

MONTHLY MONITORING REPORT

World Trade Center Port Authority Trans-Hudson Terminal
PORT AUTHORITY OF NEW YORK AND NEW JERSEY
New York, New York

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Cover: *View of Platform A Looking Northward from the South End.*

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 FTA or the project sponsor, in accordance with the purposes as described below.

For projects funded through FTA's Lower Manhattan Recovery program, FTA and its Project Management Oversight Contractor (PMOC) use a risk-based assessment process to review and validate a project sponsor's 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 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. DTFT60-09-D-00008, Task Order No. 002. Its purpose is to provide information and data to assist the FTA in continually monitoring the grantee's technical capability and capacity to execute a project efficiently and effectively, and hence, whether or not the grantee continues to receive federal funds for project development.

This report covers the project management activities on the Permanent World Trade Center (WTC) Port Authority Trans-Hudson (PATH) Terminal (Hub) project, conducted by the Port Authority of New York and New Jersey (PANYNJ) as grantee and financed by the FTA's Lower Manhattan Recovery Office (LMRO).

EXECUTIVE SUMMARY

The replacement of storm-damaged equipment, systems, and related project elements that were damaged or destroyed by Hurricane Sandy is advancing along with the performance of other project work that was not significantly impacted by the storm. Most of the replacement work has been completed, although several systems are yet to be tested and, in the case of electrical systems, re-energized. The cost of the work required because of Hurricane Sandy is being funded from a separate operating account and is not expected to impact the Hub project's current Estimate at Completion (EAC).

Project Description

The PATH Hub facility is an intermodal terminal serving the PATH electrified rail transit system in Lower Manhattan. The PATH Hub is an extensive underground complex of pedestrian corridors and train station facilities that will replace the original WTC PATH Terminal destroyed by terrorist attack on September 11, 2001.

Construction Agreement (CA)

The CA was signed by the LMRO on April 25, 2006. A Revised and Restated Construction Agreement (RRCA) was executed on September 18, 2012. The RRCA establishes a Required Completion Date (RCD) of December 17, 2015, and commits \$2.872 billion in federal funding to the PATH Hub. The RRCA includes an FTA-allowable amount not to exceed of \$3.995 billion. The hurricane damage is expected to delay the project by a minimum of six months.

Quarterly Progress Review Meeting

The next QPRM will be held for the third quarter of 2013 and is expected to occur in late October, 2013.

Design Activity

The designer continues to provide construction support services including the review of contractor shop drawings and other submittals. The designer has also been providing guidance

and technical criteria for the assessment and replacement of equipment, systems, and related project elements that were damaged by Hurricane Sandy.

Procurement Activity

World Trade Center Construction (WTCC) has completed all planned procurements for the Hub project. Additional procurement actions to address damage caused by Hurricane Sandy *are also largely completed*, with most replacement equipment also received and undergoing active installation.

Construction Activity

At the PATH Hall in the west bathtub, the PATH Hall Construction (PHC) contractor continued work at the mezzanine level, Platform A, and the East-West Connector. *Platform A stone installation commenced and work to prepare for the planned September opening of the East West Connector, including the temporary egress path through the North Temporary Access approached completion.*

Electrical service work continued on several fronts with some success achieved in energizing portions of the Primary Distribution Center in Tower 1, along with the EDS portion of Spot Network SN-TS.

At the Transit Hall in the east bathtub, the Oculus steel contractor *encountered difficulties in staying within prescribed tolerances for the locations of erected oculus steel elements, slowing the work while corrective measures for ensuring geometry control are developed*

Schedule

In August 2013, WTCC released Integrated Master Schedule (IMS) 68, (b) (4)

Activities to repair the damage caused by Hurricane Sandy, as well as sequencing associated with early demolition of the North Temporary Access, were included in IMS 68. WTCC continues to assess workaround opportunities, particularly for platform construction. More details of the workaround plans are expected to be included in the draft IMS 69, which was released for stakeholder reviews in September 2013.

