdale aerial structure commenced; power was provided to the new UMD pumping station transformer; at the Baltimore-Washington Parkway bridge, stone veneer removal was essentially completed and SOE pile installation commenced; drilled piles for the retaining wall along Veteran's Parkway continued with 31 of 118 piles currently installed; grading continued for the Glenridge Operations and Maintenance Facility building pad.*

See Appendix 10 of this report for construction photographs.

Real Estate Activities

As of September 12, 2018, the total number of planned property acquisitions is 607, including 468 privately owned properties and 139 public acquisitions. For the private properties, to date a total of 475 offers have been made including for parcels that have been eliminated, 234 offers have been accepted, 461 of the 468 private parcels are in MTA possession (some of which are properties that have been filed for condemnation under the State Highway Administration (SHA) process), and *258 properties have completed settlement*. Currently, 281 properties are in process for condemnation, and of these, condemnation has been filed for 142 properties, excluding those that have been optioned or settled. *Of the remaining private parcels yet to be acquired, MTA is focusing on five parcels to prevent their acquisition from affecting construction. These consist of two CSX parcels, two parcels in the Bethesda Station area and one parcel near the Silver Spring Transit Center aerial structure.*

Additional small parcel acquisitions were expected to be added to the total as utility down-guys and other utility relocation needs are identified as the project progresses. In December 2017, PLTC submitted a list of approximately 280 such utility relocation-related parcels. MTA has resolved that it will acquire these properties, rather than executing amendments to the utility agreement to have the utility companies perform this function. MTA's ability to perform appraisals in-house for these parcels or to waive appraisals for low value, uncomplicated parcels is expediting the process somewhat. MTA continues to review such requests for additional properties from PLTC to eliminate the need wherever possible. *As of September 12, 2018*, the initial request has been reduced to approximately 168 parcels. Of these, 52 are public property and will be acquired by agreement and 116 are private acquisitions. Also, most of the additional private parcels affect property already acquired or currently in the acquisition process. MTA is separately tracking the additional parcels (approximately 98% are for utility relocations) in its right of way tracking system to best manage changes to parcels already acquired or in the process of acquisition. *As of September 12, 2018, 18 of these additional 116 private properties are in MTA possession through rights of entry and/or options. Three of the properties have been filed for condemnation. Also, 31 of the 52 public properties are in MTA possession.* The MTA and PLTC cost responsibility for each parcel has not yet been worked out, with the immediate effort being on expediting the acquisitions so as to not impact construction.

The Purple Line Project will require a total of 157 relocations, of which 57 are residential and 100 are businesses. *Through September 12, 2018,* 156 move outs have been completed. The Post Office, which was the last remaining tenant in the Spring Center Shopping Center signed a lease and relocated to the Silver Spring Library building in August 2018 for at least the short term until its final location is decided and ready. The project is responsible for up to 10 month's rent at the new location. If the Post Office decides to not make this its permanent location, the Purple Line project will be responsible for a second and final relocation.

Properties that have not yet settled due to disputed compensation values have been going to trial in accordance with the ROW acquisition process. MTA is tracking actual acquisition costs versus planned expenditures so that contingency can be effectively managed, and shares this information with the PMOC. *Settlement / condemnation values continue to trend somewhat higher than the SCC budget.*

Certain parcels of property currently owned by WMATA and needed for the Purple Line project (at Bethesda, Silver Spring, College Park and New Carrollton) will be acquired via easements from WMATA, as approved by WMATA's Board in late January 2018. In lieu of monetary compensation, MTA will provide WMATA with some of MTA's current property at New Carrollton. The property plats at Bethesda have already been approved by WMATA, *and the project has all access that it needs. For College Park, Silver Spring and New Carrollton, WMATA has agreed that it does need to wait for the plats to be approved to grant access. However, WMATA does want the Exhibits that show the construction to be performed, as well as a detailed Work Plan showing the limits of the Purple Line work to be encompassed by a fence. This will allow PLTC construction work to be conducted without the normal security screening that WMATA requires for work on its system. PLTC is currently preparing the Exhibits and the Work Plans for these three station areas.* The plats for the property at Silver Spring have been submitted for approval. The WSSC utility relocations at College Park have been resolved, and after the College Park plats are prepared, these and the plats for the New Carrollton property will be submitted to WMATA for approval. Since MTA has identified that federal (Highway) funding sources were used for the acquisition of the New Carrollton property, MTA will provide FTA with the requested documentation upon transfer on the property to appropriately record responsibility for parcels with federal funding assistance, *which is expected to require several more months to obtain two separate required Board of Public works (BPW) approvals*.

MTA's delivery of properties to PLTC has fallen significantly behind the schedule committed in the P3 contract. On the other hand, PLTC's progress toward needing those properties for construction is also significantly behind the schedule anticipated in the P3 contract. To manage its risk relative to property availability for construction by the concessionaire, MTA had assembled a task force of Purple Line project team members specializing in right of way, construction management, scheduling, risk management and third party agreements. The task force has been meeting recently a weekly basis to review the forecasted property availability dates based on the latest ROW schedule update relative to the concessionaire's progressed schedule, including the concessionaire's "early start" and "late start" dates for construction activity on each property. *As stated above, MTA is focusing its effort to acquire possession of five of these properties as quickly as possible.*

- The relocation of the existing Prince George's County Parks Maintenance Facility to make way for the siting of the new Purple Line Glenridge light rail maintenance facility, is being implemented as a negotiated/functional replacement. MTA's Procurement Department is managing the Design-Build (D-B) contract solicitation for the Prince George's County facility. The RFP for the Polk Street Facility Design-Build contract was initially advertised on September 21, 2016 and resulted in two proposals that significantly exceeded the

Engineer's Estimate. The RFP was canceled. MTA worked with Prince George's County to revise the scope to reduce pricing expected on a re-solicitation, and to secure an additional $2 million commitment from Prince George's County in October 2017 to address the remaining funding gap. The additional costs and funding were processed in an amendment to the Memorandum of Agreement (MOA) with Prince George's County, which was executed on July 11, 2018. The amendment also includes a clause holding Prince George's County Maryland National Capital Parks Commission responsible for up to an additional $2 million in the case that proposals received exceed the Engineer's Estimate. The updated design package incorporating the agreed cost saving measures was completed, including five bid alternates to allow flexibility in the final award and associated cost. *The solicitation package was advertised on August 28, 2018, with bids due on November 21, 2018. NTP is anticipated in February 2019 unless a Best and Final Offer request is necessary, in which case NTP is anticipated in March 2019. A pre-bid meeting was conducted with interested proposers on September 10, 2018, and a proposer's site walk-though is planned for October 9, 2018. Two RFP addenda are planned, one each to address questions from the pre-bid meeting in September 2018 and from the site walk-through in October 2018. Proposer interest remains high.*

A 16-month design and construction period is being reflected in the solicitation documents. In the interim, the Prince George's County Maintenance facility functions have been relocated to a temporary facility, and are currently not being impacted by events related to the construction of the replacement facility.

Third Party Agreements

All major third party agreements, specifically, those agreements with Washington Gas, Verizon, Potomac Electric Power Company (Pepco), CSX Railroad, the University of Maryland (UMD), Montgomery County Parks, Prince George's County Parks, Washington Metropolitan Area Transit Authority (WMATA), Washington Suburban Sanitary Commission (WSSC), Montgomery County and Prince George's County, were executed as of June 7, 2016.

After execution of its Third Party Agreement, Verizon required that certain currently overhead lines be placed underground when they cross the alignment. To minimize the total cost impact of this change, MTA and Verizon reduced the number of occurrences to 34 locations. PLTC submitted its cost estimate to place these 34 locations underground, and that cost estimate continues in negotiation between MTA and PLTC. [redacted] Cost responsibility will be negotiated after agreement is reached on the final estimated cost, *for which MTA and PLTC continue to exchange comments*.

In early June 2018, MTA and PLTP completed negotiation of all remaining third party agreements with the smaller utility and fiber companies, recently executing agreements with Verizon Business and MEDCO. According to MTA, most of the minor fiber / telecom utilities are not co-located with the electrical utilities, and where they are, Pepco's

arrangement with the fiber / telecom utilities does not require Pepco's relocation schedule to be driven by that of the minor fiber / telecom companies.

In addition, amendments for existing executed agreements continue as needed, with current significant items including:

- With CSX, for various issues as discussed earlier in this report
- A security agreement amendment with UMD to address shared data

Project Delivery Method, Contract Packaging and Procurement

The MTA project team identified Public Private Partnership (P3) as the project delivery method for the Purple Line. The majority of the capital cost of the Purple Line project has been packaged into a Design-Build-Finance-Operate-Maintain (DBFOM) P3 contract. This delivery method fits the State's legal definition of a P3 in that it involves a long-term, performance-based agreement between MTA and a private entity (the P3 "Concessionaire") where appropriate risks and benefits are allocated in a cost-effective manner between the contractual partners. The concessionaire is performing some functions normally undertaken by the transit agency, but MTA remains ultimately accountable for the Purple Line and its public function.

The Request for Qualifications (RFQ) for the P3 contract was issued on November 8, 2013 and resulted in the receipt of submittals from six teams. An RFP was issued to four proposers on July 25, 2014. After multiple addenda, including requests for Alternative Technical Concepts and requests made by the Maryland Secretary of Transportation for scope cost reduction concepts and commercial/financial cost reduction concepts, technical and financial proposals were received from all four P3 proposing teams in November 2015 and December 2015, respectively. MTA negotiated an approximate 36-year P3 contract, including nearly 6 years of construction and 30 years of operations, and on March 2, 2016, announced that Purple Line Transit Partners (PLTP) had been selected as the P3 concessionaire. Commercial Close occurred on April 7, 2016, and Financial Close of the P3 occurred on June 17, 2016.

Environmental

The FTA issued a Record of Decision (ROD) on March 19, 2014. The National Park Service (NPS) issued its ROD on July 16, 2014. MTA has continued to submit re-evaluations as required based on design advancement and other causes. Approximately 65 Limits of Disturbance (LOD) cases were initially submitted to FTA and approved. The project team then identified over 600 additional LODs, which were packaged into two additional submittals. The first expedited package of approximately 20 high priority cases was submitted to FTA and was approved by FTA on February 9, 2018. In addition, an emerging urgent need for approval of an LOD change associated with one specific property acquisition (the Kaldis property) was identified in April 2018 and submitted to FTA the week of May 7, 2018, and was approved by FTA on June 8, 2018. MTA submitted the remaining cases in a large package of several hundred cases to FTA on June 21, 2018. FTA returned the package with several identified issues (e.g., boundaries, acreages, etc.). *MTA*

resolved the questions with PLTC and is finalizing the response for *submittal to FTA* [redacted]

The Purple Line team will also be submitting additional pending NEPA requests as follows:

- *LOD adjustments associated with the Montpelier stormwater management facility are in MTA legal review and will be submitted to FTA shortly*
- Documentation of the change in construction approach represented in the recently approved ATC for the Baltimore-Washington (B-W) Bridge, for FTA concurrence that this ATC has no impact on the project's environmental decision
- Several LOD changes associated with B-W Parkway ATC arising from Section 4(f) accommodations

The ATC for the Bethesda station jet fan will be submitted for FTA review after that change is formally accepted by MTA.

