

**TRAVEL DEMAND ANALYSIS
OF SEPTA'S NEWTOWN LINE
Supplement No. 1**



**DELAWARE VALLEY
REGIONAL PLANNING COMMISSION**

May 1995

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**The Bourse Building
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DELAWARE VALLEY REGIONAL PLANNING COMMISSION

Publication Abstract

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ABSTRACT

This Supplement considers five additional alternatives proposed for the restoration of service to SEPTA's Newtown Line, and follows an earlier report, published in January, which looked at two alternatives. The new alternatives include electrifying the line and operating direct service to the Philadelphia CBD, either via Fox Chase or via a connection to the West Trenton Line near Bethayres; diesel shuttles, either to Fox Chase or Bethayres; and running through service with a dual-powered diesel/electric locomotive. DVRPC's regional travel simulation process was used to forecast ridership for each alternative for 1996 and 2005.

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EXECUTIVE SUMMARY

This Supplement forecasts ridership for five alternatives proposed by SEPTA for restoring rail service to Newtown. These alternatives are in addition to the two originally requested for analysis.

The Newtown Line is a 15-mile non-electrified rail line running between Fox Chase in the City of Philadelphia and Newtown in Bucks County. It last saw service in 1983. Three of the five alternatives call for through service to Center City Philadelphia and two require transfers. The alternatives are:

- electric through service via Fox Chase,
- electric through service using a connection to the R3 Line near Bethayres,
- diesel shuttle to Fox Chase, with a transfer to the R8 Line,
- diesel shuttle to Bethayres, with a transfer to the R3 Line, and
- through service via Fox Chase, using a dual-powered locomotive.

For each of the five alternatives, DVRPC's regional travel simulation process was used to forecast ridership from a study area encompassing the outer ends of the R2, R3, and Newtown lines. Ridership forecasts were developed for the new, as well as the old, alternatives for both 1996 and 2005.

All of the alternatives would serve six stations in Bucks County, including new stations at the Newtown Bypass and Village Shires, one on the Bucks/Montgomery county line, and Bryn Athyn, which would be the only station served in Montgomery County.

In general, only about one-half of the riders carried on the Newtown Line are new riders, the remainder being riders shifted from adjacent lines. The alternatives providing a one-seat ride to Center City consistently attracted more riders than those requiring a transfer. The alternative calling for direct electric service via a connection at Bethayres earned the highest ridership, attracting 875 total daily boardings to the Newtown Line in 1996, of which 423 were new riders. Close behind was the alternative calling for full electrification and extending the existing R8 Fox Chase service to Newtown, with 817 daily boardings and 402 new riders. The fewest riders were attracted by Alternative 1a, which involves a transfer at Fulmor. For the latter alternative, the 1996 forecast called for 455 total daily boardings, of which 280 were new riders.

I. INTRODUCTION

In November 1994, the Southeastern Pennsylvania Transportation Authority (SEPTA) asked the Delaware Valley Regional Planning Commission (DVRPC) to estimate ridership for two alternatives proposed for the restoration of rail service on the Newtown Line. These alternatives were described and the results of the simulation reported in Travel Demand Analysis of SEPTA's Newtown Line, published by DVRPC (Publication No. 95002) in February 1995.

Following completion of this work, SEPTA asked DVRPC to estimate ridership for five additional alternatives, bringing the total analyzed to seven. These alternatives can be described as follows, with Alternatives 3 through 7 representing the new alternatives:

- 1) Operate a diesel shuttle between Newtown and a new Fulmor station on the R2 Warminster Line via Conrail's Morrisville Line. Two levels of capital investment were considered: a) restoration to 30 mph operation on the Newtown Line; and b) restoration to 50 mph.
- 2) Operate diesel through peak service to Suburban Station using a new Midvale Connection linking Wayne Junction with the R8 Chestnut Hill West Line, with limited off-peak service to Fox Chase.
- 3) Electrify line and extend R8 Fox Chase trains to Newtown.
- 4) Electrify line north of the R3 crossing at Bethayres, and operate service as a spur off the R3 West Trenton Line.
- 5) Operate a diesel shuttle between Newtown and Fox Chase, with a transfer to/from R8 trains.
- 6) Operate a diesel shuttle between Newtown and Bethayres, with a transfer to/from R3 trains.
- 7) Use a hybrid diesel/electric locomotive to haul coaches between Newtown and Center City Philadelphia via Fox Chase.

