

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 the East-West Connector, looking 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

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. 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 may delay the project.

Quarterly Progress Review Meeting

The Quarterly Progress Review Meeting (*QPRM*) for the first quarter of 2013 *was held on* May 20, 2013.

Design Activity

The designer continues to provide construction support services, and 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*. However, additional procurement actions to address damage caused by Hurricane Sandy continue.

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. The PHC contractor also continued reinforcing steel and formwork for the invert slab for the 1 Line box *where the associated series of concrete placements are expected to commence in June, 2013*.

At the Transit Hall in the east bathtub, the Oculus steel contractor erected the *first upper* portal elements and *continued* the erection of the Oculus steel abutment elements, supported by overnight deliveries of those components on an as-needed basis. *The first shipment of Oculus glass from the glass fabrication facility was made in early May with the second shipment consisting of the balance of the Oculus glass expected to be released in July, 2013.*

Major air-handling units were rigged into position at the central fan plant during May. A substantial amount of the electrical equipment needed for spot networks SN-NW and SN-PN was also received on site and placed into the corresponding spot network spaces

Schedule

In May 2013, WTCC released Integrated Master Schedule (IMS) 67, (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 preliminarily included in IMS 67. 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 68, *which is scheduled for release in July 2013*.

Cost Data

WTCC submitted its Cost Model Revision on May 31, 2013. Based on the contract awards and estimates through April 30, 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 March 31, 2013, to be just over \$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. *A schedule risk workshop is planned for early June 2013.*

Technical Capacity and Capability Review (TCCR)

An update to the TCCR and the 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 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 review.*

Project Quality Assurance

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

Site Safety Review

The WTC PATH Hub project's year-to-date safety performance through *April* 2013 *deteriorated slightly*. The resultant year-to-date *Total Case Incident Rate (TCIR)* compares favorably with the national average. *However, the year-to-date Lost-Time Incident Rate (LTIR) marginally exceeded the national average for the first time this year.* WTCC has continued its proactive 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 *first* quarter 2013 QPRM was held on May 20, 2013. The FTA and the grantee discussed pertinent issues relating to *construction*, cost, schedule, safety, and quality as well as the recovery from Hurricane Sandy.

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 of 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. Additional procurement actions to support its Hurricane Sandy recovery efforts are ongoing.

WTCC and its CM provide the PMOC with the construction and professional services Change Order (CO) logs and updates to the procurement schedule on a monthly basis.

Construction Status

As measured by craft labor hours, construction activity *has been gradually increasing since the October hurricane*. The assessment of the cost and schedule impacts of the storm damage to the PATH Hub project is being completed. Removal of storm-damaged equipment and systems to make way for the replacement equipment and systems is largely completed. *Significant deliveries of replacement equipment and installation of that equipment continued during May*.

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.

Structural Steel to Grade (SSTG) – Area 3: *Following the successful completion of the jack-down of the two box girders at the far eastern and far western ends of Area 3 and the removal of the temporary shoring towers during April, the SSTG contractor started “comeback” work, including the completion and torquing of connections that had previously been allowed to adjust to the form of the structure as the jack-down was performed. The contractor also started the field-painting process of the Area 3 steel that will ultimately lead to a finished coating of intumescent paint. Primer application is under way, and field painting is expected to continue for the next several months.*

Oculus Steel: Fabrication of Oculus steel continued during May 2013. The current metrics, based on status reports issued by the fabrication subcontractor, are: 100 percent completion for sub-portals, 100 percent completion for lower portals, 68 percent completion for upper portals, 65 percent completion for abutments, 67 percent completion for arches, 45 percent completion for transitions, and 9 percent completion for rafters. The third shipload of Oculus steel elements, consisting primarily of additional upper portals and abutments, arrived and was off-loaded at the Brooklyn storage facility on May 6, 2013. Also during May, erection of abutment elements and upper portals on both the eastern and western ends of the Oculus continued, giving the Oculus a greater above-grade presence. The fourth shipment of Oculus elements is currently scheduled to depart from the fabrication shop during the second week of June 2013 and to arrive for off-loading in Brooklyn by the end of the month.

Oculus Glass: During May 2013, the first 50 percent of the Oculus glass panels were shipped from the fabrication facility. Of the total required quantity of 771 panels, 386 panels were shipped. The remaining half of the Oculus glass continues in fabrication and is forecast to be completed by mid-summer 2013. A return visit to the glass fabrication shop by WTCC’s third-party consultant is planned to occur during July 2013.