The Rosemary Hills Elementary School requested MTA to perform the planned tree removal during summer 2018 before children return to school in the fall due to safety concerns. Since this would require tree removal in designated "forested areas" during the moratorium period, MTA requested and FTA approved an exception to the moratorium as expressed in the Purple Line Record of Decision based on examination and documentation by a biologist and an ornithologist that migratory birds would not be affected. *Tree clearing was completed at the Rosemary Hills Elementary school prior to the expiration of the limited Right of Entry on August 31, 2018.*

On August 3, 2016 in response to the lawsuit filed by the Friends of the Capital Crescent Trail against the FTA, a federal judge filed his Order and accompanying Memorandum Opinion. In those documents, it was ordered that the ROD for the Purple Line was vacated and remanded, and that a Supplemental Environmental Impact Statement (SEIS) be prepared, in accordance with the accompanying Memorandum Opinion. In a subsequent Order and Opinion filed on November 22, 2016, the judge in part revised the earlier Order by remanding to FTA the responsibility to determine if an SEIS is required, however, the ROD remained vacated. On May 30, 2017, the judge issued his ruling that dismissed the lawsuit except for the reassessment of the impact of declining Washington Metro ridership on the Purple Line Project's Environmental Impact Statement. The Washington Metro ridership aspect of the ruling was immediately appealed by the Maryland Attorney General. On July 19, 2017, the U.S. Court of Appeals reversed the vacation of the ROD, and set an expedited schedule for the appeals process. The appeals hearing occurred on November 1, 2017. The Appeals Court ruling was issued on December 19, 2017, in which the judges ruled in favor of FTA and the project, and that the transit agencies would not have to conduct a new environmental study to examine other potential routes for the Purple Line.

A second lawsuit was filed by the Friends of the Capital Crescent Trail after the FFGA signing and groundbreaking ceremony was held on August 28, 2017. The September 19, 2017 Preliminary Hearing resulted in no temporary injunctions or restraining orders, and project construction is proceeding as the case progresses through the court system. On

December 5, 2017, FTA and MTA filed a Motion to Dismiss. The plaintiffs subsequently amended and significantly revised the complaint in December 2017, and on March 1, 2018, MTA and FTA filed a Motion to Dismiss. On March 29, 2018, the Plaintiffs filed their response. *Both parties continue to await the judge's decision.*

Environmental Mitigation

Required mitigation for reforestation was achieved through the purchase of 82.5 acres of off-site credits. This is expected to be more than needed, which will be confirmed by the design performed by the P3 Concessionaire. The Forest Conservation Plan (FCP) was formally submitted to the Maryland Department of Natural Resources (DNR) in August 2016 for approval. The DNR concurred with the FCP on January 31, 2017, and the final approved FCP was received from DNR on July 31, 2017. As LOD cases are identified, they are also reviewed against the FCP credits to maintain an accurate accounting of the reforestation mitigation.

The Joint Permit Application (JPA) for Wetlands and Stream mitigation was formally submitted to the U.S. Army Corps of Engineers (USACE) and the MDE in August 2016. In late February 2018, MDE issued its Non-Tidal Wetlands and Waterways permit in advance of the USACE permit, even though it was a joint application. However, due to the passage of time since the permit had been drafted, MDE updated and issued the finalized permit the first week of April 2018. The USACE completed its National Environmental Policy Act (NEPA) and conditions review and public interface, receipt of comments and comment resolution, and issued the Section 10 404 Permit on March 14, 2018. This timing supported MTA's planned advertisement for the Wetlands and Streams mitigation construction contracts.

The project team continues to address the environmental mitigation for wetlands through the development of the off-site Ken-Gar location. The Ken-Gar final plans were submitted to the Maryland Department of the Environment (MDE) and the USACE in June 2017, completing the requirements for permits to be issued by these agencies. Wetlands mitigation will be implemented by a separate design-bid-build construction contract administered by MTA. MTA reviewed the JPA permits as issued, and found nothing that would cause a change in the wetlands mitigation design as developed; however, MDE had several minor comments which MTA addressed and subsequently received MDE approval for site development in July 2018. *MTA continues to finalize the design and plans to conduct a constructability walk-through before advertising the construction contract. Advertisement of the construction contract is targeted for early 2019 with bids due in spring 2019*. Project completion is anticipated in late 2019 after a four to six month construction duration.

Stream mitigation is continuing through the development of Paint Branch. The Paint Branch final plans were also submitted to the MDE and the USACE in June 2017. Stream mitigation will also be implemented by a separate design-bid-build construction contract administered by MTA. MTA reviewed the JPA permits as issued, and found nothing that would cause a change in the stream mitigation design as developed. MDE also concurred

with the design. MTA plans to advertise the Paint Branch Stream Mitigation construction contract in December 2018, with NTP anticipated in May 2019. The construction duration is scheduled for greater than one year due to required seasonal work suspensions in the summer months, with project completion anticipated in late 2020.

The project continues with plans to address stormwater mitigation beyond what can be mitigated on the project site, through retrofitting off-site locations in both Montgomery County and Prince George's County. For Montgomery County, the off-site stormwater mitigation sites, if needed, will be implemented via MTA stand-alone contracts. The Purple Line project initially estimated that approximately 17 acres of offsite mitigation would be required in Montgomery County in total. However, as PLTC advanced the project design, that estimate dropped significantly to approximately one acre, although the estimate continues to oscillate up and down as project details are finalized during design advancement. The Purple Line project committed to providing 5 acres of offsite mitigation for Montgomery County in place (i.e., approved by MDE) within the first two years after Financial Close of the P3 contract, which was by June 30, 2018. MTA received conceptual approvals from MDE, and then advanced site development of sites to provide at least 5 acres and submitted them to MDE for final review. As of June 14, 2018, MTA received final MDE approvals for a total of 5.53 acres, satisfying the contract requirement. MDE has also been reviewing PLTC's on-site mitigation for Montgomery County, which will determine the amount of construction, if any, of offsite mitigation required. PLTC is now expected to have the on-site approvals from MDE in late 2018. As a result, the project plans to hold off advertising any construction of off-site mitigation sites until and unless it determines that the onsite mitigation is not sufficient. The implementation of the Prince George's County stormwater mitigation sites is included within the scope of the P3 contract, although MTA had been assisting in the identification of potential sites. One of the two large Prince George's County Montpelier Basin sites identified during the P3 procurements phase has been determined to be the only site, if any, needed in Prince George's County. The site development phase design package for this Prince George's County Montpelier Basin site was submitted to MDE, who also involved the Prince George's County Soil Conservation District for review and approval. *As of mid-September, 2018, Received MDE Delegated Authority approval contingent on approval by the Maryland Soils Conservation District for the Montpelier Basin site, and Soils Conservation District approval is expected shortly.* [redacted] The Montpelier site is estimated to generate 6.1 acres of credit; current estimates of Prince George's County offsite stormwater mitigations needs are for approximately five acres. For the stormwater mitigation sites, once each 100% design package is submitted to and approved by the MDE delegated authority/Soil Conservation District, the credit represented by that package is available to support construction of the project, even though construction of the stormwater mitigation site, if needed, would not yet have been completed.

The joint MTA and University of Maryland (UMD) technical board continued its efforts on the mitigation of noise, vibration and electro-magnetic interference (EMI) at the UMD facilities. The vibration report was received in December 2017, but only evaluated areas near critical campus buildings, resulting in approximately 1,300 feet of mitigation, whereas

the UMD agreement required the entire campus to be evaluated, which would lead to approximately 6,100 feet of mitigation. The committee is currently awaiting PLTC's submittal of its revised Noise and Vibration report.

The Purple Line project team has commenced preparation of a quarterly Environmental Mitigation Monitoring Report for submittal to FTA.

B. Project Management Plan and Subplans

Project Management Plan (PMP)

The current active version of the PMP is Version 10, which was submitted on May 10, 2016. After completing its review, the PMOC issued its Oversight Procedure (OP) 20 PMP review report on May 28, 2016, finding that the PMP Version 10 met the FTA requirements for a PMP at the FFGA execution stage of the project. Certain areas of the PMP were noted as needing to be updated after development of the relevant documents by the Concessionaire in accordance with P3 contract requirements, and the PMOC recommended that the PMP be revised and resubmitted after execution of the FFGA. MTA commenced an update of the PMP on December 2017 submitted the PMP Version 11 in mid-August 2018. *The PMOC review of PMP Version 11 in accordance with OP20 continues.*

[redacted] it has been challenging for MTA to strictly follow the procedures and practices established in the Purple Line PMP Version 10. The most significant deviations from the PMP continue to relate to the project schedule and to any costs associated with schedule recovery. According to the PMP, the Master Schedule is to be updated monthly; however, the most recent approved Master Schedule update is as of March 15, 2017. Now that the FFGA has been executed, MTA and the P3 Concessionaire have produced a plan to collaborate on schedule recovery and to update the project schedule accordingly, and have started to work on those objectives. See the **Project Schedule** section of this report for further details. After MTA reaches agreement with PLTP on schedule recovery, the impact to project cost, if any, will be negotiated.

Safety and Security Management Plan (SSMP)

The current version of the SSMP is Version 6 dated October 22, 2014. [redacted] the PMOC completed its review and issued its OP22 SSMP review report on February 5, 2016. The PMOC review found that the SSMP was compliant with FTA content requirements for execution of the FFGA requested MTA to resubmit the SSMP after FFGA execution, addressing comments in the PMOC report with updated information from the P3 Concessionaire. MTA completed an update of the SSMP incorporating the P3 Concessionaire involvement, and submitted SSMP Version 7, dated June 14, 2018, on August 13, 2018. *Since there had been significant project advancement subsequent to the most recent prior review of the Purple Line SSMP, the PMOC first conducted a preliminary or "cursory" review to assure completeness before investing the effort of a detailed review. The PMOC completed the*

cursory review of SSMP Version 7 in accordance with OP22 and submitted comments to MTA on September 7, 2018. MTA is currently addressing the PMOC's cursory review comments.

Quality Assurance Plan (QAP)

In August 2017, MTA submitted for FTA/PMOC review a complete Quality Assurance Plan update, the MTA Purple Line Quality Assurance Plan Revision 8.0 dated May 2017, which supersedes the Purple Line Project Document for Quality that had been previously reviewed and accepted with comments. The MTA Purple Line Quality Assurance Plan Revision 8.0 incorporates the Concessionaire Quality Program, the Concessionaire's Design Quality Plan (CDQP) and the Concessionaire Construction Quality Plan, as well as an updated Document Control Plan. The PMOC completed its review of QAP Revision 8.0 in accordance with OP24 in October 2017, and found that the documents generally conformed to the OP. Minor comments were provided which can be addressed during the next update.