With the exception of Alternative 7, service would be provided with self-propelled cars, either electric multiple units (EMU) or diesel (DMU). In the last alternative, a hybrid diesel/electric locomotive, powered either from its own diesel engine or from a third rail, would be used to haul unpowered coaches.

The catchment area for the Newtown Line, as defined in the earlier report, was extended to include Transportation Analysis Zones No. 960 (Wrightstown Twp.) and No. 963 (Upper Makefield Twp.) Both were linked to the Bypass station. No other changes were made to the catchment areas or to the station access links. However, as a consequence of this alteration, Newtown Line ridership for Alternatives 1 and 2, as reported in this supplement, are slightly higher than that estimated in the original report.

This supplement describes the results for the new alternatives. The methodology used to forecast riders is described in the original report. Ridership is given in terms of weekday boardings in the study area, which essentially corresponds to round trips.

II. ALTERNATIVES

Although routing and choice of equipment vary by alternative, each of the five new alternatives would serve the Newtown Line north of its crossing of the R3 line with stops at the following stations:

- Newtown - existing station
- Newtown Bypass - new station north of PA 332/413 with access from Newtown Pike
- Village Shires - new station at Stony Ford Road
- Holland - existing station
- Churchville - existing station
- Southampton - existing station
- County Line - existing station
- Bryn Athyn - existing station

Village Shires replaces the previously served station at George School, and stations at Huntingdon Valley and Walnut Hill have been dropped because of historically low ridership and the proximity of alternate service.

In each of the new alternatives, peak service would run every 30 minutes and off-peak service at hourly intervals. With the exception of Alternatives 5 and 6, Zone 3 fares would be charged to Bryn Athyn and County Line stations, with the remaining stations assigned to Zone 4. For the two shuttle alternatives, all stations would be designated as Zone 3. This partially compensates riders for the inconvenience of a transfer.

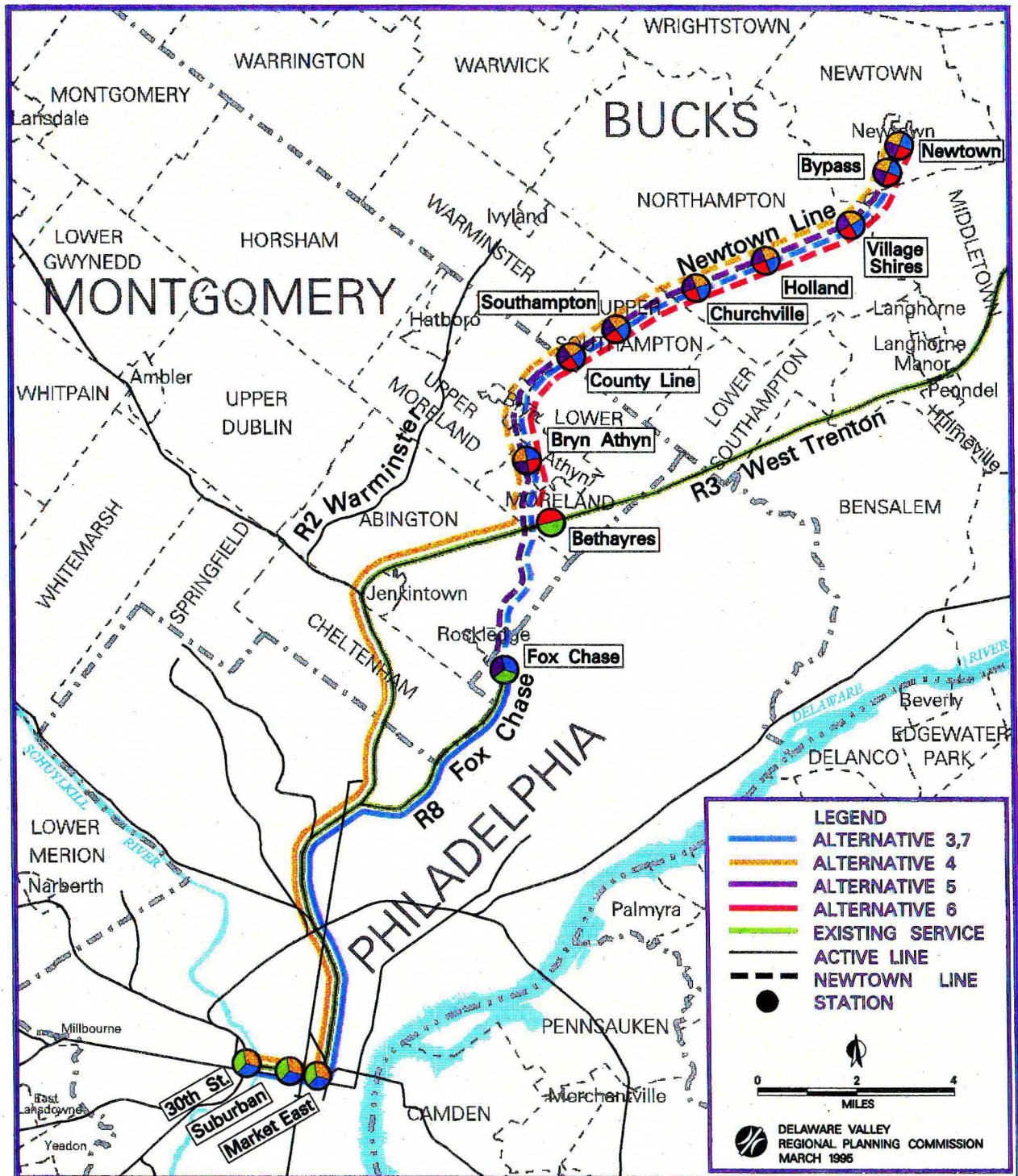
The routes and stations for the five new alternatives are shown in Supplement Map 1. As Alternatives 3 and 7 share the same route, only four routes appear on the map. Following are descriptions of the new alternatives:

