



DELAWARE VALLEY
REGIONAL PLANNING
COMMISSION

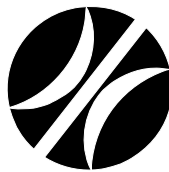
2008

SEAMLESS REGIONAL TRANSIT ACCESS

an Evaluation of
New Interstate
Links and
Connections



The Delaware Valley Regional Planning Commission is dedicated to uniting the region's elected officials, planning professionals and the public with a common vision of making a great region even greater. Shaping the way we live, work and play, DVRPC builds consensus on improving transportation, promoting smart growth, protecting the environment and enhancing the economy. We serve a diverse region of nine counties: Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer in New Jersey. DVRPC is the federally designated Metropolitan Planning Organization for the Greater Philadelphia Region - leading the way to a better future.



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EXECUTIVE SUMMARY

This report explores the feasibility of several specific transit connections proposed by DVRPC's Regional Citizens Committee (RCC). Six potential services were examined:

- Extending New Jersey Transit buses that currently terminate in Center City to 30th Street Station;
- Connecting the PATCO terminus at 15th/16th and Locust streets to 30th Street Station;
- Providing service from the Frankford Transportation Center in Philadelphia to Palmyra Station on the RiverLINE via an extension of SEPTA Route 8;
- Extending New Jersey Transit Route 413 from its current terminus at Burlington Station to Bristol Station on SEPTA's R7 Trenton line;
- Providing the Trenton – New Hope corridor with service; and
- Establishing a shuttle between Philadelphia and Pureland Industrial Complex (via Chester).

Each project was analyzed by estimating the costs and benefits for the proposed service. This was done by estimating ridership (in some cases using the DVRPC regional travel model) and determining the “cost per new estimated rider per day” for the service. The proposals were then ranked according to these costs. A summary of recommendations was prepared for each of the proposals with suggestions as to appropriate services. It bears reinforcing here that significant budget constraints exist for each service provider, and so the feasibility of any of the services evaluated in this report would have to undergo further analysis before implementation could be considered.

In general, analysis of the six proposed projects reviewed in this report found that:

Proposal 1: Connect New Jersey Transit Center City Buses to 30th Street Station

The proposed service extending the New Jersey Transit buses that currently terminate in Center City to 30th Street Station was comparatively cost-effective to the other proposals and should be considered by New Jersey Transit as part of its ongoing service planning.

Proposal 2: Improve Connection of PATCO Trains with 30th Street Station

As analyzed in the report, shuttle service connecting PATCO to 30th Street Station is not cost-effective. The existing rail connection at 8th and Market Streets (via the Market-Frankford Line) should be promoted.



Proposal 3: Connect Frankford Transportation Center with Palmyra Station

The proposed service between Frankford Transportation Center and Palmyra Station as an extension of SEPTA Route 8 is the most cost-effective of the proposals and should be considered by SEPTA as part of its ongoing service planning.

Proposal 4: Create a “Road Ferry” Between Burlington and Bristol

Extending New Jersey Transit Route 413 from Burlington City to Bristol Borough is not feasible at this time. Shuttle service under a municipal partnership might be more appropriate.

Proposal 5: Provide the Trenton – New Hope Corridor with Transit Service

Given the large distances involved as well as the service patterns required to serve discrete tourist and commuter markets, the proposed service does not appear feasible at this time.

Proposal 6: Establish a Shuttle between Philadelphia and Pureland Industrial Complex (via Chester)

While high, the estimated costs of the Job Access and Reverse Commute (JARC) service between Philadelphia and Chester City and the Pureland Industrial Complex is in line with other JARC projects and should be considered for future JARC funding.

INTRODUCTION

In FY 2006, DVRPC evaluated opportunities for better integration between transit carriers at the regional level (DVRPC publication No. 06017—*Seamless Transportation Service To and Through the Region's Core*). As a follow-up, DVRPC's Regional Citizen's Committee (RCC)—the committee charged with providing citizen access to and participation in regional planning and decision-making—prepared an itemized white paper detailing specific gaps or missing links in current transit services that the committee wished to be evaluated. The six proposals identified by the RCC were as follows:

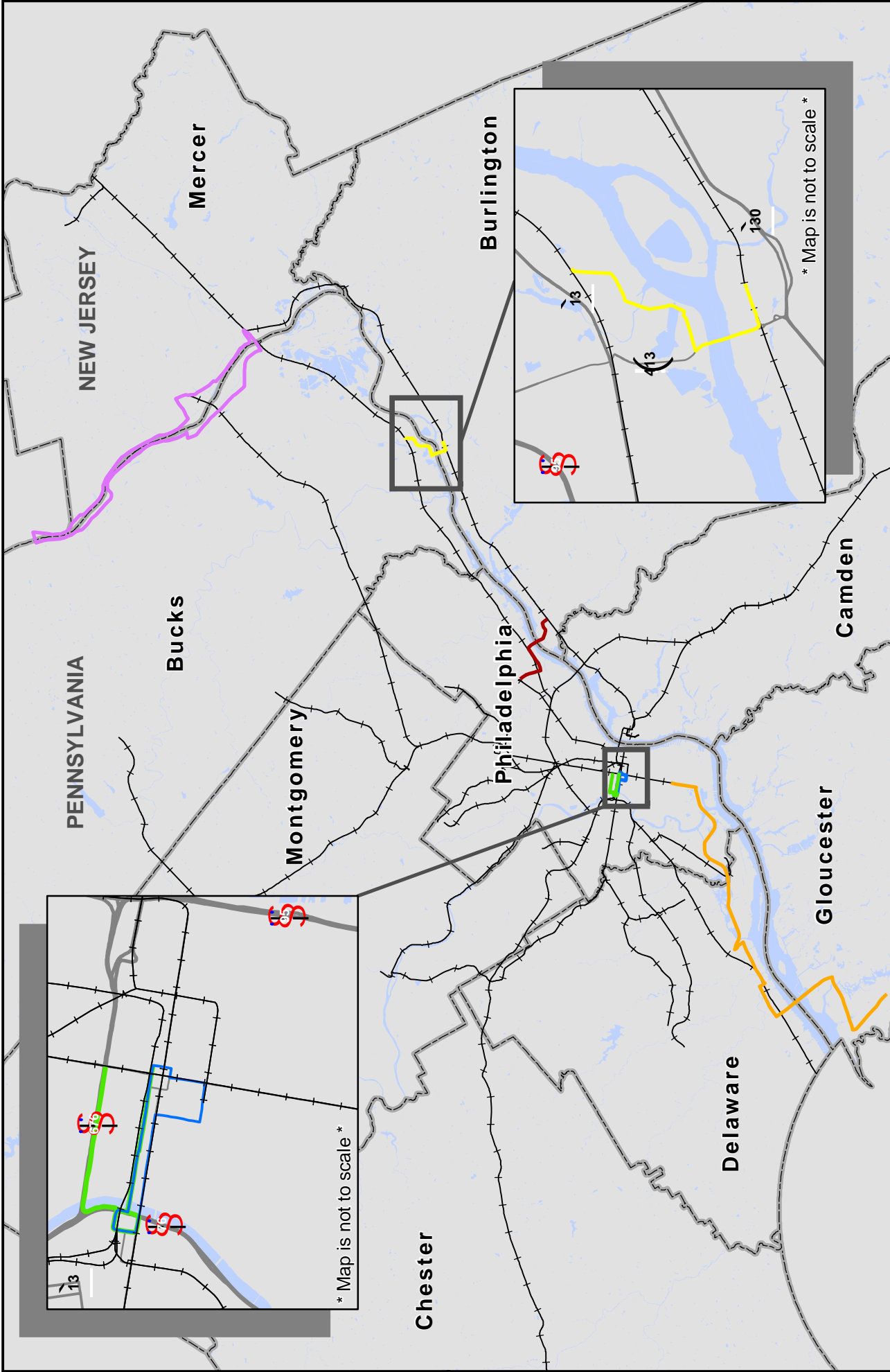
1. Connect New Jersey Transit Center City buses to 30th Street Station;
2. Improve the connection of PATCO trains with 30th Street Station;
3. Connect Frankford Transportation Center with Palmyra Station;
4. Create a “road ferry” between Burlington and Bristol;
5. Provide the Trenton – New Hope corridor with transit service;
6. Establish a shuttle between Philadelphia and Pureland Industrial Complex (via Chester).

This report focuses on six proposed projects that create interstate links. For example, extending New Jersey Transit buses and/or connecting the PATCO line to 30th Street station via bus or shuttle would allow for simpler movements for New Jersey commuters or those wanting to connect to Amtrak service. Closing the Tacony – Palmyra gap and linking Burlington to Bristol would allow for alternative modes of bridge crossings where currently none exist in Northeast Philadelphia and Bucks County. Establishing service in the Trenton – New Hope corridor could simultaneously offer new ways to commute to Trenton and its environs as well as provide tourists in the region with a way to access New Hope without having to drive. Finally, a shuttle between Philadelphia and the Pureland Industrial Complex through Chester would provide residents of these two Pennsylvania cities with access to the job opportunities located at Pureland in Logan Township, Gloucester County. The locations of the six proposed projects are depicted in Map 1.

PURPOSE


This report explores each of these individual projects in the context of costs and benefits. Costs are estimated using cost data provided by SEPTA, New Jersey Transit, and shuttle operators. Benefits are defined in this report as the number of new daily riders estimated for each of the six proposed services. Costs and benefits are combined to define an “estimated daily cost per new rider” as a means of comparing cost-effectiveness among the six proposals. The purpose is to identify low-capital bus projects that can close these gaps as well as promote greater cooperation between the region's various transit carriers. The challenge is for the estimated ridership of the proposed new services to justify the operating and maintenance expenses. Each of our regional transit carriers has significant budget constraints, and so it bears noting that investments in new service may require service cuts elsewhere.





Map 1: Seamless Regional Transit Access Proposed Projects

-  NJ Transit Buses to 30th Street
-  PATCO - 30th Street Shuttle
-  Frankford - Palmyra
-  Burlington - Bristol
-  New Hope - Trenton
-  South Philadelphia - Pureland



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SUMMARY OF METHODS

Each project recommended by the RCC is evaluated on the basis of costs versus benefits with costs taking the form of cost per estimated rider and benefits taking the form of new estimated daily riders. The first step was to determine how the link could best be created. For each of the proposed projects, staff identified the most likely configuration of service and estimated costs and benefits accordingly. For the New Jersey Transit buses/30th Street Station link, the feasibility of extending a group of bus routes was examined. For both the Tacony-Palmyra and Burlington-Bristol services, the potential of extending a single existing bus route was examined. For the remaining links, shuttle service was determined to be more appropriate in creating the link, and evaluated accordingly.

