Central New Jersey
Raritan Valley
Transit Study

Feasibility Analysis Report

EXECUTIVE SUMMARY

April 2011

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NJTRANSIT
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EXECUTIVE SUMMARY

Overview

DISCLAIMER

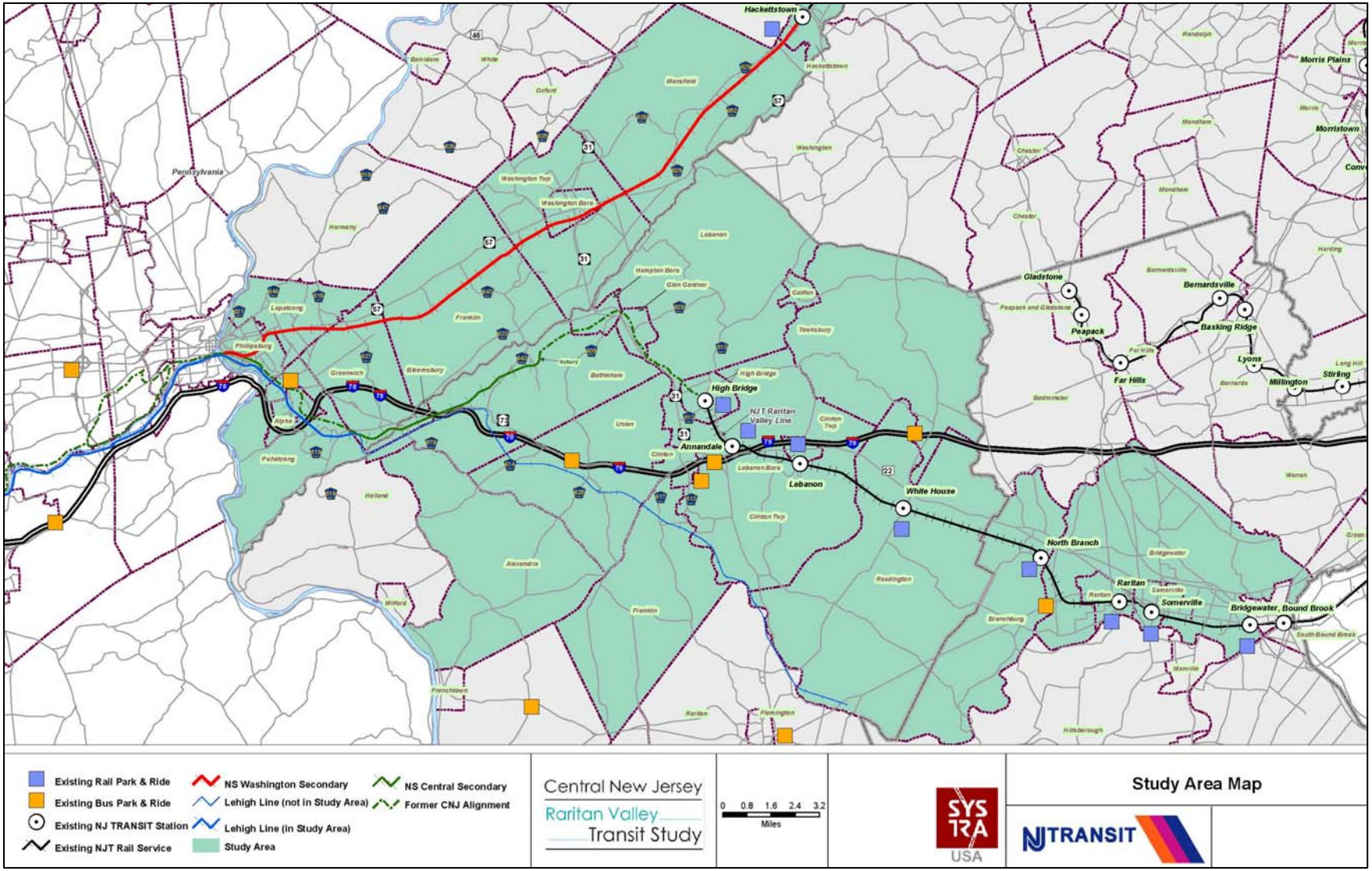
Rail ridership for this study was based on a year 2030 NJ TRANSIT commuter rail system operating plan which included the Access to the Region's Core (ARC) project. The ARC project would have provided a one-seat ride to Midtown Manhattan on the Raritan Valley Line (RVL). Recently the decision has been made not to progress the ARC project. This decision will change the operating plan possible if rail service was extended causing a change in ridership. The technical work on this project was completed months prior to the decision about ARC. Without an ARC project, the anticipated trans-Hudson ridership will be lower than what is shown in this report due to the lack of direct service to Manhattan.

