

## **PMOC MONTHLY REPORT**

### **Second Avenue Subway Phase 1 (MTACC-SAS) Project**

Metropolitan Transportation Authority

New York, New York

**Report Period November 1 to November 30, 2016**



PMOC Contract No. DTFT6014D00017

Project No. DC-27-5287, Task Order No. 0002, Work Order No. 3

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Length of time on Project: Five years on Project for Urban Engineers

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### **THIRD PARTY DISCLAIMER**

This report and all subsidiary reports are prepared solely for the Federal Transit Administration (FTA). This report should not be relied upon by any party, except the FTA or the project sponsor, in accordance with the purposes as described below:

For projects funded through the FTA's Full Funding Grant Agreement (FFGA) program, the FTA and its Project Management Oversight Contractor (PMOC) use a risk-based assessment process to review and validate a project sponsor's cost, budget, and schedule. This risk-based assessment process is a tool for analyzing project development and management. Moreover, the assessment process is iterative in nature; any results of an FTA or PMOC risk-based assessment represent a "snapshot in time" for a particular project under the conditions known at that same point in time. The status of any assessment may be altered at any time by new information, changes in circumstances, or further developments in the project, including any specific measures a sponsor may take to mitigate the risks to project costs, budget, and schedule, or the strategy a sponsor may develop for project execution.

Therefore, the information in the monthly reports may change from month to month, based on relevant factors for the current month and/or previous months.

### **REPORT FORMAT AND FOCUS**

This monthly report is submitted in compliance with the terms of the Federal Transit Administration (FTA) Contract No. DTFT6014D00017, Task Order 0002. Its purpose is to provide information and data to assist the FTA as it continually monitors the Project Sponsor's technical capability and capacity to execute a project efficiently and effectively, and hence, whether the Project Sponsor continues to be ready to receive federal funds for further project development.

This report covers the project management activities on the Second Avenue Subway (SAS) Phase 1 Project managed by Metropolitan Transit Authority Capital Construction (MTACC) of New York City (NYC). MTA is the Project Sponsor, financed by the FTA FFGA.

## **MONITORING REPORT**

### **1.0 PROJECT STATUS**

NOTE: The dates in Sections 1.0 and 2 are based on SAS Test Date Update 8 (data date November 25, 2016) and inputs obtained by the PMOC during station and system progress and coordination meetings.

During November 2016, the MTACC continued advancing SAS Phase 1 to meet a Revenue Service Date (RSD) of December 30, 2016, within its Current Working Budget (CWB) of \$4.451 billion (exclusive of financing costs). The overall project is approximately 93.5% complete with construction being 98.2% complete. Substantial Completion has been achieved on three of the eight active construction contracts. The project has transitioned into the integration and acceptance test phase.

#### **a. Procurement**

All ten of the construction contracts for SAS Phase 1 have been awarded. Three of the construction contracts are currently in the closeout process.

#### **b. Construction**

As of November 30, 2016, there are eight (8) active contracts on the SAS Phase 1 Project. Overall construction progress is 98.2% complete and the contractors have transitioned into the integration and test phase. Integration and testing of the critical systems required for Revenue Service are as follows:

##### **Contract C-26005 (C2A) 96th Street Site Work and Heavy Civil**

The Contractor achieved Substantial Completion on November 5, 2013. Contract closeout is being delayed because of NYCDEP field inspections. The inspections are being performed to verify that the work is as reflected on the revised “As-Built-Drawings”. Closeout is anticipated by the end of the 4Q2016.

##### **Contract C-26010 (C2B) 96th Street Station Civil, Architectural, and MEP**

Construction has progressed to 98.0% complete. Integration and acceptance testing is ongoing and is reported as 88.9% complete (number of tests completed/number of tests required). Critical systems being tested are as follows:

##### **▪ Fire Suppression Systems**

- Water Mist System – Equipment installed and L3/4 Field Installation Acceptance Tests are 100.0% complete. Integration into the Fire Alarm System and subsequent testing by the Systems Contractor is now expected to be completed on December 9, 2016.
- Sprinkler System – Equipment installed and L3/4 Field Installation Acceptance Tests are 100.0% complete. Integration into the Fire Alarm System and subsequent testing by the Systems Contractor is now expected to be completed on December 9, 2016.
- Dry Fire Standpipe – Equipment installation completed and L3/4 Field Installation Acceptance tests are 100.0% complete.
- Inergen System – Equipment installed and L3/4 Field Installation Acceptance Test are 100.0% complete. Integration into the Fire Alarm

System and subsequent testing by the Systems Contractor is now expected to be completed on December 9, 2016.

- **Tunnel Station Smoke Management System (Axial Fans)**
  - Ancillary #1 (South) – Equipment installation completed. L3/4, 5, and 6 (100 hour and final vibration) tests are complete. Turnover to the System Contractor has been delayed with no turnover date indicated.
  - Ancillary #2 (North) – Equipment installation completed. L3/4 and 5 tests are complete. L6 testing (100 hour and final vibration) is ongoing. Subsequent turnover to the System Contractor has been delayed with no turnover date indicated.
- **Elevators**
  - Platform Hydraulic Elevator (1 Elevator) – Equipment installation complete. L3/4, 5, and 6 tests have been completed. Completion of the ancillary equipment test has been delayed until December 9, 2016.
  - Street Level Hydraulic Elevator Entrance #3 (1 Elevator) – Equipment installation complete. L3/4, 5, and 6 tests have been completed. Completion of the ancillary equipment test has been delayed until December 9, 2016.
- **Escalators**
  - Platform (3 Escalators) – Equipment installation is complete. L3/4, 5, and 6 tests have been completed. Completion of the ancillary equipment test has been delayed until December 9, 2016.
  - Entrance #1 (1 Escalator) – Equipment installation is complete. L3/4, 5, and 6 tests have been completed. Completion of the ancillary equipment test has been delayed until December 9, 2016.
  - Entrance #2 (3 Escalators) – Equipment installation is complete. L3/4, 5, and 6 tests have been completed. Completion of the ancillary equipment test has been delayed until December 9, 2016.
  - Entrance #3 (2 Escalators) – Equipment installation is complete. L3/4, 5, and 6 tests have been completed. Completion of the ancillary equipment test has been delayed until December 9, 2016.
- **Heating Ventilation Air Conditioning (HVAC)**
  - Sump Pumps, Supply Fans, Cooling Tower, and Chiller System – Equipment installation is complete. L3/4 and 5 tests are in progress and scheduled to be completed on December 16, 2016.

### **Contract C-26006 (C3) 63rd Street Station Rehabilitation**

Construction has progressed to 98.5% complete. Integration and acceptance testing is ongoing and is reported as 88.0% complete (number of tests completed/number of test required) as of October 31.

Critical systems being tested are as follows:

- **Fire Alarm Tests (Levels 5a and 5b)**
  - Modified Level 5 fire alarm testing is scheduled to be completed by December 10, 2016.

