Central New Jersey
Raritan Valley Transit Study
Pennsylvania Component

Final Report

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Submitted by:

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In Association with:

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Lehigh Valley ECONOMIC DEVELOPMENT CORPORATION
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STUDY PURPOSE

The Central NJ/Raritan Valley Transit Study (CNJ/RV) - Pennsylvania Component is an extension of the NJ TRANSIT CNJ/RV Transit Study, which assessed commuter bus and commuter rail transit improvement alternatives along Interstate 78 (I-78) in New Jersey. The purpose of the Pennsylvania Component Study was to build upon the New Jersey portion of the study (New Jersey Component Study) by identifying and assessing options to improve rail and bus services along the Route 22 and I-78 corridors in the Lehigh Valley and the northern New Jersey/New York Urban Core (Jersey City, Newark, Midtown Manhattan and Lower Manhattan). The rail and bus options were developed to provide local decision makers information to decide whether they warrant more detailed study and development. At this time no funding has been identified to pursue further planning work.

The Pennsylvania Study Area, shown below, is comprised of Northampton and Lehigh Counties, primarily covering the three urban centers (Easton, Bethlehem, and Allentown), the rail alignments through the Lehigh Valley that could connect to the NJ TRANSIT Raritan Valley Line (RVL) commuter rail service, and roadways that connect to I-78.

Pennsylvania Study Area Map

PUBLIC INVOLVEMENT

The goal of the public involvement process was to engage a diverse group of public and agency participants to solicit relevant input and provide timely information throughout the study. The public involvement process included regular meetings with agency officials and municipal workshops with the various stakeholders to explain and present the process and findings of the study, gain public input in the planning process, as well as inform the public of study progress. The stakeholder groups are represented by two committees organized for the Pennsylvania Component Study. The Community Liaison Committee (CLC) represents municipalities and local interest groups such as higher education facilities

The PA Component Study is sponsored by:

- **County of Lehigh**
- **County of Northampton**
- **Lehigh Valley Economic Development Corporation**

and economic development organizations. The Technical Advisory Committee (TAC) is made up of county, regional and state-level transportation and planning agencies. The CLC met in July 2009 and March 2010. The TAC convened in August 2009, November 2009 and March 2010.

PROJECT GOALS AND OBJECTIVES

The goals and objectives for the Pennsylvania Component of the study are presented in the following table. They were established at the outset of the study in conjunction with stakeholder groups and played a key role in the alternative development process. Of particular importance is the goal to revitalize urban centers through improved transit service.

TRANSPORTATION

- Improve mobility within the study area between the Lehigh Valley and the North Jersey/New York areas
- Reduce the growth of peak period traffic congestion along I-78 and other key roadways
- Improve multi-modal regional transportation and promote connectivity of transportation systems, including walking, biking, buses, auto, trails and freight rail
- Improve the image of public transit as an attractive, safe and viable form of transportation through the study area
- Increase transit ridership
- Expand work commute options for residents
- Connect important work destinations and major employers with new transit services and connections to transit routes and systems
- Promote and support non-work related transit trips
- Maintain and/or reduce travel time
- Improve the connectivity of existing transit services in the region and make better use of existing transportation facilities
- Provide the ability for phased implementation, as well as projects with short-term implementation

ENVIRONMENTAL/COMMUNITY

- Minimize environmental impacts to the preexisting, natural and community environment
- Implement transit improvements so that community impacts are minimized
- Reduce the region's dependence on fossil fuels and reduce greenhouse gas emissions
- Encourage dense development and redevelopment in the three Lehigh Valley urban cores – Allentown, Bethlehem and Easton
- Encourage more transit-friendly communities with mixed-use pedestrian-friendly transit station areas, where desired
- Attract and retain young professionals to live and work in the Lehigh Valley; and increase residential density in the urban cores
- Incentivize good land use planning and urban revitalization through the location of recommended facilities

FINANCIAL

- Develop cost effective alternatives
- Increase overall transit revenues
- Invest financial resources efficiently and effectively
- Implement financially sustainable transit improvements

ALTERNATIVES DEVELOPMENT

The Pennsylvania Component Long List of Alternatives was developed based on data collected at the outset of this study, the results of the New Jersey Component study as they relate to the Lehigh Valley, and information gathered during the Pennsylvania Component Study's first set of CLC workshops in July 2009 and first TAC meeting in August 2009. The three rail and five bus Long List alternatives were conceptually developed and a Short List (one rail & two bus alternatives) was approved by the TAC in November 2009. The Short List alternatives were analyzed in more detail (ridership, environmental, engineering, operations, and cost) and the results of this analysis were reviewed with the TAC and CLC in March 2010.

***Short List Alternatives*:**

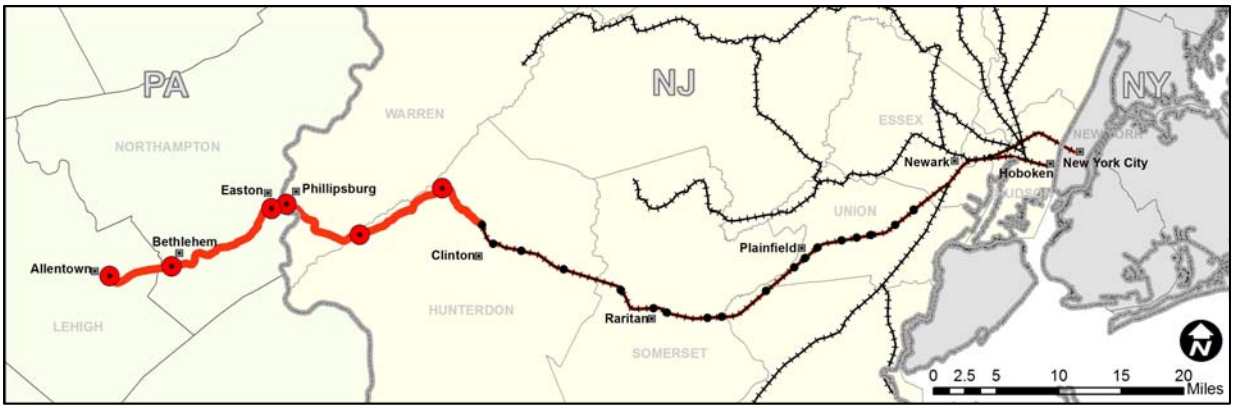
- **Commuter Rail Extension to Allentown**
- **Express Bus to New York**
- **Express Bus to Bridgewater**

DESCRIPTION AND FINDINGS OF SHORT LIST ALTERNATIVES

COMMUTER RAIL EXTENSION TO ALLENTOWN

BACKGROUND

Commuter rail service is provided by NJ TRANSIT on the Raritan Valley Line (RVL) between High Bridge, NJ and Newark, NJ. At Newark, riders transfer for service to Midtown and Lower Manhattan, Jersey City and Hoboken (Urban Core). In the future, after the opening of the Access to the Region's Core Project, which is a new rail tunnel under the Hudson River and new rail station at 34th Street between 6th Avenue and 8th Avenue in Midtown Manhattan, some RVL trains are planned to operate directly to Midtown Manhattan. The predecessor NJ Component Study developed alternatives to extend RVL service 20 miles west from High Bridge to Phillipsburg, NJ with stops in Hampton and Bethlehem/Bloomsbury, NJ. Rail station bus shuttles are available today from some intermediate stations along the RVL, and additional bus shuttles have been proposed in the NJ Component study, as a "last mile" strategy between rail stations and work sites.



ALTERNATIVE DESCRIPTION

This alternative would extend RVL service 17 miles from Phillipsburg, NJ to Allentown, PA along the south side of the Lehigh River. The proposed route would use the Norfolk Southern Lehigh Line right-of-way in Easton/Bethlehem and the RJ Corman right-of-way (Lehighton Industrial Track) in Allentown. New dedicated passenger track and passing sidings would be provided, with shared freight tracks in some locations.

With any extension of rail service into PA, an operating agreement between a Commonwealth of PA agency and NJ TRANSIT would be required, to address shared costs, liabilities and other issues. If at some point in the future RVL rail service in NJ is extended to a point east of Phillipsburg (Hampton or Bloomsbury/Bethlehem), the costs for the PA Component would need to consider the costs within NJ of reaching Phillipsburg.

THREE PROPOSED PENNSYLVANIA STATIONS

- **Easton**
- **Bethlehem**
- **Allentown**

STATIONS AND YARD

Proposed stations have been located in consultation with local officials, and within right-of-way constraints. All stations would be fully accessible to persons with disabilities and would serve existing and planned walk-up markets and park-and-ride customers.

The proposed Easton Station is located in the Easton Central Business District (CBD), on the south side of the Lehigh River, just north of West Canal Street, and west of the intersection of Third Street and Smith Avenue. Parking would be available at the planned new Easton Intermodal Terminal 900 feet away. This facility is being sponsored by the City of Easton outside of this study. LANTA N, P and R bus lines would serve this station. Additional LANTA routes would be available at the Easton Intermodal Terminal.

The proposed Bethlehem Station is located within the BethWorks development site, approximately 1,500 feet west of the Sands Casino. Parking would be available at the planned BethWorks Multimodal Transit Facility, 1,500 feet away. This facility is sponsored by the City of Bethlehem outside of this study. LANTA F and "The Loop" bus lines would serve this station. Additional LANTA routes would be available at the Multimodal Transit Facility.

The proposed Allentown Station is located between Hamilton Street and Union Street, with access from 3rd Street. Parking would be available at the Allentown Bus Terminal or at a new parking facility at the station site. LANTA A and E bus lines would serve this station.

Parking at Allentown and Bethlehem is assumed to be free and the parking rate at Easton is assumed to be $2 per day.

The proposed Yard/Maintenance Facility to service and store trainsets overnight is located near the Harris Rebar site in Salisbury Township, west of the Hill-to-Hill Bridge. Space is available at this site for overnight storage, inspection, fueling, cleaning and running repair for eleven trainsets.

SERVICE

All RVL trains proposed to operate to High Bridge in 2030 would be extended to Allentown. The service plan includes:

- 8 AM peak period inbound trains (6-10 AM arrival in Newark/New York) with limited reverse peak service
- 8 PM peak period outbound trains (4-8 PM departure from Newark/New York) with limited reverse peak service
- Hourly off-peak and evening service in each direction
- Limited weekend service

Future Year (2030) Travel Time to New York

155 minutes from Allentown
144 minutes from Bethlehem
128 minutes from Easton

RIDERSHIP

The three new PA stations would generate 800 daily riders or boardings (1,600 one-way trips) in 2030, which includes 110 intra-valley riders (or 220 trips). PA daily passenger boardings range from 220-350 per station.

The assumed distance-based fares were based on an extension of the January 2010 NJ TRANSIT RVL rail fare structure. Fares to New York were assumed to be $13.50 one-way and $378 monthly from Philipsburg and Easton, $14.00 one-way and $392 monthly from Bethlehem and $14.50 one-way and $406 monthly from Allentown. These fares are assumed to rise with inflation. At the time of service implementation, the fares will reflect the then-current fare structure.

Since commuter rail is considered a factor in land use planning, transit-oriented development goals being pursued by each station host city were considered in the ridership estimation. Also, university travel and special generators such as festivals and museum trips were considered.

2030 Average Daily Rail Ridership					
	Rail Station	**Riders (Boardings)**	**Drive Access**	**Parking**	**One-Way Trips**
Proposed Pennsylvania Stations	**Allentown**	230	170	140	460
	Bethlehem	220	100	80	440
	Easton	350	280	230	700
	TOTAL PA	*800*	*550*	*450*	*1,600*
CNJ-RVL New Jersey Component Stations	Phillipsburg	70	60	50	140
	Bloomsbury/ Bethlehem	185	185	150	370
	Hampton	145	145	115	290
	TOTAL NJ	*400*	*390*	*315*	*800*
	TOTAL	*1,200*	*940*	*765*	*2,400*
	New Rail Trips				2,300
	Diversions to Rail				
	From Exiting Rail				110
	From Bus				840
	From Auto				1,445
	From Other				5

NOTE: THIS TABLE REFLECTS AVERAGE WEEKDAY RIDERSHIP. WEEKEND AND SPECIAL EVENT RIDERSHIP IS NOT INCLUDED.

ENVIRONMENTAL IMPACTS

Potential impacts are summarized below. In some cases construction and permanent impacts cannot be avoided and permitting with mitigation strategies would be required.

ALIGNMENT

- Floodplains - Small areas of 100-year floodplain are present in several locations adjacent to the right-of-way and within the right-of-way in Easton, Glendon and Lower Saucon, Bethlehem, and Fountain Hill. The right-of-way (ROW) is located within the 100-year floodplain in Allentown.
- Wetlands - Rail ROW crosses wetlands and a creek on the approach to the proposed Allentown Station at Banana Joe's site (former passenger station).
- Historic - Rail ROW is adjacent to the historic Lehigh Canal and is part of the Lehigh River Greenway.
- Parklands – The Hugh Moore Historical Park is located adjacent to the ROW on the north side.
- Ecology - The ROW is located within the Lehigh Slopes Natural Area in Williams and the Steel City Slopes Natural Area in Bethlehem. The locally-significant Steel City Slopes are located on a north-facing slope above the Lehigh River in Lower Saucon Township and supports a diverse herb and fern habitat. Proposed work would be contained within already disturbed areas.

STATIONS

- Easton Station - Small area of 100-year floodplain located within ROW on the north side of the alignment.
- Bethlehem Station - Located on former industrial property. Any hazardous materials impacts from the Bethlehem Steel operation would be mitigated by the BethWorks development.
- Allentown Station - Located entirely within 100-year floodplain.

YARD

- Located entirely within the Lehigh Uplands Park Preserve and the Lehigh Mountain Seeps Natural Area; however, all work would be performed within already disturbed areas.

PROPERTY NEEDS

The proposed alignment would use private railroad right-of-way and the railroad owner would be compensated. Property acquisition would be required at the proposed Allentown station. Two parcels north of Hamilton Street would be needed for track, platform and parking. A small acquisition would also be needed for the yard site.

INSTITUTIONAL

Norfolk Southern Railway is the owner of most of the rights-of-way proposed for passenger rail service. While Norfolk Southern is represented on the study's Technical Advisory Committee; it has not reviewed or approved any of the alternatives that make use of their rights-of-way or facilities, as is their general policy with preliminary studies.

FINANCIAL

Costs shown are for extending rail service between Phillipsburg, NJ and Allentown, PA. Capital and operating funding have not been identified for this alternative. At this time NJ TRANSIT has made no commitment to extend rail service beyond the existing terminus in High Bridge, NJ. When a decision is made to advance rail service to Allentown, the PA Component costs would need to consider the costs within NJ for reaching the terminus of the existing service.

Costs	2010 $
Capital Cost	$650-710 million
Annual Operating Cost	$14.9 million
Annual Revenue	$3.3 million
Farebox Recovery (a)	22%

(a) Percentage of operating costs covered by revenues

COMMUTER RAIL EXTENSION TO ALLENTOWN - FINDINGS

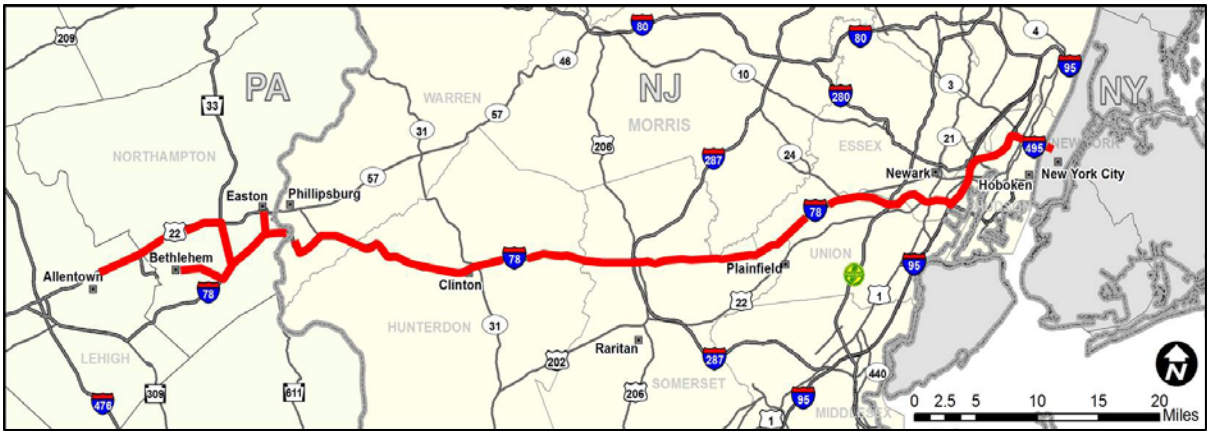
The total estimated capital cost project would be $658.9 million (2010$), or $39 million per route mile for the 16.94 miles from Phillipsburg, NJ to Allentown, PA. Commuter rail projects being considered for federal funding have capital costs that are under $20 million per route mile. The rail alternative's high capital cost and low farebox recovery will be a challenge in the competitive environment for Federal and local funding. Economies such as potentially sharing the Pennsylvania yard costs (estimated to be $87.4 million) with New Jersey could be explored in the future to bring the costs of the project down to a more competitive level. Should this project qualify for federal capital assistance, such assistance would only cover a portion of the project costs and local matching funds would be required.