The Central New Jersey/Raritan Valley Transit Study is a feasibility analysis for a wide range of potential transit improvements along the Interstate Route 78 (I-78) Corridor in portions of central and western New Jersey. The Study Area, shown in **Figure ES-1**, spans portions of Hunterdon, Warren and Somerset counties, with its western limit along the Delaware River at the border of New Jersey and Pennsylvania and the eastern limit along the Raritan Valley Line in Bridgewater, New Jersey in Somerset County. Making transit more attractive would allow residents more travel choices and could help reduce peak period traffic volumes on I-78. The purpose of this study was to produce basic factual information on a range of alternatives in order to make this information available to decision-makers in the region so that they can be better informed of the relative value of a range of transit improvements and their benefits in this corridor.

Traffic congestion in this area is forecast to worsen due to future residential and employment growth in New Jersey and in the Lehigh Valley in Pennsylvania. Lehigh Valley growth is more pronounced, as development restrictions are in place in parts of New Jersey. At the same time, transit services and facilities in the Study Area are limited. Raritan Valley Line (RVL) rail service extends only to eastern Hunterdon County and rail station parking is used to capacity. Likewise, bus park-and-rides which are convenient to I-78 are used to capacity. Bus services on this portion of I-78 are currently operated by private carriers Transbridge Lines and Bieber Tourways. This is expected to continue for any new services. This study provides further analysis of some recommendations made in the I-78 Corridor Transit Study, completed by the North Jersey Transportation Authority in January, 2008

As the Raritan Valley Line essentially parallels I-78 across New Jersey, NJ TRANSIT views the RVL as a transportation corridor of strategic importance. However, the history of the study area has created some issues that will affect the success of transit in the area. The RVL does not run in a straight line, but loops around the Musconetcong Mountain to get to areas further west. In contrast, Route 78 takes a more direct route from Annandale to Bloomsbury. The less direct route of the railroad (approximately 3 miles longer than the highway), the 65-mph speed limit on I-78, and the likely intermediate point station stops (High Bridge and Hampton) means longer trip times compared to buses that can take the more direct highway route.

Figure ES-1: Study Area Map



Also, express rail trips that would skip large numbers of stops on the eastern part of the RVL are not currently possible because the RVL consists of only two tracks east of the study area, with both tracks being needed for the existing bidirectional service. Substantial capital investment (discussed below) would be needed to add the capacity required for an express service.

Raritan Station marks the end of the "primary" RVL commuter zone. Rail service west of Raritan has traditionally been of lower intensity than the service east of that point. RVL "west of Raritan" service has had a varied history over the past 50 years. The traditional endpoint for "commuter" service in this outer zone was Hampton. Service to Phillipsburg was provided by the limited number of intercity trains (to Allentown and/or Harrisburg). In 1967, the intercity service was discontinued and Hampton became the "end of the line". In 1974, the State of New Jersey provided funding to extend service as far west as Phillipsburg. Ridership was very low (less than 50 daily boardings combined at the three stations west of High Bridge), and at the end 1983 NJ TRANSIT truncated the west of Raritan service at High Bridge. Trains are stored overnight at Raritan Yard and "deadhead" to/from High Bridge. At that time, NJ TRANSIT also came to an agreement with Trans Bridge lines, a local private bus company, to coordinate bus services in the I-78 Corridor. NJ TRANSIT transferred all of its former TNJ (Transport of New Jersey) bus service west of Clinton to Trans Bridge, with NJ TRANSIT providing the local service east of Clinton.