- **Fire Suppression Systems (Levels 3/4 and 5a)**
  - Water Mist – All tests are complete and turnover to the C6 contractor is complete.
  - Sprinkler System – All tests are complete and turnover to the C6 contractor is complete.
  - Dry Fire Standpipe (DFSP) System – All tests are complete and turnover to the C6 contractor is complete.
  - Inergen System – All tests are complete and turnover to the C6 contractor is complete.
- **Elevator & Escalator Testing (Levels 3/4 and 5a)**
  - All tests are complete and turnover to the C6 contractor is complete.
- **HVAC System (Levels 3/4 and 5a)**
  - Total tests required: 169. All tests are complete and turnover to the C6 contractor is complete. There are no Level 6 tests required for this system.
- **TSSM (Tunnel Station Smoke Management) System (Levels 3/4 and 5a)**
  - All tests are complete and turnover to the C6 contractor is complete.

#### **Contract C-26007 (C4B) 72nd Street Station Cavern Mining and Lining**

Substantial Completion was achieved on January 14, 2014. Submittal of contract closeout documentation and completion of punchlist items are ongoing.

- The punchlist items, including correcting the deficiencies to the architectural finish along the escalator incline at Entrance #2, are complete and the area has been turned back over to the C4C contractor; and,
- Similar corrective work will also be required on the Entrance #1 incline finish.

#### **Contract C-26011 (C4C) 72nd Street Station – Station Finishes, MEP, Ancillary Buildings and Entrances**

Construction is 93.8% complete. Integration and acceptance testing is ongoing and is reported as 79.1% complete (number of tests completed/number of test required).

Critical systems being tested are as follows:

- **Fire Alarm Tests (Levels 5a and 5b)**
  - Modified Level 5 fire alarm testing is scheduled to be completed by December 26, 2016.
- **Fire Suppression System (Levels 3/4)**
  - Water Mist – Total tests required 6. Total tests completed 4 (66.7%). All tests and acceptance and turnover are scheduled to be completed by December 22, 2016.
  - Sprinkler System – All tests are complete and turnover to the C6 contractor is scheduled for December 22, 2016.
  - Dry Fire Standpipe (DFSP) System – All tests are complete and turnover to the C6 contractor is scheduled for December 22, 2016.
  - Inergen System – Total tests required: 8. Total tests completed: 2 (25%). All tests and acceptance and turnover are scheduled to be completed by December 22, 2016.

- **Elevator & Escalator Testing (Levels 3/4 and 5a)**
  - Escalators – Total test required 60. Total tests completed 29 (48.3%).
  - Hydraulic Elevator – Total test required 10. Total tests completed 4 (40%).
  - Traction Elevators (5) - Total test required 25. Total tests completed 6 (24%).
- **HVAC System Critical Spaces (Level 3/4 and 5a)**
  - Total tests required: 219. All tests completed.
- **Track Drainage**
  - Total tests required 16. Total tests completed 4 (25%).
- **TSSM (Tunnel Station Smoke Management) System (Levels 3/4 and 5a)**
  - Total tests required 14. Total tests completed 12 (86%). This has not changed since the PMOC's October 2016 report.

#### **Contract C-26008 (C5B) 86th Street Station Cavern Mining and Lining**

Substantial Completion of all contract work was achieved on December 16, 2014. The architectural finish corrections at Entrance #2 and Entrance #1 escalator inclines have been completed and the areas turned back to the C5C contractor.

#### **Contract C-26012 (C5C) 86th Street Station Finishes, MEP Systems, Ancillary Buildings and Entrances**

Construction is 95.0% complete. Integration and acceptance testing is ongoing and is reported as 95.8% complete (number of completed/number of test required).

Critical systems being tested are as follows:

- **Fire Alarm (Levels 5a and 5b)**
  - Modified Level 5 fire alarm testing is scheduled to be completed by December 15, 2016.
- **Fire Suppression Tests (Levels 3/4 and 5a)**
  - Water Mist – All tests are complete and turnover to the C6 contractor is to be completed by December 10, 2016.
  - Sprinkler System – Total tests required 2. Total tests completed 0 (0%). This has not changed since the PMOC's October 2016 report.
  - Dry Fire Standpipe (DFSP) System – Total tests required 3. Total tests completed 2 (67%).
  - Inergen System – Total tests required: 8. Total tests completed: 4 (50%).
- **Elevator and Escalator Testing (Levels 3/4 and 5a)**
  - Escalators – Total tests required 78. Total tests completed 60 (76.9%). All tests, acceptance, and turnover are scheduled to be completed by December 15, 2016, for platform and December 20, 2016, for Entrances #1 and #2.
  - Hydraulic Elevator – All tests are complete and turnover to the C6 contractor is complete.
  - Traction Elevator – Total tests required 5. Total test completed 0 (0%). This has not changed since the PMOC's October 2016 report. All tests, acceptance, and turnover are scheduled to be completed by December 7, 2016.

- **HVAC System (Level 3/4 and 5a )**
  - Total tests required: 219. Total tests completed 178 (81%). All tests, acceptance, and turnover are scheduled to be completed by June 2017, due to the requirements to perform the seasonal performance verification test, which will be completed by June 27, 2016. This does not affect revenue service.
- **Track Drainage**
  - Total test required: 16. Total tests completed: 8 (50%)
- **TSSM (Tunnel Station Smoke Management) System (Levels 3/4 and 5a)**
  - Total tests required: 14. Total tests completed: 10 (71%).

#### **Contract C-26009 (C6) Track, Power, Signals and Communication Systems**

Construction is 96.0% complete. Integration and acceptance testing is ongoing and is reported as 67.1% complete (number of tests completed/number of tests required). Critical systems being tested are as follows:

- **Remote Monitoring System (RMS) Testing**
  - Equipment installation and L3/4 testing completed at all stations.  
No other tests required.
- **Closed Circuit Television (CCTV)**
  - Equipment installation at the 63rd and 96th Street Stations is complete and is ongoing at the 72nd and 86th Street Stations. L3/4 testing at the 63rd and 96th Street Stations is complete. CCTV for elevators is to be completed by December 16, 2016.
- **Computer Based Dispatch System (CBDS)**
  - Equipment is only installed at the 96th Street Station and has completed all testing.
- **Emergency Booth Communication System (EBCS)**
  - Equipment is only being installed at the 72nd, 86th, and 96th Street Stations. L3/4, 5, and 6 testing is scheduled to start at each of the stations on December 21, 2016, be completed the same day.
- **Fire Alarm System (FAS)**
  - Equipment installation is complete at the 63rd and 96th Street Stations and is ongoing at the 72nd and 86th Street Stations. L3/4 testing at the 63rd and 96th Street Stations has been completed. All tests at the 63rd Street Station are scheduled to be completed by December 16, 2016; at 72nd Street Station by December 23, 2016; at 86th Street Station by December 15, 2016; and at 96th Street Station by December 18, 2016.
- **Intrusion Access Control (IAC)**
  - Equipment installation and L3/4 testing has been completed at the 63rd, 86th, and 96th Street Stations. Equipment installation at the 72nd Street Station has been completed and L3/4, 5 and 6 testing is scheduled to be completed by December 31, 2016.



