

Table 8A-6
PATH Ridership Forecast for WTC Service in the Opening Year (2009)

Year	Average Weekday Trips			AM Peak Hour		
	Terminal Users	Weekday Boardings	Weekday Allightings	Terminal Users	Weekday Boardings	Weekday Allightings
2000	142,300	67,000	75,300	26,604	4,107	22,497
2009	125,286	58,989	66,297	23,423	3,749	19,674

NO ACTION ALTERNATIVE

If the Preferred Alternative is not constructed, then the temporary WTC PATH station that is currently in service would remain in service through the opening year. The temporary WTC PATH station was designed and constructed with the primary objective of restoring PATH service to Lower Manhattan as quickly as possible following September 11, 2001. Thus, its capacity, functionality, and equipment are limited over time, but its systems could support the anticipated opening year ridership.

PREFERRED ALTERNATIVE

The Preferred Alternative would consist of a track and platform level, a mezzanine/fare-zone level, and a street-level terminal building incorporating sub-grade pedestrian connections to adjacent streets, NYCT subways, and on- and off-site developments. The PATH tunnels, tracks, platforms, and mezzanine would be located within the WTC "bathtub" as they were prior to September 11, 2001.

The Preferred Alternative is being planned to support the PATH's system-wide improvements identified above, PATH's operating requirements, and future ridership demand. Each of these factors results in specific requirements for the design of the Terminal's platforms and tracks, and as such, it has been determined that a 5-track, 4-platform station is needed. Further details on the selection of 5-track, 4-platform configuration as well as alternative track and platform schemes evaluated in conjunction with project planning are provided in Appendix C.

System-Wide Improvements

PATH will implement improvements to increase capacity on trains operating between Newark and the WTC, by increasing their length from 8 to 10 cars. Not only will this improvement require that the WTC Terminal support 10-car operations but a consequence will be that more people will use the WTC PATH Terminal's platforms during peak travel periods.

All new PATH cars will have 3-doors per side allowing PATH to retire the portions of its current fleet with 2-doors per side. Three-door cars will decrease the boarding/alighting times of trains by 50 percent, which will improve dwell times at intermediate stations along the PATH route and could reduce the overall run time of trains. However, the new cars are not expected to improve the platform clearance time for passengers since they will not directly affect platform area or the provision or operation of stairways and escalators.

While PATH currently maintains 3-minute headways on its Newark-WTC Line and 4-minute headways on its Hoboken-WTC Line during portions of the peak hour, CBTC will facilitate such headways over a longer period with greater reliability and less potential for delays. CBTC in conjunction with the 10-car train program will have the ability to increase the throughput of the

PATH system, resulting in more passengers and a higher frequency of service at the WTC Terminal than before September 11, 2001. As such, platforms at the WTC Terminal will need to clear more swiftly in the future in order to maintain safe and efficient operations.

Operational Requirements

PATH must plan for failure management to maintain reliable, on-time peak period service. Because the WTC is a terminal station, trains dwell for short periods to maintain the operating schedule. Thus, to maintain the headway and allow for the arrival of a subsequent train, PATH requires two tracks for each the Hoboken-WTC and Newark-WTC Lines. In the event that a train becomes disabled, a fifth track is needed. The fifth track allows the disabled train to remain in the Terminal while the remaining four active tracks can be used to continue service.

PATH has limited capacity for train storage at its Newark, Harrison, and Journal Square Yards. Therefore, PATH would use the WTC Terminal for the overnight storage of 6 Hoboken-WTC trains. Four tracks are required for this overnight storage and a 5th track is needed for revenue service on the Newark-WTC Line. The overnight storage of Hoboken-WTC trains at the WTC Terminal would allow for a more efficient ramp-up to AM peak period revenue service and decreases the potential for weather-related delays on the Hoboken-WTC Line.

Ridership Requirements

A principal consideration for the planning of the Terminal is the ability of platforms to safely accommodate peak period ridership. Because PATH is primarily a commuter system, the platform design must accommodate both AM and PM peak patterns of travel.