Real Estate Acquisition Management Plan (RAMP)

The PMOC reviewed the Purple Line RAMP Version 7, dated May 2016 in accordance with OP23. The PMOC's review, as documented in its OP23 report issued on May 27, 2016, found that RAMP Version 7 met the requirements of OP23 for the then current phase of the project and for the execution of an FFGA. MTA prepared an update of the RAMP in December 2017, and submitted Purple Line RAMP Version 8, dated April 18, 2018 for FTA/PMOC review. The PMOC completed its review and issued its OP23 report dated June 2018, which required revision and resubmittal of the RAMP. MTA subsequently addressed the comments and submitted RAMP Version 8 in mid-August 2018. *The PMOC review of RAMP Version 8 in accordance with OP23 continues.*

Fleet Management Plans

The current FTA/PMOC reviewed version of the Purple Line Rail Fleet Management Plan (RFMP) is RFMP Version 7.0, dated February 15, 2016, which incorporates information from the selected P3 Concessionaire's proposal. The PMOC completed review of RFMP Version 7.0, and documented in its OP37 RFMP review report issued on May 27, 2016 that Version 7.0 met the requirements of OP37 for execution of an FFGA. The review also recommended that MTA submit an update to RFMP Version 7.0 to FTA and the PMOC to reflect the P3 Concessionaire's own Rail Fleet Management Plan after MTA review has confirmed that it meets Purple Line project requirements. The P3 contract requires PLTP to submit its RFMP for MTA review and approval within 90 days after the June 17, 2016 P3 contract Financial Close, to submit the RFMP with the LRV Preliminary Design submittal, to submit an updated RFMP with the LRV Final Design submittal, to submit a further updated version no later than six months prior to the scheduled beginning of Revenue Service, and to update the RFMP annually once in revenue service. MTA received, reviewed and approved PLTP's Purple Line Rail Fleet Management Plan Revision 0 dated June 22, 2016 after Financial Close, in accordance with contract

requirements. At the time of the LRV Preliminary Design submittal, MTA and PLTP reviewed the RFMP again and determined that Revision 0 dated June 22, 2016 was still valid. MTA submitted PLTP's RFMP Revision 0 dated June 22, 2016 to the FTA/PMOC. This PLTP Revision 0 version of the RFMP had not yet had the benefit of any significant engineering by PLTP after contract award, and has not been reviewed by the PMOC in accordance with OP37.

The current version of the Bus Fleet Management Plan (BFMP) is BFMP Version 8.1, which was submitted for FTA/PMOC review on February 12, 2016. The PMOC completed its review of BFMP Version 8.1 and issued the final OP37 BFMP Review Report on March 4, 2016, concluding that the BFMP met the requirements of OP37 for the execution of a FFGA for the Purple Line project.

Risk and Contingency Management Plan (RCMP)

The current version of the RCMP is Version 10, dated May 2016. The PMOC's OP40 review found that Version 10 met the requirements of OP40 for an RCMP at the FFGA stage of a project. [redacted] MTA had not been able to establish routine bi-monthly Risk Management Committee meetings or formal updates of the Risk Register as required by the RCMP. MTA resumed bimonthly meetings in October 2017. MTA completed an update of the Purple Line Risk Register in March 2018 and provided a copy to the PMOC. MTA also completed preparation of an RCMP revision, and submitted it to FTA/PMOC for review in April 2018. Also see the **Project Risk** section of this report.

Safety and Security Certification Plan (SSCP)

The current version of the Purple Line SSCP is Version 3 dated November 4, 2014, which was reviewed as a companion document to the SSMP. The PMOC review found that Version 3 met the FTA requirements in support of the FFGA application. An updated version incorporating requirements from the P3 Concessionaire should be submitted for review after the updated SSMP submittal (see SSMP above), and will be reviewed by the PMOC subsequent to the SSMP review.

C. Project Management Capacity and Capability

Through the PMOC's observations and discussions with MTA, especially MTA Transit Development and Delivery (TDD) and Purple Line project management personnel, the PMOC has noted that MTA has been responsive to finding and assigning management capacity and capability as needed to sufficiently complete the project in compliance with applicable FTA requirements. This has included bringing talent, either MTA or Maryland Department of Transportation (MDOT) personnel or consultants, onto the project to manage the current needs, such as planning, P3 procurement and contracting, real estate acquisition, construction, etc.

Recent (August-September 2018) Purple Line staffing activity has included the following:

- *A Commercial/Financial Manager was added to the PMC staff to lead Change Management of the P3 contract.*
- MTA continues to interview for a Spanish-speaking replacement to fill the remaining Community Liaison position vacancy.
- A job posting remains open for an MTA person in Construction Safety.
- *MTA filled the opening for a Right of Way specialist for the Purple Line project team.*

The PMOC continues to monitor the effectiveness of the MTA staff and the added personnel resources from consultants, MDOT and other modal administrations as they have been integrated into overall MTA project management of the Purple Line Project.

D. Project Cost

Appendix 6 of this report summarizes the project's actual expenditures and forecast at completion compared with the project budget as reported in MTA's June 1, 2016 Standard Cost Category (SCC) Workbook, which is the basis of the Purple Line FFGA. The project documented expenditures of $850.5 million through July 15, 2018 (PLTP costs) /July 31, 2018 (MTA costs). Refer also to the FFGA Core Accountability table in the Executive Summary section of this report for details on the planned and actual expenditures on the project.

In the cost estimate presented in the June 1, 2016 SCC Workbook, which is the basis for the FFGA, contingency in Year of Expenditure (YOE) dollars is as follows:

Allocated Contingency	$58.814 million
Unallocated Contingency (SCC 90)	$90.536 million
Total Contingency	$149.350 million

To date, seven Change Orders and one Change Order Amendment have been executed under the P3 contract, which have resulted in a $0 net change to the estimated cost of the FFGA project. Accordingly, the remaining contingency is the original amount of $149.350 million. There are also multiple Change Orders pending or proposed under the P3 contract that have potential cost impact on the P3 project. Working with the PMOC, the Purple Line project team developed a three-part change tracking system that documents:

- Executed Change Orders
- Pending Change Orders that are pending execution, and Proposed Change Orders that are currently either being priced by the contractor or are in various stages of negotiation
- Potential Change Orders that the contractor has formally submitted to protect specific rights and privileges, but which have not been either fully developed by the contractor or accepted by MTA

The PMOC monitors the executed, pending, proposed and potential changes reflected in monthly updates to these change logs and reviews any noteworthy changes with the project team.

In addition to the Change Orders above, mitigation to recover the schedule (see the **Project Schedule** section of this report, below) may potentially result in added costs to the project, which will need to be negotiated with PLTP.

Project Funding

The funding for the Purple Line project, as reflected in Attachment 3 for the FFGA, is as follows:

Sources of Federal Funding and Matching Share Ratios

	Costs Attributed to Source of Funds Dollars	Federal/ Local Matching Ratio within Source	All Federal Funds Dollars	Local Funds Dollars*
Federal 5309 New Starts	2,362,030,286	38/62	900,000,000	1,462,030,286
Federal Other (FTA Section 5307)	45,000,000	80/20	36,000,000	9,000,000
Total	**2,407,030,286**		**936,000,000**	**1,471,030,286**
Overall Federal Share of Project		**38.9%**		
New Starts Share of Project		**37.4%**		

* Local includes costs funded by the MDOT TTF as well as the P3 concessionaire funded costs. The P3 concessionaire uses Transportation Infrastructure Finance and Innovation Act (TIFIA), private financing, and equity to fund its costs. The P3 concessionaire funded costs are treated as Local Match for the 5309 New Starts funds.

Standard Cost Category (SCC) Worksheets

Appendix 7 presents the Purple Line project cost estimate, based on the June 1, 2016 update of the SCC Workbook in FTA's Standard Cost Category format.

E. Project Schedule

The PMOC receives copies of the master project schedule updates, including the native Primavera scheduling software files, once the update has been approved by MTA. The March 15, 2017 progress update of the master project schedule was approved as noted in May 2017, *and continues to be the latest approved version of the schedule, as later submissions of schedule updates from PLTC have not been approved for various reasons. However, in response to a letter that FTA issued to MTA in early August 2018 expressing concern with the amount of time that the project has advanced without an approved schedule, MTA prepared a working schedule update of the master project schedule. The update is based on the current negotiations of the P3 contract schedule, which have been ongoing with PLTP since late 2017*

and which have been detailed in prior PMOC Monthly Monitoring reports; but the update is not yet based on a mutually agreeable P3 contract schedule. The schedule is titled "MTA Master Schedule August 2018", and is progressed through August 31, 2018. Although the MTA Master Project Schedule August 2018 is not yet the final recovery schedule with the mutual agreement of MTA and PLTP, it does provide a more accurate presentation of the current Purple Line project status than the latest approved project schedule (March 15, 2017).

The most significant differences between the last approved project schedule (March 15, 2017) and the recently submitted MTA Master Schedule August 2018 are:

- *The schedule critical path has shifted from through Segment 4 (Plymouth Tunnel) to through Segment 7 (Riverdale aerial structure).*
- *The "PLTP Commence Revenue Service date" has slipped from March 11, 2022 to October 28, 2022.*

However, according to the MTA Master Schedule August 2018, the Purple Line is still forecasted to start revenue service earlier than the FFGA Revenue Service Date of December 31, 2022.

The PMOC advises, though, that this is not yet a contractually enforceable schedule and that agreement still remains to be reached contractually between MTA and PLTP. In addition, any costs associated with schedule recovery will need to be determined and assigned responsibility.

A copy of the summary level of the MTA Master Schedule August 2018 is included in Appendix 8 of this report.

Key Milestones

The following are the current key milestone dates for the project, showing both the March 15, 2017 progress update of the master project schedule and the MTA Master Schedule August 2018.