- **Radio Systems**
  - L3/4 testing of the Police UHF Radio Cabinet has been completed at the 63rd Street Station and is scheduled to be completed at the 72nd, 86th, and 96th Street Stations by December 16, 2016.
- **Public Address Customer Information Screens (PACIS)**
  - Equipment installation at all stations has been completed. Testing at all stations is scheduled to be completed by December 24, 2016.
- **Local Area Network (LAN) and Wide Area Network (WAN)**
  - L3/4, 5, and 6 testing has been completed at all stations
- **Signal Work**
  - All signals along the alignment have been installed and tested.
- **Track Work**
  - All major track work is complete.
- **Traction Power**
  - Traction power substations are complete and have been tested at all four stations.

### **c. Quality**

#### **Quality Assurance and Quality Control (QA/QC)**

##### Status:

During November 2016, the Second Avenue Subway Quality Management Team continued to conduct Quality Meetings of the Contractor with Consultant Construction Manager (CCM), MTACC, and PMOC participation. The Quality Management Team participated in the job progress meetings, monitored quality matters in the field for each construction contract, reviewed and provided comments for Quality Work Plans, and participated in Preparatory Phase Meetings for numerous construction processes.

The following issues on the C2B, C4C, and C5C contracts were discussed by the respective SAS Quality Managers at their Quality Management Meetings:

##### Observations:

**C2B:** There are still many issues on this contract that affect Quality. These include:

- Lack of supervision for all activities;
- Lack of scheduling and conducting the Preparation Phase Meeting (PPM) for tree planting and elevator activities;
- Material receiving inspection is not available for review;
- Some electrical and mechanical issues are not documented and resolved. Some nonconformance reports (NCRs) are not written for nonconforming electrical and mechanical work that is documented on the Observation List;
- HAR application over CCFT floors and corridors has not been performed; and,
- Water Leaks – Multiple locations are still leaking. A total of 62 active leaks were reported as of November 30, 2016.

**C4C:** There are still many issues on this contract that affect Quality. These include:

- The number of open NCRs has remained at over 70 for several months – 45 are more than three months old;
- Acoustic paint: Repair at both ends of the platform is delinquent;
- Bond Beams: Closing out Categories 1 and 2 and need to complete repairs for Category 3;
- Granite Pavers: Testing is far behind;
- The contractor still has not issued a closeout letter for high strength bolts, though all bolts have been installed and inspected; and,
- The PMOC is concerned that the contractor's Quality Manager does not have enough support.

**C5C:** There are still many issues on this contract that affect Quality. These include:

- NCRs – concrete analyses (34 are open) is pending for the past 5 months;
- Non-concrete-related NCRs (28) are not being resolved in a reasonable time;
- Field supervision is not sufficient: Examples are stairs, electricals, HVAC, plumbing, wall cladding, and architectural finishing;
- Special inspection for electrical and mechanical seismic installations are delayed;
- The monthly Special Inspection Report for October 2016 has not been submitted as of the end of November 2016;

- Record Drawings at 50% completion have been delayed;
- Submittals (Revise and Resubmit) – currently 130 – are pending re-submission; and,
- As-built drawings are not being submitted as per contract milestones.

The following table depicts nonconformance report and daily inspection report statuses for each of the five (5) active SAS contracts:

<b>Contract Package C2B</b>	
<b>Status:</b>	Through November 30, 2016, a total of 183 NCRs have been issued. One hundred seventy-five (175) have been closed and 8 NCRs are open. In November 2016, one new NCR's was written and two were closed. One (1) of the eight open NCRs is for concrete that was out-of-specification.
<b>Observation:</b>	Bi-weekly Quality Management Meetings, as suggested by the PMOC, are being held. Submittal of Daily Inspection Reports is one week behind.
<b>Concerns and Recommendations:</b>	The PMOC recommends that the contractor devote the necessary effort to resolving the issues listed in the beginning of this section.
<b>Contract Package C3</b>	
<b>Status:</b>	Through November 30, 2016, a total of 134 NCRs have been issued. One hundred thirty-two (132) have been closed and two are still open. In November 2016, three new NCRs were written and seven were closed.
<b>Observation:</b>	Submittal of Daily Inspection Reports is two weeks behind. The number of open Observations has been reduced from 4,397 at the end of October to 2,754 at the end of November and those open that are critical for Revenue Service Date (RSD) have been reduced from 1,491 to 664.
<b>Concerns and Recommendations:</b>	For the past several months, it has been reported that no Daily Inspection Reports have been entered into the CM System since July 22, 2016. This month, they have almost caught up. The contractor has made good progress in several areas this month.
<b>Contract Package C4C</b>	
<b>Status:</b>	Through November 30, 2016, a total of 256 NCRs have been issued. One hundred eighty-Two (182) have been closed and 74 NCRs are still open. In November 2016, no NCRs were written and none were closed.
<b>Observation:</b>	Two hundred-three (203) of the 256 NCRs are for concrete that was out of specification. Forty-six (46) of the remaining 74 open NCRs are for concrete that was out of specification. Submittal of Daily Inspection Reports is two weeks behind.
<b>Concerns and</b>	The PMOC is concerned that there are still 74 open NCRs and

<b>Recommendations:</b>	recommends that a target date and assigned individual be established for closure of each NCR. The PMOC also recommends that the contractor devote the necessary effort to resolving the issues listed in the beginning of this section.
<b>Contract Package C5C</b>	
<b>Status:</b>	Through November 30, 2016, a total of 246 NCRs have been issued. One Hundred seventy-five (175) have been closed and 71 NCRs are still open. In November 2016, 11 new NCRs were written and 12 were closed.
<b>Observation:</b>	Forty-three (43) of the 71 NCRs that are open are for concrete that is out of specification. The contractor committed that thirty-four (34) of these will have a concrete analysis prepared in early December and they should then be closed later that month. Submittal of Daily Inspection Reports is four weeks behind.
<b>Concerns and Recommendations:</b>	The PMOC recommended that the contractor prepare a concrete statistical analysis in July 2016 to close those NCRs that passed the 56-day break. The contractor's Program Manager then directed the contractor's Quality Manager to prepare the analysis, but he did not, and, as of the end of November 2016, the analysis has still not been prepared. That analysis is now committed to be completed in early December. The PMOC also continues to recommend that the contractor establish a schedule for closing the 28 non-concrete NCRs and devote the necessary effort to resolving the issues listed in the beginning of this section.
<b>Contract Package C6</b>	
<b>Status:</b>	Through November 30, 2016, a total of 74 NCRs have been issued. Sixty-seven (67) NCRs have been closed and seven are still open. In November 2016, two new NCRs were written and none were closed.
<b>Observation:</b>	Submittal of Daily Inspection Reports is current.
<b>Concerns and Recommendations:</b>	The PMOC has no concerns at this time.

Concerns and Recommendations:

Shown individually above

**d. Readiness for Revenue Operation**

During May 2016, the FTA initiated a review of SAS's Readiness for Revenue Operations. The Readiness Review was conducted by the PMOC in accordance with OP-54, Readiness for Revenue Operations. This process is intended to evaluate the adequacy, soundness, and timeliness of the MTACC-SAS's Systems Integration Testing; Project System Safety and Security Validation; Pre-Revenue Operation Plan and any required work-arounds; and Management Capacity and Capability.

After reconciliation of comments and actions required, the PMOC's final report was issued on October 26, 2016. The report listed nine recommendations that MTACC needed to consider. Table 6 in Appendix B has been added to provide a status of the nine recommendations as of November 30, 2016.

