

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: *Looking south, a view of the space directly beneath the New York City Transit #1 Line subway box, which will connect the main floor of the Transit Hall to the east with the mezzanine of the PATH Hall to the west.*

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 assessment of the cost and schedule impacts of the Hurricane Sandy damage to the PATH Hub project is being completed. Replacement of storm-damaged equipment and systems is under way throughout the project site as permanent construction activities continue. The costs related to Hurricane Sandy will be funded from a separate operating account and likely will not impact the 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 may delay the project.

Quarterly Progress Review Meeting (QPRM)

The fourth quarter 2012 QPRM was held March 13, 2013.

Design Activity

The designer continues to provide construction phase design services, and guidance and technical criteria for the assessment and replacement of equipment and systems damaged by Hurricane Sandy.

Procurement Activity

World Trade Center Construction (WTCC) has completed all planned procurements. Additional procurement actions to support Hurricane Sandy recovery efforts continue.

Construction Activity

Construction activity increased again during March 2013, continuing a four-month trend since dropping off immediately after Hurricane Sandy in October 2012. Replacement of storm-damaged equipment and systems is under way throughout the project site as permanent construction activities continue.

At the PATH Hall in the west bathtub, the structural steel contractor continued with welding, installation of precast ductwork above Tracks 1 and 2, and application of intumescent paint. The PATH Hall Construction (PHC) contractor continued both permanent construction and storm remediation at the mezzanine level, Platform A, and the East-West Connector. The PHC contractor began reinforcing and formwork for the invert slab for the 1 Line box, and also began preparing the north and south fan rooms to receive replacement equipment.

At the Transit Hall in the east bathtub, the structural steel contractor completed welding of the east and west end arches and began preparations to remove all temporary supports. The Oculus steel contractor continued erection of the Oculus steel, supported by frequent deliveries of fabricated steel members. Fabrication of Oculus glass continued. Architectural steel members were installed in the Transit Hall at elevation 274. Sections of the storefront glass were delivered to the jobsite.

Mechanical, Electrical, and Plumbing (MEP) and Fire Protection Work: MEP contractors continued installations throughout the site. Reconstruction of a major power distribution center that was damaged by Hurricane Sandy began.

Schedule

In March 2013, WTCC released Integrated Master Schedule (IMS) 66, (b) (4) [REDACTED] [REDACTED] damage caused by Hurricane Sandy was preliminarily included in IMS 66. WTCC will continue to assess the opportunities of workarounds, in particular for platform constructions.

Cost Data

WTCC submitted its Cost Model Revision on March 28, 2013. Based on the contract awards and estimates through February 28, 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 February 28, 2013, to be approximately \$2.5 billion.

Risk Management

The Project Management Oversight Contractor (PMOC) conducted a contingency update workshop in August 2011. To provide an improved project risk tool, the FTA, the PMOC, and

WTCC completed the Project Execution Plan (PEP), in conjunction with the execution of the RRCA on September 18, 2012. It is expected that risks associated with the recovery from Hurricane Sandy will be identified and quantified as information becomes available.

Technical Capacity and Capability Review (TCCR)

An update to the TCCR and resulting report are anticipated to be completed later in 2013.

Project Management Plan (PMP)

The grantee is preparing updates to its Project Quality Assurance Plan, Force Account Plan, and Operations Management Plan, all of which are PMP sub-plans.

Project Quality Assurance

During March 2013, WTCC Quality Assurance (QA) and the Construction Manager (CM) QA performed six quality assurance audits of ongoing field construction activities, including the receipt and installation of Oculus structural steel members.

Site Safety Review

The WTC PATH Hub project's year-to-date safety performance through February 2013 continues a trend of improved safety performance that started in the fourth quarter of 2012. The resultant year-to-date safety management metrics compare favorably with national averages. WTCC has continued its proactive role in managing worker safety.

Issues/Problems/Suggestions

- The overall completion of the PATH Hub project is expected to be delayed as the effects of Hurricane Sandy are remediated. (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 will not impact WTCC's current EAC. The adequacy of the current budget and schedule contingencies will be evaluated as 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, and includes an FTA-allowable amount not to exceed of \$3.995 billion.

Quarterly Progress Review Meeting

The fourth quarter 2012 QPRM was held March 13, 2013. FTA and the grantee discussed pertinent issues relating to cost, schedule, safety, and quality as well as the recovery from the Hurricane Sandy damage.

WTC Site Master Plan

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

Environmental Compliance

(Reported 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 of elements of construction.

The designer 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, 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. Additional procurement actions to support its Hurricane Sandy recovery efforts are under way.

WTCC and its CM provided the PMOC with the construction and professional services Change Order (CO) logs and updates to the procurement schedule.