After determining how each of the gaps was to be bridged, it was necessary to estimate the ridership these new services would generate. In consultation with staff from DVRPC's Travel Modeling unit, new connections that were possible to model in order to estimate ridership were identified. Where route extensions were modeled, a continuation of existing service patterns (e.g., headways) was assumed for the extensions for affected timeframes (typically 7 AM to 6 PM). If modeling the route extensions was determined to be impossible, potential ridership was estimated by available journey-to-work data, ridership of historic, now-defunct services, or ridership of current and analogous services.

After estimating the potential ridership numbers for these proposed services, it was necessary to determine the costs that these services would incur. Cost estimates were derived using several different methods. For some of the proposed projects, information available in the SEPTA FY 2007 Annual Service Plan and New Jersey Transit Line Cost Model was used to estimate costs. For projects where shuttle service was deemed more appropriate, Job Access and Reverse Commute (JARC) routes or other similar services were used to provide a framework for estimating costs.

For an order-of-magnitude, apples-to-apples comparison between services, costs are determined as follows:

$$\text{Estimated daily operating costs} / \text{Estimated riders} \\ = \text{Cost per new estimated rider}$$

For this measure, "rider" refers to an individual passenger making a round trip. Where "estimated cost per new estimated rider" is lower, chances are better that the proposed link would be an attractive option for regional transit providers. Throughout this report, estimated costs per rider are compared to the average costs per rider of comparable operating services. Per SEPTA's FY2007 Route Operating Ratio Report, the average cost per round-trip rider of all SEPTA City Transit Division bus routes is roughly \$5.52, while the average cost of SEPTA's suburban bus routes (Victory and Frontier divisions) is \$9.37 per rider, and the net average cost per rider of all SEPTA bus service is roughly \$5.86. According to New Jersey Transit staff, the average cost per round-trip rider in FY 2007 was roughly \$7.16 systemwide and \$10.10 for the Southern Division. In considering shuttle services, the average cost of suburban JARC routes in Pennsylvania is roughly \$23.30 per rider (Source: FY09 PA JARC preliminary rankings). For simple comparisons, each of these per-rider costs assumes that stated passenger trip costs may be doubled for per-rider costs (transfers are not considered).

PROPOSAL 1: CONNECT NEW JERSEY TRANSIT CENTER CITY BUSES TO 30TH STREET STATION

No New Jersey Transit bus routes currently extend to 30th Street Station and the various transit connections available there. The 400 Series of commuter routes, which bring riders from Trenton, Sicklerville, Glassboro and other locations in southern New Jersey, terminate at City Hall in Philadelphia. Routes 313, 315, 317, and 551 make trips to and from Cape May, Asbury Park, and Atlantic City, respectively, and terminate at the Greyhound Station at 11th and Filbert streets (near Market East Station). A passenger on one of these buses currently has to switch to either a SEPTA bus or the Market-Frankford Line to get to 30th Street Station. Map 2 depicts a proposed routing for an extension of these routes from the City Hall vicinity to 30th Street Station.

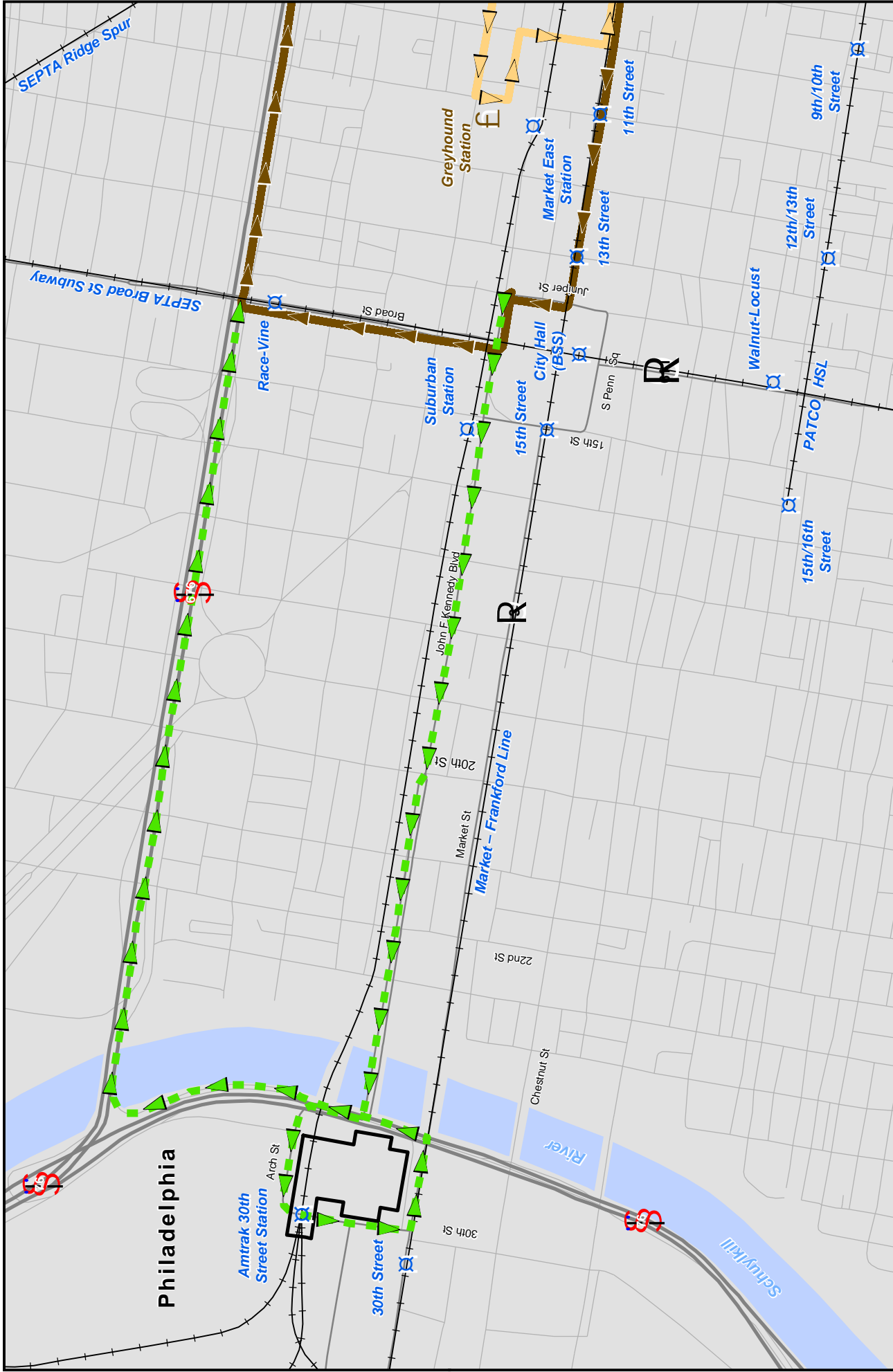
To provide a context for this proposal, an evaluation of current service patterns is instructive. Table 1 indicates recent weekday ridership averages for the New Jersey Transit shore routes and the 400 series of commuter routes. The number of scheduled runs refers to buses going both inbound (towards Philadelphia) and outbound (from Philadelphia). Passenger volumes are taken from selected monthly ridership reports.

Table 1: Average Weekday Boards, New Jersey Transit Shore Series and 400 Series






Shore Routes					
Route	Scheduled Runs	March 2007	Weekday Boards		Average
			June 2007	July 2007	
313 Cape May to Philadelphia (via Millville)	6	186	275	275	245
315 Cape May to Philadelphia (via Tuckahoe)	6	125	213	192	177
317 Asbury Park to Philadelphia	19	832	927	961	907
551 Atlantic City to Philadelphia	76	2,067	2,368	2,418	2,284
Total	107	3,210	3,783	3,846	3,613
400 Series Commuter Routes					
Route	Scheduled Runs	March 2007	Weekday Boards		Average
			June 2007	July 2007	
400 Sicklerville to Philadelphia	128	5,138	5,299	4,975	5,137
401 Salem to Philadelphia	25	711	673	641	675
402 Pennsville to Philadelphia	23	674	697	655	675
403 Turnersville to Philadelphia	78	3,252	3,392	3,177	3,274
404 Cherry Hill Mall to Philadelphia	62	1,764	1,794	1,753	1,770
405 Cherry Hill Mall to Philadelphia (via Kingston Estates)	44	945	1,011	961	972
406 Berlin/Marlton to Philadelphia	74	1,919	1,951	1,859	1,910
407 Moorestown Mall to Philadelphia	66	1,521	1,465	1,403	1,463
408 Millville to Philadelphia	40	1,464	1,447	1,378	1,430
409 Trenton to Philadelphia	92	3,055	3,038	2,946	3,013
410 Bridgeton to Philadelphia	44	1,079	1,126	1,076	1,094
412 Glassboro to Philadelphia	39	1,301	1,291	1,274	1,289
419 Burlington to Philadelphia	47	724	786	751	754
Total	762	23,547	23,970	22,849	23,455

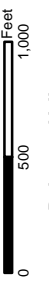
Source: New Jersey Transit, 2007





Map 2: Potential Routing to Extend NJ Transit Buses from City Hall to 30th Street Station

-  Proposed Route
-  Present Routing, Shore Routes
-  Present Routing, Commuter Routes
-  Rail Station
-  Bus Station



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In aggregate, the 400 Series of New Jersey Transit commuter bus routes and the shore routes had a total daily ridership of over 27,000 (for both inbound and outbound trips). On the whole, roughly 20 – 25 percent of the total trips on these routes are interstate trips to/from Philadelphia. Based on volume, this is an important component of the regional transit network. Extending these routes to 30th Street Station would create new intermodal connections and could have a substantial impact on a large number of regional transit riders.

Ridership Estimates

In order to determine the effect that extending the aforementioned routes would have on ridership, the extension of each of these bus routes from their current terminus to 30th Street Station were simulated by the DVRPC regional travel demand model. Routes were modeled for peak service (7 AM to 9 AM and 3 PM to 6 PM) and midday service (9 AM to 3 PM). Evening and weekend service are not included in the modeling forecasts. Table 2 summarizes the forecast changes in the total number of passenger trips that the route extensions would generate.