National Capital Purple Line LRT Key Milestone Dates		
Activity	March 15, 2017 Approved Project Schedule	*MTA Master Schedule August 2018*
Locally Preferred Alternative (LPA) Approval Date	August 4, 2009 (A)	---
FTA Approval to Enter PE	October 7, 2011 (A)	---
FTA Record of Decision	March 19, 2014 (A)	---
Issue Final RFP for P3 Concessionaire	July 28, 2014 (A)	---
FTA Approval to Start enter Engineering Phase	August 28, 2014 (A)	---
Issue Addenda 4 through 6 to the P3 RFP	July through Nov. 2015 (A)	---
P3 Technical Proposals Due	November 17, 2015 (A)	---
P3 Financial Proposals Due	December 8, 2015 (A)	---
Evaluation and Announcement of Selected P3 Proposer	January 2-March 2, 2016(A)	---

National Capital Purple Line LRT Key Milestone Dates		
Board of Public Works (BPW) Approval-P3	April 6, 2016 (A)	---
P3 Commercial Close	April 7, 2016 (A)	---
Limited Notice to Proceed (LNTP) for P3 Engineering	April 7, 2016 (A)	---
MTA submit Full Funding Grant Agreement Application	May 24, 2016 (A)	---
P3 Financial Close	June 17, 2016 (A)	---
Full Funding Grant Agreement signed	August 22, 2017 (A)	---
Start of First Major Construction Activity	August 28, 2017 (A)	---
All Significant ROW Acquisition & Relocation	As needed by construction	---
P3 Ready to Commence Revenue Service	TBD	*October 28, 2022**
MTA Opens for Revenue Service	March 2022	---
Revenue Operations Date (includes contingency)	December 31, 2022	---
FFGA Revenue Service Date (includes contingency)	December 31, 2022	December 31, 2022

** P3 Revenue Service date is based on MTA's working version of an updated integrated master project schedule progressed through August 31, 2018 based on MTA/P3 Concessionaire negotiations to date, but for which final agreement with the P3 Concessionaire has not yet been reached.*

90-day Look Ahead

The critical 90-day look-ahead activities for the National Capital Purple Line project are

Scheduled Date	Activity / Event
Ongoing	P3 submittal / MTA review of design packages
Ongoing	Completion of critical Real Estate acquisitions and relocations
Ongoing	MTA and PLTP collaboration for agreement on a mitigated project schedule
September 18, 2018	*Start of blasting for tunnel excavation*
October 2018	Receipt of the Bethesda Station ATC final design package leading to approval of the ATC
October 2018	*Start final assembly of first LRV in Elmira, NY*
Mid-October 2018	*MTA to resubmit large package of NEPA LOD cases for FTA review*
November 21, 2018	*Polk Street Facility D-B Proposal submittals are due*

Critical Path Activities

The critical path as reflected in the MTA Master Schedule August 2018, for which final agreement with PLTP has not yet been reached, continues to show the critical path through Segment 7, which includes the aerial structure and Riverdale Park station near Kenilworth Avenue.

F. Quality Assurance / Quality Control (QA/QC)

The Purple Line QA/QC is addressed in Section 10 of the PMP, Quality Program Plan, and the updated MTA Quality Assurance Program Revision 8.0, which incorporates the implementing

Quality Plans prepared by PLTC. The most current versions of the PMP, the Purple Line Document for Quality and the QAP are as discussed in the **Project Management Plan and Subplans** section of this report. MTA has been reviewing the multiple updated Quality Assurance plans submitted by PLTC, *with PLTC's Design Quality Plan being the last outstanding PLTC plan yet to be finalized*. MTA provided comments on the formal submittal of PLTC's updated Design Quality Plan, which requires resubmittal. [redacted]

The Purple Line project continues to conduct its monthly meeting to review the QA/QC activities performed by the Purple Line project team, including those by the P3 Concessionaire, PMC and the GEC. Documentation from these meetings is distributed separately. The PMOC performs an overview of each distributed package, with more detailed reviews conducted on periodic basis.

The project's Monthly Progress Report to FTA also contains a brief summary of the significant current QA/QC activities/events on the project, including quality audits and quality reviews of PLTC submittals.

G. Safety and Security

PLTP has conducted thirty-six Preliminary Hazard Analysis (PHA) workshop sessions to date. *Recent workshops have been conducted to resolve MTA comments on the PHAs completed to date.* PLTP's Safety and Security Working Group (SSWG) continues to oversee the hazard management process. MTA has representation on the group to provide comments and insight, but does not vote on topics before the PLTP SSWG.

MTA chairs a Safety and Security Certification Committee (SSCC) that reviews, comments on, and approves PLTP hazard management and certification issues. The first meeting of the MTA SSCC was conducted on March 20, 2018. Starting with July 11, 2018, the meeting will be held on a monthly basis on the second Wednesday of the month until the level of activity requires more frequent meetings. *The fourth meeting of the SCCC was held on September 12, 2018 and focused on PHA items, including logging and tracking, evaluation of mitigation measures and assurance of sufficient PLTP resources to meet commitments.*

The PLTP System Safety team completed development of its first Design Criteria Conformance Checklist (DCCC) in May 2017 and submitted it for MTA approval. However, it did not meet MTA expectations and was returned for revision and resubmittal. PLTP had not been preparing DCCCs until January 2018, when they resumed preparing them, since MTA stated it would reject any Final Design Packages submitted without an associated DCCC. MTA (assisted by the PMC) reviews the DCCCs as part of the Final Design Package according to the established submittal review process. Per PLTP, the DCCCs will be verified prior to the issuance of Released for Construction (RFC) packages. *However, no additional DCCCs have been received with the latest RFC packages.* Also, MTA continues to return the Certified Elements List (CEL) and the Certified items List (CIL) with comments, to be revised and resubmitted. Revisions to the CEL and CIL could affect DCCCs that have already been issued with RFC packages, and require them to be revised.

PLTP also completed its initial Threat and Vulnerability Assessment (TVA) process and submitted the draft TVA report for MTA review and comment. MTA's review resulted in a significant number of comments, which were returned to PLTP to be addressed. PLTP updated the TVA report and submitted it to MTA, and it is undergoing MTA/PMC review.

The MTA Purple Line Safety and Security personnel review and comments on the PLTP design submittals, including those of the vehicle supplier.

MTA continues to conduct Fire/Life/Safety meetings with each Montgomery and Prince George's Counties on bi-monthly basis. The meetings provide a basis for the County emergency responders to understand the features of the Purple Line systems, and to resolve any concerns. *Current topics with Prince George's County addressed how the Purple Line blue light phone system could be integrated with the UMD blue light program, which led to a discussion of potentially integrating other security functions as well*

As required by the P3 contract, the P3 concessionaire, PLTP, is responsible for directly implementing many of the safety and security requirements for the project, including construction safety and the collection and maintenance of the Occupational Safety and Health Administration (OSHA) safety statistics for the project. *PLTP did not provide MTA with updated Purple Line project statistics as of August 2018; statistics as reported through July 2018were as follows:*

- Recordable Rate (Construction – heavy civil):
  - Actual: 0.04
  - PLTP goal: 0.45
  - National Ave. 2.8
- Lost Time Rate:
  - Actual: 0.00
  - PLTP goal: 0.00

See Section B of this report for the status of the safety and security related subplans of the PMP. Appendix 1 of this report includes extensive additional safety and security-related information for the Purple Line project on a quarterly basis.

H. Americans with Disabilities Act (ADA)

The PMOC confirmed that the Design Criteria Manual applicable to the Purple Line project addresses ADA requirements, including references to the requirements in the Maryland Accessibility Code (MAC), the ADA Accessibility Guidelines for Buildings and Facilities (ADAAG), and the ADA Standards for Transportation Facilities.

Accessibility and compliance with ADA are required as part of the functional requirements for stations and guideway and as part of the codes and standards for light rail vehicles within the P3 contract (Book 2 Part 2) for the Purple Line project. The design packages prepared in accordance with the P3 contract by PLTC are reviewed by MTA and its consultants. In project

reviews conducted by the PMOC, MTA has confirmed that it includes ADA compliance in its QA Oversight reviews of PLTC's design packages. ADA compliance is included in the PMOC periodic project reviews, during which timely project ADA-related items are discussed. *In august-September 2018, there were no ADA issues identified across the project, including with the vehicles.*

I. Buy America

The PMOC has discussed Buy America requirements with the Purple Line project team during the PMOC project review meetings, and has confirmed that MTA understands that Buy America compliance applies not only to the rail vehicles but is also required for procurement of all manufactured products, including all iron and steel. MTA is also aware that domestic manufacture of all federally-funded procurements is required and should be certifiable. Compliance with Buy America is contained in MTA standard clauses for its procurements, and the P3 contract contains explicit Buy America language in its Appendix 16.

To date, the largest challenges have been with utility relocations. Washington Gas has warned MTA that Buy America compliant materials will require longer lead times, and this should be accommodated in the utility relocation schedules. *As designs are reaching finalization, PLTC is starting to encounter more occurrences wherein Buy-America compliant supply of as-designed commodities may not be available. These are being identified to MTA for assistance in their resolution.*

PLTC passed the Buy America requirements on to the vehicle supplier, Construcciones y Auxiliar de Ferrocarriles (CAF). The Buy America Pre-Award audit was conducted by Virginkar and Associates, who concluded that there is reasonable certainty that CAF will satisfy the Buy America requirements as stated in 49 CFR 661. [redacted] An intermediate post-award Buy America audit for added confidence that the post-delivery audit will not identify issues was conducted of CAF's Elmira, NY facility during the week of October 2, 2017. There were no significant findings, and based on the audit, the domestic content of the LRVs is currently estimated at approximately 62% as compared to the required 60% for these vehicles. CAF is targeting 65% domestic content in the completed vehicle. *MTA has also been in communication with the U.S. Maritime Administration regarding the use of US Flagship carriers for the transport of carshells from Spain to the United States for final assembly.*

J. Vehicles and Vehicle Technology

Based on the contract negotiated with PLTP, the vehicles will be 136-foot long, multiple articulated light rail vehicle operated as single car maximum length trains. Due to the vehicle's extended length, only 25 vehicles (21 plus 4 spares) will be provided under the FFGA for opening year.

PLTP executed the LRV contract with CAF on June 17, 2016 and issued CAF Notice to proceed on July 5, 2016.

Vehicle carshell manufacturing activities, coordinated with design progress, continued in Spain in August and early September2018. All CAF intermediate design submittals have been completed and final design submittals continue. The carbody stress (crashworthiness) analysis, which was returned with comments, *continues to undergo comment resolution by CAF. MTA stated that none of the comments are of a nature that would require carbody design changes.* Actual carbody shell structural testing will be conducted on the second vehicle shell to be manufactured in Spain. *CAF submitted its carbody structural test procedure, which was reviewed by MTA and returned with comments.* Shock and vibration tests continue to be performed by various manufacturers. *Fire, smoke and toxicity testing has been re-scheduled from September 2018 until October 2018, with results expected in November 2018.* [redacted] *MTA recently returned the vehicle noise report with comments, and is awaiting the response from PLTP/CAF. Also, although the P3 contract requires solar-powered wayside track lubricators, CAF's design included only on-board lubricators. MTA and PLTP research as to the relative benefits of the two systems is still ongoing. However, if a wayside system is found to be preferred, MTA will need to verify that acquired right of way can accommodate wayside installation before approving the change, since PLTP's reviews to date for potential changes to the Limits of Disturbance has not taken wayside equipment into consideration.* CAF is shipping the first carshell in segments from Spain to Elmira, NY for final assembly. *The first four of the five segments of the first carshell, modules A, C1, C2 and D, arrived at the Port of Baltimore on September 1, 2018. After the modules complete customs procedures, they will be transported to Elmira, NY. The fifth segment, module B, is scheduled to arrive in Baltimore in early October 2018.*

Vehicle final assembly will be taking place in CAF's facility in Elmira, NY. MTA rejected CAF's requested design deviation to utilize the current environmental test chamber in Elmira, which is shorter than the overall vehicle, for a second time. *CAF has stated that it will resubmit its request with justification for testing in the existing test chamber, which can accommodate 4 of the 5 segments at a time.*

Additional Vehicle Status information is included as Appendix 9 of this report on a quarterly basis.