Future consideration of expansion/improvement of transit services to this area would benefit from some local actions that would support transit, especially including changes to local land use plans that would encourage clustering of development around the transit stations, and new partnerships between NJ TRANSIT, local governments and other transit operators that would create partnerships for sustaining the services. For instance, transit services, especially rail services, require concentrations of origins and destinations to generate enough ridership. Current land use in the RVL area tends to disperse development, making it harder to serve with traditional fixed route and scheduled transit service. Equally important are the availability of parking at station and/or the provision of feeder transit services so travelers can access the service. Meeting these needs requires new partnerships between NJ TRANSIT, local governments, residents, business, and other transit providers, like Transportation Management Associations (TMAs), to make transit work. As noted earlier, the current Raritan Valley Line has some capacity constraints that limit the quality of service that can be offered. NJ TRANSIT will be further investigating potential improvements to address these limitations, which affect the 21,000 existing daily riders as well as any new riders attracted by potential extensions. Improvements to be investigated include:

- Hunter Flyover (a grade separation allowing eastbound RVL trains to cross above the Northeast Corridor and enter NEC Track One);
- Lehigh Line improvements, including additional parallel trackage along a 6-mile segment of Conrail's Lehigh Line in Essex and Union Counties (used by approximately 60 daily RVL trains and 40 daily freight trains)
- RVL Third track – addition of a third track to a section of the RVL allowing for future overtake/express service.

Alternatives Development Process

A set of short, medium and long-term potential projects made up a Long List of 51 Alternatives that were evaluated. The list was developed based on a review of previous reports, internal NJ TRANSIT evaluation, and consultation with the Study's Technical Advisory Committee (TAC) and Community Liaison Committee (CLC). All proposals identified were included in the Long List, and were categorized by estimated implementation time-frame – Short-term (less than 5 years), Medium-term (5 to 10 years) and Long-term (over 10 years).

Bus services in the Long List include additional service to the Urban Core (Midtown and Downtown Manhattan and Jersey City, but not Newark) and to the Bridgewater/Somerville/Raritan area, where many work trips from the Study Area are destined. Rail services included in the Long List were the extensions of the NJ TRANSIT Morris and Essex Line (M&E) from Hackettstown to Phillipsburg, and the Raritan Valley Line (RVL) from High Bridge to Phillipsburg.

After undergoing a screening evaluation consistent with the Study's Purpose and Need Statement for technical feasibility, environmental impacts and permitting requirements, construction scope and required off-site improvements, such as highway infrastructure modifications, the Long List was pared down to a Short List. This process was conducted in consultation with the TAC and CLC.

Results

The Short List of alternatives, shown in **Table ES-1**, focuses on a phased approach of providing added bus park-and-ride capacity along I-78 in the short-term or medium-term, followed by the possibility of extending RVL commuter rail service over a period of years into the future. Included with the RVL extension is a storage yard and maintenance facility sized for all trainsets planned to start and end west of Raritan Yard, thereby eliminating the current practice of deadheading trainsets between Raritan and High Bridge.

The Short List bus alternative includes new express bus service to the Urban Core with a new park-and-ride in Bloomsbury/Bethlehem and a second park-and ride in the area where the RVL crosses Route 22 in Clinton Township (**Figure ES-2**). A complimentary strategy to support new and existing bus services in congested conditions is the implementation of a bus shoulder bypass lane on I-78, which would allow buses to operate in the shoulder during instances where general traffic flow on I-78 is below 35 mph during weekday peak hours. The proposed eastbound shoulder running would extend along I-78 between the Raritan River Bridge in Clinton (MP15.54) and Rattlesnake Bridge Road (MP 27.11) and the proposed westbound shoulder running would extend between the I-78/I-287 Interchange (MP 30.65) and Rattlesnake Bridge Road (MP 27.11).. The Short List rail alternatives include RVL extensions to three potential locations: Hampton, Bloomsbury/Bethlehem and Phillipsburg. A potential train storage yard site is included at the terminal point of each extension option (**Figure ES-3**). A new yard was established as a goal for extended service since the existing yard in Raritan is located 20 to 35 miles from the potential endpoints. Repositioning trains over such a great distance would drive up operating costs and present added service reliability risks. To support operations in this manner would likely require additional passing sidings/second track to provide the needed capacity.