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 Concourse, and other areas in the

PATH Hub. Fabrication of the stone by the stone provider designated by WTCC in the installation contract is currently under way. *Delivery of the first shipments of interior stone, which is currently earmarked for the North-South Concourse, is scheduled to occur in the fourth quarter of 2013. A total of ten phases of stone fabrication and installation are planned.*

PATH Hall Construction (PHC): During May 2013, the PHC contractor continued contract work at Platform A, the South Mezzanine, and the East-West Connector. The PHC contractor continued installing the 1 Line box invert slab reinforcing steel 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 May 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 *that Platform A will be completed* 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. During May 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 May 2013, reconstruction of spot network SN-TN continued, following the demolition of the previously completed facility, which was destroyed by the October hurricane. WTCC is projecting that this facility will be back in service by the end of October 2013. *During May, considerable progress was also made at spot network SN-TS, which is located at elevation 255 within Tower 3. This facility is now under the exclusive control of the Hub project electrical contractor and is expected to be placed into service in August of 2013. Two additional spot networks, SN-NW and SN-PN, have begun taking shape at elevation 255 below the grand stair connecting the PATH Hall mezzanine to the main floor of the Transit Hall. Most of the electrical equipment to be installed in these facilities was received on-site during May and is currently being placed into the spot network rooms. Work in the Central Fan Plant by the MEP and Fire Protection contractors has also been advancing, and this work is currently forecast to be complete in early 2014.*

Emergency Generator Plant and Emergency Chiller Plant: At Tower 3, the PATH Hub contractors are constructing an Emergency Generator Plant on the third floor and an Emergency Chiller Plant on the fourth floor. Both of these facilities will serve the emergency needs of the PATH Hub facility, although a portion of their capacity will also be for the benefit of other WTC site facilities. At present, eight emergency diesel generators have been installed, with associated generator control and paralleling gear currently being installed in an adjacent portion of the same space. The four emergency air-cooled chillers are expected to be brought to the site and rigged to the fourth floor during June 2013. Both of these facilities currently are expected to be placed in service during the second half of 2014.

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. During *May*, *installation of replacement components continued* at all of the eight line-ups, also known as PDCs A through H. 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 continued installing the escalator components. The contractor has *replaced* the Platform A elevator pistons that were damaged by Hurricane Sandy. The contractor also continued installing the Platform A elevator glass enclosure. *The contractor began installing the escalators located in Tower 4.*

Architectural Trades: Installation of the architectural steel members in the Transit Hall at elevation 274 continued. *The storefront contractor began taking field measurements of sections of the North-South Concourse at elevation 274.* Sections of the storefront glass were installed in the East-West Connector in *May 2013*.

Miscellaneous Metals: During *May 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 *May 2013*, the contractor *repaired the roof concrete slab and the waterproofing system that was damaged by another contractor working in the area. The remaining work at elevation 250 is expected to be completed in the second quarter of 2013.* The contractor continued cleaning areas and performing punch list work.

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 *May*, 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. The removal and relocation of a traffic signal at the intersection of Fulton Street and Broadway is required for the delivery *to the site* of some of the *still larger Oculus steel elements and was completed during the overnight period on May 30, 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 67 in May 2013. This latest IMS, with a data date of April 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 will be included in the draft IMS 68 that will be released in July 2013.

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 May 31, 2013. Based on the contract awards and estimates through April 30, 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 March 31, 2013, to be over \$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 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. The total cost to complete the PATH Hub project includes the EAC and 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 March 31, 2013:

Description	EAC (WTCC's Forecast) (in millions)	Expenditures (in millions)
Construction	\$2,835	\$1,949
Program Management and Design	683	587
Contingency	(b) (4)	(b) (4)

Total	(b) (4)	(b) (4)
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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, *now that IMS 67 has been released. A schedule risk workshop is planned for early June 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 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 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 *May 2013*, the WTCC QA and CM QA performed four quality assurance audits of ongoing field construction activities, including the installation of the Oculus steel.

G. Site Safety Review

The WTC PATH Hub project's safety performance through *April 2013 deteriorated slightly during the month*. From the start of the year through the end of *April 2013*, there *have been 11* recordable injuries and *6* lost-time *injuries* on the project, with *545,242* hours worked. The resultant year-to-date LTIR for the project *now calculates at 2.20*, which *is slightly above* the national average of 2.10. The corresponding TCIR for the project for the same period *calculates at 4.03*, 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 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 damage caused by Hurricane Sandy is addressed. (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.