Cost Data

WTCC submitted its Cost Model Revision on August 30, 2013. Based on the contract awards and estimates through July 31, 2013, WTCC's EAC for the federally funded PATH Hub project is just over \$3.7 billion. *WTCC is reporting the PATH Hub expenditures through July 31, 2013, to be over \$2.6 billion, or just over 70 percent of the EAC.*

Risk Management

To provide an improved project risk tool, the FTA, the Project Management Oversight Contractor (PMOC), and WTCC completed the Project Execution Plan (PEP), in conjunction with the execution of the RRCA on September 18, 2012. As information on the impacts of Hurricane Sandy became available, the PMOC conducted risk assessment workshops in June

2013 to discuss and quantify cost and schedule risks. In July 2013, the PMOC completed the preliminary results of the risk assessment and in the process of reconciling the results with WTCC. The outcomes of this risk assessment will be a reference for updating the PEP.

Technical Capacity and Capability Review (TCCR)

An update to the TCCR will be performed in conjunction with the updated PEP and is anticipated to be completed later in 2013.

Project Management Plan (PMP)

The grantee is preparing updates to its Project Quality Assurance Plan and Operations Management Plan, both of which are PMP sub-plans. The grantee *has* provided a draft construction phase Force Account Plan and Justification, and it is currently under PMOC review.

Project Quality Assurance

During *August* 2013, WTCC Quality Assurance (QA) performed *eight* quality assurance oversight audits on both field construction and QA program activities, including its *reviews of CM QA field activities and the on-going installation of oculus steel*. In addition, WTCC QA completed an audit *on August 5, 2013* to verify the receiving, inspection, and storage practices for the Hub *glass panels* delivered to the *contractor's warehouse in New Jersey*. For the QA audits completed in *August* 2013, *no corrective actions were identified*.

Site Safety Review

The WTC PATH Hub project's year-to-date safety performance through July 2013 *remained relatively stable for the month*. The year-to-date Total Case Incident Rate (TCIR) increased *slightly* but still compares favorably with the national average. The year-to-date Lost-Time Incident Rate (LTIR) *declined slightly but remained above the national average*. WTCC has continued its active role in managing worker safety.

Issues/Problems/Suggestions

- The completion of the PATH Hub project has been delayed as a result of Hurricane Sandy in late October of 2012. (b) (4)
- While the cost to complete the PATH Hub is expected to increase significantly as WTCC addresses the damage caused by Hurricane Sandy, WTCC has advised that the storm-related costs will be funded from a separate operating account and will not impact WTCC's current EAC. The adequacy of the current budget and schedule contingencies will be further evaluated as additional information becomes available.

MONITORING REPORT

A. Project Description

The PATH Hub facility is an intermodal terminal serving the PATH electrified heavy rail transit system, which has a total of 13 PATH stations in New York and New Jersey. When completed, the PATH Hub will connect to 11 New York City Transit (NYCT) subway lines in Lower Manhattan. The PATH Hub will include a platform level, associated mezzanine and concourse levels called the PATH Hall, and a terminal building called the Oculus, or Transit Hall, with north-south and east-west pedestrian connections to the NYCT subways, the World Financial Center, and WTC above-grade site development. It will be a permanent replacement of the original WTC PATH Terminal complex destroyed by terrorist attack on September 11, 2001.

B. Project Status

Construction Agreement

The CA was signed on April 25, 2006. An RRCA was executed on September 18, 2012. The RRCA establishes an RCD of December 17, 2015, and commits \$2.872 billion in federal funding to the PATH Hub project. It also includes an FTA-allowable not-to-exceed amount of \$3.995 billion.

Quarterly Progress Review Meeting

The next QPRM will be held for the third quarter and is expected to occur in late October 2013.

WTC Site Master Plan

WTCC's current site master plan is Master Plan Version 10, released October 1, 2010.

Environmental Compliance

(Reported on separately by FTA's LMRO.)