Table ES-1: Short List Build Alternatives

Alternative Name	Description
BUS SERVICES	
Additional Express Bus Service in the I-78 Corridor to Urban Core (Midtown/ Lower Manhattan/ Exchange Place Jersey City)	Additional bus service to currently served locations as needed to meet forecasted ridership, and with stops at new park-and-rides. Implementation is dependent on new park-and-ride capacity. Peak headway would be 15 minutes.
NEW BUS PARK-AND-RIDES	
Bloomsbury/Bethlehem I-78 Bus P&R and Future RVL Rail Station	For bus service to Urban Core and for RVL Extension rail service. Would likely be implemented in phases. First phase is for bus-only in the short-term and second phase is for rail in the long-term.
New Bus/Rail Facility in the area of the Confluence of Rt 33/I-78/Rt 22 and the RVL	For bus service to Urban Core and for RVL rail service. Would be implemented in the medium-term. Could include the relocation of the Annandale Rail Station and the Annandale Square Bus Park-and-ride to this site.
PARKING EXPANSIONS AT EXISTING RAIL STATIONS	
Annandale Station RVL – Expand parking on NJT ROW (50 to 100 stalls) and vacant parcel (280 stalls - in possible second phase)	Expansion on NJT ROW could be accomplished in the short- term, while the vacant parcel expansion is medium-term
High Bridge Station RVL – Expand parking via shared use with Casa Maya Restaurant (50 stalls)	Expansion and shared used of a restaurant parking facility adjacent to the station. Expected to be implemented in the medium-term.
COMMUTER RAIL EXTENSIONS	
Extend the Raritan Valley Line to Hampton	Extension of 5.0 miles from High Bridge with one new rail station in Hampton and an eight-trainset yard in Hampton. Uses NJ TRANSIT-owned ROW entirely Eight AM Peak period trips (Some to NY, some to Newark)
Extend the Raritan Valley Line to Bloomsbury/ Bethlehem	Extension of 12.2 miles with two new rail stations in Hampton and Bethlehem Township (Bloomsbury/ Bethlehem I-78 Bus P&R) and a nine-trainset yard in Bethlehem Township. Uses NJ TRANSIT-owned ROW entirely Eight AM Peak period trips (Some to NY, some to Newark)
Extend the Raritan Valley Line to Phillipsburg former CNJ Main Line	Extension of 20.0 miles with three new rail stations in Hampton, Bethlehem Township and Phillipsburg, and a nine-trainset yard in Phillipsburg. Uses NJ TRANSIT-owned ROW entirely. Eight AM Peak period trips (Some to NY, some to Newark)
Extend the Raritan Valley Line to Phillipsburg via the NS Lehigh Line	Extension of 20.0 miles with three new rail stations in Hampton, Bethlehem Township and Phillipsburg and a nine-trainset yard in Phillipsburg. Uses NS-owned Lehigh Line from Bloomsbury to Phillipsburg. Eight AM Peak period trips (Some to NY, some to Newark)