Table 2: Forecast Changes in Passenger Trips for New Jersey Transit Routes

Route	Change in passenger trips
313 Cape May to Philadelphia (via Millville)	+11
315 Cape May to Philadelphia (via Tuckahoe)	+22
317 Asbury Park to Philadelphia	+1
400 Sicklerville to Philadelphia	+215
401 Salem to Philadelphia	+15
402 Pennsville to Philadelphia	+64
403 Turnersville to Philadelphia	+159
404 Cherry Hill Mall to Philadelphia	+28
405 Cherry Hill Mall to Philadelphia (via Kingston Estates)	+12
406 Berlin/Marlton to Philadelphia	+170
407 Moorestown Mall to Philadelphia	+92
408 Millville to Philadelphia	+108
409 Trenton to Philadelphia	+121
410 Bridgeton to Philadelphia	-8
412 Glassboro to Philadelphia	+315
419 Burlington to Philadelphia	+65
551 Atlantic City to Philadelphia	+47
Total	+1,437

Source: DVRPC Travel Simulation Model, 2007

As evidenced by Table 2, a gain of 1,437 passenger trips is estimated in aggregate for both the 400 series and the New Jersey Transit shore routes, or roughly 719 new daily riders.

Route 412 from Glassboro to Philadelphia and Route 400 from Sicklerville to Philadelphia were forecast to gain over 250 new daily riders between the two routes. Of the shore routes, Route 551 from Atlantic City to Philadelphia was forecast to gain the most at 24 new riders. Overall, if all of the aforementioned routes were extended from



their current termini to 30th Street Station, daily ridership on these routes is estimated to grow roughly 2.7 percent.

These new riders would use the extended services to reach destinations at 30th Street or along the West Market Street corridor. In addition, a certain portion of current riders would benefit by being able to reach destinations west of City Hall without a transfer (these benefits are not quantified).

Estimated Costs

The estimated costs involved in extending these bus routes are summarized in Table 3. The 13 routes currently make 305 daily weekday trips inbound to their respective locations in Center City. Extending each route to 30th Street Station would add approximately 2.8 miles to each route round trip, for an added total of 787 daily miles in aggregate for all of the routes.

Table 3: Estimated Costs of New Jersey Transit Route Extensions

New Jersey Transit Routes	Trips into Philadelphia (7 AM – 6 PM)	Added total mileage from proposed route extensions	Added daily costs
New Jersey Transit Shore Routes	30	84	\$507
400 Series Commuter Routes	251	703	\$4,239
Total	281	787	\$4,746

Source: New Jersey Transit Line Cost Model, May 2007

According to New Jersey Transit's May 2007 Line Cost Model, the average operating cost per mile (by month) for all New Jersey Transit buses in the last fiscal year was \$6.03. This means that the 84 miles generated by extending the shore routes to 30th Street Station would cost \$507 per day (84 miles x \$6.03 cost per mile), and that the 703 new miles generated by extending the 400 Series of commuter routes would cost \$4,239 per day (703 miles x \$6.03 cost per mile). In aggregate, the routes would cost roughly \$4,746 per day if extended to 30th Street Station. It should be noted that the \$6.03 cost per mile is inclusive of all services, and that urban operations (such as the proposed extension to 30th Street Station) will be more expensive on average due to slower operating speeds. Accordingly, it is likely that the costs estimated here are somewhat understated.

Considering that the New Jersey Transit shore routes and 400 series were forecast to experience a net gain in ridership of 719 new riders per day, these total costs would yield an estimated cost of \$6.60 per new estimated rider per day.

**Proposal 1: New Jersey Transit 30th Street Station bus extension —
Daily expenses/ridership summary**

$$\begin{aligned} & \$4,746 \text{ (Estimated daily operating costs)} / 719 \text{ (Estimated daily riders)} \\ & = \$6.60 \text{ (Cost per new estimated rider)} \end{aligned}$$

Conclusion/Recommendations

For reference, the estimated cost-effectiveness of these route extensions appears reasonable compared to the costs of other New Jersey Transit Southern Division bus services (roughly \$10.10 per round-trip rider in FY 2007). The recommendation is that New Jersey Transit evaluate the feasibility of this concept more rigorously as part of its ongoing service planning process. As a test, it might be appropriate to extend routes that were estimated to generate higher levels of daily ridership (routes 400, 403, and 412 to name a few) before extending all routes.

New Jersey Transit's Bus Service Planning Department is set to undertake a Philadelphia bus service study in the near future to explore alternatives for improving Philadelphia services. DVRPC is also conducting a passenger survey of six bus routes in the Gloucester/Cumberland corridor, which will refine our understanding of trip patterns. In the meantime, it is possible for New Jersey Transit bus passengers to reach 30th Street Station by transferring to the Market-Frankford Line at Market East Station. This connection should be promoted to passengers.

PROPOSAL 2: IMPROVE CONNECTION OF PATCO TRAINS WITH 30TH STREET STATION

PATCO service currently extends from Lindenwold, New Jersey to 15th/16th and Locust Streets in Center City, Philadelphia. There is no direct service that connects PATCO passengers to 30th Street Station. PATCO riders can transfer onto SEPTA Market-Frankford Line trains at 8th and Market and ride to 30th Street Station, but for passengers carrying luggage for trips outside the region, this may not be a convenient transfer. Filling the gap with dedicated shuttle service taking disembarking passengers from 15th/16th and Locust to 30th Street Station would provide a more comfortable transfer for riders as well as provide another option for commuters to University City. Map 3 indicates a possible routing from the PATCO terminus at 15th/16th and Locust Streets to 30th Street Station.

Proposed Service

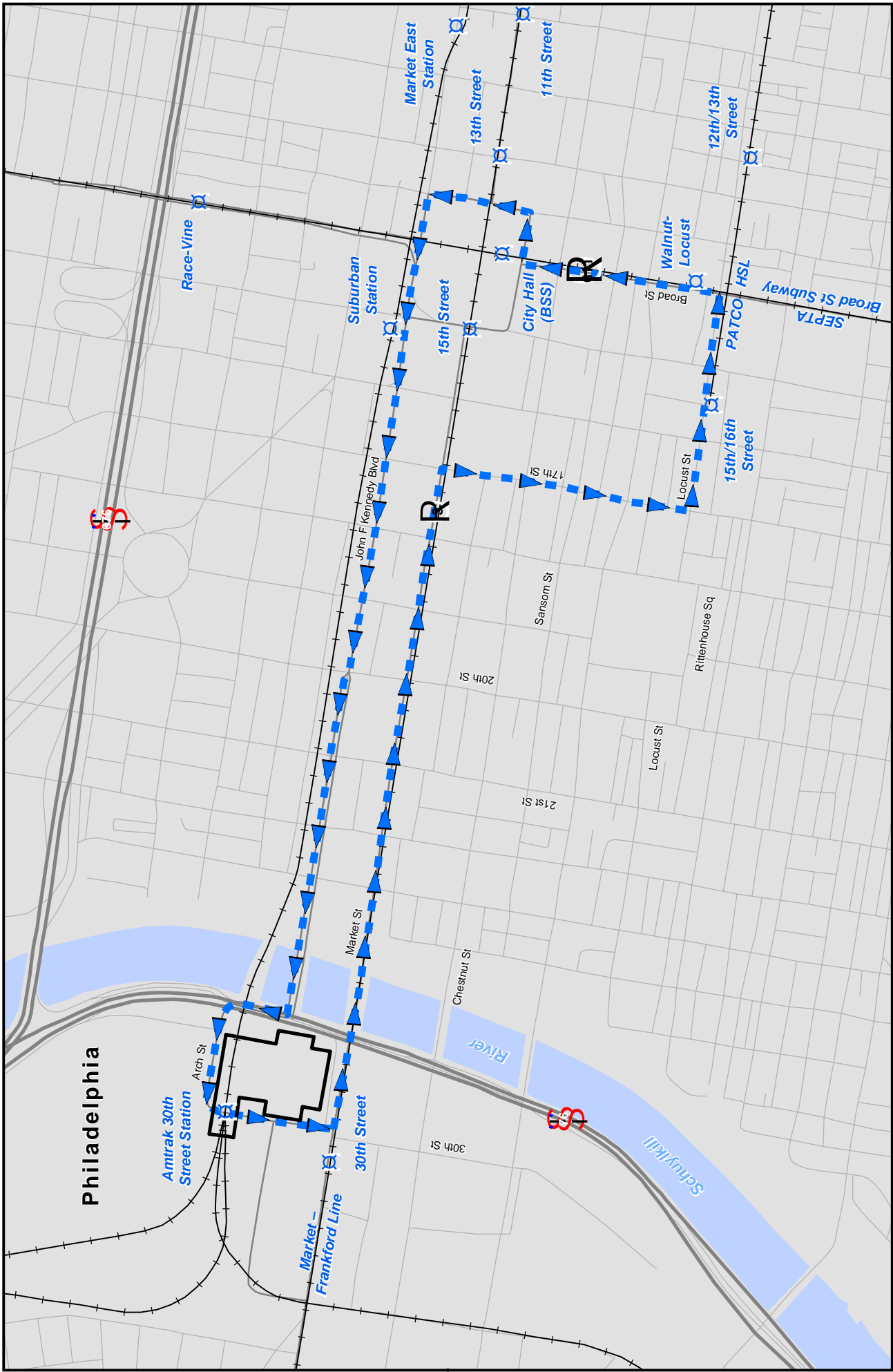
To determine potential ridership and the associated costs of shuttle service connecting PATCO's Center City terminus to 30th Street Station, it is informative to look at the current cost figures for SEPTA's "Loop through University City (LUCY)." LUCY provides shuttle service for people going from 30th Street Station to the various educational and employment centers located throughout University City, including the University of Pennsylvania, Drexel University, and Presbyterian Hospital. It runs only on weekdays and serviced over 320,000 passengers in 2006, or 1,258 riders per weekday. Its operating subsidies are borne entirely by the University of Pennsylvania, the Hospital of the University of Pennsylvania, and the VA Medical Center (via the University City District). LUCY is analogous to the proposed PATCO shuttle in the length and configuration of its loop, in its service area, and in its multipurpose market.