Design Support during Construction

The designer continued providing post-award design support services for the PATH Hub construction, including responding to contractor Requests for Information and providing certifications of completion for elements of construction.

The designer also continues to provide guidance and technical criteria for the assessment and replacement of storm-damaged equipment and systems for all categories of construction, including electrical, plumbing, HVAC, fire protection, compressed air, architectural, structural, and vertical transportation.

Procurement and Contracting Activities

WTCC has completed all planned procurements for the PATH Hub project. Procurement actions to address damage caused by Hurricane Sandy continue. However, all major replacement items have been ordered, according to WTCC.

Construction Status

Transit Hall Concrete: During *August*, the concrete contractor continued placement of miscellaneous concrete items and concrete wall sections located at the lower levels of the Transit Hall. Current work includes the removal of formwork material, and the filling of openings in concrete walls and floor slabs, which were omitted during larger concrete pours, to provide temporary construction access openings.

Structural Steel to Grade (SSTG) – Area 3: *During August, the contractor's activities in Area 3 continued to focus on the application of intumescent paint to the steel elements that remain exposed to public view. Application of spray-on fireproofing to concealed steel elements was also ongoing during the month. Intumescent paint and spray fireproofing application is expected to continue through the end of the third quarter of 2013.*

Oculus Steel: Fabrication, shipment and erection of Oculus steel continued during *August 2013*. The current fabrication metrics, based on status reports issued by the fabrication subcontractor, are: 100 percent completion for sub-portals, 100 percent completion for lower portals, 91 percent completion for upper portals, 100 percent completion for abutments, 11 percent completion for abutment outer shells, 91 percent completion for arches, 100 percent completion for transitions, and 27 percent completion for rafters. The fifth shipload of oculus steel departed on August 9, 2013 carrying additional upper portals, arches, transitions, and the first rafters to be sent. Arrival in early September is expected. During field erection of upper portals and transition arches difficulties are being encountered in remaining within required tolerance for the installed location of each oculus element. Theoretical target points in all three directions are being checked as each element is installed with variances from allowable tolerances frequently occurring. Incremental movement of the structure as each element is added to the structure is contributing to the tolerances being exceeded with temperature variations also cited as a factor. The development of a plan to better control the geometry of the oculus structure as each element is erected continues at present. This issue has slowed field erection significantly during the month.

Oculus Glass: Fabrication of the second half of the required oculus glass was completed during this *August*. The shipment of these panels is underway at present and expected to be completed by the end of September. Upon receipt, they are expected to be handled into the contractor's receiving location in Harrison, New Jersey with the other oculus glass that was previously received. The panels will be retained at that location until the oculus structure has advanced to a point where their installation can begin.

Oculus Skylight: Fabrication of a full-size mock-up of a typical section of the oculus skylight was completed during *August*. The mock-up was subsequently shipped to the contractor's testing facility where a test chamber had been prepared. It is currently being assembled in the test chamber where it will be subjected to visual inspection followed by twenty days of performance testing, currently forecast to start in late September 2013, at the testing facility located in eastern Pennsylvania.

Transit Hall Interior Stone: Bi-weekly job progress meetings continued to be held with this contractor during July 2013. The stone fabrication and installation under this contract is divided into ten phases, and the first phase, consisting of the stone at the southern end of the lower level of the North-South Concourse, was released for fabrication in March 2013. This first phase of stone is currently *scheduled* for delivery to the site by *mid-September*, 2013. *Start of installation is currently being coordinated with the active work of the storefront contractor in the same location.*

PATH Hall Construction (PHC): The PHC contractor completed *the removal of* the temporary shoring system of the previously placed concrete sections of the 1 Line box invert slab, allowing follow on contractors to proceed with their work. *The mechanical trades began installing the overhead mechanical work under the PATH Hall roof.* Work on the closed portions of Platform B at the north end of the station continued. The contractor *continued* construction of the temporary access to the PATH North Temporary Access to allow commuters to enter and exit the PATH station from the East West Connector. *The stone contractor has mobilized and began the stone installation at the north end of platform A.* WTCC continues to forecast that Platform A will be placed into service by *the end of the fourth quarter of 2013.*

Structural Steel to Grade (SSTG): The SSTG contractor began erecting structural steel members at the north end of platform B in the PATH station.