Figure ES-2: Shortlist Bus Alternative Map

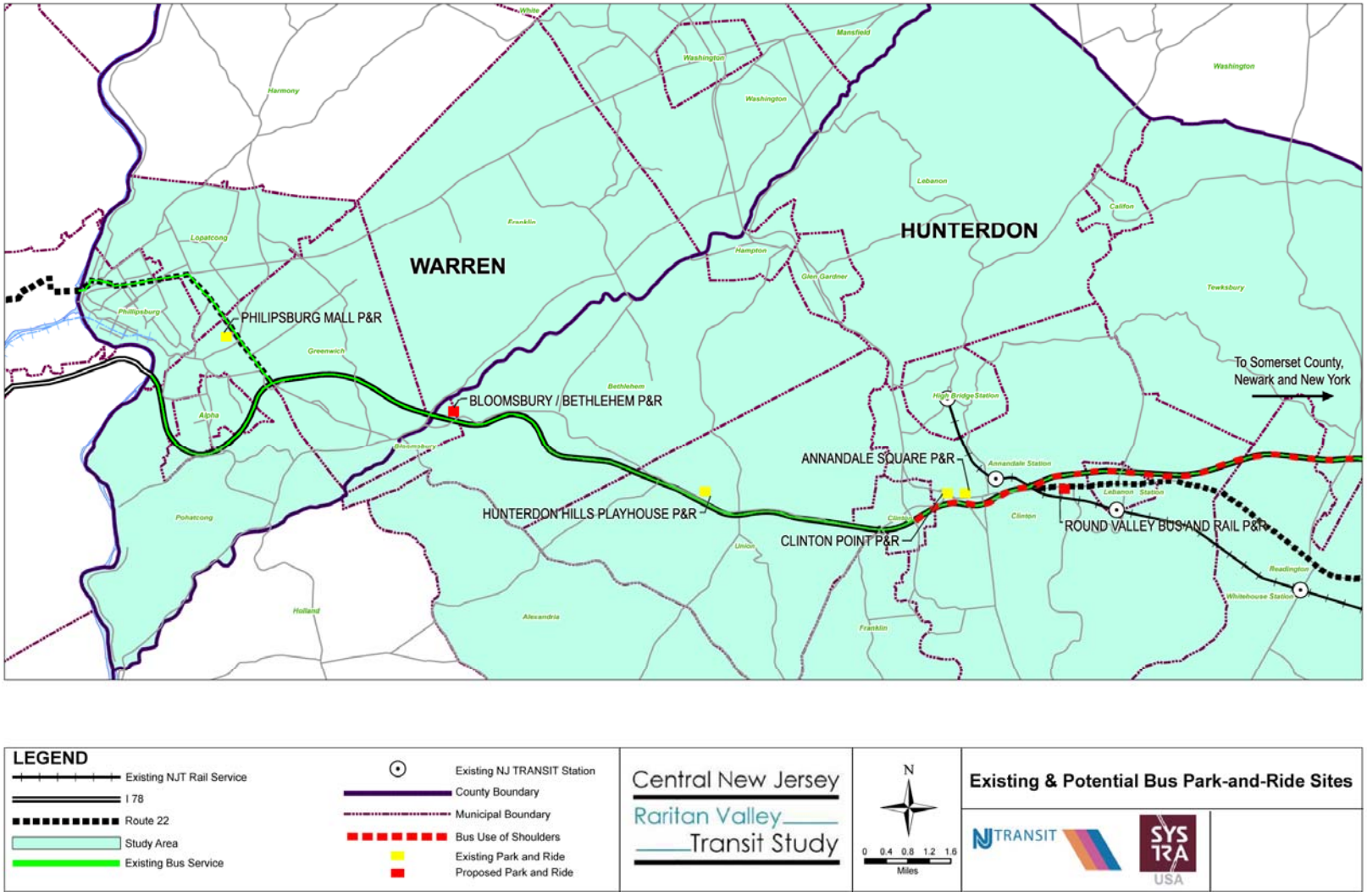
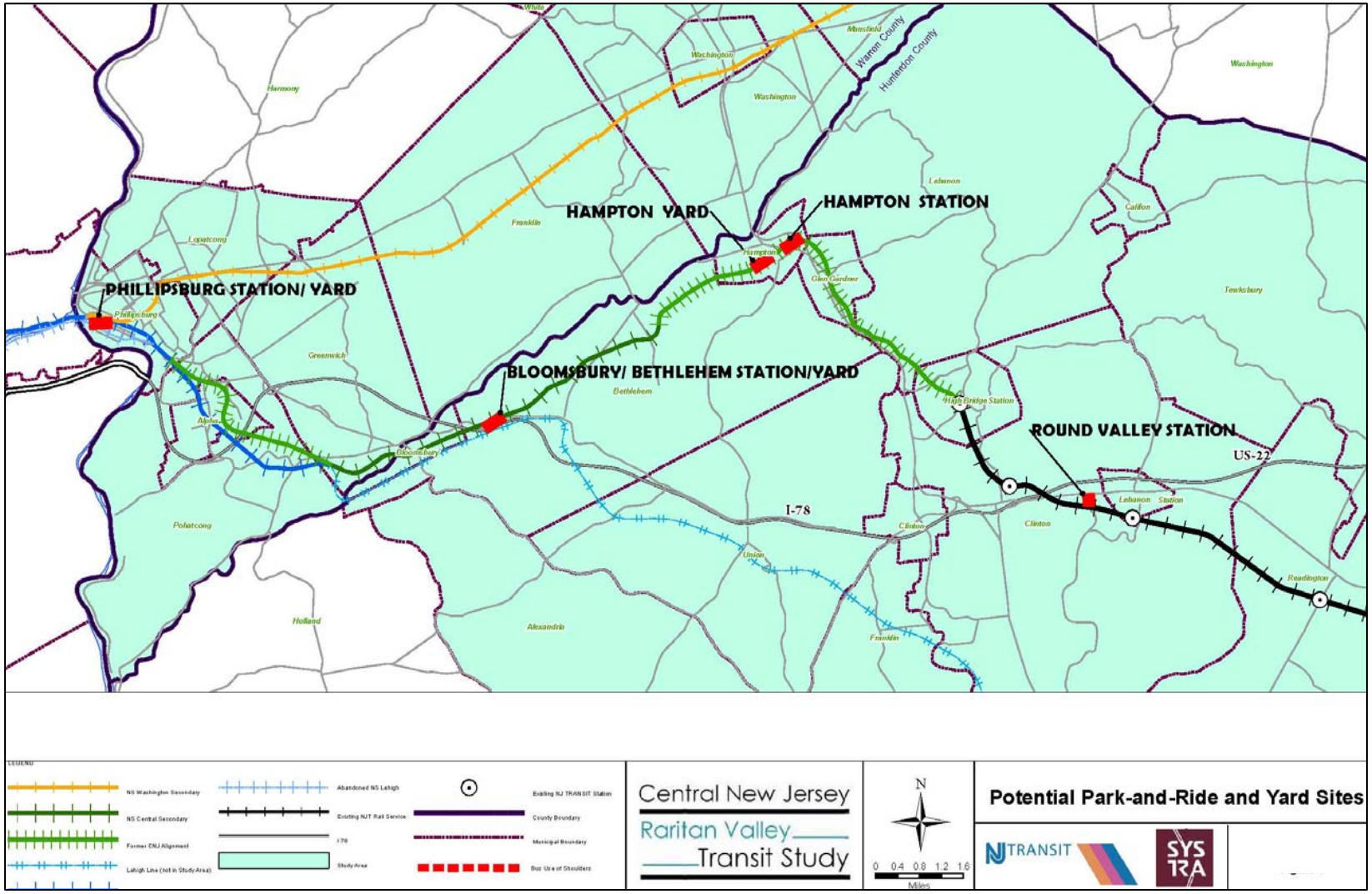