Alternative 3 - This alternative represents a simple extension of the existing R8 service to Newtown, but would require electrification of the line beyond Fox Chase. Operation would replicate that found on SEPTA's other Regional Rail lines, i.e., electric trains operating from the outer end running through to Center City. This alternative sends no additional trains through the Center City tunnel, and would help balance the system by adding riders to the relatively weak Fox Chase Line. Running time between Newtown and Suburban Station would be 62 minutes.

Alternative 4 - This alternative also provides through electric service to Center City, but by providing a connection to the R3 West Trenton Line at Bethayres, the need to electrify and restore three miles of track between Bethayres and Fox Chase is avoided. The Newtown service would then be operated as a spur from the R3 line, with the Newtown trains stopping at R3 stations inside Bethayres, and the West Trenton trains making all stops as far as Bethayres and then running express to Center City. Although more circuitous than Alternative 3 through Fox Chase, this alternative offers higher running

Supplement Map 1

SERVICE RESTORATION ALTERNATIVES FOR NEWTOWN LINE



speeds, and as consequence requires three minutes less to reach Suburban Station for a total of 59 minutes from Newtown. It also adds trains to the congested trunk line south of Jenkintown.

Alternative 5 - This alternative restores the pre-1983 pattern of operation, where passengers transfer between electric and diesel trains at Fox Chase. No electrification is required, but SEPTA would have to acquire diesel train sets and cope with their separate maintenance requirements. Allowing five minutes for the transfer, total travel time to Suburban Station would be 74 minutes.

Alternative 6 - This is similar to the previous alternative, except the transfer would be made to R3 trains at Bethayres. As with Alternative 4, this would obviate the need to restore track between Bethayres and Fox Chase, but would require extending track ¼ mile eastward in order to access the Bethayres station. Because of higher speeds on the R3 line, total travel time is reduced to 69 minutes.

Alternative 7 - This alternative is almost the same as Alternative 3, in that each provides a one-seat ride to Center City via Fox Chase. The principal difference is that a hybrid diesel/electric locomotive with coaches would be used instead of self-propelled electric cars. This increases the running time to Suburban Station to 69 minutes, 7 minutes longer than in Alternative 3. While no electrification would be needed north of Fox Chase, this alternative would require installation of a third rail through the Center City tunnel. In the U.S., dual-powered locomotives are currently used in the New York area.

For completeness, brief descriptions of Alternatives 1 and 2, which were covered in the original report, follow:

Alternative 1 - A diesel-powered shuttle would be operated on the line between Newtown and its intersection with Conrail's Morrisville Line, just south of the Bucks/Montgomery county line. From there, a new two-mile connection built on Conrail's right-of-way would be used to reach a new station near Fulmor on the R2 Warminster Line. Passengers would then transfer to the electric R2 Warminster service for the remainder of their journey. Two versions are considered, one in which the Newtown Line is restored for 30 mph operation, and a second to accommodate speeds of 50 mph. Allowing ten minutes for the transfer, the lower speed version requires 81 minutes to travel between Newtown and Suburban Station, whereas raising speeds to 50 mph shortens the travel time to 77 minutes.