The estimated farebox recovery of 22% is based on forecasted passenger fare revenues of $3.3 million and operating costs of $14.9 million. A subsidy of $11.6 million would have to be provided (all in 2010$). A source for this ongoing subsidy has not bee identified. The farebox recovery compares unfavorably with the FY09 farebox recovery of 55% on the overall NJ TRANSIT commuter rail system.

EXPRESS BUS TO NEW YORK

BACKGROUND

Bus service is provided today from eight locations in Lehigh and Northampton Counties to New York City via Interstate 78 (I-78). Service is provided to the Port Authority Bus Terminal, Lower Manhattan with additional service to JFK International Airport and Jersey City. Much of this service makes additional stops along I-78 in New Jersey. Existing non-stop express service from the Lehigh Valley to New York originates at highway park-and-ride locations. The predecessor NJ Component Study developed express service from two new park-and-rides in New Jersey. The results of that study indicated a demand for some additional service originating in Pennsylvania. According to the 2000 Census, nearly 1,100 people per day leave Lehigh and Northampton Counties bound for job sites in New York City, a number which has grown with the population growth in the Lehigh Valley. Routes that serve downtown residents were developed to meet the Study's goals for strengthening redevelopment of downtown neighborhoods.



ALTERNATIVE DESCRIPTION

This alternative would provide three new express, non-stop bus routes from Easton, South Bethlehem and Allentown Central Business Districts. Service would depart from each of these facilities, and proceed non-stop to the Port Authority Bus Terminal (PABT) in Midtown Manhattan. Buses would access I-78 by the most direct possible route, and then proceed to NY via the Lincoln Tunnel Express Bus Lane. This service would take advantage of proposed bus-on-shoulder operation along the most congested sections I-78 in NJ, as described in the NJ Component Study. The proposed bus-on-shoulder operation would benefit bus travel times by up to 9 minutes in the AM peak period. This service would be operated by a private operator.

SERVICE CONCEPTS

These services would provide direct, non-stop express bus service from the three core cities of the Lehigh Valley to the PABT in Midtown Manhattan. Service would originate at existing, or planned new bus facilities, and would be in addition to any currently operated service.

THREE PROPOSED SERVICES

- **Easton**
- **South Bethlehem**
- **Allentown**

The Easton Service would start at the planned new Easton Intermodal Center, located at the Southwest corner of Ferry Street and South 3rd Street. This planned intermodal facility would serve as the main terminal for intercity, commuter and local buses in downtown Easton. Parking would be available at this facility at a cost of $2/day. LANTA routes N, P and R would serve the station site today, with routes C, E and 5 operating nearby. It is assumed that any nearby local bus service

will be re-routed to serve the new facility. After departing the facility, buses would travel non-stop through South Easton to I-78. Additional LANTA routes would be available at the Easton Intermodal Terminal.

The South Bethlehem Service would start at a proposed new multimodal facility within the BethWorks development site, on 3rd Street in South Bethlehem. Parking would be available on-site, and is assumed to be fee of charge. LANTA F and "The Loop" bus lines serve this station site today, with routes B, G and E operating nearby. It is assumed that any nearby local bus service will be re-routed to serve the new facility. After departing the facility, buses would travel east on 3rd Street, accessing I-78 via Route 412. Additional LANTA routes would be available at the Multimodal Transit Facility.

Future Year (2030) Travel Time to New York

129 minutes from Allentown
113 minutes from Bethlehem
100 minutes from Easton

The Allentown Service would start at the existing Allentown Bus Terminal at 3rd Street and Hamilton Street. Parking would be located on-site free of charge. LANTA A and E bus lines serve this station site today, with line G operating nearby. It is assumed that any nearby local bus service will be re-routed to serve the new facility. After departing the facility, buses would travel via the proposed American Parkway Bridge to Route 22 East and Route 33 South to I-78.

SERVICE

Buses are assumed to operate every 15 minutes in the peak period (6-9 AM arrival in New York). No off-peak, reverse peak or weekend service is assumed. This service frequency and time-of-day pattern was assumed for purposes of determining potential ridership, and does not include any changes to existing New York bus service schedules.

RIDERSHIP

The three new express bus services together would generate 484 daily riders or boardings, or 967 daily one-way trips in 2030. The most productive of these services is South Bethlehem, with over 600 daily trips. The location of this service may be able to divert some demand from the overutilized Hellertown/Route 412 park-and-ride. Of the 967 trips, 403, or 42% are new bus trips. The rest are diverted from existing private operator New York bus services.

The fares assumed for ridership forecasting are consistent with private operator fares as of January 1, 2010. Fares from Easton are $18.50 one-way and $427.25 for a 40-trip book. From Bethlehem, fares are $19.25 one-way and $444.75 for a 40-trip book. From Allentown, fares are $20.00 one-way and $462.50 for a 40-trip book. These fares are assumed to rise with inflation. At the time of service implementation, the fares will reflect the then current fare structure.

2030 Average Daily Bus Ridership

	Bus Service	Riders (Boardings)	One-Way Trips
Proposed PA Express Bus Services	**Easton**	143	285
	Bethlehem	306	612
	Allentown	35	70
	TOTAL	**484**	**967**
Diversions to Express Bus Service			
From Auto			403
From Other Buses			564

INSTITUTIONAL ISSUES

New bus service would be operated by a private operator under the same conditions that affect current operators. Access to bus facilities would be subject to agreements between the operators and the facility owners.

FINANCIAL

As the proposed service would be operated by a private operator, capital and operating costs would be dependent on that operator's labor costs and operational capacity. Assuming a new fleet of buses would be required to operate the service, each of the three services would require 15 new vehicles, for a total of 45 new vehicles. This results in a capital cost of approximately $25 million. However, it is likely that the operator could use some buses now used on other existing routes, as these new services would divert riders from these existing services. Capital and operating funding have not been identified for this alternative.

EXPRESS BUS TO NEW YORK - FINDINGS

The findings of this bus alternative will be shared with local operators to assist in their future bus service decision-making. The modeled bus services indicate that the Bethlehem to New York express bus service deserves further consideration. New York express bus services from Easton and Allentown would require adjustments in frequencies and perhaps additional stops to make the services sufficiently cost-effective. These adjustments would be made in the context of the overall set of services from the Lehigh Valley to New York.

EXPRESS BUS TO BRIDGEWATER

BACKGROUND

The Bridgewater area in Somerset County, NJ is a major employment center, and the destination of many commuters from the Lehigh Valley. According to the 2000 Census, nearly 3,000 people per day leave Lehigh and Northampton Counties bound for job sites in Somerset County, a number which has grown with the population growth in the Lehigh Valley and additional job growth in suburban NJ. There is currently no transit service offered in this corridor.

ALTERNATIVE DESCRIPTION

This alternative would provide express service from the William Penn Route 33 Park-and-Ride and Easton Intermodal Terminal to employment sites in Bridgewater, Raritan and Somerville, NJ. Buses would serve the two park-and-rides, and then access Interstate 78 (I-78) by the most direct possible route, and then proceed to the Bridgewater area via Interstate 287 (I-287). This service would take advantage of proposed bus-on-shoulder operation along the most congested sections I-78 in NJ, as described in the NJ Component Study. The proposed bus-on-shoulder operation would

benefit bus travel times by up to 9 minutes in the AM peak period. This service would be operated by a private operator.

SERVICE CONCEPTS

MAJOR DESTINATIONS SERVED

- **Somerset Corporate Center**
- **Ethicon**
- **MetLife**
- **Ortho-McNeil**
- **Somerset Medical Center**

These services would provide express bus service from the William Penn Park-and-Ride and planned Easton Intermodal Center to major employment centers in and around Bridgewater, NJ. Major destinations would be served with direct service with bus stops as close as possible to the building entrances. Other job sites would be served with the closest possible stop to the job site.

The service would originate at the William Penn Park-and-Ride at the intersection of Route 33 and William Penn Highway. Then, after serving the planned new Easton Intermodal Center, located at the Southwest corner of Ferry Street and South 3rd Street, it would travel non-stop through South Easton to I-78. On I-78, it would be able to take advantage of proposed bus-on-shoulder operation before entering I-287 South to the Bridgewater area.

SERVICE

Buses would operate every 15 minutes in the peak period (6-9 AM arrival in Bridgewater) and every 60 minutes in the off-peak. No reverse peak or weekend service is assumed.

Future Year (2030) Travel Time to Bridgewater

	To First Bridgewater Stop	To Last Bridgewater Stop
William Penn	50 min.	90 min.
Easton	38 min.	78 min.

RIDERSHIP

The Bridgewater service would generate 50 daily riders, or boardings, or 100 daily riders, making 200 daily one-way trips in 2030. Of these, 68% would board at the William Penn Park-and-Ride, while 32% would board at the Easton Intermodal Center. All of this ridership is new to transit, and is diverted from automobile trips.

The assumed fares to Bridgewater are consistent with private operator fares as of January 1, 2010. From either William Penn or Easton, one-way fares would be $12.25 one-way and a 40-trip book would be $228.00. These fares are assumed to rise with inflation, although the actual fares at the time of service implementation will reflect the then current fares structure in place.

2030 Average Daily Bus Ridership

	Bus Service	Riders (Boardings)	One-Way Trips
Proposed Bridgewater Express Bus Service	William Penn	68	136
	Easton	32	64
	TOTAL	100	200

INSTITUTIONAL ISSUES

New bus service would be operated by a private operator under the same conditions that affect current operators. Access to bus facilities would be subject to agreements between the operators and the facility owners.

FINANCIAL

As the proposed service would be operated by a private operator, capital and operating costs would be dependent on that operator's labor costs and operational capacity. Assuming a new fleet of buses would be required to operate the

service, 15 new vehicles would be needed, resulting in a capital cost of $8.25 million. However, if is likely that the operator of this service has additional unutilized vehicles, this cost may be reduced. Capital and operating funding have not been identified for this alternative.

EXPRESS BUS TO BRIDGEWATER - FINDINGS

The findings of this proposed bus alternative will be shared with local operators to assist in their future bus service decision-making, however based on the analysis; the proposed express services to the Bridgewater appear to not be cost-effective.

NEXT STEPS

The Pennsylvania Component study developed preliminary constructability, ridership and cost information for rail and bus alternatives which can used by local decision makers to determine whether any alternatives are warranted and should be advanced. No final determinations have been made as a result of this study and no funds have been identified to initiate the next phase of alternative development.

The bus information will be shared with local operators to assist in their future bus service decision-making. Variations to the short listed rail alternative could be studied prior to proceeding into an AA/EIS phase. The costs of these feasibility studies are estimated to be in the $200,000 to $500,000 range, and depend on the number of options included. Potential variations that have been identified for further consideration include: extending commuter rail service from Phillipsburg, NJ to Bethlehem, PA; extending commuter rail to Easton, PA; and using the former railroad right-of-way on the north side of the Lehigh River to Easton, PA.

1. PURPOSE AND NEED

1.1. Introduction

The Central NJ/Raritan Valley Transit Study (CNJ/RV) - Pennsylvania Component is an extension of the NJ TRANSIT CNJ/RV Transit Study, which assessed commuter bus and commuter rail transit improvement alternatives along Interstate 78 (I-78) in New Jersey. The purpose of the Pennsylvania Component Study was to build upon the New Jersey portion of the study (New Jersey Component Study) by identifying and assessing actions to increase the amount and efficiency of rail and bus services along the Route 22 and I-78 corridors in the Lehigh Valley and the northern New Jersey/New York Urban Core (Jersey City, Newark, Midtown Manhattan and Lower Manhattan).

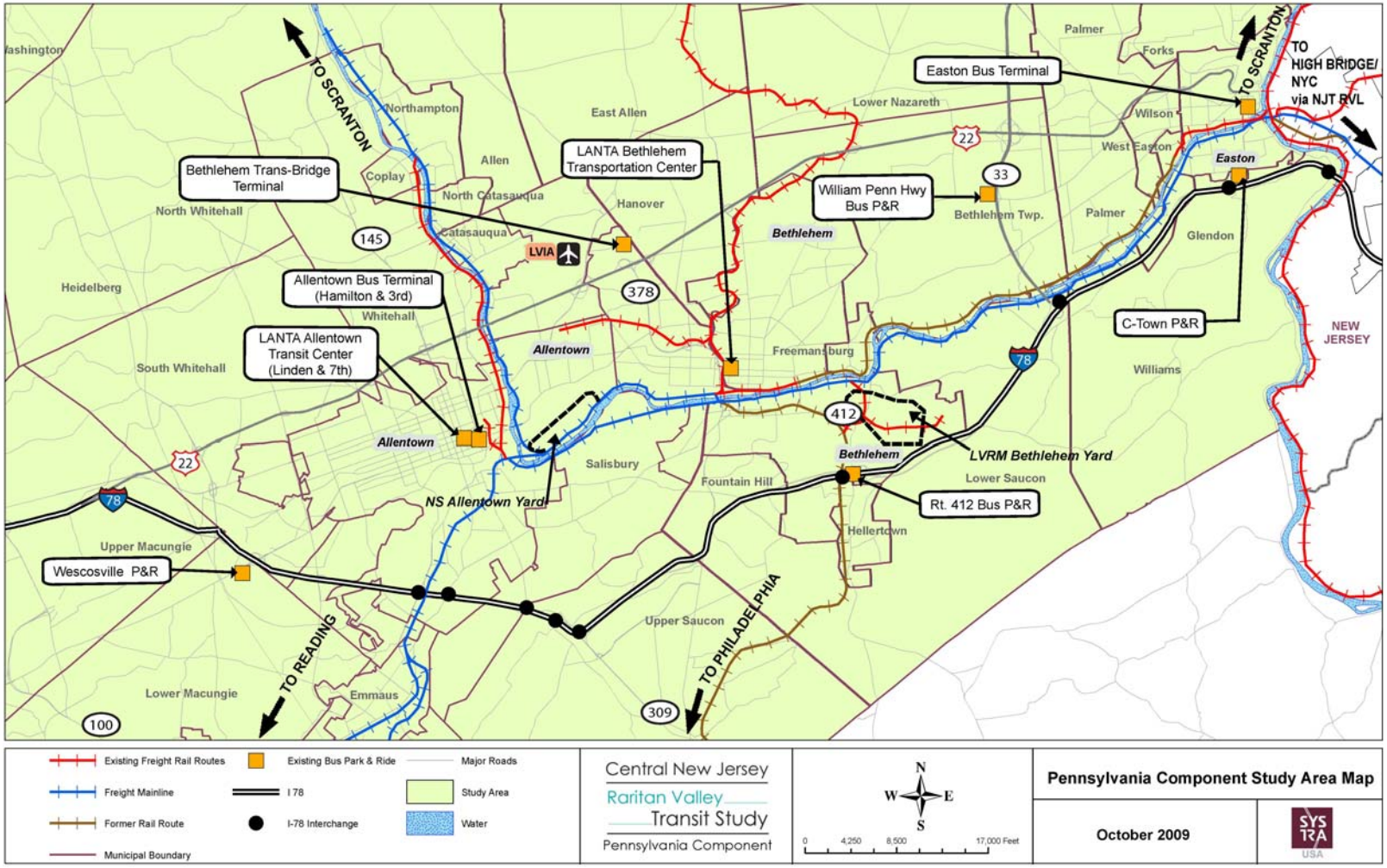
The project is sponsored by the County of Northampton, Pennsylvania, County of Lehigh, Pennsylvania and the Lehigh Valley Economic Development Corporation, in collaboration with the Lehigh Valley Planning Commission and NJ TRANSIT.

Both the Pennsylvania and New Jersey Components of the study sought to define a comprehensive set of short, medium and long-term actions to address present and forecasted future congestion problems along the I-78 corridor in New Jersey, which are expected to worsen over the years without intervention. For the Pennsylvania Component, importance was also placed on reducing dependency on single-occupant auto travel and enhancing travel choices for Lehigh Valley residents, as well as promoting economic development in the three urban centers of Easton, Bethlehem and Allentown.

1.2. Study Area

The Pennsylvania Component Study Area is comprised of Northampton and Lehigh Counties, primarily covering the three urban centers (Easton, Bethlehem, and Allentown), the rail alignments through the Lehigh Valley that could connect to the NJ TRANSIT Raritan Valley Line (RVL) commuter rail service, and roadways that connect to I-78. The Study Area is shown in Figure 1.

Figure 1: Pennsylvania Component Study Area with Existing Commuter Bus Facilities and Rail Routes



1.3. Existing Study Area Transit Services and Park-and-Rides

Lehigh Valley residents commuting to New Jersey/New York have limited transit options. Park-and-ride lots located in the Lehigh Valley provide access to bus service to the Port Authority Bus Terminal (PABT) in Midtown Manhattan, Lower Manhattan (Wall Street) and Jersey City, and are shown in Figure 1. Also, park-and-ride facilities located in New Jersey are used by Lehigh Valley residents. The following table lists the existing Pennsylvania park-and-ride facilities, with bus services, parking capacity and utilization at locations where counts were recently taken. Park-and-ride facilities are located in both downtown areas and along Route 22, Route 33 and I-78. Because of limited markets and park-and-ride capacity in downtown locations, service to these locations is minimal. Walk-up commutation markets in the more densely developed residential areas are also minimal. However, service from the highway-located facilities is commensurate with market demand and park-and-ride capacity, and is attractive, with service frequencies of at least every 30 minutes in peak periods.