Figure ES-3: Shortlist Rail Alternative Map



Comments on the results shown in Table ES-1

In the area of the confluence of I-78/Rt 22/Rt 31, the most oversubscribed commutershed in the Study Area, short-term options have been identified to add a modest amount of parking at the existing High Bridge and Annandale rail stations. Adding capacity at existing stations would alleviate some, but not all, of the park-and-ride oversubscription. This area is located east of where I-78 eastbound congestion routinely occurs in morning peak periods. The I-78/Rt 22 interchange is particularly congested. Forecasted traffic on Rt. 22 warrants roadway improvements, even without additional localized traffic generated by proposed transit facilities in this area. The study team developed a concept to address this congestion and presented it to NJDOT. Further refinement of this concept should be considered by NJDOT.[1]

To help alleviate both I-78 congestion and demand for existing park-and-ride facilities in the I-78/Rt 22/Rt 31 area, an increase in bus and rail park-and-ride capacity to the west along I-78 should be undertaken. The proposed Bloomsbury/Bethlehem park-and-ride, which at first would be for bus only and later could become a rail station, is the shortlisted park-and-ride that would best serve this area of the I-78 corridor. However, with Bloomsbury in place, the I-78/Rt 22/Rt 31 area is still forecasted to be oversubscribed. Therefore, parking expansions at Annandale[2] and High Bridge Stations should be considered, which would alleviate most of the remaining unmet demand.

The study examined a possible long-term option for meeting the transit needs of the I-78/Rt 22/Rt 31 area with a new station in the area where the RVL crosses Route 22 in Clinton Township and east of High Bridge Station. However, no site has been found to be acceptable without an overall plan to mitigate area-wide traffic issues on Route 22 and it's confluence with other highways. A station in this location is potentially attractive to the larger catchment area, and would contain station-generated traffic circulation to major arterials. Several alternative sites have been investigated for a combined bus and rail facility that meets ridership needs over the long-term. This study identified a parcel adjacent to US 22 and the Round Valley Access Road which appears suitable for a combined bus/rail parking facility. However, US 22 in this area is forecasted to have increased traffic volumes in the future. The community is strongly opposed to development of this site as a park-and-ride, largely due to traffic concerns.

The study also identified a number of potential small scale improvements to rail station parking in the corridor, in some cases by advancing concepts for shared use of existing parking facilities. Current projections for future demand suggest that localized smaller scale parking expansions be advanced on a case-by-case basis related to emerging local needs. These small-scale projects were not developed in detail as part of this project. North Branch, Whitehouse Station and Lebanon were identified as having potential for improvement.