In the AM peak hour, trains unload passengers to the platform who must then ascend to mezzanine level. For this condition, the principal design criterion is the targeted time period within which all passengers exiting a train alight from the platform. As stairways and escalators become congested, passengers queue at the foot before they can ascend. Therefore, to avoid a lengthening of this back-up, it is important that all passengers clear the platform before arrival of the next train. The *Transit Capacity and Quality of Service Manual* states that a platform (and vertical circulation) should be planned to ensure full clearance of the platform before the next train arrives. However given that passengers may not use or may not be able to use all available exits, a safety factor of 20 to 30 percent is applied. Thus, a platform should clear fully within 70 to 80 percent of the scheduled headway.

The proposed frequency of Newark-WTC Line service requires that its platform clear within 126 to 144 seconds. However, based on projected ridership, a single Newark-WTC platform would require 213 seconds to clear. Thus, two Newark-WTC Line platforms are needed to meet platform clearance guidelines. A single Hoboken-WTC platform is sufficient to meet platform clearance criteria.

For the PM peak period, the planning of the platforms must also consider failure management in the event of a missed headway and subsequent delay in service. Thus, the platform must provide for adequate room to queue passengers waiting for the next arriving train.

Given ridership levels in 2025 and level of service standards, a minimum 15,264 square feet of platform area would be required for the Newark-WTC service in the event of a missed headway while 10,385 square feet would be required for the Hoboken-WTC service. However, accounting for the unusable areas of the platform (e.g., spaces occupied by escalators and elevators and the safety buffer along the platform edge), the Terminal's platforms would each provide for an

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effective area of 10,416 square feet. Thus, a single platform would be adequate for the Hoboken-WTC Line but more than one platform would be needed for Newark-WTC Line.

In order to maintain temporary PATH service during construction of the Preferred Alternative, PANYNJ would not relocate the existing PATH tracks. As such, Platform A cannot be widened beyond its current configuration, which is not adequate for normal revenue service. Since three full-size platforms are needed for peak period service, the Preferred Alternative would include a total of 4 Platforms. The 5 tracks that are currently part of the temporary station would be retained in their current alignment, which is adequate to meet PATH's operating requirements.

The platform and mezzanine levels would have a north-south orientation and would be located immediately west of NYCT's 1 and 9 train tunnel and the proposed Greenwich Street extension. The four platforms would be long enough to accommodate 10-car trains in accordance with PATH's long-range goal to increase the operational capacity of the system, and five tracks will allow for increased queuing capacity during peak periods. Fare equipment would be located on the mezzanine level. The platforms and mezzanine would be fully enclosed with heating, air conditioning, and advanced communication and security systems.

The concourse and street-level terminal building would be located on the eastern section of the WTC site extending from Greenwich to Church Streets. The mezzanine and lower concourse levels would connect via a passage under the NYCT's 1 and 9 train tunnel and over to the western side of the site. The concourse would have pedestrian passageways to the north, south, and west. The west passageway would cross beneath Route 9A to the World Financial Center. These passageways would also provide access to the proposed towers on the WTC site.

As shown in Figure 8A-3, the concourse level would also provide access to NYCT's Cortlandt Street Station on the 1 and 9, and R and W lines; the WTC Station on the E line; the existing corridor to One Liberty Plaza; and street-level at the intersections of Fulton and Greenwich Streets and Vesey and Church Streets. The passageway to the R and W Cortlandt Street Station would also link with the proposed pedestrian connection to the Fulton Street Transit Center. All circulatory elements within the Permanent WTC PATH Terminal would be designed to fully accommodate the expected volumes of passengers through its 2025 design year, with passenger corridors varying in width between 10 and 30 feet, and to comply with ADA requirements.

The Preferred Alternative would provide the PATH system with greater operational flexibility in meeting growing passenger demand over time. The new terminal itself would be able to accommodate larger passenger flows and reverse passenger flows than the original terminal or the current temporary WTC PATH station. It would also provide more convenient passenger connections to surrounding buildings, nearby NYCT subway stations, and trans-Hudson ferries. The Preferred Alternative is not expected to induce additional PATH ridership beyond the levels that would have existed had the events of September 11, 2001 not occurred, but it would be designed to accommodate passengers induced by the WTC redevelopment itself.