Mechanical, Electrical, and Plumbing (MEP) and Fire Protection Work: Work by these four contractors *continued* during *August* in several locations, including Spot Networks SN-TS, SN-TN, SN-PN, and SN-NW, along with work at the Central Fan Plant. Spot Network SN-TS, located within the podium of Tower 3, which had been forecast to be energized by August 2, 2013, has been *further* delayed and recently re-forecast to be energized by the end of *September* instead. Work in Spot Network SN-TN continues to be expedited using selective craft overtime to secure its placement into service to meet the forecast date of late October 2013. *However, some material shortages are currently threatening the achievement of that date with efforts ongoing to secure their delivery from the equipment manufacturer.* At the Central Fan Plant, *a target date for substantially completing the facility has been set for December 31, 2013 with the facility to be in service by April 30, 2014*

Emergency Generator Plant and Emergency Chiller Plant: During *August*, installation of the emergency generator equipment advanced. However, the manufacturer of two of the eight generators *has* identified a manufacturing defect with that particular model and *is planning* to send technicians to perform corrective work on those units with that visit *now* scheduled to begin in *mid-September*, 2013. *Fuel delivery system work linking the generators to their three fuel storage tanks located below grade within the Tower 3 sub-basements also needs to be accomplished in the coming period in order for the generators to achieve their target completion dates of second quarter 2014.* Additionally, one of the four emergency air-cooled chillers that were brought to the site and rigged to the fifth floor of Tower 3 during June, sustained damage in handling. *The mechanical contractor is now indicating that it attends to have the equipment manufacturer come to the site and repair that damage.*

Primary Distribution Center (PDC) at Tower 1: *Although originally targeted for re-energization in late June, PDC line-ups A and B were not energized until August 9, 2013, following authorization from Con Edison. The next pair of line-ups, C and D, is currently undergoing the*

same process of testing and Con Edison inspection. Late September 2013 energization is currently forecast

Vertical Circulation: During August, the contractor continued to work on the escalators and elevators in the East-West Connector and the Route 9A underpass which are scheduled to be in service in September 2013. The contractor continued installing the escalator components of Platform A. The contractor continued installing the escalator components located in the Transit Hall at elevation 274. The contractor continued installing the platform A elevator cabs and the escalators located in Tower 4.

Architectural Trades: The contractor began erecting multiple architectural steel columns at elevation 296 of the Transit Hall. The architectural steel members in the Transit Hall at elevation 274 are expected to be completed in September 2013. Multiple sections of the storefronts at elevation 274 are in fabrication.

North Projection Structural Rehabilitation: During the month of August 2013, the contractor continued cleaning areas and performing punch list work.

Construction Logistics

The WTCC Office of Program Logistics (OPL) continued bi-weekly logistics and coordination meetings to facilitate construction progress and the sharing of access, egress, and work zones among all contractors on-site. OPL is currently coordinating the planned 4th quarter opening of Fulton Street between Church Street and Greenwich Street to limited traffic. Street paving required to implement the planned opening is scheduled to occur in late September. Paving will temporarily limit access for contractors and has the potential to delay construction. Paving is also planned on Greenwich Street at Tower 4.

A construction crane is scheduled to be brought to the site via a PATH work train. Rail clearances through the PATH tunnels and lower levels of the WTC site have been verified and transport of the crane by rail will not be restrictive. Two (2) tower cranes and multiple assist cranes will also be brought to the site, most of these associated with the start of additional construction at Tower 3. Set-up, access and necessary work area for these cranes is an issue of concern. Tower 4 commissioning of MEP and Fire Protection systems continues. Tower 4 is being prepared for turnover and occupancy. The month of November remains the official target date for turnover. Potential impacts on Hub construction are being assessed. OPL is also involved in the planned opening of the East-West Connector to pedestrian traffic, which remains scheduled to occur in late September, 2013. Interagency Coordination

OPL continued its coordination of site construction and logistics among the many project stakeholders, including contractors, construction managers, tenants, insurance firms, PATH operations, and the Port Authority Police Department.