Table 1: Existing Lehigh Valley Bus Park-and-Ride Utilization

NAME	LOCATION	BUS SERVICE PROVIDERS	BUS SERVICE DESTINATIONS	NUMBER SPACES AVAILABLE	NUMBER OF SPACES UTILIZED
Easton Bus Terminal	Downtown Easton	Trans-Bridge, LANTA	PABT	N/A (see note 1)	N/A (see note 1)
C-Town	South Easton, Line and Davis Streets	Trans-Bridge	Wall Street, Jersey City	N/A (see note 2)	37
William Penn	Route 33 at William Penn Highway — Bethlehem Township	Trans-Bridge	PABT, Wall Street, Jersey City	221 (see note 3)	263
Route 412/Hellertown	Route 412 at I-78	Bieber	PABT	101 (see note 4)	138
Bethlehem-LVIP	North Bethlehem near Lehigh Valley Airport	Trans-Bridge	PABT, Wall Street, Jersey City	298	273
Allentown Bus Terminal	Hamilton Street at American Parkway	Trans-Bridge	PABT	75	31
Allentown Intermodal Transportation Center	West Linden Street at North 7th Street	LANTA	Local	N/A (see note 1)	N/A (see note 1)
Wescosville	Hamilton Blvd. at Route 222	Bieber	PABT	297	221

Source: LVPC counts (September/October 2009) except Bethlehem-LVIP and Wescosville, LVEDC counts (October 2009)
Note 1: Shared use facility; cars parked for the purpose of commuters can not be determined through counts. Consequently, no counts were made.
Note 2: Park-and-ride function within the overall parking facility is not defined
Note 3: Parking expansion is planned at William Penn park-and-ride. New capacity will be approximately 1,250 spaces.
Note 4: Parking expansion is underway at Route 412/Hellertown park-and-ride. New capacity will be approximately 250 spaces.

Due to shorter in-vehicle travel times and frequent service, many Lehigh Valley residents drive east into New Jersey to park at facilities with easy access to I-78, as shown in the following table.

Table 2: Pennsylvania Parkers at New Jersey Park-and-Ride Facilities

NAME	CAPACITY	SHARE OF PARKERS FROM PENNSYLVANIA
Phillipsburg Mall (bus)	127	40%
Clinton Point (bus)	305	7%
Annandale Square (bus)	110	11%
Annandale (rail)	77	15%

Source: I-78 Corridor Transit Study (2006)

Rail service is provided by NJ TRANSIT on the RVL between Newark and High Bridge, NJ, 20 miles east of Phillipsburg, NJ. Accessing the RVL from the Lehigh Valley requires driving across the Delaware River through Warren and Hunterdon Counties in NJ along I-78 and possibly I-287 in areas of those highways that are now or are forecasted to be congested. Park-and-ride facilities at rail stations that could be used by Lehigh Valley residents (generally stations between Bridgewater and High Bridge are usable, based on travel times via I-78) are used to capacity, except at Bridgewater, where there currently is some availability.

Passengers traveling by rail to Midtown Manhattan must transfer at Newark to NJ TRANSIT's Northeast Corridor or North Jersey Coast lines for service to Penn Station New York (PSNY), or PATH to Lower Manhattan. In the future, after the opening of the Mass Transit Tunnel and new Midtown Manhattan rail station (Access to the Region's Core (ARC) project), RVL trains will have direct access to Midtown Manhattan thereby eliminating the transfer at Newark. However, due to capacity limitations in the Midtown Manhattan terminal that will remain even after the ARC project is completed some RVL trains will continue to terminate at Newark. The ARC service improvement will warrant increased service frequencies, making the RVL an even more attractive choice. The RVL as modified for the purpose of the PA Component study (with the ARC project and the extension to Phillipsburg in place) is shown in Figure 2. Potential RVL extension to western NJ and PA is discussed in Chapter 3.

1.4. Study Goals and Objectives

The goals and objectives for the Pennsylvania Component of the study are presented in Table 3. They were established at the outset of the study in conjunction with stakeholder groups and play a key role in the alterative development and screening process. The stakeholder groups are described in Chapter 2.

Figure 2: NJ TRANSIT's Raritan Valley Line as Modified for the Pennsylvania Component Study

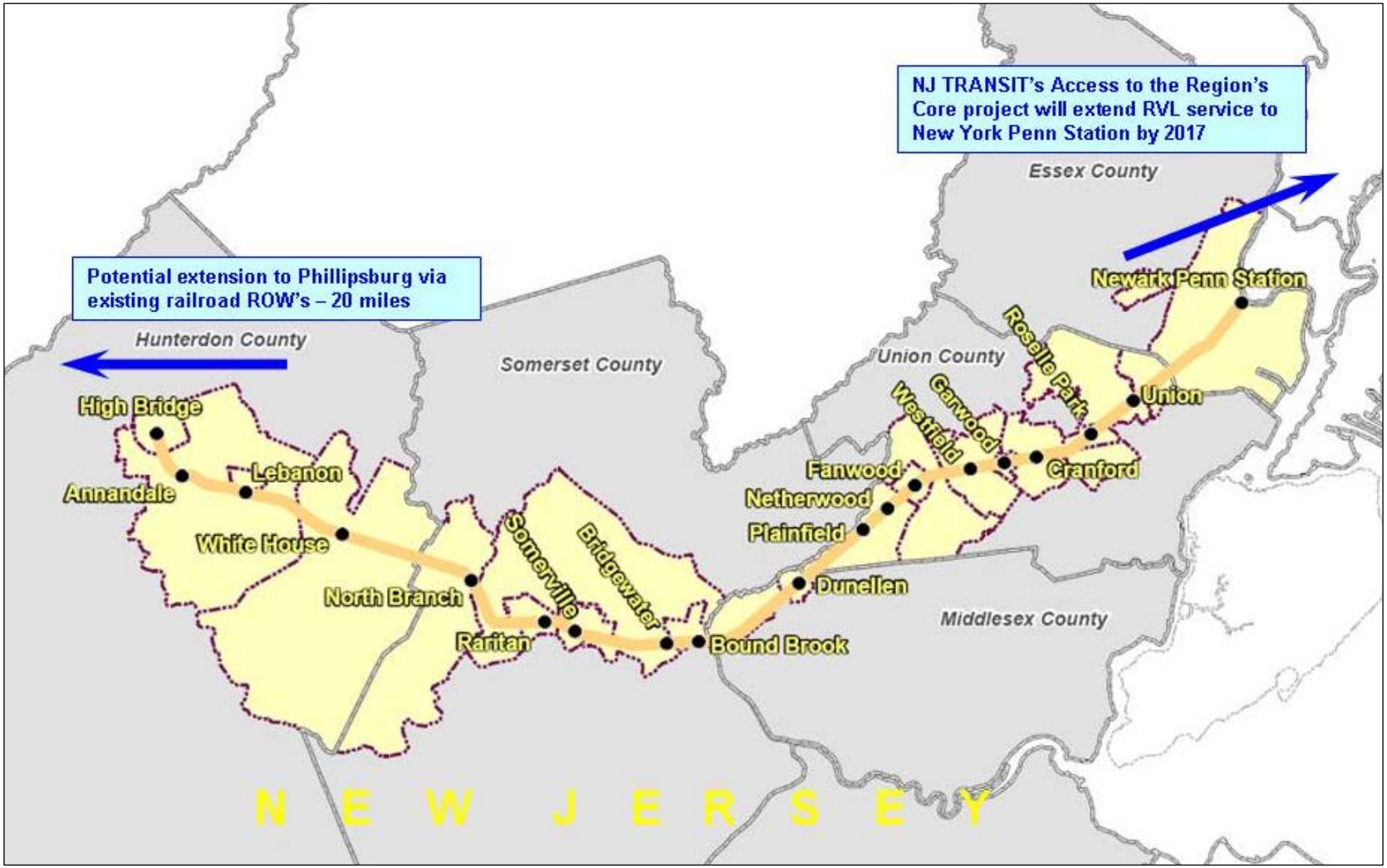


Table 3: Study Goals and Objectives

TRANSPORTATION
• Improve mobility within the study area between the Lehigh Valley and the North Jersey/New York areas • Reduce the growth of peak period traffic congestion along I-78 and other key roadways • Improve multi-modal regional transportation and promote connectivity of transportation systems, including walking, biking, buses, auto, trails and freight rail • Improve the image of public transit as an attractive, safe and viable form of transportation through the study area • Increase transit ridership • Expand work commute options for residents • Connect important work destinations and major employers with new transit services and connections to transit routes and systems • Promote and support non-work related transit trips • Maintain and/or reduce travel time • Improve the connectivity of existing transit services in the region and make better use of existing transportation facilities • Provide the ability for phased implementation, as well as projects with short-term implementation
ENVIRONMENTAL/COMMUNITY
• Minimize environmental impacts to the preexisting, natural and community environment • Implement transit improvements so that community impacts are minimized • Reduce the region's dependence on fossil fuels and reduce greenhouse gas emissions • Encourage dense development and redevelopment in the three Lehigh Valley urban cores – Allentown, Bethlehem and Easton • Encourage more transit-friendly communities with mixed-use pedestrian-friendly transit station areas, where desired • Attract and retain young professionals to live and work in the Lehigh Valley; and increase residential density in the urban cores • Incentivize good land use planning and urban revitalization through the location of recommended facilities
FINANCIAL
• Develop cost effective alternatives • Increase overall transit revenues • Invest financial resources efficiently and effectively • Implement financially sustainable transit improvements

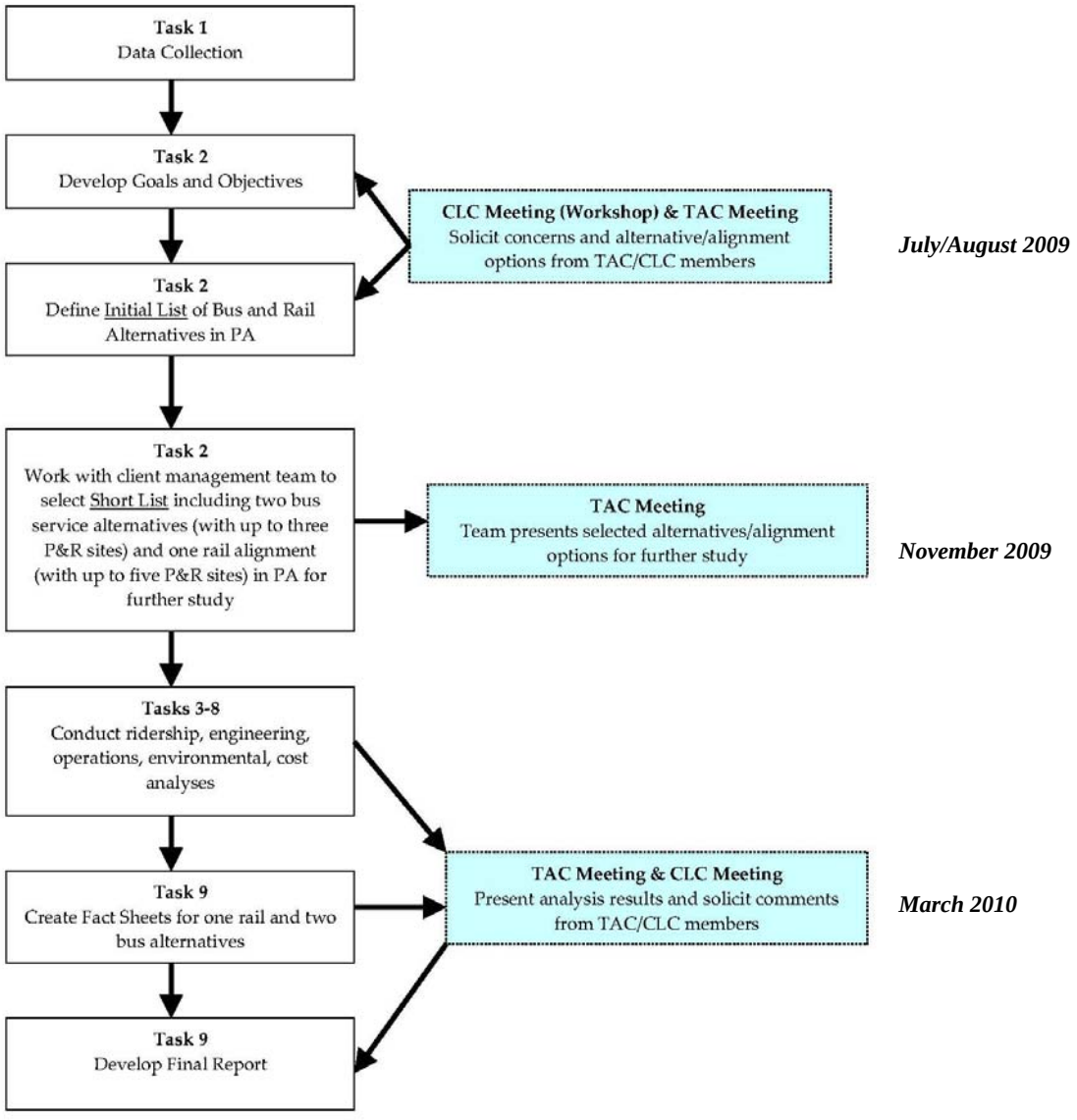
1.5. Planning Context

The FTA planning and project development process, in which federal, state and local officials plan and make decisions regarding major transit capital investments, contains five phases: 1) System Planning; 2) Alternatives Analysis (AA); 3) PE/EIS; 4) Final Design; and 5) Construction. The CNJ/RV - Pennsylvania Component Transit Study completes a Feasibility Analysis, within the System Planning to the Alternatives Analysis. This study is within the pre-System Planning Phase, to determine feasibility and costs for a wide range of alternatives, as well as the next steps for advancement to the Alternatives Analysis and further phases.

2. PUBLIC INVOLVEMENT

The goal of the public involvement process was to engage a diverse group of public and agency participants to solicit relevant input and provide timely information throughout the study. The public involvement process included regular meetings with agency officials and municipal workshops with the various stakeholders to explain and present the process and findings of the study, gain public input in the planning process, as well as inform the public of progress updates. The stakeholder groups were represented by two committees organized for the Pennsylvania Component Study. The Community Liaison Committee (CLC) represented municipalities and local interest groups such as higher education facilities and economic development organizations. The Technical Advisory Committee (TAC) was made up of county, regional and state-level transportation and planning agencies. The following figure shows the study milestone CLC and TAC meetings. The CLC met in July 2009 and March 2010 and the TAC met in August 2009, November 2009 and March 2010. Appendix F includes TAC/CLC public involvement materials.

Figure 3: Alternative Development/Meeting Flowchart



3. ALTERNATIVES CONSIDERED

3.1. Long List Alternatives Development and Screening Process

The Pennsylvania Component Long List was developed based on data collected at the outset of this study, the results of the New Jersey Component study as they relate to the Lehigh Valley, and information gathered during the Pennsylvania Component Study's first set of CLC workshops in July 2009 and first TAC meeting in August 2009.

A qualitative evaluation of the rail and bus alternatives was conducted to generate a short list of one rail and two bus alternatives, with associated stations and park-and-rides for each mode, for further evaluation. The short list recommendations were reviewed and approved by the Technical Advisory Committee on November 12, 2009. The *Alternatives Definition and Shortlisting Memo* (December 2009) which documents the shortlisting process is included in Appendix A. The results are summarized in Table 4.

Table 4: Long List to Short List Alternative Screening Results

LONG LIST ALTERNATIVE NUMBER	LONG LIST NAME	SCREENING RESULTS
COMMUTER RAIL ALTERNATIVES		
1	RVL Rail Extension to Lehigh Valley International Airport via North Alignment	*Eliminated from further study* – Added cost of new right-of-way and circuitous route to air passenger terminal
2	RVL Rail Extension to Allentown via North Alignment	*Eliminated from further study* - Impacts to recreational uses now occupying former right-of-way and stations in Allentown and Bethlehem would not be suitably located to support community redevelopment goals; route passes through NS Allentown Yard
3	RVL Rail Extension to Allentown via South Alignment	Short List
COMMUTER BUS ALTERNATIVES		
4	South Easton Bus Park-and-Ride	Short List
5	South Bethlehem/Sands Bus Park-and-Ride	Short List
6	Downtown Allentown Express Bus Service	Short List
7	William Penn Express Bus Service to Bridgewater Area, NJ	Short List
8	BethWorks Multimodal Facility	Short List
Complementary	Route 22 Bus Shoulder Operations	*Eliminated from further study* - Insufficient shoulder widths at overhead bridge abutments

Alternative 3, the RVL Rail Extension to Allentown via South Alignment, was selected for further study. While Alternatives 1 and 2 were dropped, the location of Easton Station on the north alignment is favored by City of Easton officials, and the north side station site and alignment within the City of Easton is estimated to be less costly than on the south side

alignment. However, west of Easton, the north side alignment is flawed to the extent that it should not be further considered. Five Long List bus alternatives were combined into two short list bus alternatives, as shown in Table 5.

Table 5: Short List Alternatives

SHORTLISTED ALTERNATIVE NAME	MODE	DESCRIPTION
Commuter Rail Extension to Allentown	Rail	Extension of RVL service from High Bridge and Phillipsburg, NJ to the Lehigh Valley via the Delaware River CNJ bridge. Route follows NS south alignment with station stops in Easton, Bethlehem and Allentown.
Express Bus to New York	Bus	Three new express, non-stop bus routes from Easton, South Bethlehem and Allentown Central Business Districts. Service would depart from each of these facilities, and proceed non-stop to the PABT in Midtown Manhattan. Buses would access I-78 by the most direct possible route, and then proceed to NY via the Lincoln Tunnel Express Bus Lane.
Express Bus Bridgewater	Bus	New express service from the William Penn Route 33 Park-and-Ride and Easton Intermodal Terminal to employment sites in Bridgewater, Raritan and Somerville, NJ. Buses would serve the two park-and-rides, and then access I-78 by the most direct possible route, and then proceed to the Bridgewater area via I-287.