## 2.0 SCHEDULE DATA

### Status:

As of July 1, 2016, MTACC is no longer maintaining an Integrated Project Schedule (IPS). The project has transitioned into the integration and acceptance test phase and the MTACC's Program Control Manager provides weekly status updates. Update 8 is the latest and has a data date of November 25, 2016. Details of the update are reported on in Section 1.b (Construction) of this report.

### Observations:

**Milestone Summary:** As a part of the "Schedule Acceleration Agreements", MTACC established revised milestones with the 72nd, 86th, and 96th Street Station Contractors and the Systems Contractor for the work involved. Remaining incomplete milestones are summarized and updated based on SAS Test Data Update 8 (data date November 25, 2016).

72nd Street Station			
MS	Description	Acceleration Agreement Date	Current Forecast
24	Complete all work and testing through FIST (L3/4) on the water mist system (except those portions of the system located within Entrance 1 escalator trusses).	07/01/16	12/22/16
25	Complete all work and testing of all elevators and escalators (except escalators at Entrance 1 and elevators at Entrance 3) through FSIT (Levels 5a/b), including 2 weeks dedicated to performing FSIT over the WAN in coordination with the C26009 Contractor (Level 5b).	09/30/16	11/21/16A
26	Complete all work and testing through FSIT (Levels 5a/b) for Escalators at Entrance #1 and Elevators at Entrance #3.	11/01/16	12/13/16

86th Street Station			
MS	Description	Acceleration Agreement Date	Current Forecast
19	Complete all installation and testing through Level 5b.	09/01/16	12/20/16

96th Street Station			
MS	Description	Acceleration Agreement Date	Current Forecast
17	Complete Level 5a Testing for HVAC and Fire Suppression Systems	07/31/16	12/01/16
19	Complete Level 5b Testing for All Systems; Complete ALL Work	08/31/16	04/25/17

<b>Systems</b>			
<b>MS</b>	<b>Description</b>	<b>Acceleration Agreement Date</b>	<b>Current Forecast</b>
16	63rd Comms. Systems: Complete all work and pre-testing required to perform Field Installation Acceptance Tests	05/31/16	12/31/16
17	72nd Comms. Systems: Complete all work and pre-testing required to perform Field Installation Acceptance Tests	06/13/16	12/15/16
18	86th Comms. Systems: Complete all work and pre-testing required to perform Field Installation Acceptance Tests	06/27/16	12/15/16
19	96th Comms. Systems: Complete all work and pre-testing required to perform Field Installation Acceptance Tests	06/20/16	12/15/16
20	The Contractor shall complete all work and testing through Final Systems Integrated Testing of all systems over the Local Area Network (LAN) and overall Wide Area Network (WAN), such that the LAN/WAN networks are available for Final Systems Integrated Testing by the Station Contractors.	06/06/16	12/01/16
21	Complete all other work required to start Pre-Revenue Service Training	09/30/16	12/15/16

#### **Activity Progress Monitoring:**

Fragnets are no longer being utilized to monitor the integration and testing activities. Tests completion milestones have been established to provide day to day insight into the integration and acceptance testing activities. Using the Weekly Test Date updates, SAS Program Control has developed a test matrix that shows the number of tests and systems to be tested each week from October 21, 2016, to December 30, 2016, in order to complete the integration and acceptance testing of the critical systems required for revenue service. Weekly coordination meetings are being held to update the matrix, make adjustments, and commit additional resources as necessary. Commitments of resources are being made by the station contractors, its subcontractors, and the user group, NYCT.

From October 21, 2016, to December 30, 2016, seven hundred and two (702) tests have been identified that need to be completed by the station contractors and the Systems Contractor. As of November 30, 2016, three hundred-forty-eight (348) of the 481 scheduled tests have been completed.

#### **Concerns and Recommendations:**

The PMOC is concerned that the 702 tests noted on the test matrix is an understatement. Data analysis by the PMOC indicates that, as of October 31, 2016, only 257 of the 1,319 Level 3/4 Field Installation Acceptance Tests (FIATs) have been completed (19.5%) ; only 21 of the 131

Level 5 FIST have been completed (16.0%) ; and only 21 of the 129 Level 6 FSIT have been completed (16.3%) . Reconciliation of the number of tests is in process.

Failure of the Station Contractors to complete base contract and acceleration milestones has impacted the Systems Contractor, resulting in compression of the integration and testing phase.

Testing of the various systems is not progressing as defined in the Facilities System Test Program and the submission of test reports is not occurring in a timely manner. Current schedules indicate that many reports will be submitted after revenue service has commenced.

Of major concern is the testing of the Fire Suppression Systems and the various systems that interface with the Fire Alarm System. Work-arounds have been developed for the 72nd and 86th Street Stations with buy-in from NYCT.

With the large number of observations noted during the inspection at each station, this appears to be a breakdown in the Contractors' Quality Assurance and the Subcontractors' Quality Control processes. MTACC's Project Procedure No. CO.10 (Beneficial Use, Substantial Completion and Final Completion) suggests that these items must be addressed before substantial completion can occur with subsequent turnover to the user group.

MTACC's is committed to revise and clarify Volume 2 of the Facilities System Test Program, wherein it identifies a System Acceptance Phase (SAP) after substantial completion (completion of FAT, FIAT, SIST and FSIT). To date, this task remains incomplete.



### 3.0 COST DATA

Based upon financial expenditures reported by the MTACC through November 30, 2016, SAS Phase 1 is approximately 93.5% complete. The completion status of each individual construction contract through November 30, 2016, based upon reported expenditures through the above date, is as follows:

- C26002 (C1 Tunnel Boring) – 100.0%;
- C26005 (C2A 96th Street Station) – 100.0%;
- C26010 (C2B 96th Street Station) – 98.0%;
- C26013 (C5A 86th Street Station) – 100%;
- C26008 (C5B 86th Street Station) – 99.6%;
- C26012 (C5C 86th Street Station) – 92.0%;
- C26006 (C3 63rd Street Station) – 98.5%;
- C26007 (C4B 72nd Street Station) – 100.0%;
- C26011 (C4C 72nd Street Station) – 93.8% ; and,
- C26009 (C6 Systems) – 96.0%.

Aggregate Construction percentage complete:

- 100% of all construction has been bid;
- 100% of all construction is under contract; and,
- 93.5% of base contract construction (excluding AWOs) is complete.

Soft Cost expenditures (not including real estate, OCIP, etc.) reported this period by the MTACC totaled \$8.2M; expenditures were spread through all of the project management and technical support categories. At forecast expenditure levels, the available budget should be sufficient through 2016. Significant expenditure beyond 2016, however, may require the transfer of additional funds from contingency. Any significant construction delays beyond December 2016 may also require additional contingency transfer.