No impacts to PATH riders or its operations are expected once the Preferred Alternative is fully opened in 2009. Rather, the terminal would provide added passenger capacity that would be required given the redevelopment of the WTC site. The Preferred Alternative would accommodate elements that the temporary WTC PATH station could not, including pedestrian linkages to surrounding buildings, all area NYCT subway lines, and more convenient access to trans-Hudson ferries. Multiple entrances and exits would reduce walking times to access and egress the new terminal, which would lead to shorter walking distances and commute times for

many users. Thus, any potential impacts of the Preferred Alternative to its users and to PATH operations would be beneficial.

DESIGN YEAR (2025)

FUTURE COMMON TO ALL ALTERNATIVES

In addition to the PATH system improvements described above under "Construction Period", PANYNJ is considering extending the PATH system from its current terminal at Newark Penn Station to connect with the Newark Liberty International Airport AirTrain rail system. When constructed, PATH would provide a direct rail connection between Lower Manhattan and the airport. The Newark Liberty International Airport extension will be undertaken independent of the Preferred Alternative.

As shown in Table 8A-7, by the design year, average weekday PATH usage to the WTC site is projected to be 167,718, an increase of 13.6 percent from 2000 levels. The AM peak hour usage is estimated to be 29,001, which is a 9 percent increase over 2000 ridership (see Appendix C).

Table 8A-7
PATH Ridership Forecast for WTC Service in the Design Year (2025)

Year	Average Weekday Trips			AM Peak Hour		
	Terminal Users	Weekday Boardings	Weekday Allightings	Terminal Users	Weekday Boardings	Weekday Allightings
2000	142,300	67,000	75,300	26,604	4,107	22,497
2025	167,718	76,143	85,575	29,001	5,660	23,341

Absent a Preferred Alternative, those demanding trans-Hudson service to and from the WTC site may be diverted to other modes of travel as the temporary WTC PATH stations nears or exceeds its reasonable capacity. However, for analysis purposes, it is assumed that these trips would continue to be made in some capacity.

NO ACTION ALTERNATIVE

Under the No Action Alternative, PATH service to Lower Manhattan would be eliminated by the design year since the temporary station would exceed its useful life. Over 162,000 weekday passengers who would have used the Permanent WTC PATH Terminal in year 2025 would be required to divert to alternate modes of transportation to access Lower Manhattan. These passenger diversions would require a more expensive and time-consuming commute for PATH riders and may involve additional transfers. Adverse impacts on vehicular traffic, other transit services, and the pedestrian network in the area are addressed in subsequent sections of this chapter.

Fifteen percent of PATH passengers who would have used the Permanent WTC Terminal if it were available would still use PATH as one leg of a multi-modal commute to Lower Manhattan. These passengers would instead use the Christopher Street or 9th Street PATH Station and then either walk or transfer to the NYCT subway. In year 2025, 24,258 total passengers would be diverted to these two stations each weekday, and 4,350 passengers would be diverted during the AM peak hour. It is anticipated that each station would attract half of these riders. Although both stations will have been renovated to include an additional exit/entrance than exist today, the

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addition of almost 2,200 passengers to each of these stations during the AM peak hour would substantially impact the safe and efficient operation of each station.

PREFERRED ALTERNATIVE

No impacts to PATH riders or its operations are expected in 2025, the design year for the Preferred Alternative, if the terminal is constructed. Rather, the terminal would provide added passenger capacity that would be required given the completed redevelopment of the WTC site. The Preferred Alternative would accommodate elements that the temporary WTC PATH station could not, including pedestrian linkages to surrounding buildings, all area NYCT subways lines, and more convenient access to trans-Hudson ferries. Multiple entrances and exits would reduce walking times to access and egress the new terminal, which would lead to shorter walking distances and commute times for many users. Thus, any potential impacts of the Preferred Alternative to its users and to PATH operations would be beneficial.

E. MITIGATION

The Preferred Alternative would have positive benefits to PATH system operations and the convenience of its passengers. Since the Preferred Alternative would not adversely impact PATH operations, mitigation is not required. *