LUCY makes a total of 89 trips daily, with 64 of those trips (or 72 percent) occurring within peak hours (7 to 10 AM and 4 to 6 PM). During these times there are ten-minute headways and six shuttles in operation, three for each variation of the route (the green loop and the gold loop). Off-peak headways vary between 30 and 45 minutes, and the trip (which begins and ends at 30th Street Station) is scheduled to last twenty-five minutes. The LUCY route measures roughly 3.5 miles in length.

Compared to many other SEPTA routes, LUCY is a low-cost operation. The fully allocated expenses (for FY 2005) were \$768,825, or roughly \$4.80 per round-trip rider ($\$768,825 / 160,336$ annual round-trip passengers) and \$5.25 per mile. Because of LUCY's unique funding structure and because employees and students of the University of Pennsylvania, the University of Pennsylvania Health System, and VA Medical Center need only valid institutional identification to board the bus, very few passengers pay the full fare, which is equivalent to that of a normal SEPTA bus route (\$2.00 cash). If all 320,671 LUCY passengers paid the average SEPTA city bus fare of \$1.04 (according to the SEPTA FY 2007 Annual Service Plan), total passenger revenue would be \$333,492 and the operating ratio (the percentage of fully allocated expenses that are covered by passenger revenues) would be 43 percent, average by SEPTA standards.

Shuttle service connecting PATCO trains to 30th Street could follow the routing indicated in Map 3. The length of the proposed route is 2.6 miles round trip, or roughly one mile shorter than that of the LUCY route. To accommodate PATCO transfers, this service





Map 3:
Proposed Routing for
PATCO – 30th Street Shuttle

 Proposed Route
 Rail Station

0 500 1,000 Feet


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would generally match PATCO headways. There are 82 PATCO arrivals at 15th/16th and Locust Streets between 7 AM and 6 PM on weekdays with five-minute headways during the proposed peak hours and 10 minutes in the midday. It is recommended that this service follow ten-minute headways throughout the day from 7 AM to 6 PM, which would translate into 67 scheduled weekday trips.

Cost Estimates

SEPTA's line cost model estimates operating and maintenance costs using a combination of miles, hours, and peak vehicles. The potential routing indicated on Map 3 measures approximately 2.6 miles for a loop from 15th/16th and Locust streets to 30th Street Station and back. With 67 weekday trips, this translates into 174 route miles total per day (2.6 miles per trip x 67 weekday trips). According to SEPTA's FY 2007 Annual Service Plan, city bus travel costs an average of \$2.87 per mile. The mileage of this route would therefore cost an estimated \$499 per day.

Assuming a conservative speed estimate of 7 MPH (reasonable when considering Center City traffic), one round trip on the PATCO – 30th Street shuttle would take approximately 22 minutes. With a standard 5-minute recovery time, each trip would take 27 minutes. The number of minutes per trip, multiplied by the 67 trips per day equals roughly 30 route hours per day that the shuttle would spend in service. The FY 2007 Annual Service Plan lists the average cost per hour for SEPTA City Transit Division buses to be \$42.12. The vehicle hours for this route would therefore cost \$1,263.

To determine the number of peak vehicles necessary for this service, the number of trips each bus can make in an hour must be ascertained. 60 minutes per hour/27 minutes per route = 2 trips per bus per hour. Then 6 trips per hour (for ten-minute headways)/2 trips per bus = 3 peak buses required for this service. The FY 2007 Annual Service Plan lists the full cost per peak vehicle as \$142,900 per year, or \$572 per nonholiday weekday (approximately 250 days annually). The daily cost then of three peak vehicles for this service would be roughly \$1,716.

SEPTA's FY 2007 Annual Service Plan defines "Fully Allocated Cost" as [vehicle hours x unit cost] + [vehicle miles x unit cost] + [peak vehicles x fully allocated unit cost]. Accordingly, adding the mile, hour, and vehicle-based costs above yields a total daily operating and maintenance cost of \$3,478.

Ridership Estimates

Since modeling for this proposal was deemed unfeasible, an alternative method of estimating ridership was necessary. An evaluation of Traffic Analysis Zone (TAZ)-level journey-to-work data indicates that there were 173 commuters from New Jersey whose trip ended in University City and whose primary mode of travel was rail. We can surmise that many of these commuters make the PATCO to Market-Frankford Line transfer daily, and would represent a potential market for the proposed shuttle.

It is reasonable to assume that at least half of these commuters would continue to use the current PATCO to SEPTA transfer available at 8th Street to get to University City. If we liberally assume that roughly half of these 173 commuters would use the proposed shuttle, and that an equivalent number of nonwork and new riders would be attracted, a daily ridership estimate of 170 becomes reasonable on an order-of-magnitude basis.

This passenger volume is small: less than 30 percent of the number of riders who use LUCY per day.

To determine the estimated cost per new rider for this service, the cost estimated above (\$3,478 per day) is divided by the number of new estimated riders, which has been estimated at 170 per day. This gives an estimated cost of \$20.46 per new estimated rider per day.

**Proposal 2: PATCO Shuttle to 30th Street Station —
Daily expenses/ridership summary**

$$\begin{aligned} & \$3,478 \text{ (Estimated daily operating costs)} / 170 \text{ (Estimated daily riders)} \\ & = \$20.46 \text{ (Cost per new estimated rider)} \end{aligned}$$

Conclusion/Recommendations

Given the relatively high estimated cost per rider compared to the LUCY service (roughly \$4.80 per rider in FY 2005) the proposed shuttle service does not appear feasible, particularly where there are already options in place for passengers making this connection. We recommend that the available transfer to the Market-Frankford Line at 8th Street Station be better promoted to PATCO riders. A passenger disembarking at the 8th Street PATCO station can reach 30th Street Station in 15 minutes or less during peak hours when factoring in the time it takes to walk to the Market-Frankford Line platform. The scheduled travel time between 8th Street and 30th Street on the Market-Frankford Line is only 5 minutes. This connection should become still more seamless following SEPTA fare modernization, assuming farebox compatibility with PATCO's Freedom Card. Considering the speed and density of Center City traffic, the existing transfer could actually save time compared to shuttle service between the 15th/16th Street PATCO station and 30th Street Station (we have estimated an 11-minute trip for the proposed shuttle between 15th/16th and Locust and 30th Street stations).

PROPOSAL 3: CONNECT FRANKFORD TRANSPORTATION CENTER WITH PALMYRA STATION

There is no current connection between the Frankford Transportation Center (FTC)—hub for 25 SEPTA bus and rail routes including the Market-Frankford Line—and New Jersey. To get from the Frankford Transportation Center to New Jersey on public transit, a passenger must ride the Market-Frankford Line to 8th Street, and transfer to the PATCO line. This places one south of the Tacony-Palmyra Bridge; necessitating another bus or the RiverLINE from Camden northward.

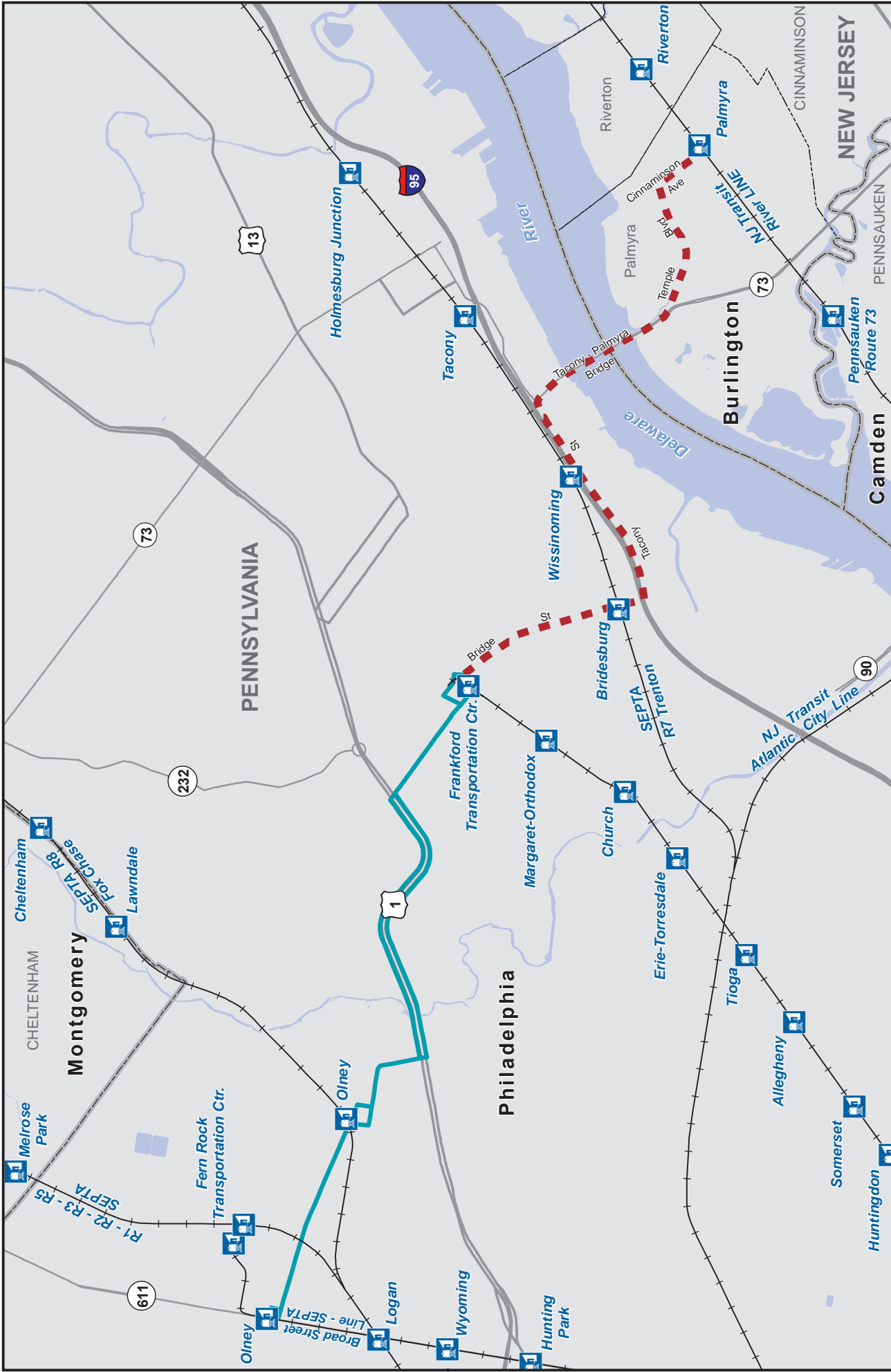
Bus service over the Tacony-Palmyra Bridge from Frankford Transportation Center to Palmyra Station on the RiverLINE would connect Philadelphia residents to jobs located along the New Jersey Delaware River corridor as well as offer enhanced access to Trenton and Camden. It would also provide another commuting option for residents in towns located on the New Jersey side of the Delaware River into Philadelphia. Map 4 indicates a potential routing for service over the Tacony-Palmyra Bridge in the form of an extension of SEPTA's Route 8 bus.