**Cost Growth:** As of September 2016, the status of Additional Work Orders (AWOs) for each construction contract on Phase 1 of the Second Avenue Subway Project is summarized as follows:

Contract / (Package)	% Complete	Award	Exposure		Executed	
			\$	% of Award	\$	% of Award
C26002 (1)	100.00%	\$337,025,000	\$41,086,647	12.19%	\$41,086,647	12.19%
C26005 (2A)	100.00%	\$325,000,000	\$47,615,409	14.65%	\$47,612,118	14.65%
C26010 (2B)	85.04%	\$324,600,000	\$63,299,694	19.50%	\$58,214,587	17.93%
C26006 (3)	94.71%	\$176,450,000	\$42,761,025	24.23%	\$30,483,188	17.28%
C26007 (4B)	99.93%	\$447,180,260	\$1,325,639	0.30%	\$1,325,639	0.30%
C26011 (4C)	73.36%	\$258,353,000	\$68,640,573	26.57%	\$41,534,934	16.08%
<b>C26013 (5A)</b>	<b>100.00%</b>	<b>\$34,070,039</b>	<b>\$6,525,471</b>	<b>19.15%</b>	<b>\$6,525,471</b>	<b>19.15%</b>
C26008 (5B)	99.63%	\$301,860,000	\$26,280,122	8.71%	\$21,586,813	7.15%
C26012 (5C)	64.84%	\$208,376,000	\$37,395,738	17.95%	\$29,293,626	14.06%
C26009(6)	69.51%	\$261,900,000	\$39,598,750	15.12%	\$26,184,210	10.00%
<b>TOTAL TO DATE</b>		\$2,674,814,299	\$374,529,068	14.00%	\$303,847,233	11.36%

The PMOC notes that total AWOs currently exceed the original AWO budget. The PMOC also notes that exposure values are not included in a significant number of logged AWOs. Based on current AWO trends, the final AWO value is estimated at approximately \$340 million. MTACC maintains an AWO forecast at completion that includes input from its Risk Registers. The MTACC AWO Estimate at Completion (EAC) Forecast through September 2016 is \$375,251,428. This value is somewhat greater than the current AWO Exposure and will be used as part of the overall contingency/EAC analysis.

Note: Quarterly update will be reflected in the December 2016 monthly report.

**Cost Contingency:** Based upon the MTACC Current Working Budget, expenditures as of September 2016 reported by the MTACC and the current AWO EAC forecast as of September 2016, the PMOC contingency analysis is as follows:

	Contingency Analysis	
	Current	@ Completion
Phase 1 Budget	\$4,451,000,000	\$4,451,000,000
Construction Awards	\$2,674,814,299	\$2,674,814,299
Soft Cost Expended	\$1,207,669,341	\$1,207,669,341
Soft Cost Forecast to Complete	\$180,453,659	\$180,453,659
Add'l Soft Cost - Schedule Acceleration		\$0
AWO	\$296,651,203	\$373,049,344
Total Contingency	\$91,411,498	\$15,013,357
Reserved Contingency	\$91,411,498	\$15,013,357

Notes:

- (1) AWO Exposure at completion incorporates MTACC's latest "risk-informed" forecast through July 2016.
- (2) Based on September 2016 expenditures, approximately \$91M remains in contingency. However, based on MTACC's forecasts, only \$15.0M will remain in contingency at project completion.
- (3) Changes to Soft Cost in September 2016 include:
  - a. Reduced Cost-To-Cure EAC to \$31M;
  - b. Increased construction support by \$8.9M; and,
  - c. Increased T/A Labor to include additional support costs due to schedule acceleration.
- (4) An increase to the CCM EAC is anticipated. PMOC has included \$10M in the "@ Completion" estimate to address this anticipated increase.
- (5) Total Contingency = Reserved Contingency = total budget balance after forecast expenditures.
- (6) Minimum Available Contingency required by ELPEP is approximately \$45,000,000 (100% Construction Bid, 85% Construction Complete).
- (7) MTACC states that it anticipates further soft cost EAC reductions as well as significant credit from the design engineer due to E&O issues.

Note: Quarterly update will be reflected in the December 2016 monthly report.

## 4.0 RISK MANAGEMENT

### Status

The major risk challenging the SAS Project Team at this time is schedule; senior MTA management has advised that the current goal for construction completion and the start of Revenue Service is December 30, 2016. Secondary risk involves the possibility that additional schedule acceleration (or delay mitigation) costs could threaten the completion of the project within MTACC's Current Working Budget of \$4.451B.

At this stage of the project, these risks are well understood by senior SAS managers and their mitigation is the focus of almost all project management activity.

### Observation and Analysis:

Risks involving MTACC's schedule acceleration initiative can be classified as either management and organizational risk or technical and coordination risk. Major risks within each of these categories are summarized as follows:

Management and Organizational Risks		
Risk		Status
1.	MTACC's ability to implement its schedule acceleration program through compression of construction schedules.	The accelerated schedules for the construction and system contracts have been implemented. There are still equipment installation and test performance acceleration milestones that have not been completed. New completion dates are being established.
2.	Design and scope changes requested by NYCT during the late stages of construction. NYCT has agreed that changes not related to safe operation of the railroad and station facilities will be deferred until after the start of Revenue Service.	Based on the number and nature of AWOs initiated this period, MTACC continues to manage and mitigate this risk. Those few AWOs not directly related to achieving the RSD appear well within the contractors' current capability to execute without schedule impact.
3.	Availability of NYCT staff to support testing, commissioning, and final acceptance of work performed by SAS contractors	The test schedules continue to be compressed because of the station contractors not completing their milestones. Because of the compression, additional personnel from the contractors, subcontractors, and NYCT will be required to support the 12/30/2016 RSD. Additional personnel have been added to support the current testing dates.
4.	MTA code compliance reviews. Past experience suggests that risks involve delayed inspections, unrealistic code interpretation, and disregard for project operational goals.	Compliance reviews are discussed in greater detail below. The number of open critical observations that could impact the RSD is alarming. Classification of Code compliance items is underway. Not all code compliance items need to be resolved prior to Revenue Service.
5.	MTACC's ability to manage the change order process in a timely manner to avoid contractor delay.	Additional personnel have been assigned to each active contract to expedite and support the management of technical risk and any associated contract modifications. To date, management of this risk has been acceptable. .

<b>Management and Organizational Risks</b>		
<b>Risk</b>		<b>Status</b>
6.	NYCT's ability to conduct its pre-revenue familiarization and testing activities within the time period provided by MTACC.	RTO training has been completed. Additional training and associated personnel required to support revenue service has been identified and will be completed by December 18, 2016.

<b>Technical and Coordination Risks</b>		
<b>Risk</b>		<b>Status</b>
1.	Critical communication systems: fire alarm system, police radio installation, installation, and startup at all stations.	MTACC considers completion and testing of the fire alarm system to be the biggest technical risk remaining on the project. Adequately testing of all the interfaces to the fire alarm system continues as a major risk. Modified L5 testing is being implemented at the 72nd and 86th Street Stations.
2.	Network (LAN/WAN)	No longer an issue.
3.	Permanent facility power – all stations	Availability of permanent facility power is no longer a risk. All stations have permanent power.
4.	Traction Power – all stations	No longer an issue.
5.	Installation, testing, commissioning, and acceptance of elevators and escalators.	All elevators and escalators have been installed. All but one escalator has been tested. Testing of this escalator is scheduled to be completed by 12/16/2016.
6.	Watermist system.	No longer an issue. A Watermist system has been installed and tested in each station.
7.	Delays in the development and approval of test procedures.	Risk is being mitigated. MTACC needs to continue to complete these tasks expeditiously.