Alternative 2 - The line would be restored to Fox Chase, but not electrified, and a new Midvale connection built in the vicinity of Wayne Junction, thereby linking the ex-Reading trunk line with the R8 Chestnut Hill West Line. This alternative permits diesel-powered trains from Newtown to reach Suburban Station without using the Center City Tunnel. Travel time over the length of the route would be 71 minutes.

III. STUDY AREA RIDERSHIP

The simulation conducted by DVRPC forecasts the number of boardings expected on a normal weekday at stations within the study area, which includes all stations beyond Jenkintown on the Warminster Line (R2), beyond Glenside on the West Trenton Line (R3), and beyond Fox Chase on the Newtown Line. Essentially, local boardings represent rail round trips taken to or from the area.

Based on actual SEPTA ridership counts, the R2 and R3 lines were carrying 4,298 weekday round trips at the time of the 1990 U.S. Census. No service was then provided on the Newtown Line. The boardings forecast for 1996 and 2005 are shown in Supplement Table 1, and the new riders generated by the various alternatives are compared in Supplement Figure 1. New riders represent the total round trips attracted from the study area less those carried in the No-Build Alternative. These are the additional rail riders attracted by restoration of service on the Newtown Line.

Examination of the table reveals several general characteristics. First, because of the proximity of the R2 and R3 lines, approximately one-half of the riders on the Newtown Line are riders willing to ride the existing lines given unconstrained parking and capacity aboard trains. As might be expected, the more attractive alternatives for the Newtown service are those that also attract the highest share from the R2 and R3 lines. The riders perceive benefits, otherwise they would not make the shift. In most cases, station access is improved, resulting in reduced vehicle-miles traveled on area roads.

Second, through service to the Philadelphia Central Business District (CBD) is more attractive than service requiring a transfer. Looking at the 1996 forecast, all the alternatives requiring a transfer carry 313 or fewer new riders, but those providing a one-seat ride all carry more. The ridership loss induced by a forced transfer varies with the circumstances, but all transfers carry the risk of missed connections with resulting delay for passengers.

Both Alternatives 3 and 4 provide direct electric service to all stations within the CBD, and these rank second and first, respectively, in their ability to attract riders to the Newtown Line. Although Alternative 4 uses a more circuitous routing, track conditions permit higher speeds with shorter running times. For reasons previously stated, Alternative 3 may be more attractive from an operational standpoint. Alternative 7, which like Alternative 3 provides through service via Fox Chase, ranks third; its lower ranking is the result of longer running times necessitated by use of dual-powered locomotives.