PROJECT RISK

MTA has established a risk management organization, which is defined in the project's Risk and Contingency Management Plan, and which is overseen by MTA's Risk Management Committee. Two major elements of the RCMP are the performance of Quantitative Risk Assessments and the maintenance and use of a Risk Register.

During the approximately one-year period of time in which the ROD had been vacated by the federal judge in his decision related to the Friends of the Capital Crescent Trail lawsuit, MTA did not conduct formal Risk Management Committee meetings, conduct additional Quantitative Risk Assessments or perform formal updates of the Risk Register. Though, the Purple Line project management team did assess and respond to the risks associated with that unforeseen chain of events.

The project team resumed formal risk meetings in October 2017, including individual updates of each risk on the current Risk Register by the risk owner. An overall update of the Risk Register was completed as draft in January 2018, and updated further and reissued in March 2018. Updating of the Risk Register is an ongoing process throughout a project's duration, and according to MTA's current RCMP, is to be performed bi-monthly. MTA also prepared a formal revision of the RCMP to update it to the current project status, and submitted it to FTA/PMOC for review in April 2018.

MTA provides copies of significant updates of the Purple Line Risk Register to the FTA and PMOC. The top risks from the project's latest issued update of the Risk Register and PMOC-assessed risks are included as Appendix 2 of this report on a Quarterly basis.

ACTION ITEMS

Action Items are identified at MTA/FTA Quarterly Progress Meetings, at MTA/PMOC Monthly Progress Meetings and at MTA/FTA Biweekly New Starts Progress Conference Calls. Separate lists for each are included. Items identified as closed are removed from the subsequent monthly report. *Currently only one action item, which is applicable to all MTA federally funded projects discussed at the Quarterly Meeting, affects the Purple Line project. This is a request by FTA to include Disadvantage Business Enterprise (DBE) goals and performance in the MTA Quarterly Meeting package. The project team is collecting the Purple Line data to be included, effective with the upcoming November 2018 Quarterly Meeting.*

APPENDICES

The following Appendices or placeholders are provided with this report:

Appendix 1	Safety and Security Checklist Per OP25, this item is issued quarterly.
Appendix 2	Top Project Risks Per OP25, this item is issued quarterly.
Appendix 3	Roadmap to Revenue Operations Per OP25, this item is issued quarterly "as a separate attachment".
Appendix 4	Project Map
Appendix 5	Acronyms
Appendix 6	Cost vs. Budget
Appendix 7	FTA SCC Workbook – BUILD Main Worksheet
Appendix 8	Project Schedule
Appendix 9	Vehicle Status Report Per OP25, this item is issued quarterly.
Appendix 10	Construction Photographs

Appendix 1 Safety and Security Checklist

(Updated September 2018)

Project Overview	**National Capital Purple Line Light Rail Transit Project**		
Project mode (Rail, Bus, BRT, multimode)			Rail
Project phase (Project Development, Construction, or Start-up)			Construction
Project Delivery Method (Design/Build, Design/Build/Operate/Maintain, CMGG, etc)			Public Private Partnership (P3)
Project Plans	**Version**	**Review By FTA**	**Status**
Safety and Security Management Plan	Version 6 dated October 22, 2014	Y	*PL submitted updated Version 7 dated June 14, 2018 to the PMOC on August 13, 2018. Cursory review comments were returned on September 7, 2018 and are being addressed by MTA.* PLTC SSMP Rev D was approved by MTA on November 27, 2016.
Safety and Security Certification Plan	Version 3, November 3, 2014	Y	PL submitted Version 3 dated November 3, 2014 to the PMOC on November 25, 2014. *An updated revision of the MTA SSCP is being prepared by MTA. PLTC's supporting contractor-level SSCP is in comment resolution after receipt of comments from MTA.*
System Safety Program Plan (SSPP)	Reviewed annually and revised as required	2017 SSPP signed 4/12/17; 2018 SSPP approved by MDOT, awaiting MTA Administrator signature	The existing MTA SSPP will be revised to incorporate the Purple Line during the late Construction and Testing and Start-Up Phases. Internal Safety Review Audit performed May 2016 on elements 8, 9, & 10 by OSQARM.
System Security Plan (SSP) or Security and Emergency Preparedness Plan (SEPP)	Reviewed annually and revised as required	2018 SSEPP is approved as of May 1, 2018	The existing MTA SSP will be revised to incorporate the Purple Line during the late Construction and Testing and Start-Up Phases.
Construction Safety and Security Plan	-	-	PLTC's Site Security Plan was accepted by MTA on November 9, 2016. PLTC's Health & Safety Plan was accepted by MTA on November 9, 2016.

Safety and Security Authority	Y/N	Notes/Status
Is the grantee subject to 49 CFR Part 659 state safety oversight requirements?	Y	
Has the State designated an oversight agency as per Part 659.9	Y	MDOT Rail Safety Oversight Agency (RSOA)
Has the oversight agency reviewed and approved the Project Sponsor's Security Plan or SSPP as per 49 CFR Part 659.17?	Y	RSOA oversees MTA's SSPP and SSP in compliance with 49 CFR Part 659
Did the oversight agency participate in the last Quarterly Program Review Meeting (QPRM)?	Y	The oversight agency typically attends the QPRM.
Has the grantee submitted its safety certification plan to the oversight agency?	-	The final Safety Certification Plan will be submitted in accordance with MTA's SSPP.
Has the grantee implemented security directives issues by the Department Homeland Security (DHS), Transportation Security Administration (TSA)?	Y	MTA has, and will continue to, implement DHS/TSA Directives as indicated in SSMP Section 11.

SSMP Monitoring	Y / N	Notes/Status
Is the SSMP project-specific, clearly demonstrating the scope of safety and security activities for this project?	Y	
Grantee reviews the SSMP and related project plans to determine if updates are necessary?	Y	Specified in SSMP
Does the grantee implement a process through which the Safety Manager and Security Manager are integrated into the overall project management team? Please specify.	Y	Specified in SSMP; the Safety Manager and Security Managers participate in project meetings and are involved in the project.
Does the grantee maintain a regularly scheduled report on the status of safety and security activities?	Y	Safety and Security activities are regularly reported in the monthly progress report.
Has the grantee established staffing requirements, procedures and authority for safety and security activities throughout all project phases?	Y	Specified in SSMP
Does the grantee update the safety and security responsibility matrix/organizational chart as necessary?	Y	Specified in SSMP.
Has the grantee allocated sufficient resources to oversee or carry out safety and security activities?	Y	Specified in the SSMP; evaluating need for future resources.
Has the grantee developed hazard and vulnerability analysis techniques, including specific types of analysis to be performed during different project phases?	Y	Specified in SSMP.
Does the grantee implement regularly scheduled meetings to track to resolution of any identified hazards and/or vulnerabilities?	Y	Specified in SSMP.

SSMP Monitoring	Y / N	Notes/Status
Does the grantee monitor the progress of safety and security activities throughout all project phases? Please describe briefly.	Y	Specified in SSMP.
Does the grantee ensure the conduct of preliminary hazard and vulnerability analyses? Please specify analyses conducted.	Y	Specified in SSMP. PHA is complete and signed by all parties. TVA is complete and signed by all parties.
Has the grantee ensured the development of safety design criteria?	Y	Specified in SSMP. MTA developed criteria are in the Design Criteria Manual Version 3 that was issued in September 2014. Specific draft safety and security criteria have been submitted by PLTP for review and comment.
Has the grantee ensured the development of security design criteria?	Y	Specified in SSMP. MTA developed criteria are in the Design Criteria Manual Version 3 that was issued in September 2014. Specific draft safety and security criteria have been submitted by PLTP for review and comment.
Has the grantee ensured conformance with safety and security requirements in design?	Y	Specified in SSMP. P3 Concessionaire will develop the Design Conformance Checklists in its engineering phase. Thirteen Design Criteria Conformance Checklist (DCCC) have been submitted to date.
Has the grantee verified conformance with safety and security requirements in equipment and materials procurement?	-	Verification will be performed when material and equipment are procured in later project phases. Procurement documentation has not yet been submitted.
Has the grantee verified construction specification conformance?	N	P3 Concessionaire will develop the Construction Specification Conformance Checklists as the project advances. Construction Specification Conformance Checklists have not yet been submitted.
Has the grantee identified safety and security critical tests to be performed prior to passenger operations?	N	P3 Concessionaire will identify tests in its engineering and construction phases as the project advances. Safety and Security related tests have not yet been identified.
Has the grantee verified conformance with safety and security requirements during testing, inspection and start-up phases?	N	P3 Concessionaire will verify conformance in its Testing and Start-Up Phase activity These requirements have not yet been submitted.
Does the grantee evaluate change orders, design waivers, or test variances for potential hazards and /or vulnerabilities?	Y	Specified in SSMP.
Has the grantee ensured the performance of safety and security analyses for proposed work-arounds?	-	Specified in SSMP; these activities will not begin until Testing and Start-Up
Has the grantee demonstrated through meetings or other methods, the integration of safety and security in the following: • Activation Plan and Procedures	-	Specified in SSMP; these activities will not begin until late Construction and Testing and Start-Up Phases

SSMP Monitoring	Y / N	Notes/Status
• Integrated Test Plan and Procedures • Operations and Maintenance Plan • Emergency Operations Plan		
Has the grantee issued final safety and security certification?	-	Specified in SSMP; this activity will not begin until end of Testing and Start-Up Phase
Has the grantee issued the final safety and security verification report?	-	Specified in SSMP; these activities will not begin until end of Testing and Start-Up Phase

Construction Safety	Y / N	Notes/Status
Does the grantee have a documented /implemented Contractor Safety Program with which it expects contractors to comply?	Y	Specified in SSMP; P3 Concessionaire has developed a Safety and Health Plan. P3 contract requires compliance with MTA's Contractor Health and Safety Plan Guidelines.
Does the grantee's contractor(s) have a documented company-wide safety and security program plan?	Y	P3 Concessionaire main Joint Venture partner, Fluor, has company-wide safety and security plans.
Does the grantee's contractor(s) have a site-specific safety and security program plan?	Y	Concessionaire has developed a System Safety Plan and a Concessionaire Security Plan (TP Book2A Section 8.4). MTA has approved both plans.
Provide the grantee's OSHA statistics compared to the national average for the same type of work?	Y	Through July 2018: • Recordable Rate: 0.04 • Lost Time Rate: 0.00
If the comparison is not favorable, what actions are being taken by the grantee to improve its safety record?	N/A	Performance is favorable.
Does the grantee conduct site audits of the contractor's performance versus required safety/security procedures?	N/A	This will be a construction phase activity. Grantee has commenced requests for oversight personnel (who will be provided by its PMC).