Bus service in this area is operated by private carriers (and not NJ TRANSIT). Following past precedent, NJDOT would have primary responsibility for advancement of new bus park-rides and service alternatives since it is served solely by a private bus operator.

[1] The concept developed by the study team consisted of a restriping of the US 22 westbound roadway to accommodate 2 travel lanes as it passes beneath I-78. The US 22 Eastbound to Westbound U-turn movement would need to be relocated, potentially to a new jughandle that could be constructed using Sand Hill Road and the Exxon signalized intersection. Further study is needed to determine feasibility of this concept.

[2] NJ TRANSIT began improvements to the existing Annandale Station during 2010

Ridership

Ridership estimates show that a rail alternative would attract up to 1,400 net new trips per day generated in the forecast year of 2030 in a full rail build-out, with 40 more trips if additional rail station shuttles were provided. Up to 240 net new bus trips would be generated in a full bus build-out, with an additional 100 trips if bus shoulder lanes are implemented on I-78.

Ridership estimates were prepared using NJ TRANSIT's travel demand forecasting model which has been used on other NJ TRANSIT studies throughout northern New Jersey and is based on future forecasts prepared by the North Jersey Transportation Planning Authority (NJTPA), the Metropolitan Planning Organization for this region. The methodology has been reviewed and approved by the Federal Transit Administration.

Table ES-2 shows year 2030 forecasted daily ridership estimates for the shortlisted bus park-and-ride facilities and services only. This includes a No Build, a scenario where the Bloomsbury/ Bethlehem Bus park-and-ride is implemented, and the scenario where two bus and rail facilities are added: Bloomsbury/Bethlehem site plus a site in the area of the confluence of I-78/Rt 22/Rt 31, and the currently active RVL. The Round Valley Access Road site was used only for ridership estimation and demand testing purposes only, no expansions at existing facilities were assumed. The parking shortfall results indicate the expansions needed at existing facilities under each scenario. The ridership figures shown are total trips; net new trips are less as ridership for stations further east will relocate to these facilities.

Table ES-2: Forecasted Ridership - Bus Alternative

Facility	Year 2030 Daily Riders & Parking Shortfall					
	No Build		Bloomsbury/Bethlehem Only		Bloomsbury/Bethlehem and Clinton Twp (Round Valley or similarly located site)	
	Daily Riders	Parking Shortfall	Daily Riders	Parking Shortfall	Daily Riders	Parking Shortfall
PROPOSED						
Bloomsbury/ Bethlehem (bus)	-	-	213	0	65	0
Clinton Twp (bus and rail) [a]	-	-	-	-	615 (215 bus, 400 rail)	0
EXISTING						
Clinton Point (bus)	525	-170	430	-40	335	0
Annandale Square (bus)	110	0	110	0	0	0
Annandale (rail)	265	-138	210	-98	0	0
High Bridge (rail)	100	-38	85	-25	55	0
TOTAL	1,000 (635 bus, 365 rail)	-346	1,048 (753 bus, 295 rail)	-163	1,070 (615 bus, 455 rail)	0

[a] In this demand forecasting exercise, Clinton Twp (Round Valley) would replace Annandale Square (bus) and Annandale Station (rail). No specific plans to close these facilities are being advanced.

Table ES-3 shows year 2030 forecasted ridership estimates for the shortlisted rail extensions to Phillipsburg. This includes the No Build, a scenario that includes adding Hampton Station, expanding Bloomsbury/ Bethlehem to a rail station in addition to a bus park-and-ride, and adding a station in Phillipsburg, and a third scenario where a new park-ride in Clinton Township is also implemented. (In this study, a site at Round Valley Access Road was investigated but at this time is not recommended for future development. Other sites may exist in Clinton Township). No expansions at existing facilities are included. The parking shortfall results indicate the expansions needed at existing facilities under each scenario. The rail alternative assumes the bus alternative is in place.