3.2. Future No Build Condition

3.2.1. Commuter Rail Service

The Pennsylvania Component study assumed that the New Jersey Component extension to Phillipsburg was in place, with stops in Hampton and Bloomsbury/Bethlehem.

It is important to note that there are no plans or funding mechanisms for the construction or operation of the NJ portion. With any extension of rail service into Pennsylvania, an operating agreement between a Commonwealth of Pennsylvania agency and NJ TRANSIT would be required, to address shared costs, liabilities and other issues. If at some point in the future RVL rail service in New Jersey is extended to a point east of Phillipsburg (Hampton and Bethlehem (NJ) were other potential termini developed in the NJ Component Study), the costs for the Pennsylvania Component would need to consider the costs within New Jersey of reaching the NJ service termini.

Two options for the rail extension were short listed for the New Jersey Component Study – using the out of service NJ TRANSIT-owned former Central Railroad of New Jersey Main Line entirely between High Bridge and Phillipsburg, or in combination with the Norfolk Southern Railway's (NS) Lehigh Line, which has a heavy amount of freight activity. The alternatives are called RVL Extension via CNJ and RVL Extension via NS, respectively. Either route would have the same route length, travel time and ridership forecasts. Also, both options terminate at the same point in Phillipsburg. To continue west, it would use the active NS Lehigh Line Bridge (formerly CNJ) over the Delaware River into Pennsylvania. One track of this two-track bridge is currently being used. The other track would be used for passenger service (preferably the north side). Should NS determine that two tracks over the Delaware River are needed to support future

freight growth, NS may reserve the second track for its use. In this event, the rail alternative may need to relocate NS operations to the former Lehigh Valley Line Delaware River Bridge just to the south, resulting in increased costs for relocating freight tracks and for rehabilitation of the currently out-of-service bridge.

The Pennsylvania Component No Build includes the Access to the Region's Core (ARC) 2030 service plan, with trains extending from High Bridge to Phillipsburg. With NJ TRANSIT's ARC project, which is currently under construction and is expected to be operational in 2017, some RVL trains will have direct access to Midtown Manhattan, thereby eliminating the transfer at Newark. However, due to continued capacity limitations for service to New York, some RVL trains will continue to terminate at Newark.

3.2.2. Commuter Bus Service

In the No Build, all existing (January 2010) bus service was assumed to remain in the future year scenarios. In addition, the following projects were assumed to be completed:

- Completion of the American Parkway Bridge in Allentown and extension to Route 22
- Expansion of park-and-ride lots at William Penn and Route 412; and
- Completion of the Easton Intermodal Center with $2/day parking costs
- Implementation of Bus Shoulder Lanes on routinely congested segments of Route 78 in Hunterdon and Somerset Counties in New Jersey.

3.3. Shortlisted Bus Alternatives

3.3.1. Overview

Two bus alternatives emerged from the shortlisting process:

Express Bus to New York

New express, non-stop bus services from the three core cities of the Lehigh Valley to New York City. These services would depart from the new Easton Intermodal Center, the proposed South Bethlehem (BethWorks) multimodal facility and the existing Allentown Bus Terminal.

Express Bus to the Bridgewater Area

New express bus service from the Lehigh Valley to major employment centers in and around Bridgewater in Somerset County, NJ. This service would board passengers at the William Penn Route 33 Park-and-Ride and the new Easton Intermodal Center.

3.3.2. Bus Service Plans and Equipment

The express New York bus service would depart the three downtown bus terminals, and operate non-stop to the Port Authority Bus Terminal in New York. Each of these three services are proposed to operate every 15 minutes in the peak period (arriving in New York 6-9 AM), with no off-peak, reverse-peak or weekend service. This is an overlap service, and does not involve a reduction of service on existing New York bus routes.

The Bridgewater service would depart the William Penn/Route 33 Park-and-Ride, and pick up passengers at the Easton Intermodal Center. This service is proposed to operate every 15 minutes in the peak period (arriving in Bridgewater 6-9 AM), and hourly in the off-peak. No reverse peak or weekend service is planned.

Travel times for bus services are dependent on the speed of traffic on the roadways over which they travel, unless dedicated bus-only facilities are built. These two proposed bus service alternatives are planned to take advantage of proposed bus-on-shoulder operations over the most congested parts of I-78 in Hunterdon and Somerset counties. This improvement concept was identified in the New Jersey Component study. These proposed improvements would save buses approximately 9 minutes in the eastbound direction in the AM peak period and 2 minutes in the westbound direction in the PM peak period. Travel times for these bus services, including benefit from bus-on-shoulder operations are detailed in the following table. The proposed bus-on-shoulder operation has not been approved by NJDOT or the Federal Highway Administration, and is not funded.

Table 6: Bus Alternatives Travel Times

BOARDING LOCATION	EXPRESS BUS TO NEW YORK TRAVEL TIME (MINUTES)	EXPRESS BUS TO FIRST STOP IN BRIDGEWATER AREA TRAVEL TIME (MINUTES)	EXPRESS BUS TRAVEL TO LAST STOP IN BRIDGEWATER AREA TRAVEL TIME (MINUTES)
Allentown Bus Terminal	129	---	---
South Bethlehem (BethWorks)	113	---	---
William Penn/Route 33	---	50	90
Easton Intermodal Center	100	38	78

3.3.3. Bus Routes

New York Express Bus from Allentown service would depart the existing Allentown Bus Terminal at the corner of Hamilton Street and 3rd Street, and travel via American Parkway, the planned American Parkway Bridge, Route 22 East and Route 33 South to reach I-78.

New York Express Bus from South Bethlehem service would depart the proposed BethWorks multimodal facility on 3rd Street. It would then reach I-78 via 3rd Street/Daly Avenue, 4th Street and Hellertown Road/Route 412.

New York Express Bus from Easton service would depart the planned new Easton Intermodal Center at South 3rd Street and Ferry Street, and to reach I-78 via South 3rd Street, Smith Street, St. John Road, Philadelphia Road and Morgan Hill Road.

The Bridgewater Area Express Bus eservice would depart the William Penn/Route 33 Park-and-Ride in Bethlehem Township, and pick up passengers at the new Easton Intermodal Center before operating non-stop to the Bridgewater area via I-78 East and I-287 South. The service would serve major employers directly, with bus stops as close as possible to building entrances. Other job sites would be served with the closest possible stop on the main roadway. Major employment sites to be served include, but are not limited to: Somerset Corporate Center, Ethicon, MetLife, Ortho-McNeil and Somerset Medical Center.

Figure 4: Proposed Express Bus to New York Service Routing

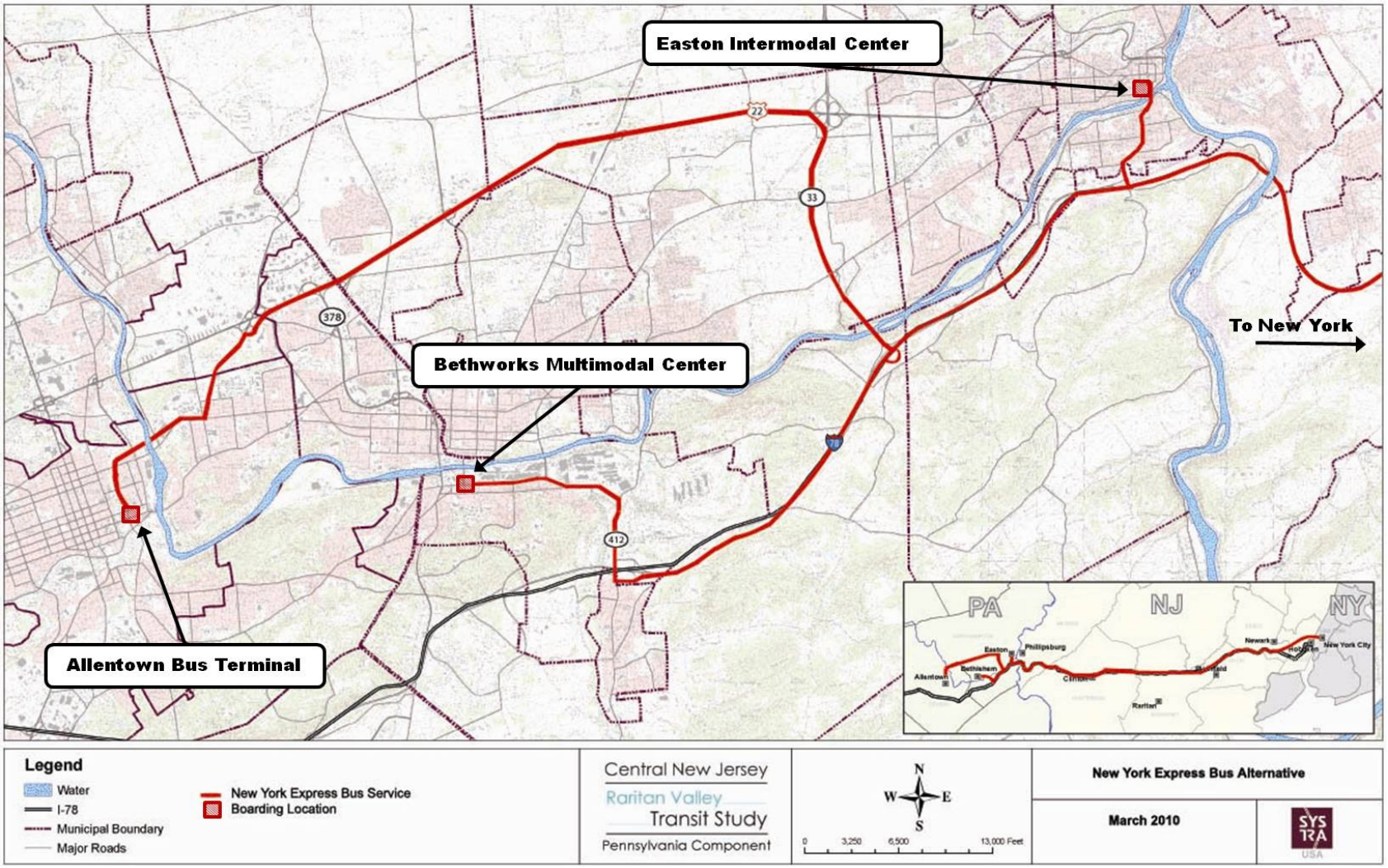
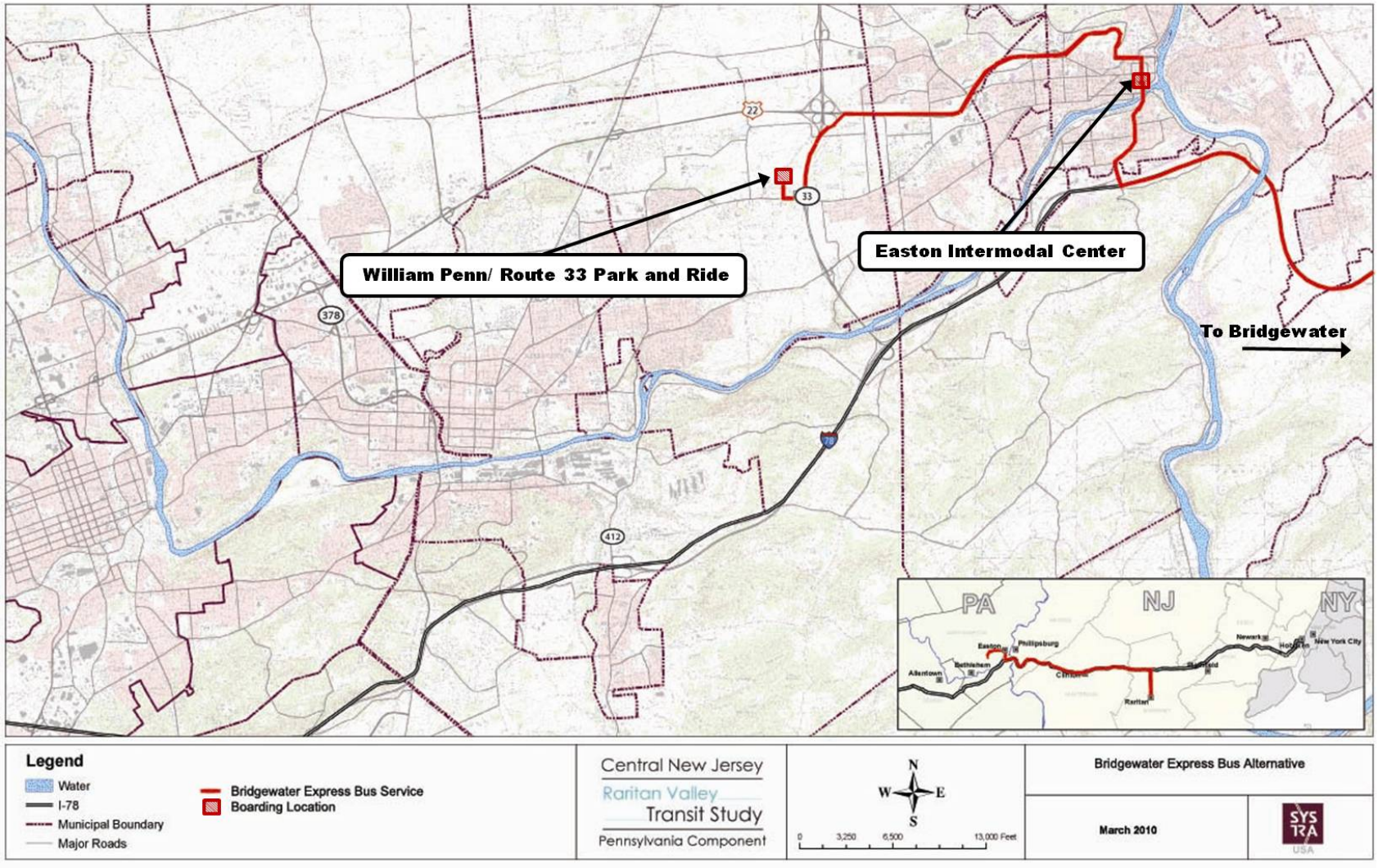


Figure 5: Proposed Express Bus to Bridgewater Service Routing



3.4. Shortlisted Rail Alternative

3.4.1. Overview

The rail alternative would be an extension of RVL service 17 miles from Phillipsburg, NJ to Allentown, PA along the south side of the Lehigh River. The proposed route would use the Norfolk Southern (NS) Lehigh Line and Reading Line right-of-way in Easton/Bethlehem and the RJ Corman right-of-way (Lehighton Industrial Track) in Allentown. New dedicated passenger track and passing sidings would be provided, with shared freight tracks in some locations. Three new stations would be located in Easton, Bethlehem and Allentown. The alignment is shown in Figure 6. The NS Lehigh Line and Reading Line is a heavily used freight main line that connects the metropolitan New York area with the Midwest. Passenger operations to the extent possible need to be on an exclusive track in order to maintain quality freight operations. Connections to other freight branch lines and customers are light density and operations to and from these connections are assumed to be scheduled around passenger operations. NS has not reviewed the proposed alignment, as is their general policy at this early stage of project development.

With any extension of rail service into PA, an operating agreement between a Commonwealth of Pennsylvania agency and NJ TRANSIT would be required, to address shared costs, liabilities and other issues. If at some point in the future RVL rail service in New Jersey is extended to a point east of Phillipsburg (Hampton or Bloomsbury/Bethlehem), the costs for the Pennsylvania Component would need to consider the costs within New Jersey of reaching Phillipsburg.

3.4.2. Rail Service Plan and Equipment

Consistent with the assumptions made in the New Jersey Component Study, all RVL trains that are proposed to operate to/from High Bridge and Newark, NJ/Midtown Manhattan in 2030 would be extended to Allentown. The service plan includes:

- 8 AM peak period inbound trains (6-10 AM arrival in Newark/New York) with limited reverse peak service
- 8 PM peak period outbound trains (4-8 PM departure from Newark/New York) with limited reverse peak service
- Hourly off-peak and evening service in each direction
- Limited weekend service

Future Year (2030) Travel Time to New York

155 minutes from Allentown

144 minutes from Bethlehem

128 minutes from Easton

Travel times between each proposed station and the two eastern terminals are shown in Table 7.

Consists will be made up of up to ten bi-level coaches with two dual mode locomotives; one locomotive will be placed at each end. Trains will operate with diesel propulsion along the RVL extension and on the existing RVL. On the Northeast Corridor near Newark, propulsion for New York-bound trains will change to electric, so that the trainset can operated in the Hudson River tunnels to and from Midtown Manhattan. A total of ten trainsets are needed to operate proposed weekday service between Allentown and Newark/New York. This is one additional trainset compared to extending the RVL to Phillipsburg, NJ only. At least one additional transit beyond the ten revenue service trains is needed as a spare.