New Jersey Transit bus Route 414 formerly ran from Marlton, New Jersey, to the former Bridge-Pratt Station, now Frankford Transportation Center. It began operating in April 1994 and was discontinued in September 1995. Route 414 had a daily average of 60 total boards and a farebox recovery of just 3.5 percent (Source: New Jersey Transit Service Planning Dept, 2007).

Proposed Service

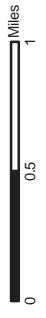
Because of the number of regional bus routes that terminate at Frankford Transportation Center and the important links that could be created by this service, it is worth exploring the feasibility of extending an already-existing bus route to fill this gap. Several regional routes are candidates for extension. Among New Jersey Transit routes, Route 419 (Burlington to Center City) was considered, as the Palmyra RiverLINE station is already a stop along this route. A number of SEPTA routes, including Route 8, which connects Olney Transportation Center to Frankford Transportation Center, Route 3 from Strawberry Mansion to Frankford Transportation Center, and Route 26 from Germantown to Frankford Transportation Center were also considered as possible candidates. The route deemed most appropriate for extension is Route 8. This route would provide an effective connection because of its frequent peak-hour service and relatively short run times (20 minutes for a one-way trip).

Route 8 is a limited stop route which makes stops only at select locations, not a typical SEPTA city bus route which stops at most street corners. Route 8 operates between 5 and 9:30 AM and between 1:30 and 7:45 PM with no midday service. It averaged 1,770 daily passengers in 2006, with 6 peak vehicles. (Source: SEPTA FY 2007 Annual Service Plan). Current headways average between 10 to 20 minutes. The SEPTA FY 2009 Operating Budget Proposal has two initiatives related to Route 8, one to improve peak hour service headways from 10 to 8 minutes in the AM and from 20 to 15 minutes in the PM, and another to provide weekday midday service (between 9 AM and 2 PM) every 30 minutes.



Map 4: Frankford – Palmyra Proposed Extension of SEPTA Route 8

-  Proposed Extension
-  SEPTA Bus Route 8
-  Rail Station



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In connecting Market-Frankford Line service with RiverLINE service, the frequency of trains departing Frankford Transportation Center (every 5 to 12 minutes) enables scheduling of any connecting bus route to be defined by the RiverLINE's timetable. Headways of the proposed extension should match that of the RiverLINE.

Table 4: Example Peak Eastbound Service Patterns for New FTC – Palmyra Bus Connection

Arrive FTC	Leave FTC	Arrive Palmyra	RiverLINE Southbound to Camden	RiverLINE Northbound to Trenton
<i>AM Service</i>				
6:36 AM	6:38	7:05	7:13	7:20
<i>PM Service</i>				
3:47 PM	3:49	4:16	4:28	4:20

Source: SEPTA and New Jersey Transit Schedules, 2008

Table 4 depicts potential trip times based on the current schedule of Route 8. Unlike typical SEPTA bus routes which stop at every corner, Route 8 makes 11 stops (including Frankford Transportation Center) over the course of its 4.4-mile route, and a one-way trip from Olney Transportation Center to Frankford Transportation Center takes 20 minutes (according to the schedule), averaging approximately 13.2 MPH.

To err on the conservative side, it will be assumed that the extension to Palmyra would average a speed of 10 MPH. The length of the proposed extension is 4.5 miles. At this speed and distance it would take 27 minutes to travel from Frankford Transportation Center to Palmyra Station including a stop at Bridesburg Station on the SEPTA R7 Trenton Line. As evidenced by Table 4, neither RiverLINE scheduling nor that of SEPTA Route 8 would have to be altered significantly to enable relatively smooth connections with the proposed bus extension. Again, Route 8 peak hour headways are relatively short and proposed to become shorter.

Ridership Estimates

In order to examine the feasibility of extending Route 8 and determine potential ridership for the added service, the extension was simulated using the DVRPC regional travel demand model. Simulated headways were 15 minutes for AM and PM peak hours (6 AM to 9 AM and 4 PM to 6 PM) and 30 minutes from 2 PM to 4 PM. As previously mentioned, there is currently no Route 8 service between 9 AM and 2 PM in either direction. The simulation resulted in an increase of 1,299 daily passenger trips, or roughly 650 new daily riders.

As mentioned earlier, there is a proposal in SEPTA's FY 2009 Operating Budget to shorten peak hour headways as well as extend operation of Route 8 through the midday. If these services were introduced, it is reasonable to expect that ridership gains could be even greater.

Cost Estimates

SEPTA's line cost model estimates operating and maintenance costs using a combination of miles, hours, and peak vehicles. As previously noted, the extension is

estimated to take 27 minutes (one way). Route 8 has 25 scheduled round trips per day. The proposed extension would add 54 minutes per scheduled run, or 23 route hours per day. The SEPTA FY 2007 Annual Service Plan lists SEPTA bus service as costing \$42.12 per vehicle hour. The cost related to vehicle hours for the extension is therefore estimated to be \$969 per day.

The proposed project extending Route 8 from Frankford Transportation Center to Palmyra would add an additional 9 miles to each individual round trip. This means that there would be an additional 225 miles (9 miles x 25 runs) per day for Route 8 assuming current frequencies are maintained. The SEPTA FY 2007 SEPTA Annual Service Plan lists the city bus cost per mile at \$2.87. The cost related to mileage for this extension is therefore estimated at \$646 per day.

Currently six vehicles are needed to operate 10-minute headways during AM peak hours, the most frequent service Route 8 runs during the day. Conservatively assuming a speed of 10 MPH, the extension would increase the round trip time of the route to roughly 100 minutes (47 minutes each way, plus 6 minutes recovery). This means a bus could make 6/10 of a trip per hour, and so to maintain ten-minute headways ten buses would be required. This is an increase of four peak-hour buses to operate Route 8 with the proposed extension at its current peak-hour headways.

The SEPTA FY 2007 Annual Service Plan lists the “peak vehicle full cost” per bus at \$142,900 per year. Divided by 250 (the number of approximate nonweekend, nonholiday days per year), this means the daily peak vehicle full cost is roughly \$572. While ten buses would be required to operate the extended Route 8, the extension alone would require four new buses, meaning that the peak vehicle cost for the extension for Frankford to Palmyra would be \$2,288 per day.

Table 5 lists the current operating and maintenance costs of Route 8 as well as the estimated costs if the route is extended to Palmyra. These are estimated costs based on current cost figures and the ridership forecast by the travel demand model.

Table 5: Operating and Maintenance Costs for SEPTA Route 8, Current Configuration and Proposed Extension

Route Configuration	Miles per trip (one way)	Trip time (one way)	Annual vehicle hours	Annual vehicle miles	Peak vehicles	Annual Cost
Current Route	4.4	20 minutes	9,500	81,420	6	\$1,491,394
Route w/ Extension	8.9	47 minutes	19,563	164,650	10	\$2,725,540

Source: SEPTA Fiscal Year 2007 Annual Service Plan, 2006

SEPTA’s FY 2007 Annual Service Plan defines “Fully Allocated Cost” as [vehicle hours x unit cost] + [vehicle miles x unit cost] + [peak vehicles x fully allocated unit cost]. Accordingly, adding the mile, hour, and vehicle-based costs above yields a total daily operating and maintenance cost of \$3,903. Therefore, the cost per rider estimate for the proposed Tacony – Palmyra extension is \$6.00 per new estimated rider per day.



Proposal 3: Extension of SEPTA Route 8 to Palmyra —
Daily expenses/ridership summary

$$\begin{aligned} &\$3,903 \text{ (Estimated daily operating costs) / } 650 \text{ (Estimated daily riders)} \\ &= \$6.00 \text{ (Cost per new estimated rider)} \end{aligned}$$

Conclusion/Recommendations

As the estimated cost-effectiveness of the proposed route extension appears somewhat reasonable compared to the costs of other SEPTA bus routes (roughly \$5.86 per round-trip rider systemwide per SEPTA's FY 2007 Route Operating Ratio Report), it is recommended that SEPTA evaluate the feasibility of this concept more rigorously as part of its ongoing service planning process. Perhaps the feasibility of 20-minute peak headways could be investigated to test the potential market for this service.

As part of more detailed evaluations, SEPTA should consider other variations on the extension concept that may be even more effective. For example, an extension to Rt. 73/Pennsauken Station instead of Palmyra Station would limit delays from operation on local roads and enable a connection with the South Jersey Transportation Authority (SJTA)'s Pennsauken/Moorestown Industrial Park shuttle.

PROPOSAL 4: CREATE A “ROAD FERRY” BETWEEN BURLINGTON AND BRISTOL

As early as the 1700s ferry service connected the industrial towns of Burlington, New Jersey, and Bristol, Pennsylvania. It continued until construction of the Burlington-Bristol Bridge was completed in the 1930s. Today there is no transit service available between the two towns. Burlington-Bristol Bridge is also closed to bicycle and pedestrian access, leaving motor vehicles as the only way people can get across the bridge. As these towns attempt to revitalize and redevelop their waterfronts, connecting them via bus or shuttle service could become a viable consideration. Connecting Bristol Station on the SEPTA R7 line to Burlington Town Center Station on the RiverLINE via a new transit connection would accomplish the simple “road ferry” concept for bicyclists and pedestrians while also expanding transportation options and intermodal connections.

Proposed Service

There are several SEPTA and New Jersey Transit bus routes that could be extended to link the two stations. New Jersey Transit Routes 413 and 419 both make trips between Philadelphia and Burlington. Route 413 operates between Mt. Holly and Burlington while Route 419 parallels the Delaware River and the RiverLINE. SEPTA Route 304 runs from Morrell Park (the border between Philadelphia and Bucks Counties) to the Bristol R7 station.