## Compliance Reviews:

### SAS OBSERVATION LISTS – NOVEMBER 2016

CONTRACT	NO. OPEN [TOTAL]	NO. OPEN [CRITICAL TO RSD*]	NO. CLOSED	TOTAL
C2B (96th St. Station)	3,009	988	3,191	6,200
C3 (63rd St. Station)	2,754	664	6,805	9,559
C4C (72nd St. Station)	3,993	1,336	3,398	7,391
C5C (86th St. Station)	2,438	1,110	2,799	5,237
C6 (Systems and Track)	724	426	286	1,010
TOTAL	12,918	4,524	16,479	29,397

\* = Observations listed as critical to Revenue Service Date (RSD) were identified by one of the following four (4) separate NYCT units: Stations, System Safety, Code Compliance, or Maintenance of Way.

With respect to the “Observation” lists, the PMOC has the following observations:

1. Monthly monitoring indicates that the number of new Observations each month continues to exceed the number being closed.
2. The Open Observations which are “Critical to RSD” have the potential to delay the RSD.
3. Contractors have not taken full advantage of the early notification of incomplete or deficient work. The PMOC estimates that at least 50% of the work on these lists was performed by subcontractors, which minimizes the General Contractor’s effort in completing the work.
4. Efforts to close the items identified on the “Observation Lists” represent a significant amount of work. While much of the work may be completed after RSD, at the user group’s discretion, the ongoing contractor presence will be a nuisance to both MTA operations and riders.

### **Concerns and Recommendations:**

The large number of discrepancies noted on the “Observation List” is a concern to the PMOC. Such a large amount of discrepancies indicates a breakdown in the Contractors’ Quality Assurance Program and the Subcontractors’ Quality Control Program and that quality is being compromised for schedule acceleration.

It is apparent that all the discrepancies noted on the “Observation List” will not be closed out at the time of Revenue Operations. The PMOC recommends that the CM and contractors evaluate the discrepancies and develop and publish a schedule to resolve and closeout the items.

## 5.0 ELPEP

With respect to SAS, the current status of each of the main ELPEP components is summarized as follows:

- **Technical Capacity and Capability (TCC):** MTACC has resolved all remaining FTA/PMOC comments and has issued the final revised PMP. MTACC is not planning any further updates to the SAS PMP;
- **Schedule Management Plan (SMP):** MTACC's position is that the SAS schedule management process is ELPEP compliant. The PMOC does not concur. The PMOC notes the ELPEP Conformance/Compliance checklist indicates the IPS is updated on a monthly basis. As noted at the March, April, May, and June 2016 Cost & Schedule Meetings, the SAS Project Team is no longer maintaining the IPS. Refer to Section 2.0 of this report for further discussion.
- **Cost Management Plan (CMP):** The SAS FFGA was amended in March 2015. The PMOC has requested MTACC to update its CWB to reflect the adjusted value. To date, MTACC has declined to do so. MTACC's position is that the SAS cost management process is ELPEP compliant. The PMOC does not agree. The contingency EAC has fallen below the ELPEP-specified \$45M. As such, it is the PMOC's opinion that MTACC is not ELPEP compliant. Refer to Section 3.0 of this report for further discussion.
- **Risk Mitigation Capacity Plan (RMCP) and Risk Management Plan (RMP):** MTACC's position is that the SAS management processes remain ELPEP compliant.

The SAS Project Team has implemented the principles and requirements embodied in the ELPEP. The procedural changes triggered by the ELPEP have become an integral part of the management of the project and give the FTA/PMOC greater insight into the risk, cost, and schedule elements of the project.

## 6.0 SAFETY AND SECURITY

Each construction contractor continued implementation of the Safety Requirements as specified in Section 01 11 50 of the General Requirements.

As of October 31, 2016, a total of 14,447,850 construction hours have been logged on the project with 103 lost time and 191 recordable incidents documented. The total hours and incidents equates to a Lost Time Rate (LTR) of 1.43 and a Recordable Rate (REC) of 4.07. The LTR is below and the REC is above the US Bureau of Labor Statistics (BLS) national rates (Heavy & Civil construction) of 1.8 and 3.2 respectively. Both the LTR and REC has been trending downward over the last ten months.

**Safety and Security Certification:** Safety and Security Certification Requirements are specified in Section 01 77 12 of the General Requirements for each station and system contract. The certifiable elements of the SAS project have been identified and the subsequent breakdown of the certifiable elements into a list of certifiable items (CIL) has been completed. Monthly Technical Working Group (TWG) meetings are ongoing with each station contractor and the system contractor in order to review the test status of the certifiable items. The accumulation of the test reports which serves as the “Body of Evidences” for the verification of the certifiable item is being delayed. The Project Sponsor has been made aware of the need to capture the “Body of Evidences” in a timely manner such that certification process can take place.



## 7.0 ISSUES AND RECOMMENDATIONS

**Schedule Acceleration Initiative:** MTACC has clearly advanced the final elements of SAS construction and testing at a faster rate than would otherwise have been achieved through its schedule acceleration effort. However, all the work has not advanced at the same rate, resulting in coordination issues for the Systems Contractor.

**Schedule:** Review of the test completion milestones shows ongoing slippage in select areas, specifically communications system installation and equipment installation, and system (Levels 3, 4, and 5) testing. At this time in the project, options and work-arounds are limited. Significant delay to the implemented acceleration plan has occurred. The ultimate impact on RSD is not known at this time as weekly work arounds are being continuously developed.

- **Contractor Coordination:** This issue was not addressed in the acceleration agreements or accompanying schedule milestone commitments. Delayed room turnover and delayed conduit installation by station contractors are two examples of delays encountered by the Systems Contractor that appear to have had a material impact on its schedule progress.
- **Technical Issues:** MTACC has adhered to its commitment to limit AWOs to those necessary issues involving operations or revenue service. Nevertheless, the number of AWOs initiated since February 2016 has been quite significant. Certain systematic design flaws have become apparent. MTACC has indicated significant work remains to be completed in order to activate the fire alarm system.
- **Compliance Inspections:** MTACC commitment to expedite this process is ongoing. Weekly inspections are being performed. The large number of open and critical observations indicates that the contractors are not taking advantage of this early notification of work remaining to be complete. Completion of work identified by these inspections may extend significantly beyond the planned RSD.
- **Systems Testing:** Delays in completing the installation of equipment has had a ripple effect on the overall integration and test program. Test schedules are being compressed, which results in additional personnel being required.
- **Financial:** The PMOC recommends that MTACC review the AWO percentages calculated for SAS and consider an average of approximately 12% construction cost growth for similar future projects. Higher percentages for projects involving extensive utility relocation or renovation of existing facilities should also be considered.