Construction Status

Construction activity increased again during March 2013, continuing a four-month trend since dropping off immediately after Hurricane Sandy in October 2012. As measured by craft labor hours, construction activity has not yet returned to pre-storm levels. The assessment of the cost and schedule impacts of the storm damage to the PATH Hub project is being completed. Contractors have removed selected equipment and systems to make way for the replacement equipment and systems. Replacement equipment has been ordered, and some items already have been delivered.

Transit Hall Concrete: The concrete contractor continued placement of miscellaneous concrete items at elevation 241 and concrete wall sections located at the lower levels of the Transit Hall. The contractor continued patching the underside of the slab sections at elevations 237, 254, and 274.

Transit Hall Waterproofing and Site Work: The contractor substantially completed installing the waterproofing system on the Transit Hall structural concrete slab at elevation 320 and continued performing punch list work for the waterproofing system.

Structural Steel to Grade (SSTG) – Area 3: During March 2013, the SSTG contractor continued working on the far east and far west ends of Area 3, with a focus on those activities that must be completed in order to permit the jack-down of the two box girders that are central structural elements in those areas, and to further permit the turnover of the space to succeeding contractors once all work has been deemed by WTCC to have been satisfactorily completed. The process of preparing for jack-down includes the correction and closing of all nonconforming conditions. Both box girders are currently forecast to be jacked-down during April 2013.

Oculus Steel: Fabrication of Oculus steel continued during March 2013. The current metrics issued by the fabrication subcontractor are: 100 percent completion for sub-portals, 100 percent completion for lower portals, 52 percent completion for upper portals, 65 percent completion for abutments, 42 percent completion for arches, 38 percent completion for transitions, and 2 percent complete for rafters. The second shipload of Oculus steel elements, including a significant portion of the upper portals and abutments (30 lower portals and 20 abutment elements), arrived in New York on March 13, 2013. Selected abutment elements were subsequently trucked to a local fabrication subcontractor's facility in New Jersey for modification before delivery to the site. The third of the total of six major deliveries of Oculus steel is expected by mid-April 2013.

Oculus Glass: During March 2013, fabrication of the Oculus glass continued at the fabrication subcontractor's facility. Also during March 2013, WTCC sent a third-party consultant to the fabrication facility for a one-week visit to review the production and assembly of glass units. A formal report from the visit is yet to be received. However, preliminary reports are that the consultant had a favorable assessment of the glass fabrication work that was under way. At present, 290 of a total of 771 glass units have been fabricated.

Transit Hall Interior Stone: This contract was awarded in August of 2012 and provides for the installation of stone flooring and other stone treatments at various Transit Hall locations,

including the interior of the Transit Hall, the North-South Connector, and other areas in the PATH Hub. The contractor is in the submittal and shop drawing phase of the contract work at present.

PATH Hall Construction (PHC): During March 2013, The PHC contractor continued contract work at Platform A, the South Mezzanine, and the East-West Connector. The PHC contractor began installing the invert slab reinforcing steel of the 1 Line box, and erecting the invert slab formwork system. The PHC contractor has prepared the north and south fan plants for replacement of the emergency smoke purge fans and electrical systems that were damaged by Hurricane Sandy. Sections of the waterproofing system over the PATH HALL roof slab were completed during the month of March and are ready to be turned over to others for follow-up work. The PHC contractor continued cleaning and retrofitting electrical systems and mechanical components damaged by Hurricane Sandy. WTCC continues to forecast completion of Platform A in the fourth quarter of 2013.

Structural Steel to Grade (SSTG): The SSTG contractor continued to install the precast concrete box girders, which also serve as ductwork over Tracks 1 and 2 at Platform A. The SSTG contractor has substantially completed the structural steel north of the East Box Girder (EBG). During March 2013, the contractor continued installing precast stairs at the mezzanine level and applying the intumescent paint coating to the structural steel at the East-West Connector and the PATH Hall roof.

Mechanical, Electrical, and Plumbing (MEP) and Fire Protection Work: During March 2013, reconstruction of spot network SN-TN commenced, following the demolition of the previously completed facility, which was destroyed by the October hurricane. Also during March, the mechanical contractor delivered and hoisted eight emergency diesel generator sets to the fourth floor of Tower 3. Space on the west end of the fifth floor of Tower 3 was released to the Hub project on March 11, 2013, for commencement of its work building the emergency chiller facility that will be housed in that space.

Primary Distribution Center (PDC) at Tower 1 – All eight line-ups at the PDC at Tower 1, which had been energized and placed into service to feed various locations, including some of the previously completed spot networks serving the PATH Hub, suffered damage during the October hurricane and were taken out of service. Replacement components arrived on-site during the last week of March 2013 and will be installed into the eight line-ups, also known as PDCs A through H, starting in early April. Once repairs are completed, each line-up will be individually retested before being placed back into service. In the interim, the PDC electrical load demands continue to be met by the temporary primary distribution center located in the North Temporary Access facility.