There are barriers in extending any of these routes. The two New Jersey Transit routes run more frequently and have higher daily ridership but have much longer travel times and already cross the Delaware River once over the Ben Franklin Bridge. SEPTA Route 304 runs less frequently and has substantially lower ridership, but it has the shortest travel times and would create entirely new links for people using the proposed extension. It would, however, have to be amended quite a bit in order to facilitate this link, while extending one of the New Jersey Transit bus routes would be a simpler option. Of these three, Route 413 was chosen for closer examination because it has the highest average ridership of the three routes. Map 5 depicts potential routing from Route 413’s current terminus at Burlington Station to Bristol Station, which would serve as the new terminus.

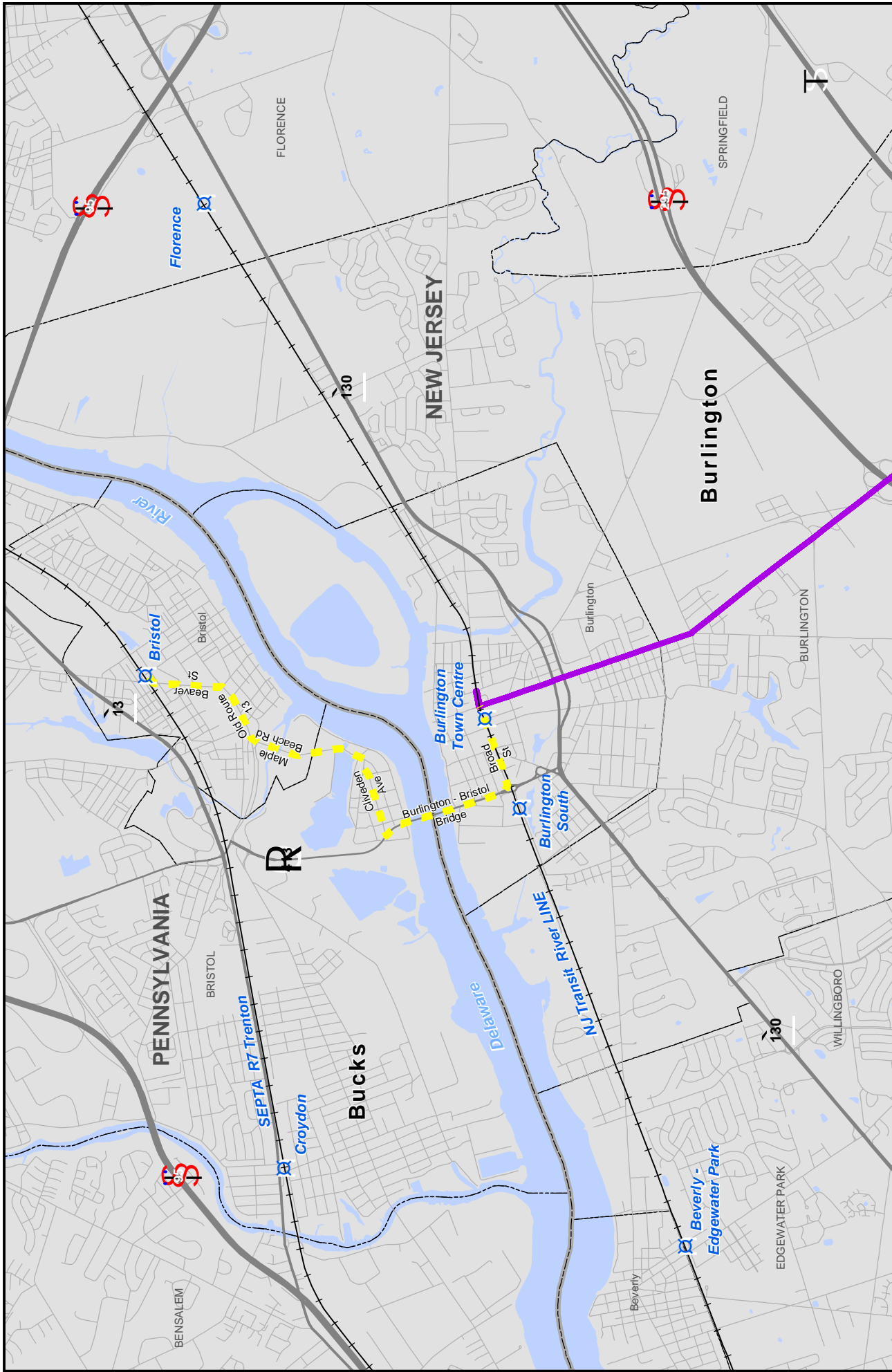
Ridership Estimates

In order to determine the effect that extending New Jersey Transit Route 413 would have on ridership, the extension was simulated using the DVRPC regional travel demand model. The route was modeled for peak service (7 AM to 9 AM and 3 PM to 6 PM) and midday service (9 AM to 3 PM). Evening and weekend service are not included in the modeling forecasts. The simulation results found that the Burlington to Bristol extension of New Jersey Transit Route 413 would generate an additional 46 passenger trips per day, or an increase of 23 riders per day.


Cost Estimates

There are several routing variations of New Jersey Transit Route 413, but our ridership estimates are related to an extension of the main Burlington – Philadelphia routing only. The proposed extension from Burlington to Bristol would add three miles to each scheduled run of the route. There are 33 trips in total from Burlington to Philadelphia, and so approximately 99 daily miles would be added due to the extension.





Map 5: Proposed Burlington – Bristol Connection as an extension of NJ Transit Route 413

-  Proposed Extension
-  NJ TRANSIT Bus Route 413
-  Rail Station



The New Jersey Transit Line Cost Model averages the costs of different bus operations to create an aggregated cost of bus service per mile. The average cost for bus service per mile (for all New Jersey Transit bus routes) between July 2006 and May 2007 was \$6.03. Multiplying this number by the 99 daily miles added from the proposed extension to Bristol Station gives an estimated total cost of \$597 to run the proposed service between Burlington and Bristol per day, or \$25.96 per new estimated rider per day.

**Proposal 4: Extension of New Jersey Transit Route 413 to Bristol —
Daily expenses/ridership summary**

$$\begin{aligned} & \$597 \text{ (Estimated daily operating costs) / 23 (Estimated daily riders)} \\ & = \$25.96 \text{ (Cost per new estimated rider)} \end{aligned}$$

Conclusion/Recommendations

For reference, the estimated cost-effectiveness of the proposed extension is relatively poor when compared to the average costs of other New Jersey Transit bus service (roughly \$10.10 per Southern Division round-trip rider in FY 2007). Accordingly, this connection is likely unfeasible as an extension of current fixed route service (although it is recommended that New Jersey Transit consider this proposal as part of its ongoing service planning).

On the other hand, given the similar riverfront character and activity of Burlington City and Bristol Borough, some form of transit connection is desirable, particularly given that additional bicycle and pedestrian tourist and recreational traffic may be expected upon completion of the East Coast Greenway. If fixed route service is unfeasible, the two communities should consider partnering to operate at least a seasonal, tourist-oriented shuttle service. The Burlington Bridge Commission, the agency charged with the operation and maintenance of the Burlington-Bristol Bridge, would also be an appropriate organization to be involved in any future partnership for this sort of service.

PROPOSAL 5: PROVIDE THE TRENTON – NEW HOPE CORRIDOR WITH TRANSIT SERVICE

There is presently no transit service available on either side of the Delaware River in the Trenton – New Hope/Lambertville Corridor. SEPTA's R3 West Trenton line stops at Yardley, but there is no connection between that station and other towns along the Delaware River in Bucks County. SEPTA Bus Route 130 extends from the Franklin Mills Mall in far northeast Philadelphia to Bucks County Community College, roughly 9 miles from the Yardley R3 station, but again, no further connection exists. In 2006, New Jersey Transit discontinued Route 608L, which connected Trenton to Lambertville with two daily trips. Reestablishing transit service in this corridor with effective intermodal connections could potentially be useful for both commuters and tourists.

Proposed Service

Transit in this corridor would need to serve both commuters and tourists. Commuters might need access to Yardley and West Trenton stations, and possibly various park-and-ride facilities (such as Scudder Falls park-and-ride), while tourists would benefit from connections to New Hope, Lambertville, and possibly Washington Crossing State Park. Map 6 indicates a potential routing for transit service in the Trenton – New Hope corridor.

A circulator service that provided access to all of these locations would measure almost 35 miles (round trip), assuming that it stopped at locations such as Scudder Falls park-and-ride as well as both the Yardley and West Trenton Regional Rail stations, Lambertville, and New Hope. During the week, there could be 30-minute headways during peak hours (7 AM to 9 AM and 3 PM to 6 PM). Since use of the more tourist-oriented sites is seasonal, weekend service could run between Memorial Day Weekend and Labor Day Weekend with perhaps 60-minute headways.