Table 7: Forecasted Rail Travel Times

STATION TO STATION	TRAVEL TIME (MINUTES)
Allentown to Bethlehem	11
Bethlehem to Easton	16
Easton to Philipsburg	3
Philipsburg to Bloomsbury/Bethlehem	9
Bloomsbury/Bethlehem to Hampton	9
Hampton to High Bridge	7
High Bridge to Newark	80
Newark to New York	20
Allentown to New York	***155***

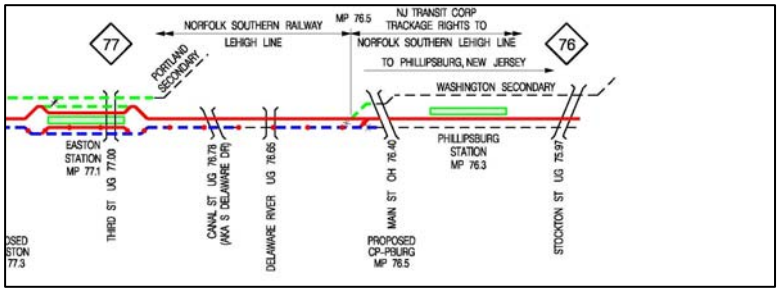
3.4.3. Rail Alignment/Right-of-Way

Detailed conceptual engineering alignment drawings and station drawings can be found in Appendix B. The alignment is based on the track infrastructure in place as of 2008. A description of the alignment follows. In addition, Table 8 and Figure 7 provide detail on how the passenger route will be co-located with freight tracks. Insets of Figure 7 are presented with the rail alignment description.

The rail alignment would include an extension of the RVL from High Bridge, NJ into the Lehigh Valley. The New Jersey Component includes the extension from the existing High Bridge Station, the current western RVL terminal, to a new station in Phillipsburg, NJ. The Pennsylvania Component alignment would begin just west of the proposed Phillipsburg station.

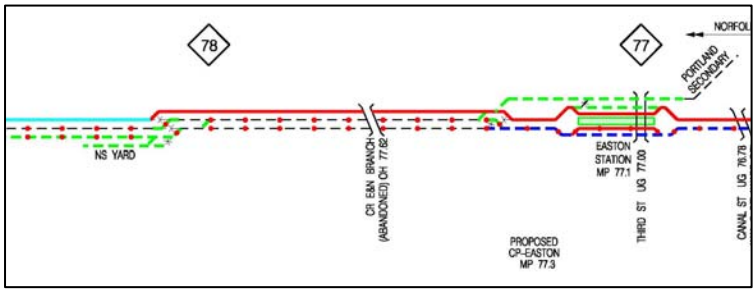
Phillipsburg, NJ to Glendon, PA (MP 76.3 to MP 81)

In this segment, one or two freight tracks are in place today. In Glendon, no new track is proposed to be added to the two existing tracks due to constrained right-of-way and proximity to roads and the canal Therefore passenger operations must utilize the existing two tracks and mix with freight operations. To maintain reliability, track crossovers have been added and the configuration of Easton Station has been set up so that freight or passenger service can operate on either track. The preferred route is to have passenger operations on the northerly track and freight operations on the southerly track.



The single-track passenger alignment would continue west from the proposed Phillipsburg, NJ station into Easton, PA, with a crossover to the single freight track. Additionally, the existing Washington Secondary connection would be relocated to connect to the proposed passenger track. The alignment would continue over the existing Delaware River NS Lehigh Line Bridge (CNJ Bridge), with the passenger track on the north side of the existing two-track bridge and the freight track remaining as is on the south side.

Approaching the proposed Easton Station, the existing Canal and Third Street Bridges would require reconstruction to properly align the tracks to accommodate the station location/configuration. The proposed Easton station would include a center island platform with two gauntlet tracks on either side. The proposed gauntlet tracks allow freight trains to pass by the new station without interfering with the high-level platforms.



Just west of Easton station, the Portland Secondary would be relocated and connect to the new passenger track, with a connection to the freight track also located west of Easton Station. The single-track passenger alignment continues west of Easton station. Just east of the existing NS yard, the new passenger track shifts to the south, replacing an existing freight track through the yard. The shift is required due to proximity to the Lehigh River. To maintain yard operations, a new freight track would be constructed between the southerly freight main track and the existing yard track. Additionally, a connection to the new single NS yard track would be constructed so that it continues to be accessible to the Portland Secondary and Washington Secondary. Turnouts to the yard siding track are currently not interlocked and are not proposed to be interlocked.

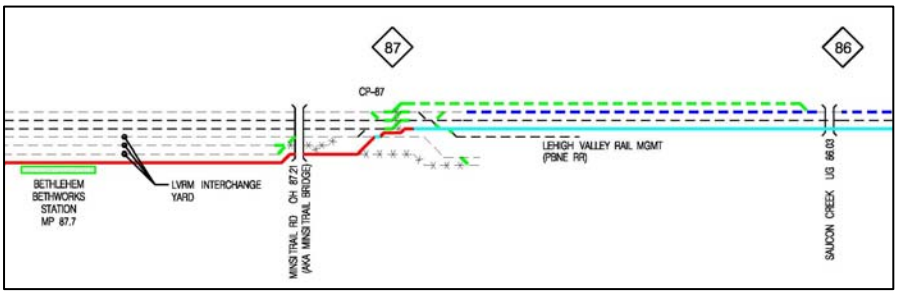
In Glendon, the single passenger track would merge with the existing northerly freight track and a crossover would be installed for access to the southerly freight track. In this area, a third track for passenger operations cannot be constructed. Passenger operations would mix with freight operations on the existing (upgraded) two tracks. In order to maintain maximum flexibility, crossovers are proposed on each side of this shared two-track section. Just west of Glendon, the shared passenger alignment diverges from the existing freight track to a new dedicated single passenger track on the south side of the existing freight tracks. In Williams Township (between Island Park and Hugh Moore Park), the dedicated single passenger track would shift north, replacing the existing south NS freight track. This shift is required due to proximity to an existing roadway. As a result, a new freight track would be constructed north of the existing NS line.

Glendon, PA to Bethlehem, PA (MP 80 to MP 88)

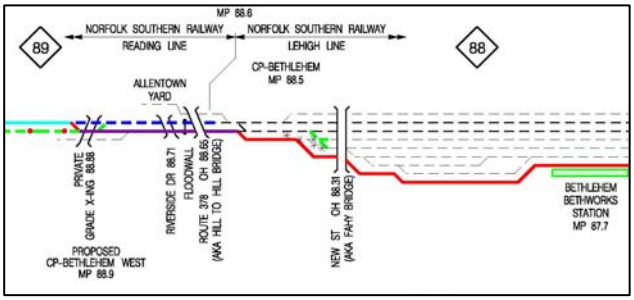
In this segment a new track is proposed on the south side of the freight main tracks. Track shifts and the repurposing of existing tracks for passenger use, while constructing new tracks for freight use, is proposed. The passenger operation is expected to be nearly exclusive, with provisions for NS movements on the passenger track if needed and for Lehigh Valley Rail Management (LVRM) to maintain operation between their interchange yard on the NS right-of-way and their facilities to the south.

The single passenger track would continue through Lower Saucon Township and into the City of Bethlehem. The Saucon Creek Bridge currently supports two main freight tracks and a freight siding track. Track shifts in the area approaching the bridge are proposed to avoid the reconstruction of the

bridge. Just west of the Saucon Creek Bridge, the existing NS siding is shifted and repurposed as the new northerly freight track. The siding track would be reconstructed on the north side of the main freight tracks, but only on the west side of the bridge. The length of the siding is reduced to 11,700 feet from 13,900 feet.



Approaching the existing Lehigh Valley Rail Management (LVRM) Interchange Yard, the single passenger track diverges to connect to the existing yard lead and then diverges again to a new single exclusive passenger track. While a straight movement for passenger operations is preferred, the diverging movements are required due to right-of-way constraints and the need to maintain the connection to the LVRM lead. The new south side passenger track would minimize conflicts with the existing LVRM Yard operations. The alignment would continue to the proposed Bethlehem station. The Bethlehem station would be a single track side platform configuration.



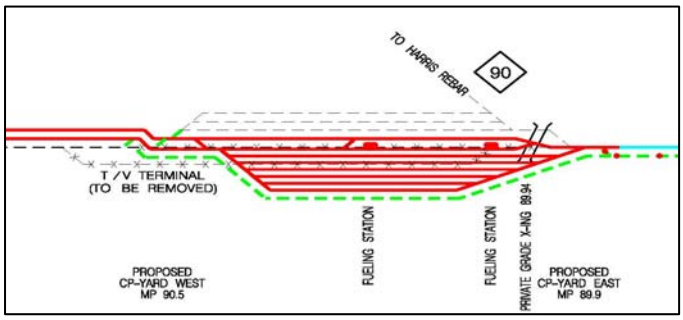
West of Bethlehem Station, the NS Lehigh Line crosses the Lehigh River and becomes the lead to Allentown Yard. A connection to the NS Reading Line is made at MP 88.6, near the Hill-to-Hill Bridge. The passenger alignment follows the NS Reading Line. In this area the passenger track must be on the south side of the freight tracks so that there is no interference with freight operations at this busy junction point.

Bethlehem, PA to Allentown, PA (MP 88 to MP 93.2)

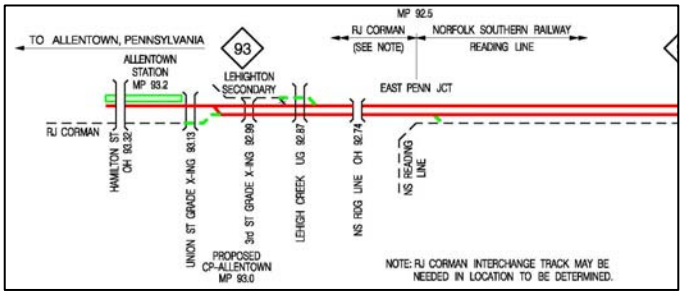
The level of freight activity is less on the NS Reading Line than on the NS Lehigh Line, and the alignment is currently single track. At the west end of this segment approaching Allentown Station, the RJ Corman freight railroad right-of-way is used. RJ Corman operations are low density, serving local customers. The proposed passenger storage yard and maintenance facility is proposed in this segment. Because is it located east of the terminal station in Allentown, double tracking for passenger operations is required, as operation will consist of both revenue and non-revenue movements. Provisions are made for NS to utilize one passenger track if needed and for RJ Corman to operate on the passenger tracks between scheduled passenger service. An interchange track may be needed and could be provided in this segment.

West of the NS Reading Line Connection near the Hill-to-Hill Bridge the alignment enters Fountain Hill Borough. Two freight tracks exist and a proposed third passenger track would merge with the existing southerly freight track. The shared southerly track continues to the existing two-track to one-track merge. In this section freight movements could be operated on both the northerly and southerly tracks to preserve maximum flexibility in the area of the lead to the NS Allentown Yard over the Lehigh River. West of the two-track to one-track merge, freight operations would continue to operate on a single track. A new freight track would be constructed south of the existing freight track and passenger service would operate on the existing single track. In this area, a proposal to relocate Riverside Drive from the north side to the south side of the railroad tracks has been made by St. Luke's Hospital and Health Network. The currently proposed rail alignment assumes Riverside Drive stays on the north side of the tracks. No impacts to the

proposed passenger service have been identified in this conceptual stage should Riverside Drive be relocated to the south side.



At the reportedly unused NS T/V Terminal site in Salisbury Township, a new yard would be constructed to accommodate 11 trainsets. The freight track would be rerouted along the south side of the proposed yard to avoid yard/freight conflicts. The single main passenger track continues along the north side of the yard. In addition, the proposed passenger alignment between the yard and Allentown Station is two-track, exclusive to passenger service except for RJ Corman freight movements. Turnouts are proposed to also allow NS Reading Line movements to service the Harris Rebar site, which is a local customer. A two track alignment is needed to accommodate non-revenue movements between the yard and Allentown Station, as well as revenue movements between Allentown Station and Newark/New York.



Approaching the City of Allentown, the two-track passenger route crosses under the NS lead from Allentown Yard to the Reading Line at the existing NS Reading Line overhead bridge. The horizontal clearance allows for at least two tracks. Near this bridge the passenger alignment turns onto RJ Corman right-of-way. The existing single track Lehigh Creek Bridge would be reconstructed to include three tracks to accommodate the new passenger main track, the new passenger siding track and the Lehighton Industrial track. The connection to the Lehighton Industrial track is proposed to be relocated to the east side of the bridge. The new passenger main track would continue to the proposed Allentown Station, with the existing RJ Corman track relocated and connected to the proposed passenger siding track. Allentown Station would consist of a single track side platform. The platform would be located under the Hamilton Street bridge. The new passenger siding track would connect to the new passenger main track just east of the Union Street grade crossing, located east of the station platform. West of Union Street, the alignment would be located to the east of the RJ Corman right-of-way on property to be acquired.

Table 8: Proposed Passenger Track Alignment Summary

LOCATION		PASSENGER TRACK USAGE
FROM	TO	
Phillipsburg Station (MP76.3)	NS Yard (MP 78.2)	New Passenger Priority (new construction)
NS Yard (MP 78.2)	West of Easton (MP 78.6)	Passenger Priority on Existing Freight (new freight track)
West of Easton (MP 78.6)	East of Glendon (MP 78.8)	New Passenger Priority (new construction)
East of Glendon (MP 78.8)	West of Glendon (MP 80.1)	Shared with Freight on Existing Two Tracks
West of Glendon (MP 80.1)	Adjacent to Island Park in Williams Twp (MP 80.6)	New Passenger Only (new construction)

LOCATION		PASSENGER TRACK USAGE
FROM	TO	
Adjacent To Island Park In Williams Twp (MP 80.6)	East of LVRM Yard (MP 87.0)	Passenger Only on Existing Freight (new freight track)
East of LVRM Yard (MP 87.0)	West of LVRM Yard (MP 88.6)	New Passenger Only (new construction)
West of LVRM Yard (MP 88.6)	Existing Two-to-One Track Merge (MP 88.9)	Shared in Area of Allentown Lead Connection; Otherwise Passenger Only
Existing Two-to-One Track Merge (MP 88.9)	East of Proposed Yard (MP 89.9)	Passenger Only on Existing Freight (new freight track)
East of East of Proposed Yard (MP 89.9)	Allentown Station (MP 93.3)	Two-Track Passenger Only (new construction)