Federal Railroad Administration	Y / N	Notes/Status
If shared track: has grantee submitted its waiver request application to Federal Railroad Administration (FRA)? (Please identify specific regulations for which waivers are being requested)	N/A	There is no shared track.
If shared corridor: has grantee specified specific measures to address shared corridor safety concerns?	Y	Future FRA coordination may be required if a currently unused freight Right of Way is reactivated.
Is the Collision Hazard Analysis underway?	N	If required, will be responsibility of new freight operator.

Federal Railroad Administration	Y / N	Notes/Status
Other FRA required Hazard Analysis – Fencing, etc.?	-	Future FRA coordination may be required if a currently unused freight Right of Way is reactivated.
Does the project have Quiet Zones?	N	
Does FRA attend the Quarterly Review Meetings?	N	

Appendix 2 Top Project Risks

In addition to the top risk items in the August 2018 update of the Purple Line Project Risk Register, the following risk items were also discussed at the Purple Line project review meetings:

- The project does not currently have a resource-loaded Master Integrated Project Schedule to serve as a management tool for the project, rendering project management decisions not fully informed until an acceptable recovery schedule is finalized, which is anticipated late in Calendar Year 2018.
- Achievement of a recovery schedule that is agreeable to both MTA and the P3 Concessionaire under the P3 contract may require the consumption of a significant amount of the current schedule contingency, leaving insufficient contingency to manage remaining schedule risks for the duration of the project.
- Achievement of a recovery schedule that is agreeable to both MTA and the P3 Concessionaire under the P3 contract may result in additional project costs
- Significant currently unidentified project risks / latent effects could result from the limitations on the project's ability to advance between August 2016 and August 2017 as a result of the judge's vacation of the project's ROD in response to the Friends of the Capital Crescent Trail lawsuit.

As documented in the Risk Register Updated by the Purple Line Risk Management process in August 2018, the following are the Purple Line cost and schedule risks that are rated "Significant" or "High":

- The MTA is meeting regularly with the third party stakeholders and draft agreements are in place with each [redacted]
- Lack of utility information and/ or incorrect information could lead to additional costs and schedule delay.
- As the design progresses, PLTP continues to identify additional necessary ROW requirements which could lead to schedule delay.
- a) PLTP underestimates the magnitude/value of the work due to incorrect assumptions, misinterpretation of the TP's and/or Agreement, thus formally seeking relief of work requirements or lowering quality standards and build to those lower standards without MTA approval; or b), embarks on a campaign of claims to recoup losses or increase revenue.
- Area 1 ROW: With remaining parcels still to be acquired, there may be insufficient time in the schedule to clear the ROW for a project of this size and scope consistent with commitments made to PLTP.

- Area 2 ROW: With remaining parcels still to be acquired, there may be insufficient time in the schedule to clear the ROW for a project of this size and scope consistent with commitments made to PLTP
- Area 3 ROW: With remaining parcels still to be acquired, there may be insufficient time in the schedule to clear the ROW for a project of this size and scope consistent with commitments made to PLTP.
- If Concessionaire is unable to utilize select backfill, then additional rock may need to be acquired. (New in Feb 2018)
- Concessionaire is unable to find adequate on-site fill material to substitute for 57 Stone for MSE walls, causing additional material and hauling costs.
- Uncertainty as to which party (MTA, WSSC, or PLTP) is responsible for costs to relocate a 66" diameter WSSC water main in Glenridge Yard that is not within the WSSC easement.

Appendix 3 Roadmap to Revenue Operations

In accordance with OP25, the Roadmap to Revenue Operations, prepared from the Project Sponsor's Master Schedule, is issued quarterly as a separate electronic file. Since the Project Sponsor's Master Schedule is undergoing a major revision for schedule recovery, the dates currently shown on this issue of the roadmap are likely to change.

Appendix 3 Roadmap to Revenue Operations

Note: This is an early version of the Roadmap to Revenue Operations that is based on MTA's preliminary updated Integrated Master Project Schedule progressed through August 31, 2018, but for which final agreement with the P3 Concessionaire has not yet been reached. Additional detail will be added as those details are further defined on the project, including the updating of the Integrated Master Project Schedule with information from the mutually agreeable P3 contract schedule.

Milestone/Activity/Event	Responsible Party	Scheduled Date	Actual Date	Comments
Complete Construction	PLTC			
Start Integrated Testing	PLTC	09/22/21*		
Complete Integrated Testing	PLTC			
Start Pre-Revenue Operations	PLTO	03/09/22*		
Complete Safety Certification	MTA			
Start PMOC Readiness for Operations review	PMOC	04/28/22*		(6 months prior to targeted start of service)
PLTP Ready for Revenue Service	PLTP	10/28/22*		
FFGA Revenue Service Date	MTA	12/31/22		

* These dates are subject to change as MTA and PLTP continue to work toward a mutually acceptable recovery schedule, targeted to be completed in late Calendar Year 2018.

Responsible Parties:

PLTC	Purple Line Transit Constructors
PLTO	Purple Line Transit Operators
PLTP	Purple Line Transit Partners
PMOC	Project Management Oversight Contractor (FTA)
MTA	Maryland Transit Administration

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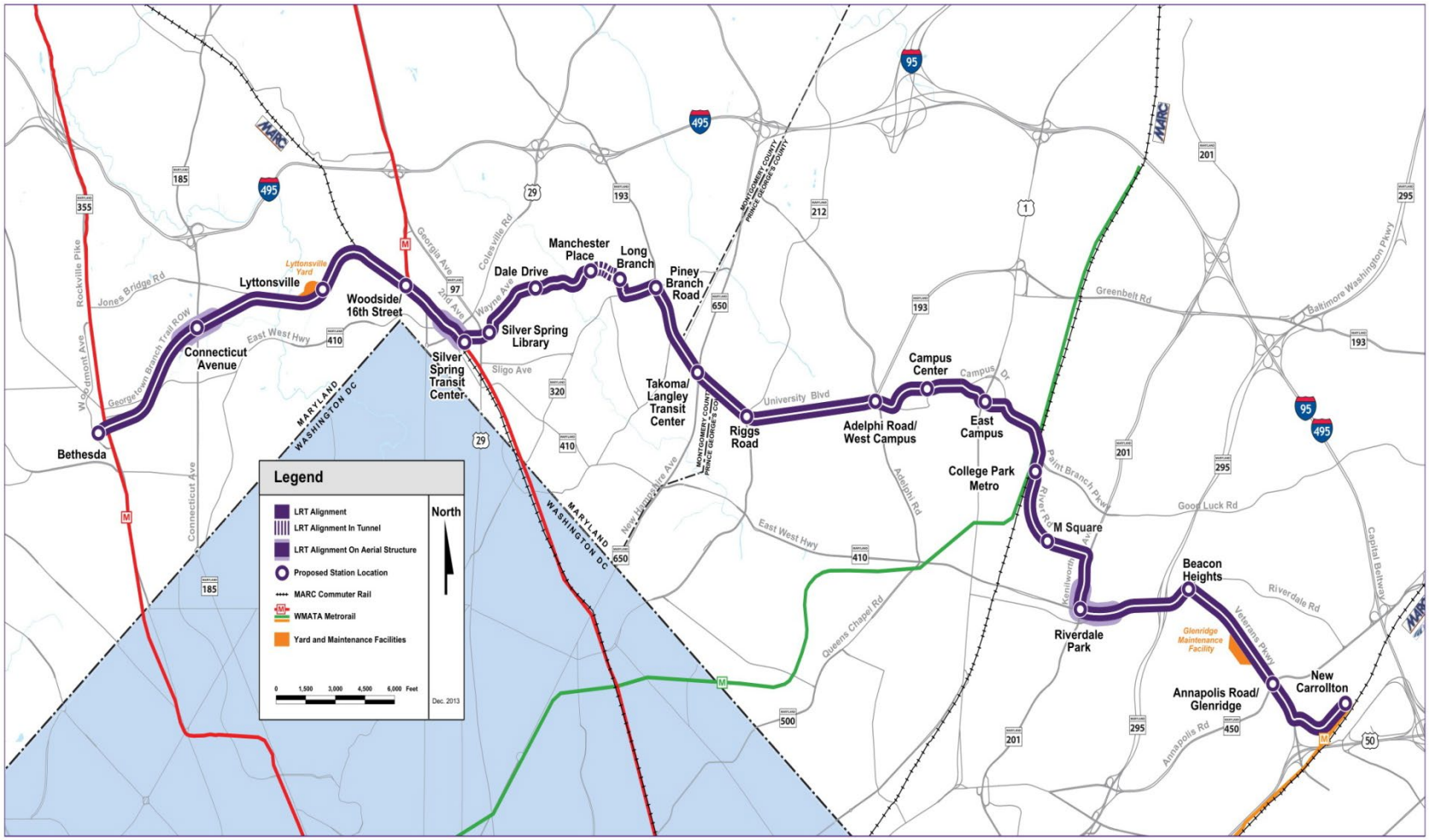
Appendix 4 Project Map



Appendix 5 List of Acronyms

ADA	-	Americans with Disabilities Act
ADAAG	-	ADA Accessibility Guidelines for Buildings and Facilities
ATC	-	Alternate Technical Concepts
B-W	-	Baltimore-Washington
BFMP	-	Bus Fleet Management Plan
BPW	-	Board of Public Works
CAF	-	Construcciones y Auxiliar de Ferrocarriles
CDQP	-	Concessionaire's Design Quality Plan
CEL	-	Certified Elements List
CIL	-	Certified Items List
D-B	-	Design-Build
DBE	-	Disadvantaged Business Enterprise
DBFOM	-	Design/Build/Finance/Operate/Maintain
DCCC	-	Design Criteria Conformance Checklist
DHS	-	Department of Homeland Security
DNR	-	Maryland Department of Natural Resources
E&S	-	Erosion and Sediment
EMI	-	Electro-Magnetic Interference
FCP	-	Forest Conservation Plan
FFGA	-	Full Funding Grant Agreement
FRA	-	Federal Railroad Administration
FTA	-	Federal Transit Administration
GEC	-	General Engineering Consultant
JPA	-	Joint Permit Application
LNTP	-	Limited Notice to Proceed
LOD	-	Limits Of Disturbance
LPA	-	Locally Preferred Alternative
LRT	-	Light Rail Transit
LRV	-	Light Rail Vehicle
MAC	-	Maryland Accessibility Code
MARC	-	Maryland Area Regional Commuter
MDE	-	Maryland Department of the Environment
MDOT		Maryland Department of Transportat
MOA	-	Memorandum of Agreement
MOT	-	Maintenance of Traffic
MTA	-	Maryland Transit Administration
NEPA	-	National Environmental Policy Act
NFPA	-	National Fire Protection Association
NPS	-	National Parks Service
NTP	-	Notice to Proceed
OP	-	Oversight Procedures
OSHA	-	Occupational Health and Safety Administration
P3	-	Public Private Partnership
PD	-	Project Development