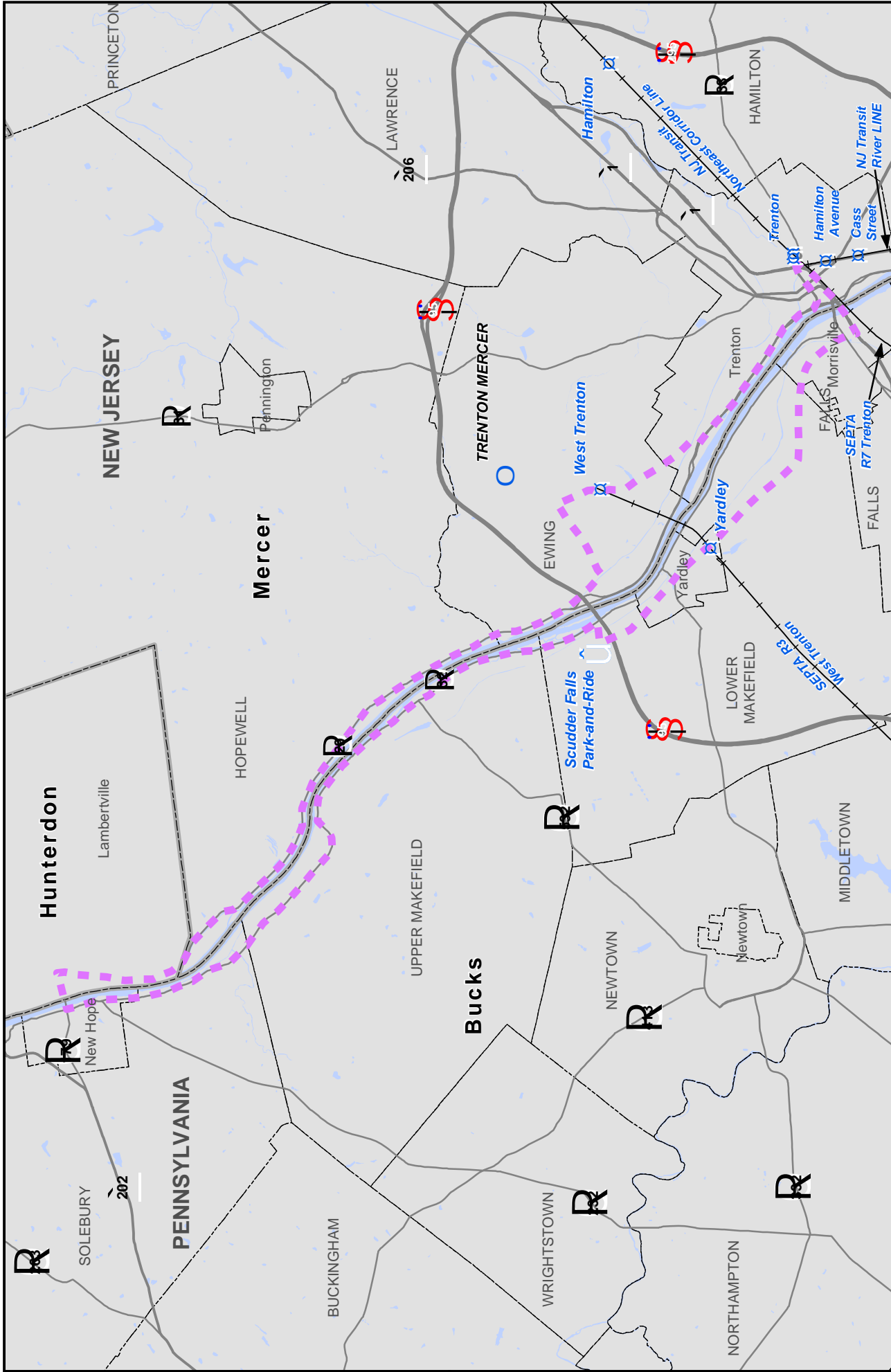
Ridership Estimates

As previously stated, there is presently no transit service available in the Trenton – New Hope corridor. In 2006, New Jersey Transit discontinued a variation of Route 609 that connected Trenton to Lambertville twice a day. This route averaged only 6 riders per day, which provides an order-of-magnitude estimate for the ridership that could be expected between Trenton and Lambertville today, and also for the analogous trip on the Pennsylvania side of the river.

For the purpose of this exercise, it will be generously estimated that service on each side of the river would generate 25 daily riders each, or 50 riders for the entire service. Ridership for the tourist-oriented weekend service will also be liberally estimated at 50 riders per day.

Cost Estimates


To determine the costs of such a service, it is informative to look at the costs of other local shuttle services (since these low estimated ridership levels will likely not justify higher levels of line-haul bus service). Job Access and Reverse Commute (JARC) shuttles operate in different parts of the region and use vehicles that would be appropriate for the proposed services. JARC routes take on a number of different forms,



Map 6:
Routing Concept for
Trenton – New Hope Corridor
Transit Service

-  Proposed Loop
-  Rail Station
-  Airport

0 1.5 3 Miles



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from extensions of rail service to the establishment of shuttle services to enhance job opportunities. Routes in the region are operated by SEPTA as well as local Transportation Management Associations (TMAs). Cost per rider estimates are available for JARC routes that operate in the Pennsylvania portion of the DVRPC region.

To estimate the costs involved with establishing service in this corridor, the JARC routes operated by SEPTA will not be considered. This is because these routes are often extensions of existing bus routes or adding weekend services to rail. Routes that primarily operate in Philadelphia are also not comparable to the proposed services because they often travel much shorter distances than those estimated for the different Trenton – New Hope services being proposed. For estimation purposes, only bus routes operated by regional TMAs or other third-party carriers in outlying suburban areas are being considered as cost-analogous to the proposed shuttles.

There are ten JARC routes that meet these criteria with mileage roughly approximate to that of the proposed service in the Trenton – New Hope/Lambertville corridor (between 12 and 60 miles in length round trip). The average cost for these ten routes per year is \$199,322.

The number of days service in this corridor would run would be the number of approximate nonweekend, nonholiday days per year (250) plus the number of Saturdays and Sundays between Memorial Day and Labor Day (30). Based on the JARC costs above, the estimated cost per day of service in the Trenton – New Hope/Lambertville corridor is \$712, or \$14.24 per new estimated rider per day.

**Proposal 5: Provide the Trenton – New Hope/Lambertville corridor with service —
Daily expenses/ridership summary**

$$\begin{aligned} & \$712 \text{ (Estimated daily operating costs)} / 50 \text{ (Estimated daily riders)} \\ & = \$14.24 \text{ (Cost per new estimated rider)} \end{aligned}$$

Conclusion/Recommendations

Drawing from New Jersey Transit Route 608's recent ridership, estimates for the proposed service in the Trenton – New Hope corridor are relatively low, leading to relatively poor cost-effectiveness. While JARC routes are used in estimating costs for the proposed service due to similarities in vehicles and route configuration, the proposed service is not a job access route and would not qualify for JARC funding. Accordingly, SEPTA's average suburban bus cost per round-trip rider of roughly \$9.37 (per SEPTA's FY 2007 Route Operating Ratio Report) is a more apt comparison, with which the proposed service compares unfavorably (similarly, New Jersey Transit's average cost per round-trip Southern Division rider was roughly \$10.10 in FY 2007). Given the large distances involved as well as the service patterns required to serve discrete tourist and commuter markets, the proposed service does not appear to be feasible at this time.

PROPOSAL 6: ESTABLISH A SHUTTLE BETWEEN PHILADELPHIA AND PURELAND INDUSTRIAL COMPLEX (VIA CHESTER)

Recently the Greater Philadelphia Urban Affairs Coalition applied for Job Access and Reverse Commute (JARC) funding to create a Center City shuttle that would run to the Pureland Industrial Complex in Logan Township, Gloucester County, New Jersey, a significant regional employment center. While JARC funding was not supported, establishing this shuttle and routing it through Chester City would provide residents of Philadelphia and Chester City a means to access the job opportunities available at Pureland.

Proposed Service

Currently there is a similar shuttle that runs from the Walter Rand Transportation Center in Camden to the Pureland Industrial Complex. The shuttle makes three round trips a day between Camden and the Pureland complex. The service patterns account for various work shifts at Pureland. A Philadelphia to Pureland shuttle (through Chester) could follow a similar scheduling pattern. On the Philadelphia side, a terminus at Broad Street and Oregon Avenue would allow the shuttle to draw riders from the Broad Street Subway, its myriad feeder bus routes, and additional bus routes serving Oregon Avenue, while also avoiding Center City traffic congestion. Map 7 depicts a possible routing for this service.

Ridership Estimates

For reference, data from the 2000 Census indicates that roughly 1,500 Philadelphia residents and 50 Chester City residents work in Gloucester County. Overall, 275 of these people work in Logan Township. It can be assumed that many of these residents work in and around Pureland Industrial Complex, being the most significant job center in Logan Township.

The shuttle from Camden to Pureland attracted 10,709 one-way trips in 2006. This is the equivalent of 5,355 riders for the year, which when divided by 250 (the number of nonweekend, nonholiday days per year) equals 21 riders per day. For the purpose of this exercise, it is estimated that the proposed service connecting Philadelphia and Chester City to Pureland would generate the same number of daily riders.

Cost Estimates

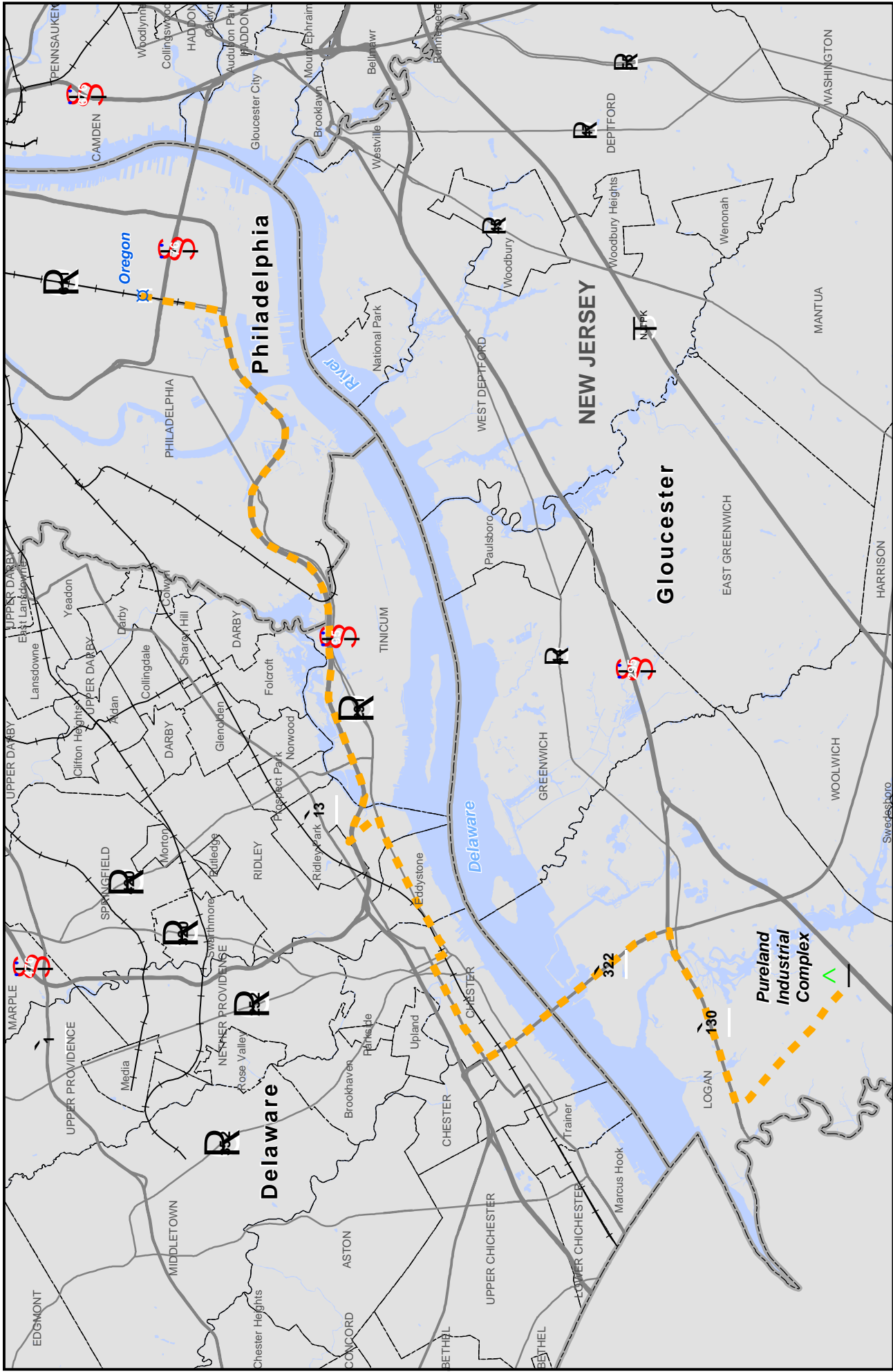
To determine the costs of creating a new JARC route between Philadelphia and Pureland, it is helpful to look at the costs of the Camden – Pureland shuttle service. These costs cover driver salaries, vehicle insurance, and overhead. Vehicle maintenance and repairs are not included. Table 6 lists the costs of this route, as well as the number of route miles for the year and yearly passengers on this route. The route mileage is approximate.