Figure 6: Proposed Commuter Rail Extension to Allentown Alignment

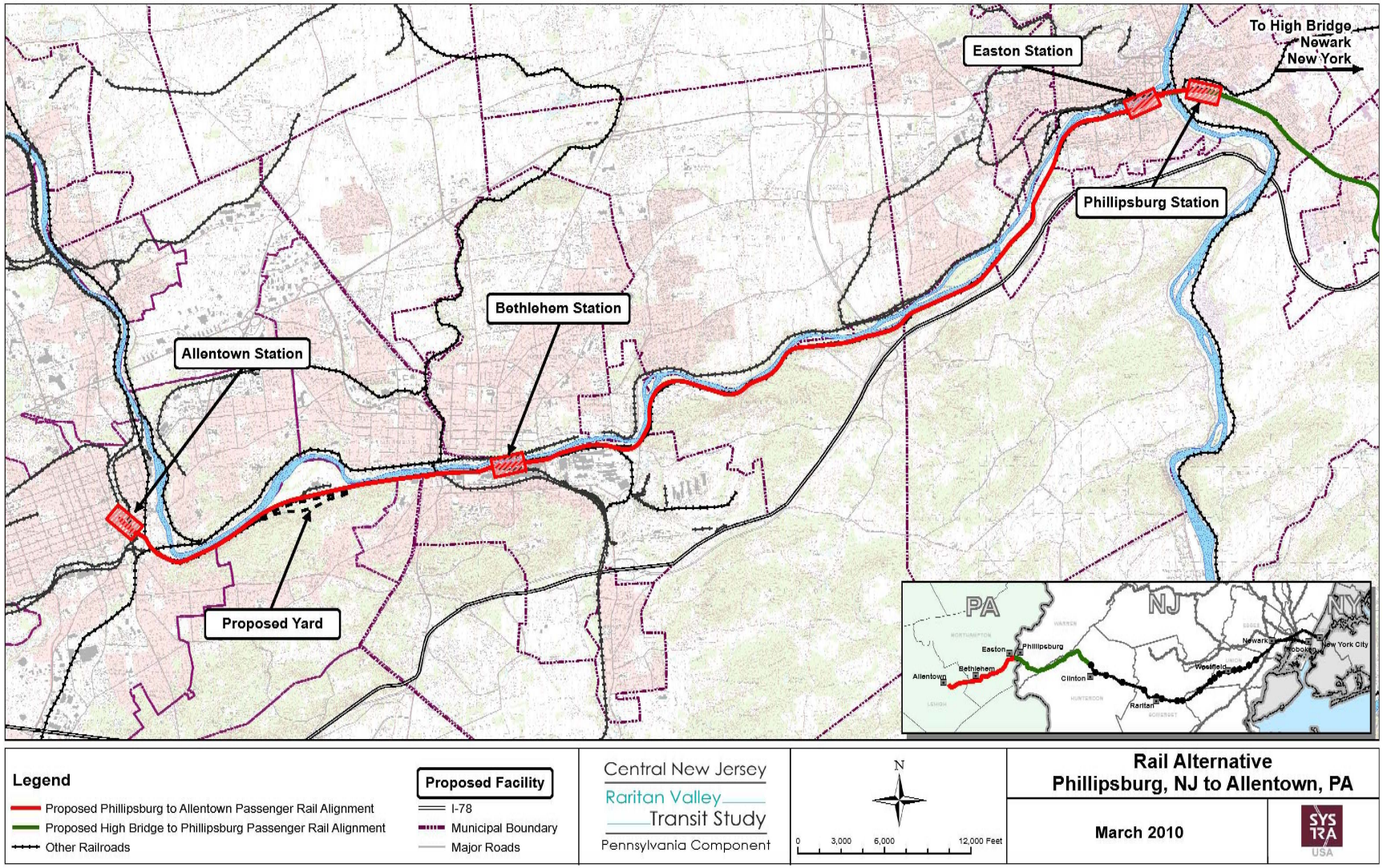
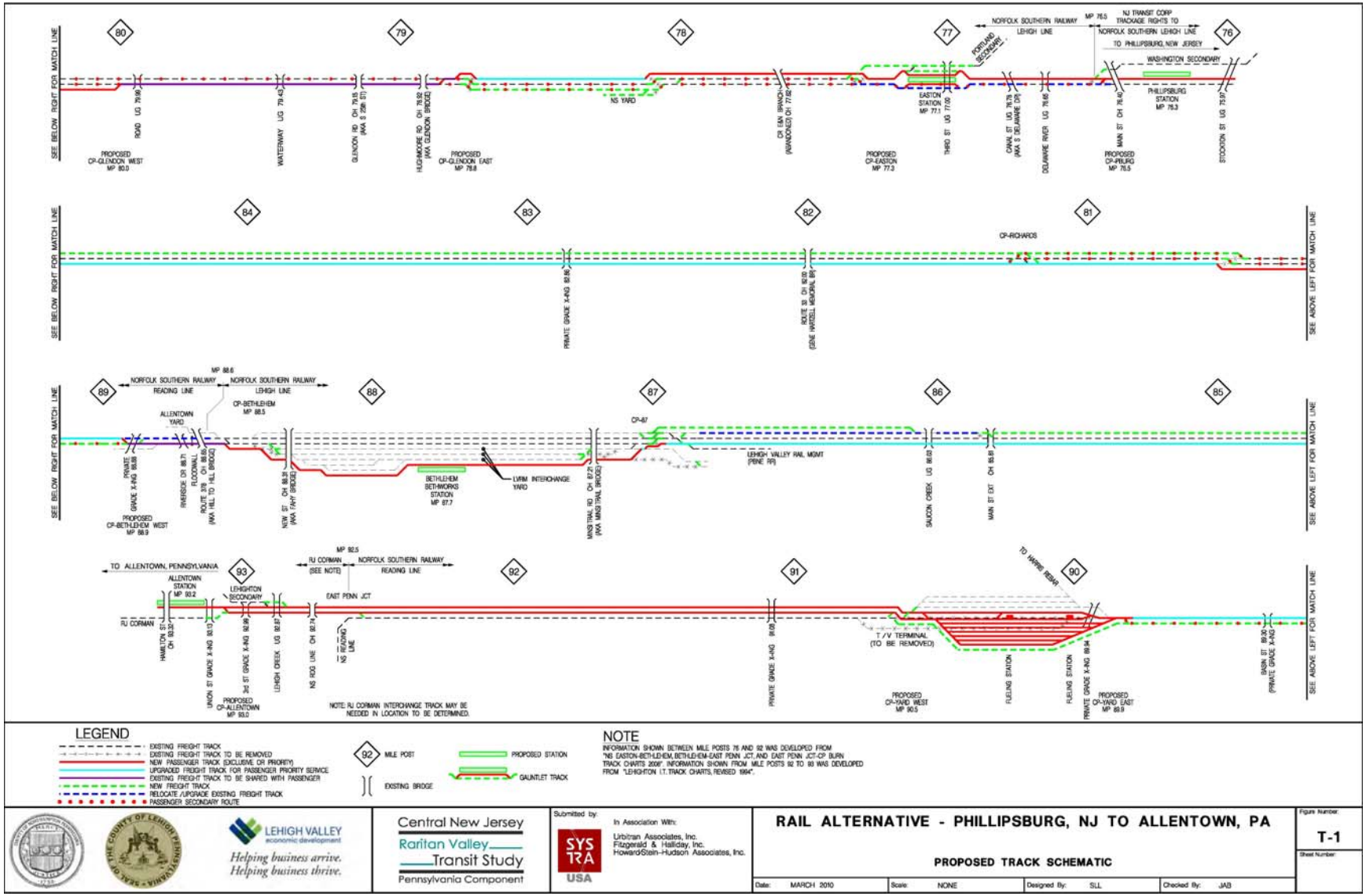


Figure 7: Proposed Commuter Rail Extension to Allentown Schematic



3.4.4. Proposed Rail Stations

Proposed stations have been located in consultation with local officials, and within right-of-way constraints. All stations would be fully accessible to persons with disabilities and would serve existing and planned walk-up markets and park-and-ride customers. Platforms are 880 feet in length and at the height of the coach floor, allowing ten coaches on the platform and wheelchair access between platform and rail vehicle.

For cost estimating purposes, each station is assumed to be outfitted with a canopy, wind screens, benches, lighting and audio and visual passenger communications and public address systems. Stations would not have ticket agents. Ticket vending machines would be provided instead. Customarily new stations are developed in coordination with local officials to coincide with the street network and local development goals. While the station infrastructure along the railroad should meet NJ TRANSIT guidelines, there are opportunities to develop the site according to community needs. For ridership forecasting purposes, parking fees were considered. Parking at Allentown and Bethlehem is assumed to be free and the rate at Easton is assumed to be $2 per day.

Easton, PA Station

The proposed Easton Station is located in the Easton Central Business District (CBD), on the south side of the Lehigh River, just north of West Canal Street, and west of the intersection of Third Street and Smith Avenue. The station is expected to have walk-up and drive access. The City's goals of improved residential neighborhoods within and near the CBD, could be supported at this station location. Parking would be available at the planned new Easton Intermodal Terminal located 900 feet away. LANTA N, P and R bus lines would serve this station. Additional LANTA routes would be available at the Intermodal Terminal. Easton is configured with a center platform with a pedestrian underpass. Full accessibility is achieved through the use of an elevator or ramp, with an elevator assumed for cost estimating purposes.

Bethlehem, PA Station

The proposed Bethlehem Station is located within the BethWorks development site, approximately 1,500 feet west of the Sands Casino. The single side platform configuration would be located on property that is part of the development. The station would provide walk-up access for the BethWorks development and other South side neighborhoods. The Sands Casino is located a five minute walk away to the east. Parking would be available at the planned BethWorks Multimodal Transit Facility located 1,500 feet away. The development of the BethWorks site is assumed to provide convenient pedestrian access to the station platform from parking and local streets and from within the development site. Station parking may be located closer to the platform as part of the development. LANTA F and Loop bus lines would serve this station. Additional LANTA routes would be available at the Intermodal Terminal.

Allentown, PA Station

The proposed Allentown Station is located between Hamilton Street and Union Street, with access from 3rd Street. The single side platform would be located on property to be acquired for the rail right-of-way. Direct pedestrian access to Hamilton Street could be provided so that much of the City's CBD would be within convenient walking distance. Parking would be available at the Allentown Bus Terminal or at a new parking facility at the station site. LANTA A and E bus lines would serve this station.

The station location is adjacent to the Lehigh River Waterfront area which will be the subject of an upcoming master planning process. The resultant plan will include land use/redevelopment recommendations and an extensive transportation component (the prospect of a future rail extension to Allentown is pointed out in the study's RFP). This area is also being considered as the site of a multi-purpose arena. Since the planning process has not as yet started, no specific land use changes or projections can be made that in turn could be included in ridership forecasts.

3.4.5. Rail Maintenance Facility/Yard

The proposed yard to service and store trainsets overnight is located near the Harris Rebar site along Riverside Drive in Salisbury Township. The site is now occupied by an NS intermodal terminal which is reported to be currently unused. The site would be acquired from NS. This site would provide for overnight storage, inspection, fueling, cleaning and running repair for eleven trainsets – ten for revenue service and one spare. The Riverside Drive grade crossing would require relocation to the east, and a small additional property acquisition from the City of Bethlehem Municipal Water Authority would be needed. To avoid conflicts with NS freight operations the NS main track is proposed to be relocated to the south of the proposed yard.

This site is the only location identified along the rail alignment between Phillipsburg, NJ and Allentown, PA that could support the needed program for trainset storage servicing, fueling and cleaning. The location of the yard site three miles east of the terminal station in Allentown would result in a complicated terminal operation. Trainsets starting in the morning need to operate from the yard westward to Allentown while at the same time revenue service will be operating eastward from Allentown, past the yard and into New Jersey and New York. In the evening peak, the same bi-direction operation would be in effect. Therefore the route must be double-tracked between the yard and Allentown Station.

Figure 8: Proposed Easton Station

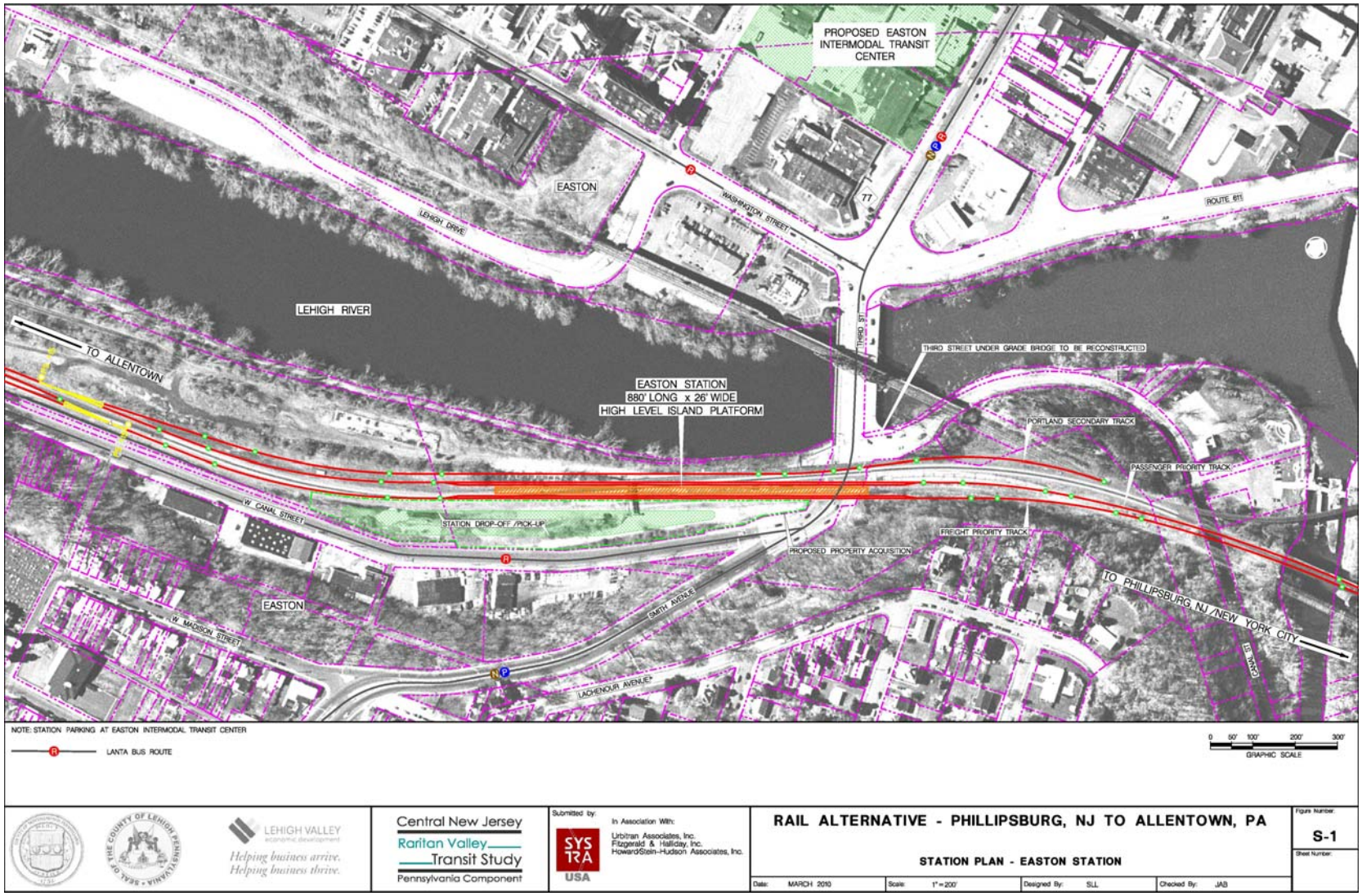


Figure 9: Proposed Bethlehem Station

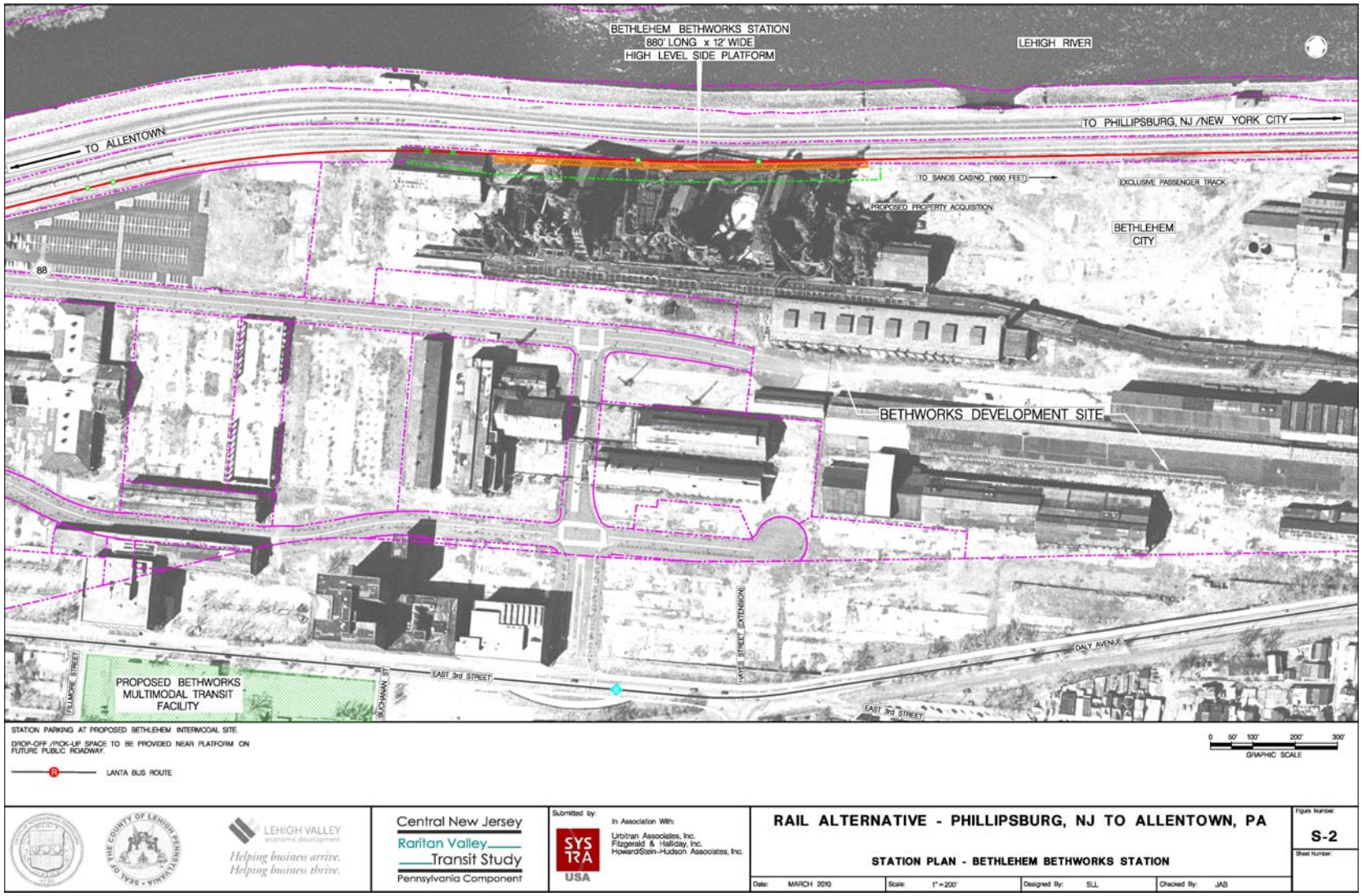
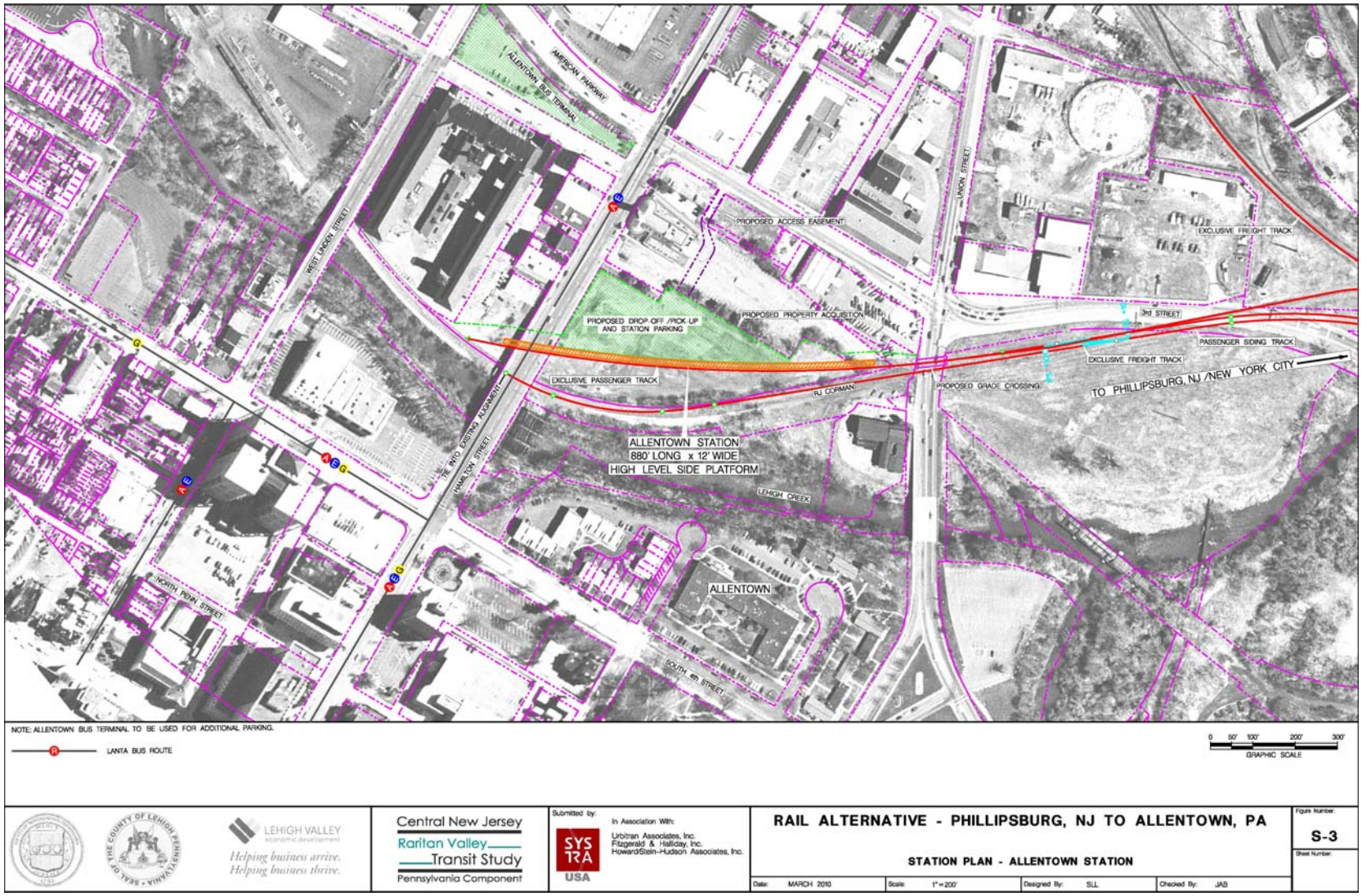