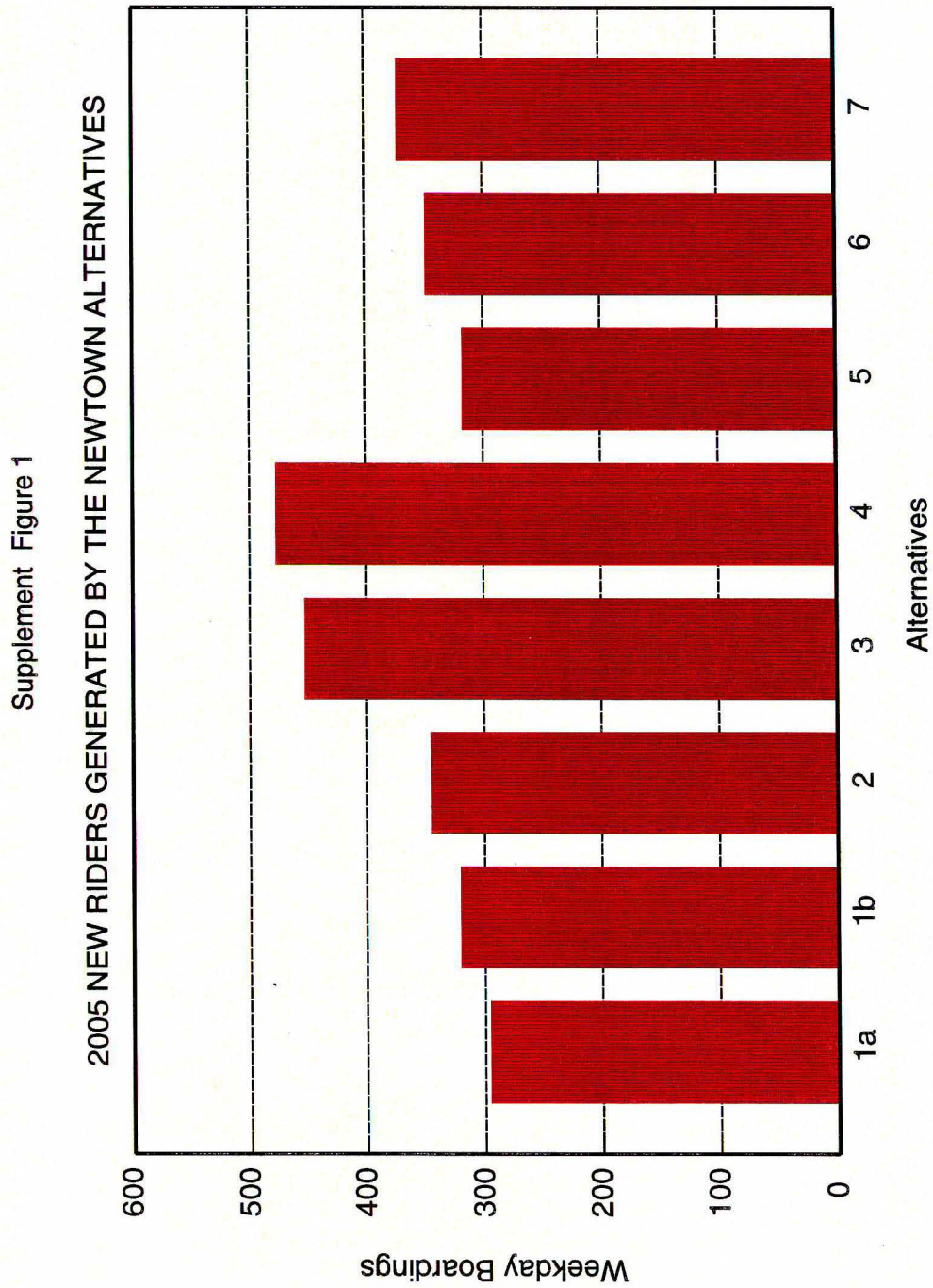
The one remaining through option, Alternative 2 via the Midvale Connection, outperforms most of the options requiring a transfer, but ranks lower than the other one-seat options, primarily because of longer running times, fewer trips, and the failure to reach the Market East Station.

Supplement Table 1

STUDY AREA RAIL RIDERSHIP
Daily Boardings (Weekday)

Alt. No.	Description	1996				2005			
		R2	R3	New town	Total Riders	R2	R3	New town	Total Riders
	No Build	1,545	3,210		4,755	1,560	3,310		4,870
1a	DMU to Fulmor (30 mph), transfer to R2	1,439	3,141	455	5,035	1,432	3,220	513	5,165
1b	DMU to Fulmor (50 mph), transfer to R2	1,426	3,132	497	5,055	1,424	3,210	556	5,190
2	DMU via Midvale Conn. to Suburban Station	1,409	3,095	576	5,080	1,380	3,180	655	5,215
3	EMU via Fox Chase, (R8 extension)	1,365	2,975	817	5,157	1,360	3,080	883	5,323
4	EMU via R3, connection at Bethayres	1,350	2,953	875	5,178	1,342	3,061	944	5,347
5	DMU to Fox Chase, transfer to R8	1,390	3,075	586	5,051	1,355	3,184	648	5,187
6	DMU to Bethayres, transfer to R3	1,359	3,051	658	5,068	1,346	3,143	729	5,218
7	Hybrid locomotive via Fox Chase	1,346	3,041	699	5,086	1,343	3,140	759	5,242

Note: Study area boardings totaled 4,298 in 1990 (1,503 on R2; 2,795 on R3); and totaled 4,625 in 1993 (1,525 on R2; 3,100 on R3).



Most of the growth expected in the study area for a horizon of 2005 will occur in the portion served by the Newtown Line. If no service is restored to Newtown, total rail ridership from the area is forecast to increase by about 13 percent between 1990 and 2005. In contrast, serving Newtown with the best option, Alternative 4, should see rail ridership from the area increase by approximately 24 percent. Although line ridership is not high, restoration of the Newtown service should strengthen rail's ability to attract new passengers from the highway system.