Vertical Circulation: The contractor continued to install the escalators in the East-West Connector and the Route 9A underpass. Replacements for the damaged sections of the Platform A escalators were delivered to the jobsite, and the contractor began installing the escalator trusses. The contractor has removed the Platform A elevator pistons that were damaged by Hurricane Sandy in order to make way for their subsequent replacement. The contractor also continued to install the Platform A elevator rails.

Architectural Trades: Architectural steel members were installed in the Transit Hall at elevation 274. Sections of the storefront glass were delivered to the jobsite in March 2013.

Miscellaneous Metals: *During March 2013, the contractor continued to install steel components at many PATH Hub locations, including the spot network rooms.*

North Projection Structural Rehabilitation: *During the month of March 2013, the contractor substantially completed contract work. The contractor will begin cleaning areas and performing punch list work next month.*

Construction Logistics

The WTCC Office of Program Logistics (OPL) continued weekly logistics and coordination meetings to facilitate construction progress and the sharing of access, egress, and work zones among all contractors on-site. In March, OPL continued to work with the Oculus steel contractor and to provide coordination with the New York City Department of Transportation (NYCDOT) with respect to the overnight deliveries to the site of larger Oculus steel elements, including the recently received upper portals and selected abutment elements. The removal and relocation of a traffic signal at the intersection of Fulton Street and Broadway is currently being coordinated and will be required for the site delivery of additional abutment elements that are scheduled to be shipped in mid-April.

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 66 in March 2013. This latest IMS, with a data date of February 1, 2013, (b) (4)

WTCC will continue to assess the opportunities of workarounds, in particular for platform construction.

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

Significant Activity	Action by
Platform A Mezzanine Structure	WTCC
East-West Connector Turnover to Retail	WTCC
All Oculus Abutments and Lower Portals Steel Fabrication Complete	WTCC

D Cost Data

WTCC submitted its Cost Model Revision on *March 28, 2013*. Based on the contract awards and estimates through *March 28, 2013*, WTCC's EAC for the federally funded PATH Hub

project is more than \$3.7 billion. WTCC is reporting the PATH Hub expenditures through January 31, 2013, to be *approximately \$2.5 billion*.

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 allocation provided for an increase in the budget from \$3.4 billion to \$3.7 billion.

The \$3.7 billion budget reflects the updated engineer's estimates for all packages in the completed procurement plan. The total cost to complete the PATH Hub project includes the EAC and the non-Hub shares of the common infrastructure projects, such as Retail, the Central Chiller Plant (CCP), the Common Electrical System, and operational support areas. WTCC continues to update the shared cost allocations associated with the non-Hub costs.

The following chart summarizes the latest available EAC (WTCC's forecast) and expenditures as of February 28, 2013:

Description	EAC (WTCC's Forecast) (in millions)	Expenditures (in millions)
Construction	\$2,830	\$1,899
Program Management and Design	682	581
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.

It is expected that risks associated with the recovery from Hurricane Sandy will be identified and quantified during the second quarter of 2013.

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 PEP will be used by the FTA to measure WTCC's capability and capacity.

Project Management Plan (PMP)

The grantee is preparing updates to its Project Quality Assurance Plan, Force Account Plan, and Operations Management Plan, all of which are PMP sub-plans.

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 March 2013, the WTCC QA and CM QA performed six quality assurance audits of ongoing field construction activities, including the receipt and installation of the Oculus structural steel members.

G Site Safety Review

The WTC PATH Hub project's year-to-date safety performance through February 2013 continues a trend of improved safety performance that started in the fourth quarter of 2012. From the start of the year through the end of February 2013, there were 4 recordable injuries and 1 lost-time injury on the project, with 255,591 hours worked. The resultant year-to-date Lost-Time Incident Rate (LTIR) for the project was 0.78, which compared favorably to the national average of 2.10. The corresponding Total Case Incident Rate (TCIR) for the project for the same period was 3.13, which also compared favorably to the national average of 5.10.

H Issues/Problems/Suggestions

- The storm damage to the new PATH Hub facility construction is extensive. Much of the equipment and systems has been submerged and will need extensive rehabilitation or replacement, including large, long-lead-time equipment, such as the emergency smoke purge fans and the electrical power distribution centers. WTCC has been proactive in procuring replacement equipment and has begun restoration throughout the areas affected by the storm.
- The overall completion of the PATH Hub project is expected to slip as the effects of Hurricane Sandy are remediated. (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 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	<i>This will be delayed until the schedule impacts of the hurricane damage recovery are determined.</i>

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
EBG	East Box Girder
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.