Table ES-3: Forecasted Ridership - Rail Alternative

Facility	Year 2030 Daily Riders & Parking Shortfall					
	No Build		Without Clinton Township (Round Valley)		With Clinton Township (Round Valley or similarly located site)	
	Daily Riders	Parking Shortfall	Daily Riders	Parking Shortfall	Daily Riders	Parking Shortfall
PROPOSED						
Phillipsburg (rail)	-	-	160	0	160	0
Bloomsbury/ Bethlehem (bus)	-	-	430 (55 bus, 375 rail)	0	370 (20 bus, 350 rail)	0
Hampton Rail	-	-	215	0	180	0
Clinton Township (bus and rail) [a]	-	-	-	-	405 (145 bus, 260 rail)	0
EXISTING						
Clinton Point (bus)	525	-170	370	-35	335	0
Annandale Square (bus)	110	0	110	0	0	0
Annandale (rail)	265	-138	95	0	0	0
High Bridge (rail)	100	-38	55	0	65	0
TOTAL	1,000 (635 bus, 365 rail)	-346	1,435 (535 bus, 900 rail)	-35	1,515 (500 bus, 1,015 rail)	0

[a] In this demand forecasting exercise, Clinton Township (Round Valley) would replace Annandale Square (bus) and Annandale Station (rail). No specific plans to close these facilities are being advanced.

Ridership results are affected by the geographical, operational and land use challenges discussed in the Overview section.

Costs and Benefits

Any extension of rail service would be a long term, capital intensive project. Any extension would include a new overnight train storage yard sized to meet proposed RVL year 2030 service plans. Farebox recovery ratios indicate that ridership is low relative to operations and maintenance costs.

This study prepared order of magnitude estimates of capital and operating costs. These are very preliminary estimates based on a limited review of physical feasibility and are NOT based on detailed engineering studies.

Capital cost estimates in year 2009 dollars for the shortlisted projects are[3]:

- Annandale and High Bridge Station parking expansions (150 spaces): $2.7 million
- Bloomsbury/Bethlehem bus park-and-ride (150 spaces): $1.6 million

Table ES-4 compares the capital costs, ridership and farebox recovery of the shortlisted alternatives to extend the RVL westward.

Table ES-4: Comparison of Rail Extension Alternatives

Alternative	Capital Costs (million 2009$)		2030 Daily Riders (Annandale and Westward)	Projected Farebox Recovery
	Total	Excluding Rolling Stock		
To Phillipsburg via NS	$305	$280	1,000	18%
To Phillipsburg via CNJ	$340	$315	1,000	18%
To Bloomsbury/ Bethlehem	$235	$210	1,000	20%
To Hampton	$155	$145	500	6%

The challenge of funding any of these alternatives is significant. Partnerships with other entities that would ensure the sustainability of the service could help to set the stage for future implementation.

Potential Next Steps

Recommendations on which projects to pursue and fund need to be made in further consultation with local officials, regional and State-level agencies and other stakeholders using the data and information developed in this project. Given the current fiscal realities, it will be imperative for interested parties to work cooperatively as partners to find creative solutions to transportation challenges in this strategic corridor. Interested parties include: NJDOT, NJ TRANSIT, Private Bus Operators, TMAs serving this region, Counties and Municipalities. Key areas of future work would include:

- Roadway improvements - including Route 22/78 ramp improvements and potential bus use of I-78 shoulder.

- Bus park-and-ride improvements - in addition to the sites discussed in this report, the Township of Clinton has suggested a potential site for a new bus-only park-and-ride, located along Route 31 south of I-78. NJDOT, Clinton Township and the private bus operator serving this region can pursue this as a replacement for the temporary Annandale Square facility.

[3] A Bus park-ride at Round Valley Access Road was on the shortlist but subsequently dropped. Estimated cost of the lot containing 600 spaces was $32 million.

- Rail improvements - including potential station & park-and-ride improvements, further review of extension possibilities, and analysis of potential improvements to the existing RVL to enhance capacity and permit faster rail service.

- Counties and TMAs can play an important role in advancing projects by building consensus with their constituents. They can also work with businesses and communities to help develop lower density transit options in this region (shared ride, van pool, minibus etc.)

- Interested local municipalities can work with NJ TRANSIT on land uses and Transit Oriented Development Opportunities (to the extent these are consistent with regional planning context such as the Highlands Act) to support increased transit usage in the future.

As noted in the overview, there are a number of complimentary conditions that help to justify making an investment in expanding transit services. NJ TRANSIT and regional leaders will need to monitor these conditions to determine the appropriate time for advancing any of the transit improvements highlighted in this report. These conditions include:

- development of complimentary land uses,
- clustering of development,
- development of sustainable markets to support transit services, and
- partnerships with local and regional bodies to provide lower density shuttle type services.