Community Relations

OPL continued to distribute construction alerts, updates, and monthly construction progress newsletters to the community and stakeholders.

C. Schedule

WTCC released IMS 68 in *August* 2013. This latest IMS, with a data date of *June 1, 2013*, shows a six-month slippage to the PATH Hub project overall completion date (b) (4)

However, re-sequencing of platform construction in support of the early demolition of the North Temporary Access may further delay the project substantial completion date. WTCC will continue to assess opportunities for workarounds, in particular for platform construction. More detailed workarounds are expected to be included in the draft IMS 69 that was released in *September* 2013 for stakeholder reviews.

The following summarizes the 90-day look-ahead for significant activities:

Significant Activity	Action by
Platform A Mezzanine Structure	WTCC
Opening of East-West Connector	WTCC
<i>Spot Network NS-TN Energized</i>	WTCC
Energization of Spot Network SN-TS	WTCC

D. Cost Data

WTCC submitted its Cost Model Revision on *August 30, 2013*. Based on the contract awards and estimates through *July 31, 2013*, WTCC's EAC for the federally funded PATH Hub project is slightly more than \$3.7 billion. WTCC is reporting the PATH Hub expenditures through *July 31, 2013*, to be *over \$2.6 billion, or just 70 percent of the EAC*. This represents a \$22 million increase since the *June 30, 2013* report.

On October 18, 2012, the Port Authority Board re-authorized the WTC PATH Hub project, at an estimated total project cost range of \$3.74 billion to \$3.995 billion. This authorization provided for an increase in the budget from approximately \$3.4 billion to slightly more than \$3.7 billion.

The \$3.7 billion budget reflects the updated engineer's estimates for all packages in the completed procurement plan and includes the Hub project's share of the common infrastructure projects, such as Retail, the Central Chiller Plant (CCP), the Common Electrical System, and site-wide operational support elements. WTCC continues to update the cost allocations that are being assigned to the Hub project.

The following chart summarizes the latest available EAC (WTCC's forecast) and expenditures as of *July 31, 2013*:

Description	EAC (WTCC's Forecast) (in millions)	Expenditures (in millions)
Construction	\$2,831	\$2,014
Program Management and Design	683	597
Contingency	(b) (4)	(b) (4)
Total	(b) (4)	(b) (4)

The RRCA commits \$2.872 billion in federal funding to the PATH Hub project and includes an FTA-allowable amount not to exceed of \$3.995 billion.

Although it was the opinion of the PMOC that the budget established after the October 18, 2012 project re-authorization by the Port Authority Board would not provide WTCC with adequate funding to complete the project, given the impacts of Hurricane Sandy, WTCC has advised that the costs related to Hurricane Sandy will be funded from a separate operating account set up by PANYNJ for Hurricane Sandy and likely will not impact WTCC's current EAC of \$3.7 billion. The PANYNJ Board has taken action to provide for the costs associated with Hurricane Sandy outside of the PATH Hub project budget.

E. Risk Management

The PMOC conducted a contingency assessment workshop in August 2011 to facilitate the completion of the PEP and the RRCA. WTCC and the PMOC reviewed the results of the cost and schedule risk models. Results from this workshop and subsequent analyses were used to develop the executed RRCA and PEP. To provide an improved project risk tool, the FTA, the PMOC, and WTCC completed the PEP in conjunction with the execution of the RRCA on September 18, 2012.

As information about the impacts of Hurricane Sandy became available, the PMOC conducted risk assessment workshops in June 2013 to discuss and quantify cost and schedule risks. In July 2013, the PMOC completed the preliminary results of the risk assessment and in the process of reconciling the results with WTCC. The outcomes of this risk assessment will be a reference for updating the PEP.