## **APPENDIX A – ACRONYMS**

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ARRA	American Recovery and Reinvestment Act
AWO	Additional Work Order
BLS	Bureau of Labor Statistics
CBDS	Computer Based Dispatch System
CBH	Circuit Breaker House
CCM	Consultant Construction Manager
CCTV	Closed Circuit Television
CD	Calendar Days
CIL	Certifiable Items List
CMP	Cost Management Plan
CPRB	Capital Program Review Board
CSSR	Contact Status Summary Report
CWB	Current Working Budget
CY	Cubic Yards
DCB	Detailed Cost Breakdown
EAC	Estimate at Completion
EBCS	Emergency Booth Communication System
ELPEP	Enterprise Level Project Execution Plan
FAS	Fire Alarm System
FIAT	Field Installation Acceptance Test
FFGA	Full Funding Grant Agreement
FSIT	Final Systems Integrated Testing
FSTP	Facilities System Test Program
FTA	Federal Transit Administration
GO	General Outage
IAC	Intrusion Access Control
IPS	Integrated Project Schedule
LAN	Local Area Network
LTR	Lost Time Rate
MO	Month
MPT	Maintenance and Protection of Traffic

MTA	Metropolitan Transportation Authority
MTACC	Metropolitan Transportation Authority – Capital Construction
N/A	Not Applicable
NYCT	New York City Transit
NYSPTSB	New York State Public Transportation Safety Board
OSS	NYCT Office of System Safety
PACIS	Public Address Customer Information Screens
PEP	Project Execution Plan
PMOC	Project Management Oversight Contractor (Urban Engineers)
PMP	Project Management Plan
PQM	Project Quality Manual
QA	Quality Assurance
RAMP	Real Estate Acquisition Management Plan
REC	Recordable Rate
RMCP	Risk Mitigation Capacity Plan
RMP	Risk Management Plan
RMS	Remote Monitoring System
ROD	Revenue Operations Date
ROW	Right of Way
RSD	Revenue Service Date
SAS	Second Avenue Subway
SCC	Standard Cost Category
SIST	Simulated Integrated System Testing
SMP	Schedule Management Plan
SSCC	Safety and Security Certification Committee
SSOA	State Safety Oversight Agency
SSPP	System Safety Program Plan
TBD	To Be Determined
TCC	Technical Capacity and Capability
TPSS	Traction Power Substation
TSSM	Tunnel Station Smoke Management
TWG	Technical Working Group
WAN	Wide Area Network (WAN)

WBS	Work Breakdown Structure
WD	Work Days

## APPENDIX B – TABLES

**Table 1 - Summary of Schedule Dates**

	FFGA (March 2015)	Forecast Completion	
		Project Sponsor	PMOC
Begin Construction	January 1, 2007	March 20, 2007A	March 20, 2007A
Construction Complete	August, 2016	September 1, 2016	October 2017
Revenue Service	February 28, 2018	December 30, 2016	February 2018

A = Actual

**Table 2 - Project Budget/Cost** 

	FFGA			FFGA Amend	MTA Current Working Budget (CWB)		Expenditures as of November 30, 2016	
	\$ Millions	% of Total	Obligated (\$ Millions)	3/17/2015	\$ Millions	% of Total	\$ Millions	% of Total
Grand Total Cost	4,866.614	100	4,572.942	5,574.614	5,267.614	100	4,162.799	79.03
Financing Cost	816.614	16.78		816.614	816.614	15.50		
Total Project Cost	4,050.000	83.22	4,572.942	4,758.000	4,451.00	84.50	4,162.799	79.03
Total Federal	1,350.693	27.75	1,063.942	1,373.893*	1,350.693	24.60	1,215.664	23.08
Total FTA share	1,300.000	96.25	990.049	1,300.000	1,300.000	23.68	1,215.664	23.08
5309 New Starts share	1,300.000	100	990.049	1,300.000	1,300.000	23.68	1,141.767	21.68
Total FHWA share	50.693	3.75	73.893	73.893	50.693	0.96	73.893	1.40
CMAQ	48.233	95.15	71.433	71.433	48.233	0.88	71.433	1.35
Special Highway Appropriation	2.460	4.85	2.460	2.460	2.460	0.04	2.460	0.05
Total Local share	2,699.307	55.47	3,509.000**	3,384.107	3,509.000 **	63.92	2,947.135	55.95
State share	450.000	16.67	100.000		450.000	8.20		
Agency share	2,249.307	83.33	1,145.782		3,059.000	55.72		
City share	0	0			0	0		

\* Obligated and expended amounts obtained from the FTA's Transit Award Management System (TrAMS) and MTACC's Grant Management Department.

\*\* Current MTA Board approved budget.

**Table 3 - Estimate at Completion**

<b>Category</b>	<b>Current Working Budget</b>	<b>EAC Forecast</b>
<b>Total Construction</b>	\$2,674,814,299	\$3,050,065,727
<b>Engineering Services Subtotal</b>	\$622,862,000	\$690,022,317
<b>Third Party Expenses</b>	\$554,086,273	\$556,586,000
<b>TA Expenses</b>	\$131,160,085	\$141,514,683
<b>Contingency</b>	\$468,077,343	
<b>Total</b>	\$4,451,000,000	\$4,438,188,727

**Table 4 - Allocation of Current Working Budget to Standard Cost Categories**

<b>Std. Cost Category (SCC)</b>	<b>Description</b>	<b>FFGA (January 2008)</b>	<b>FFGA Amended (March, 2015)</b>	<b>MTA's Current Working Budget (June, 2016)</b>
10	Guideway & Track Elements	\$612,404,000	\$195,346,781	\$189,310,484
20	Stations, Stops, Terminals, Intermodal	\$1,092,836,000	\$1,666,605,679	\$1,654,647,928
30	Support Facilities	\$0	\$0	\$0
40	Site Work & Special Conditions	\$276,229,000	\$793,118,232	\$878,871,887
50	Systems	\$322,707,000	\$250,379,966	\$212,886,484
60	ROW, Land, Existing Improvements	\$240,960,000	\$281,500,000	\$281,500,000
70	Vehicles	\$152,999,000	\$0	\$0
80	Professional Services	\$796,311,000	\$1,026,608,168	\$1,187,398,615
90	Unallocated Contingency	\$555,554,000	\$544,441,174	\$46,384,602
Subtotal		\$4,050,000,000	\$4,758,000,000	\$4,451,000,000
Financing Cost		\$816,614,000	\$816,614,000	\$816,614,000
<b>Total Project</b>		<b>\$4,866,614,000</b>	<b>\$5,574,614,000</b>	<b>\$5,267,614,000</b>

Note: Quarterly update will be reflected in the December 2016 monthly report.

**Table 5 - Core Accountability Items**

Project Status:		Original at FFGA	Current*	ELPEP**
Cost	Cost Estimate	\$4,050 million	\$4,451 million	\$4,980 million
Contingency	Unallocated Contingency	\$555.554 million	\$91 million	\$45 million
	Total Contingency (Allocated plus Unallocated)	\$555.554 million	\$91 million (As of Sept. 2016)	\$45 million
Schedule	Revenue Service Date	June 30, 2014	December 30, 2016	February 28, 2018
Total Project Percent Complete	Based on Expenditures	93.5%		
	Based on Earned Value	N/A		
Major Issue		Status	Comments	
Construction Schedule Acceleration		Open	MTACC’s decision to accelerate the construction schedule to allow NYCT pre-Revenue Testing to commence on 09/01/16 results in concerns over additional cost and the ultimate ability to achieve this goal.	
Construction Quality and Operational Readiness		Open	MTACC has deviated from established organizational and project procedures as part of its schedule acceleration effort. PMOC is concerned that these deviations may result in reduced construction quality and incomplete systems testing.	
Date of Next Quarterly Meeting:		Tentatively January 19, 2017		