Figure 10: Proposed Allentown Station



4. ENVIRONMENTAL ANALYSIS

This section presents the results of the environmental screening analysis that was conducted on the Short List rail alternative. Bus alternatives were not reviewed as they do not involve new construction.

4.1. Regulatory Context

The following state- and local-level polices and regulations are applicable to the construction and/or operation of passenger rail service to Allentown, Pennsylvania.

- Pennsylvania Stormwater Management Act of 1978 (Act 167) – was enacted to regulate post-development discharge of stormwater in all watersheds of the Commonwealth. Act 167 requires municipalities to develop and periodically update stormwater management plans for their respective watersheds. Relative to this study, Act 167 requires that post-development stormwater discharge replicate, to the greatest extent possible, pre-construction stormwater rates and flows.

- Lehigh Valley Planning Commission (LVPC) Global Stormwater Ordinance – was developed to meet the requirements of Act 167 and to regulate post-development stormwater discharge for watersheds within the Lehigh Valley. Therefore, if a municipality has adopted the LVPC Global Ordinance, that municipality is considered to be in compliance with Act 167 and the State Water Quality Guidelines. Similar to Act 167, the LVPC Global Ordinance also requires no new increases in post-construction stormwater discharge; however, the LVPC Ordinance also identifies any existing gravel, crushed stone or hard packed soil areas on a site as pervious cover, and would be considered exempt, and would therefore not constitute a violation of the LVPC global ordinance or Act 167. For the purposes of this study, the existing ballast of the rail bed would be considered pervious surface. If the additional track can be laid within the existing rail ROW and rail bed, along the same curve as the existing track, then there would be no violation of Act 167 or the LVPC global ordinance.

- Pennsylvania Floodplain Management Act of 1978 (Act 166) - was enacted to regulate the design and construction of highway and other obstructions in the 100-year floodplain in order to encourage sound planning practices and to also protect people and property within the floodplain from the dangers and damages of flood waters. Relative to this study, Act 166 identifies that obstructions related to the provision of passenger rail by the Commonwealth or other public utility service provider in the floodplain as an activity that would require a permit from the Department of Environmental Protection (DEP).

- City of Allentown Floodplain Management Ordinance – was passed to meet the requirements of Act 166. Relative to this study, the Ordinance requires that the lowest floor (including the basement) of any new non-residential structure constructed within the floodplain area, be at least one and one-half (1 1/2') feet above the 100-year flood elevation. All floors located below this mark would require flood proofing.

- LVPC Natural Areas Inventory – was compiled in 1998 in cooperation with the Nature Conservancy. The report presents the significant, known floral, faunal, and geologic features of Northampton and Lehigh counties and also provides recommendations for conservation and preservation of areas, as well as provides a priority ranking of protection for each resource. Relative to this study, the proposed southern alignment would be located

adjacent to two natural areas (Readington Cave and Lehigh Mountain) and would also be located completely within and surrounded by two additional natural areas (Steel City Slopes and Lehigh Mountain Seeps).

4.2. Environmental Screening Methodology

Geographic Information System (GIS) mapping was created for the rail alternative based on data layers provided by the LVPC. The mapping was then used to conduct a "10,000 foot" macro-level screening evaluation and focused on identifying generally where the alternatives might interface with natural and cultural resources of concern; in general, critical environmental resources were evaluated in terms of their general potential to be impacted by the construction of the rail tracks, station platforms and yards. Additional field reviews will be necessary to determine the full extent of these resources adjacent to and within the ROW. In accordance with the evaluation screening methodology developed for this project, environmental screening was conducted for the following critical resource areas:

- Water resources including wetlands, open bodies of water, 100-year floodplains, and streams;
- Critical natural areas, as defined by the LVPC Natural Areas Inventory;
- Historic resources and districts;
- Schools;
- Cemeteries;
- Parklands; and
- Woodlands.

4.3. Environmental Analysis Results

The results of the environmental screening are presented in the following table. The alignment and station environmental screening maps can be found in Appendix C.

Table 9: Environmental Analysis Summary

POTENTIAL IMPACT	PERMITTING & COORDINATION
RAIL ALIGNMENT	
Easton: The alignment traverses 100-year floodplain as it enters Easton. 100-year floodplain is also located within the ROW west of the Canal Street/ North Smith Avenue intersection and west of the 3rd Street Bridge. The alignment traverses the Delaware Canal State Park and the Hugh Moore Historical Park runs adjacent to the ROW on the north side; however, Hugh Moore Park overlaps the ROW near the West Canal Street/Center Street intersection. The historic Lehigh Canal runs adjacent to the ROW on the north side. Glendon: There are two (2) locations along the north side of the alignment where small areas of 100-year floodplain are located within the ROW. The High Moore Historical Park runs adjacent to the ROW on the north side. Williams Township: The ROW is located within the Lehigh Slopes Natural Area. Lower Saucon Township: 100-year floodplain borders the ROW and is located within the ROW on the north side along the entire length of the alignment through the Township. A large wetland system borders the ROW on the north side. The ROW is located within the Lehigh Slopes and Steel City Slopes Natural Areas and adjacent to the Redington Cave Natural Area. City of Bethlehem: The alignment crosses Saucon Creek near the Lower Saucon-Bethlehem border; floodplains associated with this creek are located adjacent to the ROW on the north and south sides. 100-year floodplain also located within ROW just east of Fountain Hill border. Fountain Hill Borough: 100-year floodplain is located within the ROW in two (2) locations on the north side of the alignment. Salisbury Township: 100-year floodplain is located in the ROW on the north side, east of the Harris Rebar site. 100-year floodplain also borders the ROW on the north side, west of the proposed yard site. The ROW is located within the Lehigh Mountain Natural Area and is located adjacent to the Lehigh Mountain Seeps Natural Area and the Lehigh Uplands Preserve. City of Allentown: The alignment crosses Lehigh Creek and its associated floodplain and wetland on the approach to Allentown Station at Banana Joe's. The ROW within Allentown is located within the 100-year floodplain. North of Hamilton Street Bridge, RJ Corman/station spur track tie-in is located within the 100-year floodplain and wetland.	Field visits will be required to determine the extent of floodplain and wetland resources. Permits would be required from DEP for all work done within the 100-year floodplain prior to the start of construction. Coordination will be needed with PA DEP to determine the appropriate boundaries of and buffers needed around potentially affected wetlands. Permits may be required for construction activities within wetlands. All proposed construction near state- and locally-significant natural areas will be done in already-disturbed areas.
STATIONS	
Easton Station: site is located on vacant, urban land north of West Canal Street. There is a small area of 100-year floodplain located within ROW on the north side of the alignment.	A field visit will be required to determine the extent of the floodplain resources. A permit may be required from DEP for floodplain impacts prior to the construction of the station platform.

POTENTIAL IMPACT	PERMITTING & COORDINATION
Bethlehem Station: site is located on vacant industrial land. The presence of hazardous materials and other environmental risk sites is not known at this time; however, all potential impacts from hazardous materials would be mitigated by the BethWorks development.	Coordination within the Pennsylvania DEP to determine the presence of hazardous materials and other environmental risks.
Allentown Station: site currently vacant, commercial land located adjacent to Jordan Creek. This site is located within by the 100-year floodplain associated with Jordan Creek.	A field visit will be required to determine the extent of the floodplain resources. Although there is no need for the depression of the alignment under the Hamilton Street Bridge, per Pennsylvania Act 166 and the Allentown Floodplain Ordinance, a permit will be required for the construction of this station platform within the floodplain.
PROPOSED YARD	
This site is vacant, industrial land. A small area of 100-year floodplain is located in the northeast corner of the site. The Walking Purchase Park borders the ROW on the north side west of the industrial development. The southern portion of this site is located within the Lehigh Uplands Preserve and the Lehigh Mountain Seeps Natural Area; however, since this site is already disturbed, the potential for impacts is negligible.	A field visit will be required to determine the extent of the floodplain resources.

5. RIDERSHIP FORECASTS

5.1. Methodology

Ridership forecasts were developed using the expanded version of the North Jersey Travel Demand Forecasting Model (NJTDFM-ELV). This version expanded the FTA-approved NJTDFM to provide more detail in Lehigh and Northampton Counties and to include the most recent adopted municipal-level demographic forecasts of the Lehigh Valley Planning Commission. All forecasts were conducted for the year 2030.

For the rail alternative, off-model ridership forecasts were developed for universities, special generators, events and intra-Lehigh Valley travel. These forecasts were based on the total size of the travel market, the spatial orientation of the travel market, the predicted demographics of the market and the number of days during which those trips would be taken. A full listing of off-model generators is listed in the section below.

5.2. Assumptions

5.2.1. Demographics

Demographics were constant with regionally adopted forecasts from NJTPA and LVPC at the municipal level. For the bus scenarios, sub-municipal Traffic Analysis Zone (TAZ) demographics as defined by LVPC were used without any modifications.

For the rail scenario, it was assumed that a fixed transit investment would promote denser development near stations. As such, in consultation with the local municipalities, preferred station sites and types of future development in the vicinity of the proposed station sites were determined. Municipal level demographic growth was reallocated to favor those TAZs near the station sites which local zoning codes and plans indicate will be acceptable for denser transit-oriented development. These targeted TAZs received a larger percentage of the 2005-2030

growth increment than originally allocated by the LVPC. However, projected total municipal population and employment remained the same as forecast by the LVPC.

5.2.2. Roadway and Existing Transit Network

All projects included in the various MPOs fiscally constrained long range plans were included. Projects with direct relevance to the scenarios to be tested include:

- Completion of the American Parkway Bridge in Allentown and extension to Route 22
- Expansion of park-and-ride lots at William Penn and Route 412
- Completion of the Easton Intermodal Center with $2/day parking costs
- Access to the Region's Core (ARC) rail service plan with associated urban core infrastructure improvements. This includes direct service to PSNY from the RVL
- All existing (January 2010) transit service is assumed to remain in the future year scenarios

5.2.3. Costs

All costs, including transit fares, tolls, parking fees and auto operating costs were set at the costs in place as of January 1, 2010 and are assumed to rise with inflation. Pricing policies are assumed to be the same through the forecast year. Gasoline costs were set at approximately $2.60 per gallon and are assumed to rise with inflation.

Fares were established to be consistent with NJ Transit and Private Bus Carrier fares as of January 1, 2010. At the time the service is implemented, the actual fare policies will reflect the fare policies then in effect.

Bus fares to New York from Easton on January 1, 2010 are $18.50 one-way and $427.25 for a 40-trip book. From Bethlehem, fares are $19.25 one-way and $444.75 for a 40-trip book. From Allentown, fares are $20.00 one-way and $462.50 for a 40-trip book. Fares to Bridgewater from either William Penn or Easton would be $12.25 one-way and $228.00 for a 40-trip book.

The assumed rail distance-based fares were based on an extension of the January 1, 2010 NJ TRANSIT Raritan Valley Line rail fare structure. Fares to New York were assumed to be $13.50 one-way and $378 monthly from Philipsburg and Easton, $14.00 one-way and $392 monthly from Bethlehem and $14.50 one-way and $406 monthly from Allentown.

Parking at the new Easton Intermodal Center was assumed to cost $2 per day. All other existing and planned parking facilities were assumed to have no parking fees.

5.2.4. Off-model Ridership (for Rail Alternative Only)

Various sources of ridership for the rail scenarios were not explicitly modeled using the NJTDFM-ELV. These sources include special generators, such as museums and festivals, student trips including commutation, weekend and holiday trips from school to home and recreational trips, as well as trips between the three Lehigh Valley stations for work and non-work purposes. These trips are not included in the NJTDFM-ELV's trip tables, and so cannot be assigned to a specific mode by the model's processes. The specific sources of off-model ridership included:

<u>Easton</u>

- Crayola Factory and Museum
- National High School Sports Hall of Fame Museum
- National Canal Museum
- Lafayette College

Bethlehem
- Sands Casino
- MusikFest
- Lehigh University
- Moravian College
- DeSales University

Allentown
- Muhlenberg College
- Cedar Crest College

Many of the trips associated with these off-model trip purposes occur on weekends, holidays and during specific times of the year, and so are not included in average weekday ridership. However, these trips are included in annual ridership and revenue, as used for calculating cost recovery.

5.3. Ridership Results

5.3.1. Express Bus to New York Service

The ridership forecasts developed for express, non-stop New York bus service is described in Table 10. These ridership forecasts include the benefits of proposed bus-on-shoulder operation along I-78 in New Jersey, and reflect the service plan and routings described in sections above. Each bus is an independent service making no further stops between the boarding location and New York, and for testing purposes, no reduction in the existing service plan of New York bus services is assumed.

Table 10: Average Daily Year 2030 Express Bus to New York Ridership

	BUS SERVICE	RIDERS (BOARDINGS)	ONE-WAY TRIPS
Proposed Pennsylvania Express Bus Services	**Easton Express**	143	285
	Bethlehem Express	306	612
	Allentown Express	35	70
	TOTAL	**484**	**967**
Diversions to Express Bus Service			
From Auto			403
From Other Buses			564

The three new express bus services would generate a total of 967 daily one-way trips in 2030. The most productive of these services would be the South Bethlehem operation, with 612 daily trips. The location of this service may be able to divert some demand from the forecasted over-utilized Hellertown/Route 412 park-and-ride.

The walk-up market (with the remainder of the market accessing the bus boarding locations by car or another vehicle mode) at each station is:

- Easton - 43 trips/ 22 riders (15% of total)
- Bethlehem - 70 trips/ 35 riders (11% of total)
- Allentown Bus - 12 trips/ 6 riders (16% of total)

Of the 967 trips, 403, or 42% are new bus trips. The rest are diverted from existing private operator New York bus services. As there is no off-peak service in the service plan, all of this ridership occurs in the peak period.

5.3.2. Express Bus to Bridgewater Service

The ridership forecasts developed for Bridgewater area bus service is described in Table 11. These ridership forecasts include the benefits of proposed bus-on-shoulder operation along I-78 in New Jersey, and reflect the service plan and routings described in sections above.

Total ridership for the Bridgewater service is forecast to be 100 people making 200 daily trips. 95% of these trips occur in the peak period. As there is no current transit service in this market, all of the riders in this scenario are diverted from automobiles.

Table 11: Average Daily Year 2030 Express Bridgewater Bus Ridership

	BUS SERVICE	RIDERS (BOARDINGS)	ONE-WAY TRIPS
Proposed Bridgewater Express Bus Service	**William Penn**	68	136
	Easton	32	64
	TOTAL	**100**	**200**

5.3.3. Allentown to Newark/New York Commuter Rail Service

The ridership forecasts developed for the rail scenario are consistent with the forecasts for Raritan Valley Line ridership west of High Bridge as discussed in the New Jersey Scenario. As rail service to Phillipsburg is a necessary condition for any rail service within the Lehigh Valley, the ridership for the Lehigh Valley rail extension should be compared against an extension to Phillipsburg only. Forecasted year 2030 ridership by station is shown in Table 12.