F. Technical Capacity and Capability Review

An update to the TCCR and a new TCCR Spot Report are anticipated to be completed later in 2013. The FTA will use the PEP to measure WTCC's capability and capacity.

Project Management Plan (PMP)

The grantee is preparing updates to its Project Quality Assurance Plan and Operations Management Plan, both of which are PMP sub-plans. The grantee provided a draft construction

phase Force Account Plan and Justification in early May, and it is currently under PMOC review.

Project Organization

WTCC updates consultant and contractor staff assignments across the project areas to address staffing needs as the project develops.

Project Quality Assurance

During August 2013, WTCC Quality Assurance (QA) performed eight quality assurance oversight audits of both field construction and QA program activities, including its reviews of CM QA field observations and the on-going installation of oculus steel. The WTCC QA also conducted an audit on August 5, 2013 to verify the receiving, inspection, and storage practices for the Hub glass panels that were delivered to the contractor's warehouse in New Jersey. For the QA audits completed in August 2013, no corrective actions were identified.

G. Site Safety Review

The WTC PATH Hub project's safety performance through July 2013 remained relatively stable during the month, varying little from the performance recorded through June 2013. From the start of the year through the end of July 2013, there have been 28 recordable injuries and 14 lost-time injuries on the project, with 1,216,048 hours worked. The resultant year-to-date LTIR for the project is 2.30, which is above the national average of 2.10. The corresponding TCIR for the project for the same period is 4.61, which compares favorably to the national average of 5.10.

H. Issues/Problems/Suggestions

- The storm damage to the new PATH Hub facility construction was extensive. Much of the equipment and systems were submerged and thus require extensive repair or replacement, including some large, long-lead-time equipment, such as the emergency smoke purge fans and the electrical power distribution centers. WTCC has been proactive in procuring and installing replacement equipment throughout the areas affected by the storm.
- (b) (4)
- While the cost to complete the PATH Hub is expected to increase significantly as WTCC remediates and mitigates the effects of Hurricane Sandy, WTCC has advised that the costs related to Hurricane Sandy will be funded from a separate operating account and likely will not impact WTCC's current EAC. The PANYNJ Board has taken action to provide for the costs associated with Hurricane Sandy outside of the PATH Hub project budget. The adequacy of the current budget and schedule contingency will be evaluated as more information becomes available.

I. Action Items

Key Project Action Item Checklist

Key Project Action Item	Agency	Target Completion	Status/Comments
PEP Milestone Review Point	PANYNJ/ LMRO/ PMOC	TBD	This will be delayed until the schedule impacts from the hurricane are fully recognized.

End of report. Appendices follow.

APPENDICES

APPENDIX A – LIST OF ACRONYMS

CA	Construction Agreement
CCP	Central Chiller Plant
CM	Construction Manager
CO	Change Order
EAC	Estimate at Completion
FTA	Federal Transit Administration
IMS	Integrated Master Schedule
LMRO	Lower Manhattan Recovery Office
LTIR	Lost-Time Incident Rate
MEP	Mechanical, Electrical, and Plumbing
NYCDOT	New York City Department of Transportation
NYCT	New York City Transit
OPL	Office of Program Logistics
PANYNJ	Port Authority of New York and New Jersey
PATH	Port Authority Trans-Hudson
PDC	Primary Distribution Center
PEP	Project Execution Plan
PHC	PATH Hall Construction
PMOC	Project Management Oversight Contractor
PMP	Project Management Plan
QA	Quality Assurance
QPRM	Quarterly Progress Review Meeting
RCD	Required Completion Date
RRCA	Revised and Restated Construction Agreement
SSTG	Structural Steel to Grade
TCCR	Technical Capacity and Capability Review
TCIR	Total Case Incident Rate
WTC	World Trade Center
WTCC	World Trade Center Construction

APPENDIX B – LESSONS LEARNED

No update.