\* MTACC's Current Working Budget

\*\* Enterprise Level Project Execution Plan (ELPEP), reflecting median level of risk mitigation

Financial data based upon MTACC reporting through 10/31/2016

**Table 6 - OP54 Recommendations and Current Status**

RECOMMENDATION	INITIAL MTA RESPONSE	CURRENT STATUS AS OF NOVEMBER 30, 2016	COMMENTS
<p><b><u>Recommendation # 1:</u></b> MTACC and NYCT should develop work-around plans to defer completion of lower priority elements of the SAS while expediting completion of critical life safety and security aspects of the project. Less critical elements would be completed after the commencement of revenue service.</p>	<p>The process of developing work-around plans has been on-going and will continue to be further developed and accelerated by expediting the completion of SAS critical life safety elements while deferring non-critical elements.</p>	<p>MTACC and NYCT have developed a series of work around plans to ensure that critical life safety and security aspects of the project are completed, with less critical aspects being completed after revenue service commences.</p> <p>As of the end of November 2016, these plans have not been implemented.</p>	<p>The PMOC considers that the intent of this recommendation is being met. However, these plans should be tracked and updated on a regular basis.</p>
<p><b><u>Recommendation # 2:</u></b> MTACC and NYCT should take additional steps to ensure that necessary coordination efforts and staff assignments are made to ensure that connections to the NYCT communications system are expedited in order to facilitate remote testing, acceptance, and certification of the various life safety and control systems prior to revenue service.</p>	<p>The main connection at the 63rd Street Station was successfully connected on April 27, 2016. Remote testing is ongoing. The station communication systems at the 72nd, 86th, and 96th will connect seamlessly to the headend at the Rail Control Center. MTACC and NYCT continue to take necessary steps to ensure that remaining connections to the main transmission backbone system are performed as expeditiously as possible.</p>	<p>MTACC and NYCT completed the final connections to the NYCT communications system on October 15, 2016.</p> <p>As of the end of November 2016, System Testing is underway and the overall system is performing in a satisfactory manner.</p>	<p>The PMOC considers that the intent of this recommendation is being met.</p>



RECOMMENDATION	INITIAL MTA RESPONSE	CURRENT STATUS AS OF NOVEMBER 30, 2016	COMMENTS
<p><b><u>Recommendation #3:</u></b> MTACC should take the necessary steps to continually monitor and expedite the completion of critical life safety systems that need to be tested, approved, and certified by NYCT prior to revenue service. Such critical systems should be given the highest priority in terms of contractor completion and testing, and NYCT acceptance and certification.</p>	<p>The necessary steps are now underway.</p>	<p>MTACC and NYCT have jointly developed a tabulation of critical testing required to be performed prior to revenue service. This tabulation was incorporated into a schedule dated October 31, 2016.</p>	<p>The PMOC has reviewed this eight-page schedule and finds that it is comprehensive and that it meets the requirements of this recommendation. However, this schedule relates to the critical life safety systems. The PMOC recommends that the status of the additional certifiable elements/items noted on the checklist for each station and system contractor should continue to be monitored.</p>
<p><b><u>Recommendation # 4:</u></b> NYCT should develop a formal schedule for the pre-revenue service training of its operations staff, including begin and end dates, to assist in determining both the availability and scheduling of training staff and operating employees.</p>	<p>A formal schedule of the pre-revenue service training of its operations staff has been prepared.</p>	<p>NYCT completed the training of 900 train operators and 40 tower operators between October 9 and November 4, 2016. Training of 40 train dispatchers on the Computer Based Dispatch System will commence on December 12, 2016 and training of station maintenance personnel will commence on December 18, 2016.</p>	<p>The PMOC considers the ongoing implementation of the training efforts to have met the requirements of this recommendation.</p>

RECOMMENDATION	INITIAL MTA RESPONSE	CURRENT STATUS AS OF NOVEMBER 30, 2016	COMMENTS
<p><b><u>Recommendation # 5:</u></b> MTACC and NYCT should develop and implement specific procedures for the acceptance and inventory control of contractor provided spare parts. Acceptance and inventory control procedures need to be developed with respect to the spare parts provided by the SAS contractors.</p>	<p>A procedure for handling SAS spare parts by the contractor is already in place through each contract document. Spare parts are inventoried and stored by NYCT until needed for maintenance and/or repair.</p>	<p>MTACC provided revised procedures on delivery of contractor provided materials, and NYCT developed internal procedures dated September 2016 for the handling of contractor provided materials in its inventory systems.</p>	<p>The PMOC considers that the intent of this recommendation has been met.</p> <p>The PMOC recommends that this recommendation be closed.</p>
<p><b><u>Recommendation #6:</u></b> MTACC should make appropriate revisions to its System Integration Test Plan to reflect the combination of once separate Level 3 and Level 4 testing into a single combined test.</p>	<p>MTACC will make the appropriate revisions to its Testing and Commissioning Schedule.</p>	<p>MTACC revised its testing and commissioning schedules as of October 28, and 31, 2016 to show the combination of Level 3 and Level 4 testing and commissioning efforts.</p>	<p>The Facilities System Testing Program (Vol. 1- Management Plan) needs to be updated to reflect the current testing methodology.</p>
<p><b><u>Recommendation # 7:</u></b> MTACC should ensure that system testing schedules required by the System Integration Test Plan is updated and submitted on a timely basis. Similarly, test reports for completed tests should be prepared and submitted on a timely basis.</p>	<p>The SAS Testing and Commissioning Reports are being updated and submitted to FTA and its Project Management Oversight Contractor (PMOC) weekly.</p>	<p>MTACC has been submitting updated and revised testing and commissioning reports to the PMOC on a weekly basis.</p>	<p>This recommendation was closed out on October 25, 2016.</p>

RECOMMENDATION	INITIAL MTA RESPONSE	CURRENT STATUS AS OF NOVEMBER 30, 2016	COMMENTS
<p><b><u>Recommendation # 8:</u></b> MTACC should ensure that a final combined systems test be performed with all systems at each of the four stations operating concurrently.</p>	<p>Based on NYCT's Standard Operating Procedures, a final combined systems test will be performed with all systems operating concurrently at each of the four stations.</p>	<p>MTACC has provided the necessary documentation in the Systems Integration Testing Plan Document ID 7049.05.009797-01, which is part of the SAS Projects EDMS. This plan is currently being implemented by the Systems contractor. The Integrated Test Plan is currently being monitored by MTACC/NYCT staff to ensure that all requirements are being fully implemented.</p>	<p>The Facilities System Testing Program (Vol. 1- Management Plan) needs to be updated to reflect the current testing methodology.</p>
<p><b><u>Recommendation #9:</u></b> MTACC should revise the SAS SSMP to reflect the current organization and functions of its SSM organization.</p>	<p>An updated organizational chart will be added to the SSMP. A revised SSMP will be sent to FTA.</p>	<p>MTACC has revised its Safety and Security Management Plan (SSMP) to reflect the revised organization and has submitted it to the PMOC/FTA.</p>	<p>The SSMP document itself has not been revised to reflect both the changes to the organizational chart and to the functions of its SSM organization as detailed in Section 3 of the SSMP.</p>