Table 6: Camden – Pureland Shuttle Annual Costs, Mileage, and Ridership

Annual cost	Route mileage	Riders
\$156,933	32,850	5,355

Source: DVRPC, 2007





Map 7:
Proposed South Philadelphia -
Chester City Shuttle to
Pureland Industrial Complex



0 1.5 3 Miles

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The yearly cost of the route is almost \$157,000. The annual route mileage was determined by taking the length of one route (43.8 miles per round trip) and multiplying by the number of trips for the entire year (three round trips per day x 250 days—the number of approximate work days per year). The average cost per mile is \$4.78.

If routed through Chester Transportation Center, a shuttle from South Philadelphia to Pureland would be roughly 44 miles in length per round trip. Assuming this service matched the frequencies of the Camden shuttle (three round trips per day, weekdays only) the total daily mileage would be 132 miles.

If the cost per mile remained at the level of the Camden – Pureland shuttle (\$4.78), the total estimated cost of a Philadelphia to Pureland shuttle would be \$631 (132 miles x \$4.78 per mile) per day. These costs would yield an estimated cost of \$30.04 per new estimated rider per day.

**Proposal 6: Establish a Shuttle between Philadelphia and
Pureland Industrial Complex (via Chester) —
Daily expenses/ridership summary**

$$\begin{aligned} & \$631 \text{ (Estimated daily operating costs)} / 21 \text{ (Estimated daily riders)} \\ & = \$30.04 \text{ (Cost per new estimated rider)} \end{aligned}$$

Conclusion/Recommendations

The estimated cost per rider is comparable to the current Camden – Pureland JARC shuttle, and also comparable to other suburban Pennsylvania JARC routes, which on average cost \$23.30 per rider. It bears noting that there are alternatives to a direct Philadelphia/Chester – Pureland shuttle which might be more cost-effective. For example, SEPTA Route 37, which runs from Philadelphia to Chester Transportation Center and connects various airport-area, industrial, and waterfront employers, currently receives JARC funding to extend its service hours. A portion of this route's daily trips might be extended across the Commodore Barry Bridge to Pureland as a separate or expanded JARC proposal. However, this would introduce jurisdictional complications, and the dispersed nature of Pureland development, combined with the low ridership estimated here, may make Route 37's full-sized buses and fixed-route service pattern less effective.

As another alternative, a shuttle might connect Chester Transportation Center to Pureland without extending to Philadelphia. This would enable connections to Pureland from the many bus and rail services at Chester Transportation Center, and would likely be less expensive to operate than a one-seat-ride from Philadelphia. On the other hand, JARC service effectiveness is judged on a social benefit basis in addition to pure cost-effectiveness, and a two-seat-ride via Chester Transportation Center would be a much longer trip for riders given intermediate stops and the need to transfer.

Despite these tradeoffs, each of these alternatives may a viable JARC project, and it is recommended that some variation of this service be considered during future JARC funding rounds (though additional subsidies may be required). However, in order for a JARC project to be considered for funding, it must be proposed by a project sponsor. Details of the specific proposal, which may be determined by jurisdictional or other concerns, would have a significant impact on competitiveness for funding.



SUMMARY AND RECOMMENDATIONS

Table 7 lists the service proposals in ascending order of estimated cost per rider, as well as the estimated ridership that the new service would generate. As mentioned previously, ridership for proposals 1, 3, and 4 was modeled by DVRPC. Ridership for the remainder of the proposals is based on factors such as journey-to-work data, historic ridership, and the availability of alternative services. The final costs per rider are estimates based on current service costs and forecast ridership. While they are based on real numbers, they should be considered order-of-magnitude estimates. Considering the financial constraints of our regional transit providers, further analysis would be required before implementation.

Table 7: Cost-Effectiveness and Recommendation Summary

Proposed service	Estimated weekday ridership gain	Cost per new rider	Recommendation
Proposal 3: Connect Frankford Transportation Center with Palmyra Station	650	\$6.00	SEPTA further consideration
Proposal 1: Connect New Jersey Transit Center City Buses to 30th Street Station	719	\$6.60	New Jersey Transit further consideration
Proposal 5: Provide the Trenton – New Hope corridor with transit service	50	\$14.24	Currently not feasible
Proposal 2: Improve Connection of PATCO Trains with 30th Street Station	100	\$20.46	Currently not feasible — promote current rail connection at 8th/Market
Proposal 4: Create a “road ferry” between Burlington and Bristol	23	\$25.96	Not feasible for SEPTA/NJT. Consider under municipal partnership
Proposal 6: Establish a Shuttle between Philadelphia and Pureland Industrial Complex (via Chester)	21	\$30.04	Consider for future JARC funding

Source: DVRPC, 2008

Proposal 1: Connect New Jersey Transit Center City Buses to 30th Street Station

Closing the gap between New Jersey Transit buses and 30th Street Station is estimated to cost \$6.60 per rider. This represents the aggregate of 17 different bus routes all with varying ridership and frequencies. As a test, it might be appropriate to extend routes that were estimated to generate higher levels of daily ridership (routes 400, 403, and 412 to name a few) before extending all routes. Such selective extensions may be even more cost-effective.

Proposal 2: Improve Connection of PATCO Trains with 30th Street Station

Service between the PATCO Center City terminus at 15th/16th and Locust Streets and 30th Street Station is estimated to cost \$20.46 per new estimated rider per day. Costs were estimated using SEPTA's cost framework given the proposed service's similarity to the LUCY shuttle, and ridership was estimated based on available journey-to-work data.



It is recommended that the current PATCO/Market-Frankford Line connection at 8th and Market Streets be promoted in lieu of a new service.

Proposal 3: Connect Frankford Transportation Center with Palmyra Station

Of the six proposed services, the Tacony-Palmyra link, which proposed extending SEPTA Route 8 from its current terminus at Frankford Terminal to Palmyra Station on the New Jersey Transit RiverLINE is estimated to be the most cost-effective, at \$6.00 per rider for the proposed extension. Considering that SEPTA is planning on shortening peak hour headways as well as adding midday service to this route, estimated ridership gains could be even greater than those forecast by the travel demand model.

Proposal 4: Create a “Road Ferry” Between Burlington and Bristol

The potential for Burlington – Bristol service was evaluated by examining the possibility of extending New Jersey Transit Route 413 from its current terminus in Burlington, and was estimated to cost \$25.96 per new daily rider. Considering the high price and the relatively low number of riders forecast to be gained by closing this gap, local shuttle service might be more appropriate to create the link between the two towns.

Proposal 5: Provide the Trenton – New Hope Corridor with Transit Service

The estimated cost per daily rider for services in the Trenton – New Hope corridor was \$14.24. Ridership was forecast by liberally factoring up the average ridership for a now-defunct New Jersey Transit bus route. Costs per passenger were then calculated by averaging the costs of similar JARC routes run by regional TMAs. In all likelihood, ridership for service in the Trenton – New Hope corridor has been overestimated and costs underestimated. Given the large distances involved as well as the service patterns required to serve discrete tourist and commuter markets, the proposed service does not appear feasible at this time.

Proposal 6: Establish a Shuttle between Philadelphia and Pureland Industrial Complex (via Chester)

The establishment of JARC service from Philadelphia to the Pureland Industrial Complex via Chester City was estimated to cost \$30.04 per estimated rider per day. Cost and ridership estimates were based on those of the existing Camden – Pureland shuttle. This cost-effectiveness is comparable to other regional JARC services, and it is recommended that some variation of this service be considered during future JARC funding rounds, though additional subsidies may be required.

Recommendations

Among the projects, the extension of SEPTA’s Route 8 from Frankford Transportation Center and the extension of the New Jersey Transit bus routes from City Hall to 30th Street Station are the two strongest candidates in terms of cost-effectiveness. It is recommended that New Jersey Transit and SEPTA consider these extensions as part of their ongoing service planning processes. Other recommendations are detailed in Table 7.



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ABSTRACT: This report explores the feasibility of several specific transit connections proposed by DVRPC's Regional Citizens Committee (RCC) to improve interstate service and enhance system connectivity. Six potential services were examined: extending New Jersey Transit buses that currently terminate in Center City to 30th Street Station; connecting the PATCO terminus at 15th/16th and Locust streets to 30th Street Station; providing service from Frankford Transportation Center in Philadelphia to Palmyra Station on the RiverLINE via an extension of SEPTA Route 8; extending New Jersey Transit Route 413 from its current terminus at Burlington Station (RiverLINE) to Bristol Station on SEPTA's R7 Trenton line; providing the Trenton – New Hope corridor with service; and establishing a shuttle between Philadelphia and the Pureland Industrial Complex in Logan Township, Gloucester County (via Chester). Each project was analyzed by estimating the costs and benefits for the proposed service.

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