PEPCO	-	Potomac Electric Power Corporation
PLTC	-	Purple Line Transit Constructors
PLTP	-	Purple Line Transit Partners
PMC	-	Project Management Consultant
PMOC	-	Project Management Oversight Contractor
PMP	-	Project Management Plan
QA/QC	-	Quality Assurance/Quality Control
QAP	-	Quality Assurance Plan
QPRM	-	Quarterly Program Review Meeting
RAMP	-	Real Estate Acquisition and Management Plan
RCMP	-	Risk and Contingency Management Plan
RFMP	-	Rail Fleet Management Plan
RFC	-	Released for Construction
RFP	-	Request for Proposal
RFQ	-	Request for Qualifications
ROD	-	Record of Decision
ROW	-	Right-of-Way
RSD	-	Revenue Service Date
RSOA	-	Rail Safety Oversight Agency
SCC	-	Standard Cost Category
SEIS	-	Supplemental Environmental Impact Statement
SEPP	-	Security and Emergency Preparedness Plan
SHA	-	State Highway Administration
SOE	-	Support of Excavation
SSCC	-	Safety and Security Certification Committee
SSCP	-	Safety and Security Certification Plan
SSMP	-	Safety and Security Management Plan
SSP	-	System Security Plan
SSPP	-	Sysem Safety Program Plan
SSTC	-	Silver Spring Transit Center
SWM	-	Stormwater Management
SSWG	-	Safety and Security Working Group
TDD	-	Transit Development and Delivery
TIFIA	-	Transportation Infrastructure Finance and Innovation Act
TPSS	-	Traction Power Substation
TSA	-	Transportation Security Administration
TVA	-	Threat and Vulnerability Assessment
UMD	-	University of Maryland
USACE	-	United States Army Corps of Engineers
WMATA	-	Washington Metropolitan Area Transit Authority
WSSC	-	Washington Suburban Sanitary Commission
YOE	-	Year of Expenditure

Appendix 6 Cost vs. Budget

The following are project budgets, actual expenditures and forecast at completion amounts through July 15, 2018 (for PLTP costs) and July 31, 2018 (for MTA costs), compared with the project budget as reported in MTA's June 1, 2016 SCC Workbook and MTA's current Working Budget.

(in $1,000)

SCC	Cost Category	Budget (June 1, 2016 SCC Workbook)	Working Budget* (Jan. 1, 2017 SCC Workbook)	Expended	Forecast at Completion
10	Guideway and Track	280,620,726	258,782,885	28,853,960	258,782,885
20	Stations	114,857,016	116,127,445	4,068,492	116,127,445
30	Maintenance Facility	94,155,591	94,155,591	10,019,226	94,155,591
40	Sitework	521,968,990	315,482,782	71,066,286	315,482,782
50	Systems	263,887,313	263,887,313	30,928,832	263,887,313
	Subtotal 10 thru 50	1,275,489,636	1,048,436,017	144,936,796	1,048,436,017
60	Right-of-Way	229,600,000	229,600,000	166,369,366	229,600,000
70	Vehicles	212,940,927	212,940,927	16,508,094	212,940,927
80	Professional Services (total)	571,658,114	798,711,733	522,663,675	798,711,733
80.01	Project Development (PD)	87,149,878	87,149,878	87,149,878	87,149,878
80.02	Engineering	139,766,036	114,618,846	100,009,049	114,618,846
80.03	Project Management for Design and Construction	148,555,323	227,047,206	123,936,617	227,047,206
80.04	Construction Administration & Management	83,269,280	255,349,776	166,321,585	255,349,776
80.05	Professional Liability; other Non-Construction Insurance	34,534,796	34,534,796	28,756,417	34,534,796
80.06	Legal; Permits; Review Fees by other agencies, cities, etc.	5,805,117	10,205,293	7,883,602	10,205,293
80.07	Surveys, Testing, Investigation, Inspection	15,164,346	16,798,570	8,606,528	16,798,570
80.08	Start up	57,413,338	53,007,367	-	53,007,367
	Subtotal 10 - 80	2,289,688,678	2,289,688,678	850,477,930	2,289,688,678
90	Contingency	90,535,748	90,535,748	-	90,535,748
100	Finance Charges	26,805,863	26,805,863	-	26,805,863
	Total	2,407,030,288	2,407,030,288	850,477,930	2,407,030,288

* NOTE: The Purple Line Working Budget is based on the current approved (December 2016) cost and resource loaded Baseline Project Schedule, which is undergoing mitigation and revision. Once the project schedule is re-baselined, the budget can be accordingly updated.

Appendix 7 FTA SCC Workbook – BUILD Main, June 1, 2016 Update

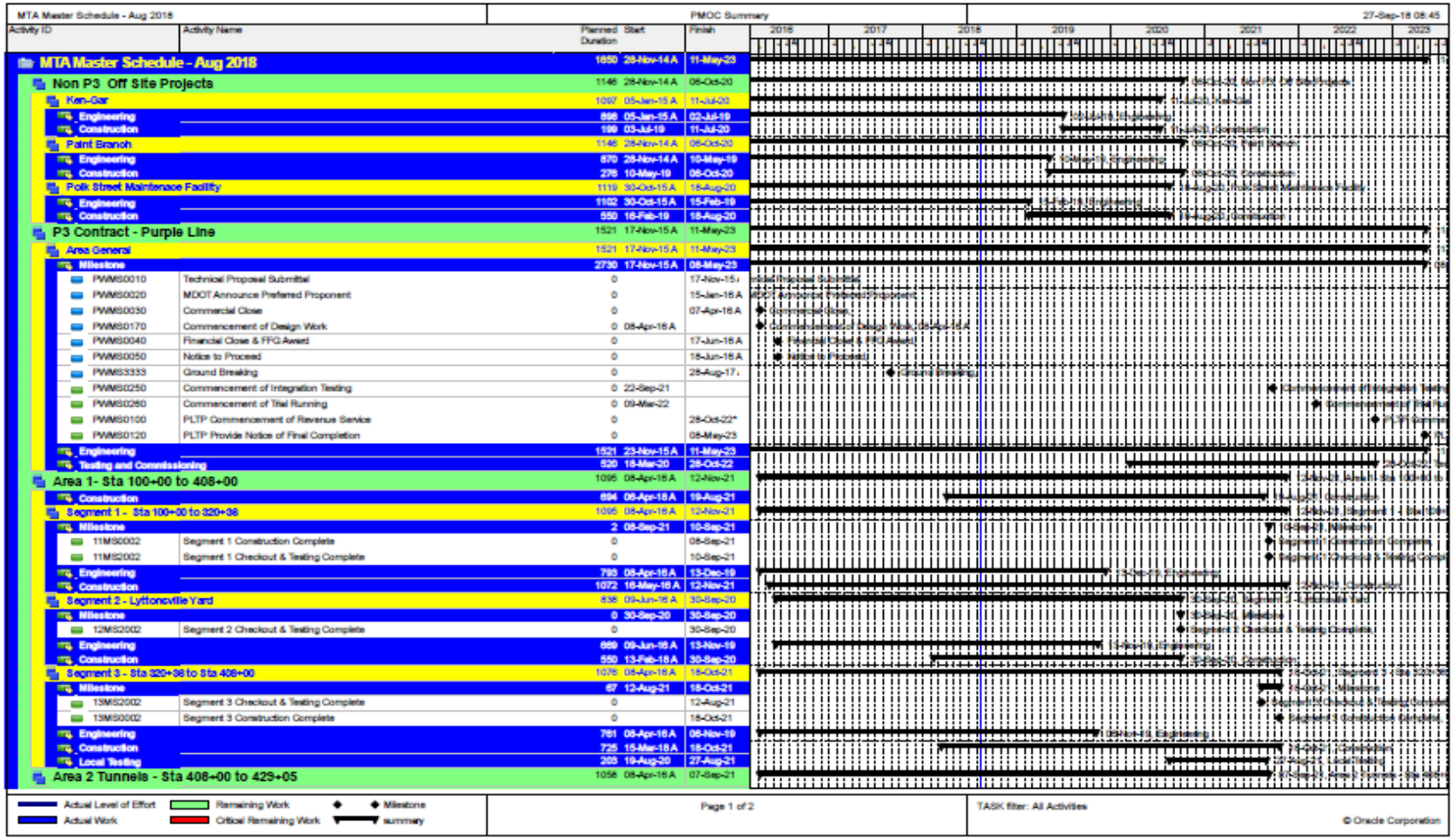
MAIN WORKSHEET-BUILD ALTERNATIVE 0

Maryland Transit Administration							Today's Date	5/24/16
Maryland National Capital Purple Line							Yr of Base Year $	2016
FFGA Applica ion							Yr of Revenue Ops	2022