Table 12: Forecasted Year 2030 Average Daily Rail Ridership

	No-Build		NJ Scenario		Pennsylvania Scenario			
Rail Scenario	**Riders**	**Trips**	**Riders**	**Trips**	**Riders**	**Trips**	**Parking Needed**	**Change in Trips from NJ Scenario**
Allentown					230	460	140	460
Bethlehem					220	440	80	440
Easton					350	700	230	700
Pennsylvania Extension Subtotal					***800***	***1,600***	***450***	***1,600***
Phillipsburg			80	160	65	130	50	-30
Bloomsbury			320	640	185	370	150	-270
Hampton			145	290	145	290	115	0
New Jersey Extension Subtotal			***545***	***1,090***	***395***	***790***	***315***	***-300***
High Bridge	110	220	105	210	95	190	80	-20
Annandale	110	220	75	150	75	150	65	-0
Existing New Jersey Subtotal	***220***	***440***	***180***	***360***	***170***	***340***	***145***	***-20***
TOTAL	**220**	**440**	**725**	**1,450**	**1,365**	**2,630**	**910**	**1,280**

The three Lehigh Valley stations combine to generate 1,600 daily trips. Parking requirements at the Pennsylvania stations would be comparatively less than at the New Jersey stations, due to the urban nature of these stations and the recreational travel they attract, which does not require parking to be provided. The walk-up share of ridership is:

- Allentown Station: 132 trips/66 riders (29% of total)
- Bethlehem Station: 205 trips/103 riders. (46% of total), assuming no shuttle is provided for Sands Casino patrons
- Easton Station: 126 trips/63 riders (18% of total)

Of the 1,600 daily trips generated by the Lehigh Valley stations, 1,280 of them are new to the rail system. The remaining 320 of them formerly boarded the rail system at stations east of the Delaware River, either at existing stations on the Raritan Valley Line or at new stations on the Phillipsburg extension. Of the trips that are new to the rail system, 37% were trips that were previously on the bus, while almost all of the rest of the trips are diverted from the automobile. The diversions to rail are shown in Table 13.

Table 13: Source of New Rail System Trips (Year 2030)

	FROM NO-BUILD TO NJ SCENARIO	FROM NJ SCENARIO TO PENNSYLVANIA SCENARIO	FROM NO-BUILD TO PENNSYLVANIA SCENARIO
From Bus	450	390	840
From Auto	555	890	1,445
From Other	5	0	5
Total New Rail System Trips	**1,010**	**1,280**	**2,290**

Both Allentown and Bethlehem stations would generate a majority of their ridership from within the city limits. Easton City's share of Easton Station's ridership would be less, likely due to the smaller size of Easton compared to its surrounding towns, and the relative accessibility of the station location. Details on the origins of riders at the three Lehigh Valley stations are shown in Table 14.

Almost half of the rail riders boarding in the Lehigh Valley are destined for New York City. However, many are destined for Newark, or other destinations along the Raritan Valley Line, or stay within the Lehigh Valley. Details on the destinations of rail riders boarding at Allentown, Bethlehem or Easton are shown in Table 15.

Rail Station Shuttles

As a complementary strategy for rail service in the New Jersey Study, station shuttles were proposed at Raritan Station to provide access for rail passengers to employment centers in Somerset County. Three shuttle routes were identified as most attractive:

- Downtown Raritan and Route 202/Ortho-McNeill
- Route 206 North of Route 22
- Route 22 West, including Somerset Corporate Center, Ethicon and MetLife

These shuttles would meet every inbound train in the AM peak period, and every outbound train in the PM peak period. The boardings generated by these rail station shuttles at the three Lehigh Valley stations is presented in Table 16. This ridership is an additional amount, and is not included in the average daily ridership presented in Table 12 above. Additionally, the cost to operate the shuttles is not included in the O&M cost.

Table 14: Origins of Rail Riders by Station

STATION	ALLENTOWN		BETHLEHEM		EASTON	
ORIGIN MUNICIPALITY	DAILY RIDERS	% OF STATION TOTAL	DAILY RIDERS	% OF STATION TOTAL	DAILY RIDERS	% OF STATION TOTAL
Allentown City	122	53.0%	16	7.1%		
Lower Macungie	30	12.9%				
Upper Macungie	23	9.8%				
North Whitehall	8	3.6%				
South Whitehall	10	4.5%				
Whitehall	15	6.7%				
Bethlehem City			152	65.7%		
Salisbury			9	4.1%		
Northampton Boro			6	2.5%		
Easton City					64	18.2%
Bethlehem Township					27	7.7%
Forks					30	8.7%
Hanover Township					19	5.4%
Hellertown					10	2.8%
Lower Saucon					14	4.1%
Palmer					60	17.2%
Plainfield					12	3.4%
Williams					15	4.4%
Wilson					22	6.3%
Other Lehigh County	22	9.5%	34	14.6%		
Other Northampton County			14	6.0%	76	21.8%

Table 15: Destination of Lehigh Valley Rail Riders

DESTINATIONS	DAILY RIDERS	% OF TOTAL
Lehigh Valley	106	13.2%
North Branch-Bridgewater	61	7.5%
Bound Brook-Union	23	2.9%
Newark	165	20.5%
Jersey City/Hoboken	69	8.6%
New York City	380	47.3%

Table 16: Forecasted Year 2030 Average Daily Riders by Boarding Station for Raritan Station Shuttles

	DOWNTOWN RARITAN/ROUTE 202	ROUTE 206 NORTH	ROUTE 22 WEST	TOTAL
Allentown	1	1	1	3
Bethlehem	3	2	3	8
Easton	21	10	17	48
TOTAL	**25**	**13**	**21**	**59**

6. COST ESTIMATION

Capital and annual operating and maintenance (O&M) costs have been prepared for the shortlisted alternatives. These costs are in 2010$ and are in the level of detail suitable for determining if the alternatives are cost effective enough to warrant further advancement.

6.1. Operating and Maintenance Costs and Revenue

Since the proposed bus services would be operated by a private operator, operating and maintenance costs would be dependent on that operator's labor and maintenance. As such, O&M costs have not been identified for the bus scenarios.

For the rail alternative, in keeping with current FTA practice, a resource build-up approach was used to develop O&M costs. This approach applies the projected unit costs for labor and materials to the amount of labor and materials necessary to perform the level of service. The model output is the total amount of labor a
nd materials and the estimated cost. Annual operating and maintenance (O&M) costs reflect the service plans for each alternative and typical operating costs for NJ TRANSIT rail operations. The annual O&M cost for the rail alternative would be $14.9 million in 2010 dollars as shown in Table 17. Operating and maintenance cost estimate details can be found in Appendix E.

Revenues for the rail alternative generated through passenger fares were estimated through ridership forecasting (see Section 5). Annual revenues are estimated to be $3.3 million in 2010 dollars.

6.2. Farebox Recovery

Farebox recovery is a measure of the cost effectiveness of the service and is expressed as the amount of operating costs that are recovered through passenger fares. In FY09, NJ TRANSIT's farebox recovery for the overall commuter rail network was 55%[1]. Farebox recovery for the rail alternative as shown in Table 17 is projected to be lower, at 22%.

[1] Source: NJ TRANSIT Rail Operations Rail Service By Line Year to Date Summary of Operating Results – Combined Service, as of June 2009, dated October 12, 2009

Table 17: Annual O&M Cost Summary – Rail Alternative

ITEM	TOTAL COST (MILLIONS – 2010 DOLLARS)
Train Operations	$8.28
Train Maintenance	$0.63
Maintenance of Way	$0.00
Yard Operation and Maintenance	$0.60
Station Operation and Maintenance	$0.51
Revenue Collection	$0.08
Access Fees	$2.98
Utilities	$0.26
Professional Service Contracts	$0.20
Administration	$0.00
Contingency (10%)	$1.36
TOTAL O&M COST (2010$)	**$14.90**

Table 18: Farebox Recovery – Extension of Service from Phillipsburg, NJ to Allentown, PA

CATEGORY	AMOUNT
Forecasted Annual Revenue	$3.3 million
Estimated Annual Operating and Maintenance Costs	$14.9 million
Farebox Recovery	22%

6.3. Capital Costs

Since the proposed bus services would be operated by a private operator, bus capital costs would be dependent on that operator's excess capacity. Assuming a new fleet of buses would be required to operate the service, each of the three express bus to New York services would require 15 new vehicles, for a total of 45 new vehicles. This results in a capital cost of approximately $25 million in 2010 dollars. However, given the forecasted reduction in utilization of existing services that would result from the implementation of the proposed services, it is likely that the operator would use some buses now used on existing routes. The Express Bus to Bridgewater service would require 15 vehicles to operate. Assuming a new fleet, the capital cost of acquiring these buses would be approximately $8.25 million in 2010 dollars. Ultimately, the capital costs of initiating these new services are dependent on the unique circumstances of the operator.

For the rail alternative, capital costs were estimated based on a conceptual design of those alternatives which yielded quantities by FTA Standard Cost Category (SCC). Consistent unit prices were then applied to those quantities. Contingency and project development costs were allocated. The capital cost estimation effort employed for this project is consistent with FTA procedural and technical guidance for the development and reporting of project capital costs. The capital costs were based on 16.94 route miles between Phillipsburg and Allentown, three new

stations and the acquisition of 13 multi-level cars and 2 dual-mode locomotives. It also includes property acquisitions for the right-of-way in Allentown, yard in Salisbury Township and all three stations. The acquisition of trackage rights on NS and RJ Corman right-of-way is also included.

Capital cost estimate details can be found in Appendix E. All capital costs are reported in millions of 2010 dollars. The total capital cost for the rail extension to Allentown is estimated to be $659 million, as shown in Table 19. The cost of the new yard (which is included in the total cost) is $87.4 million. The yard would support all service on the RVL west of Raritan NJ, where the current RVL yard is located, and could be considered a betterment for service in New Jersey and therefore a potential shared cost.

Table 19: Capital Cost Summary – Rail

STANDARD COST CATEGORIES	BASE YEAR DOLLARS TOTAL (MILLION 2010$)
10 Guideway & Track Elements	$179.6
20 Stations, Stops, Terminals, Intermodal	$12.9
30 Support Facilities: Yards, Shops, Admin. Bldgs.	$36.0
40 Sitework & Special Conditions	$59.9
50 Systems (train control, communications, fare collection)	$75.2
60 Row, Land, Existing Improvements	$94.1
70 Vehicles	$64.9
80 Professional Services	$99.9
90 Unallocated Contingency	$31.1
100 Finance Charges	$5.3
Total Project Cost	$658.9

7. FINDINGS/NEXT STEPS

The Pennsylvania Component study developed preliminary constructability, ridership and cost information for rail and bus alternatives which can used by local decision makers to determine whether any alternatives are warranted and should be advanced. No final determinations have been made as a result of this study.

Bus Alternatives
The findings of the proposed bus alternatives will be shared with local operators to assist in their future bus service decision-making. Each of the services is proposed to operate with 15 minute headways in peak periods, requiring 15 buses at a cost of $8.25 million (2010$). The modeled bus services indicate that the Bethlehem to New York express bus service deserves further consideration. New York express bus services from Easton and Allentown would require adjustments in frequencies and perhaps additional stops to make the services sufficiently cost-effective. These adjustments would be made in the context of the overall set of services from the Lehigh Valley to New York. Proposed express services to the Bridgewater appear to not be cost-effective.

Rail Alternative
Although at this time no funds have been identified to initiate this process, the possible next step for the rail alternative, if it were to be advanced, could be to initiate the Federal Transit Administration (FTA) New Starts process, which would include a formal Alternatives Analysis (AA) and possibly an Environmental Impact Statement (EIS) or Environmental Assessment (EA). However, additional feasibility studies could be undertaken for additional rail alternatives prior to investing in the AA and EIS steps, which are estimated to cost over $1 million for the AA and over $1 million for the EIS.

The total estimated capital cost project would be $658.9 million (2010$), or $39 million per route mile for the 16.94 miles from Phillipsburg, NJ to Allentown, PA. The high capital cost is primarily attributable to the need to relocate freight racks to allow a new passenger track, and to construct interlockings and other measures to keep the freight operation as un-impacted as possible. Economies such as potentially sharing the Pennsylvania yard costs (estimated to be $87.4 million) with New Jersey could be explored in the future to bring the costs of the project down to a more competitive level. Should this project qualify for federal capital assistance, such assistance would only cover a portion of the project costs and local matching funds would be required.

In addition, because of the proposed shared track arrangement in Glendon, there is a risk to passenger service quality, as passenger trains may not be prioritized over freight movements. Norfolk Southern Railway, the owner of most of the rights-of-way proposed for passenger rail service, has not reviewed or approved any of the alternatives that make use of their rights-of-way or facilities, as is their general policy with preliminary studies.

At this time NJ TRANSIT has made no commitment to extend rail service beyond the existing terminus in High Bridge, NJ. There are risks that the project to bring rail service into the Lehigh Valley may have to share in the costs of extending the rail service to Phillipsburg, NJ.

The estimated farebox recovery of 22% is based on forecasted passenger fare revenues of $3.3 million and operating costs of $14.9 million. A subsidy of $11.6 million would have to be provided (all in 2010$). A source for this ongoing subsidy has not bee identified. The farebox recovery compares unfavorably with the FY09 farebox recovery of 55% on the overall NJ TRANSIT commuter rail system.

The rail alternative's high capital cost and low farebox recovery will be a challenge in the competitive environment for Federal and local funding. Commuter rail projects being considered for federal funding have capital costs that are under $20 million per route mile.[3] Variations to the short listed rail alternative could be studied prior to proceeding into an AA/EIS phase, as noted above. The costs of these feasibility studies are estimated to be in the $200,000 to $500,000 range, and depend on the number of options included. Potential variations that have been identified for further consideration include:

- Extend commuter rail service from Phillipsburg, NJ to Bethlehem, PA on the south side. This could be a first phase of a program to extend service to Allentown. While some ridership would be lost, the capital cost of terminating at Bethlehem is estimated to be $478.2 million, a savings of $180.7 million or 27% compared to terminating at Allentown. The proposed yard in Salisbury Township would be used since the yard is located west of Bethlehem Station. This would simplify terminal operations.
- Extend commuter rail to Easton, PA on the south side, with the overnight storage and maintenance facility in Phillipsburg, NJ. This short extension of 0.8 miles may be a lower cost project. However, the feasibility of this extension must be determined. Operations over the Delaware River in this scenario would include revenue trains operating between Easton and Newark/New York as well as non-revenue movements between Phillipsburg Yard and Easton. This may require that both tracks on the active Delaware River Bridge be devoted to passenger use. In this event, NS Lehigh Line freight operations would have to be relocated to the former and out of service Lehigh Valley Line through Phillipsburg, NJ and the former Lehigh Valley Line bridge over the Delaware River, which is also currently out of service. No studies have been undertaken regarding the reactivation of this route. Also, institutional issues including creating a commuter rail agency in the Lehigh Valley and negotiating for the use of NS right-of-way must still be undertaken.
- Extend commuter rail service using a combination of a north and south side alignment. For example, the north side alignment could be used for service to Easton. Easton Station would be in a more locally preferred location. While the station would be located away from NS's active freight operations, this route would still require the use of active NS right-of-way to cross the Delaware River. If at a later date service were to be extended west of Easton, one option would be to use the full south side alignment, requiring the Easton Station to be relocated to the south side.
- Include only one station in the Easton / Phillipsburg area. While a station in each municipality is important for local economic development reasons, the two stations would be 0.8 miles apart. Commuter rail stations should typically be at least five miles apart.

[3] Source**:** Annual Report on Funding Recommendations, Fiscal Year 2011 - New Starts, Small Starts, and Paul S. Sarbanes Transit in Parks Program, Appendix A, Federal Transit Administration.

With these challenges in mind, it is essential to not only follow the FTA process, but to gain political and local support for this project. In January 2010, the FTA announced a change to the process for recommending New Starts and Small Starts projects for discretionary Federal funding assistance and described additional steps FTA would be taking to further improve the process for rating and evaluating such projects. The new funding guidelines for major transit projects will be based on livability issues such as economic development opportunities and environmental benefits, in addition to cost and time saved, which are currently the primary criteria. This new guidance may allow the Lehigh Valley to better qualify for New Starts funding in the future.

The rail alternative's ridership was based on changes to land uses so that transit-friendly development would occur around the three station sites, thereby increasing walk-up ridership. Increased ridership through this land use strategy will increase revenues without increasing operating costs, thereby improving the farebox recovery. Also capital costs would not be significantly affected. There has been interest in developing transit-oriented development, and LVPC has in its Work Program research into case studies of transit-oriented development which will e undertaken in the near future.

Under the new U.S. DOT Livability Initiative, Federal policy will enable communities to: better integrate transportation and land use planning, foster multimodal transportation systems and effective multimodal connections, provide more transportation options to improve access to housing, jobs, businesses, services and social activities, increase public participation and enhance coordination of transportation and housing and healthy communities, reduce emissions, and plan for unique needs. Additionally, the Interagency Partnership for Sustainable Communities (U.S. DOT, U.S. HUD and U.S. EPA) has been established to help families in all communities –- rural, suburban and urban – gain better access to affordable housing, more transportation options, and lower transportation costs, while protecting the environment in communities nationwide. Although limited funding is available at this time, the Lehigh Valley urban centers may be candidates for these new initiatives and can promote the advancement of the rail alternative.