	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)
10 GUIDEWAY & TRACK ELEMENTS (route miles)	**16.20**	**259,766**	**0.00**	**259,766**	**$16,035**	**22%**	**12%**	**280,621**
10 01 Guideway At-grade exclusive right-of-way	3 26	2 978		2 978	$913			3 244
10 02 Guideway At-grade semi-exclusive (allows cross-traffic)	9 67	12 497		12 497	$1 292			13 205
10 03 Guideway At-grade in mixed traffic	1 20	12 862		12 862	$10 718			13 961
10 04 Guideway Aerial structure	0 46	67 018		67 018	$145 692			73 222
10 05 Guideway Built-up fill	0 00	0		0				0
10 06 Guideway Underground cut & cover	0 00	0		0	$0			0
10 07 Guideway Underground tunnel	0 36	58 344		58 344	$162 068			62 735
10 08 Guideway Retained cut or fill	1 25	20 805		20 805	$16 644			22 693
10 09 Track Direct fixation		6 948		6 948				7 570
10 10 Track Embedded		29 159		29 159				30 811
10 11 Track Ballasted		30 012		30 012				32 575
10 12 Track Special (switches turnouts)		19 141		19 141				20 606
10 13 Track Vibration and noise dampening		0		0				0
20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)	**21**	**103,521**	**0**	**103,521**	**$4,930**	**9%**	**5%**	**114,857**
20 01 At-grade station stop shelter mall terminal platform	16	23 884		23 884	$1 493			26 295
20 02 Aerial station stop shelter mall terminal platform	3	45 703		45 703	$15 234			51 031
20 03 Underground station stop shelter mall terminal platform	2	30 698		30 698	$15 349			33 933
20 04 Other stations landings terminals Intermodal ferry trolley etc	0	0		0				0
20 05 Joint development		0		0				0
20 06 Automobile parking multi-story structure		0		0				0
20 07 Elevators escalators		3 236		3 236				3 599
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	16.20	**87,590**	**0**	**87,590**	**$5,407**	**7%**	**4%**	**94,156**
30 01 Administration Building Office sales storage revenue counting		29 571		29 571				31 894
30 02 Light Maintenance Facility		951		951				1 062
30 03 Heavy Maintenance Facility		44 357		44 357				47 842
30 04 Storage or Maintenance of Way Building		0		0				0
30 05 Yard and Yard Track		12 710		12 710				13 358
40 SITEWORK & SPECIAL CONDITIONS	16.20	**481,579**	**2,405**	**483,984**	**$29,876**	**41%**	**22%**	**521,969**
40 01 Demolition Clearing Earthwork		45 651		45 651				48 789
40 02 Site Utilities Utility Relocation		143 356	1 596	144 952				154 044
40 03 Haz mat'l contam'd soil removal/mitigation ground water treatments		17 099		17 099				18 439
40 04 Environmental mitigation e g wetlands historic/archeologic parks		24 936	808	25 744				27 716
40 05 Site structures including retaining walls sound walls		64 172		64 172				70 248
40 06 Pedestrian / bike access and accommodation landscaping		22 662		22 662				24 399
40 07 Automobile bus van accessways including roads parking lots		135 633		135 633				148 189
40 08 Temporary Facilities and other indirect costs during construction		28 072		28 072				30 145
50 SYSTEMS	16.20	**225,424**	**10,376**	**235,800**	**$14,556**	**20%**	**11%**	**263,887**
50 01 Train control and signals		53 515		53 515				60 164
50 02 Traffic signals and crossing protection		32 772		32 772				36 580
50 03 Traction power supply substations		29 992		29 992				32 849
50 04 Traction power distribution catenary and third rail		42 788		42 788				47 710
50 05 Communications		33 620		33 620				37 775
50 06 Fare collection system and equipment		2 918	10 376	13 294				15 568
50 07 Central Control		29 819		29 819				33 240
Construction Subtotal (10 - 50)	16.20	**1,157,880**	**12,781**	**1,170,661**	**$72,263**	**100%**	**52%**	**1,275,490**
60 ROW, LAND, EXISTING IMPROVEMENTS	16.20	**186,092**	**37,187**	**223,279**	**$13,783**		**10%**	**229,600**
60 01 Purchase or lease of real estate		166 132	32 483	198 615				203 143
60 02 Relocation of existing households and businesses		19 959	4 704	24 664				26 457
70 VEHICLES (number)	**25**	**192,691**	**0**	**192,691**	**$7,708**		**9%**	**212,941**
70 01 Light Rail	25	186 771		186 771	$7 471			206 351
70 02 Heavy Rail	0			0				0
70 03 Commuter Rail	0			0				0
70 04 Bus	0			0				0
70 05 Other	0	5 920		5 920				6 590
70 06 Non-revenue vehicles	0			0				0
70 07 Spare parts	0			0				0
80 PROFESSIONAL SERVICES (applies to Cats. 10-50)	16.20	**535,369**	**6,032**	**541,401**	**$33,420**	**46%**	**24%**	**571,658**
80 01 Project Development		87 150		87 150				87 150
80 02 Engineering		136 688		136 688				139 766
80 03 Project Management for Design and Construction		131 594	5 872	137 466				148 555
80 04 Construction Administration & Management		76 410		76 410				83 269
80 05 Professional Liability and other Non-Construction Insurance		32 697		32 697				34 535
80 06 Legal Permits Review Fees by other agencies cities etc		5 530	88	5 618				5 805
80 07 Surveys Testing Investigation Inspection		14 214	73	14 287				15 164
80 08 Start up		51 086		51 086				57 413
Subtotal (10 - 80)	16.20	**2,072,032**	**56,000**	**2,128,032**	**$131,360**		**95%**	**2,289,689**
90 UNALLOCATED CONTINGENCY				**81,652**			**4%**	**90,536**
Subtotal (10 - 90)	16.20			**2,209,684**	**$136,400**		**99%**	**2,380,224**
100 FINANCE CHARGES				**24,128**			**1%**	**26,806**
Total Project Cost (10 - 100)	16.20			**2,233,812**	**$137,890**		**100%**	**2,407,030**
Allocated Contingency as % of Base Yr Dollars w/o Contingency				2.70%				
Unallocated Contingency as % of Base Yr Dollars w/o Contingency				3.94%				
Total Contingency as % of Base Yr Dollars w/o Contingency				6.64%				
Unallocated Contingency as % of Subtotal (10 - 80)				3.84%				
YOE Construction Cost per Mile (X000)								$78 734
YOE Total Project Cost per Mile Not Including Vehicles (X000)								$135 438
YOE Total Project Cost per Mile (X000)								$148 582

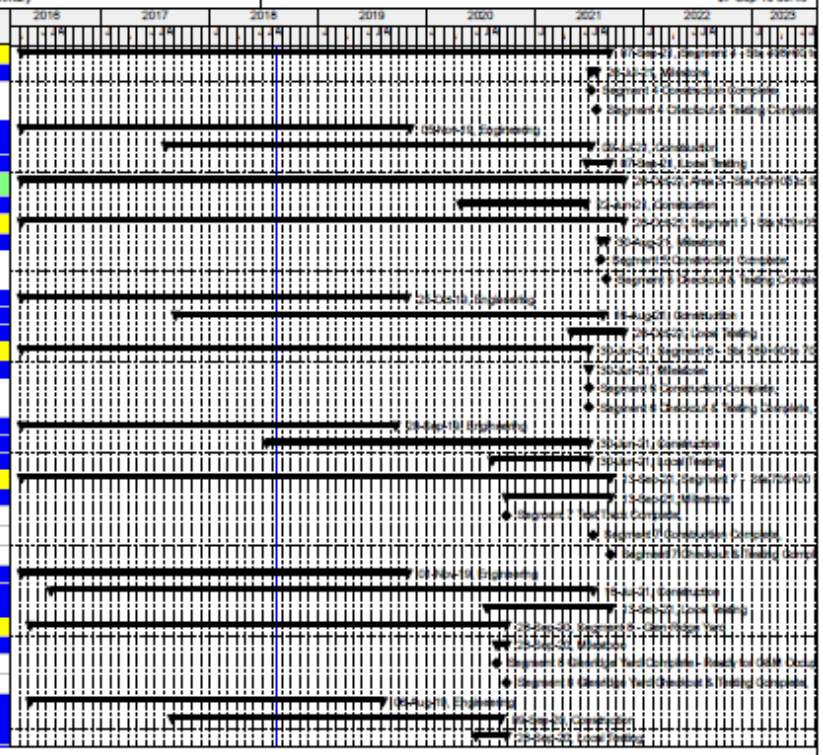
Appendix 8 Project Schedule

The following is the Purple Line project Summary Schedule, based on MTA's preliminary updated Integrated Master Project Schedule progressed through August 31, 2018, but for which final agreement with the P3 Concessionaire has not yet been reached. As noted in the body of the report, the critical path as reflected here is subject to change as the fully mitigated schedule is developed and agreed to by PLTP and MTA.



MTA Master Schedule - Aug 2018 | PMOC Summary | 27-Sep-18 08:45

Activity ID	Activity Name	Planned Duration	Start	Finish
Segment 4 - Sta 406+00 to 429+06		1058	08-Apr-16 A	07-Sep-21
Milestone		17	09-Jul-21	26-Jul-21
24MS0002	Segment 4 Construction Complete	0		09-Jul-21
24MS2002	Segment 4 Checkout & Testing Complete	0		26-Jul-21
Engineering		701	08-Apr-16 A	05-Nov-19
Construction		752	08-Aug-17 A	09-Jul-21
Local Testing		45	23-Jun-21	07-Sep-21
Area 3 - Sta 429+05 to 962+37		1085	08-Apr-16 A	26-Oct-21
Construction		246	27-Apr-20	22-Jun-21
Segment 5 - Sta 429+06 to 589+00		1085	08-Apr-16 A	26-Oct-21
Milestone		19	11-Aug-21	30-Aug-21
35MS0002	Segment 5 Construction Complete	0		11-Aug-21
35MS2002	Segment 5 Checkout & Testing Complete	0		30-Aug-21
Engineering		841	08-Apr-16 A	25-Oct-19
Construction		759	11-Sep-17 A	16-Aug-21
Local Testing		99	04-May-21	26-Oct-21
Segment 6 - Sta 589+00 to 706+00		1019	08-Apr-16 A	30-Jun-21
Milestone		0	30-Jun-21	30-Jun-21
36MS0002	Segment 6 Construction Complete	0		30-Jun-21
36MS2002	Segment 6 Checkout & Testing Complete	0		30-Jun-21
Engineering		677	08-Apr-16 A	20-Sep-19
Construction		578	12-Jul-18 A	30-Jun-21
Local Testing		188	10-Aug-20	30-Jun-21
Segment 7 - Sta 706+00 to 962+37		1085	08-Apr-16 A	13-Sep-21
Milestone		350	28-Sep-20	13-Sep-21
37MS0002	Segment 7 Test Track Complete	0		28-Sep-20
37MS0004	Segment 7 Construction Complete	0		16-Jul-21
37MS2002	Segment 7 Checkout & Testing Complete	0		13-Sep-21
Engineering		1085	08-Apr-16 A	01-Nov-19
Construction		981	15-Jul-16 A	16-Jul-21
Local Testing		226	22-Jul-20	13-Sep-21
Segment 8 - Glen Ridge Yard		854	09-May-16 A	28-Sep-20
Milestone		33	28-Aug-20	28-Sep-20
38MS0002	Segment 8 Glenridge Yard Complete - Ready for O&M Occupation	0		28-Aug-20
38MS2002	Segment 8 Glenridge Yard Checkout & Testing Complete	0		28-Sep-20
Engineering		630	09-May-16 A	05-Aug-19
Construction		577	28-Aug-17 A	09-Sep-20
Local Testing		63	16-Jun-20	28-Sep-20



Actual Level of Effort | Remaining Work | Milestone
Actual Work | Critical Remaining Work | summary

Page 2 of 2

TASK filter: All Activities

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Appendix 9 Vehicle Status Report

Purple Line Project Light Rail Vehicles

Vendor: Construcciones y Auxiliar de Ferrocarriles (CAF)

Model: Multiple-section 142-foot articulated vehicle, used in single-car consist (142 feet is coupler-to-coupler)

Year: First vehicle (prototype) is scheduled for delivery July 11, 2019

Quantity: 25 (for the FFGA project)

Identification: The LRVs will be numbered from 101 through 126

New Technologies:

None planned (all major suppliers have service proven equipment)

Upcoming Significant Events:

- Fire, smoke and toxicity testing
- Shock and vibration testing
- Structural testing of carshell (to be performed on second vehicle in Spain)
- Start final Assembly of first vehicle in Elmira, NY

Bus Vehicle Testing: Not Applicable

Appendix 10 Construction Photographs

(photo: MTA)

Photo 1: Excavation of Manchester Place Station

(photo: MTA)

Photo 2: Site preparation for drilled shaft foundation installation for the Riverdale aerial structure

(photo: MTA)

Photo 3: Installation of drilled shaft rebar cage for retaining wall along Veterans Parkway.