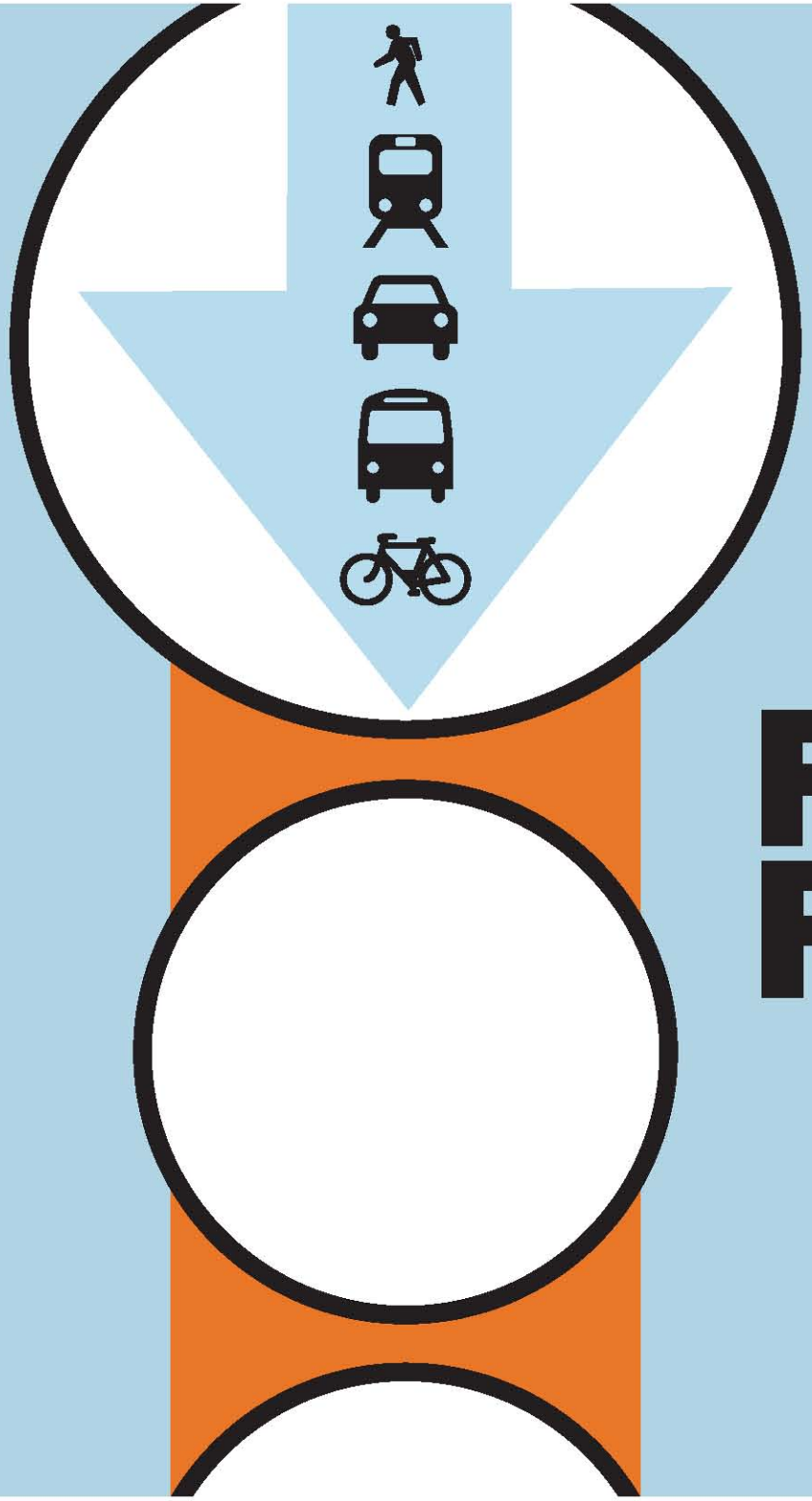

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DECEMBER 2011

FERN ROCK

INTERMODAL STUDY & CONCEPT PLAN

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FERN ROCK

INTERMODAL STUDY & CONCEPT PLAN

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.

The symbol in our logo is adapted from the official DVRPC seal and is designed as a stylized image of the Delaware Valley. The outer ring symbolizes the region as a whole while the diagonal bar signifies the Delaware River. The two adjoining crescents represent the Commonwealth of Pennsylvania and the State of New Jersey.

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APPENDIX A

SEPTA Construction Cost Estimate A-1

Executive Summary

DVRPC was asked by SEPTA to study the transit services accessible from Fern Rock Transportation Center, as well as the ways in which passengers access and move between these services. Drawing on a better understanding of how the facility is being used and might be used in the future, DVRPC was then tasked with developing a conceptual station Master Plan that reflects a near- and long-term strategy for making improvements to Fern Rock Transportation Center in a coordinated way.

Based on field observations and analysis, DVRPC identified a set of primary needs for Fern Rock Transportation Center, which were then prioritized by stakeholders in the following order:

1. A separation of SEPTA bus traffic from the main route of park-and-ride access
2. Safe and convenient pedestrian access from the east
3. A designated and well-managed drop off location, separated from bus facilities and park-and-ride traffic
4. Provision of additional off-street parking, given typical 100 percent occupancy for all lots
5. A forbidding site aesthetic, which contributes to the perception that there are safety concerns
6. Accommodation of safer pedestrian access from the southwest

Planning for strategies to address these needs was informed by two stages of engagement with SEPTA and City of Philadelphia staff: a design workshop/charrette, and an online tool that allowed stakeholders to comment on specific aspects of the draft designs.

Drawing on the collective expertise of these planning partners, DVRPC developed multiple full-buildout options for Fern Rock Transportation Center, with estimated construction costs of $46 million, as well as a recommended first phase with estimated construction costs of $5 million.

CHAPTER 1

Introduction and Background

History and Purpose

Fern Rock Transportation Center ("Fern Rock T.C.", or "Fern Rock") is a backbone facility in SEPTA's regional transit network, and one with a unique history. Fern Rock was originally developed as the maintenance facility and storage yard for the Broad Street Subway on the site of what had been an operating farm, and it began operations along with the subway in 1928. In 1956, subway passenger service was added at Fern Rock and it became the new northern terminus of the Broad Street Line. In 1992 and 1993, Regional Rail service at Fern Rock was consolidated into the current station configuration, designed to ease transfers during the "Railworks" project, when all Regional Rail passengers bound for Center City were required to pass through Fern Rock and transfer to the Broad Street Line.

Fern Rock Site at the opening of the Broad Street Subway in 1928 (Source: City of Philadelphia Department of Records)

The transportation center's incremental development over a long period of time, combined with the simple scale of the facility (roughly 25 acres, with passenger facilities over a linear 1,500 feet), means that it was not conceived as a single, coordinated facility, but rather as a series of parts. As elements of the facility age and require replacement, there is an emerging opportunity to better optimize the facility for how it is actually used and better integrate it with the surrounding community.

Project Approach

DVRPC was asked by SEPTA to explore the transit services accessible from Fern Rock T.C., as well as the ways in which passengers access and move between these services. Drawing on a better understanding of how the facility is

being used and might be used in the future, DVRPC was then tasked with developing a conceptual station Master Plan that reflects a near- and long-term strategy for making improvements to Fern Rock T.C. in a coordinated way.

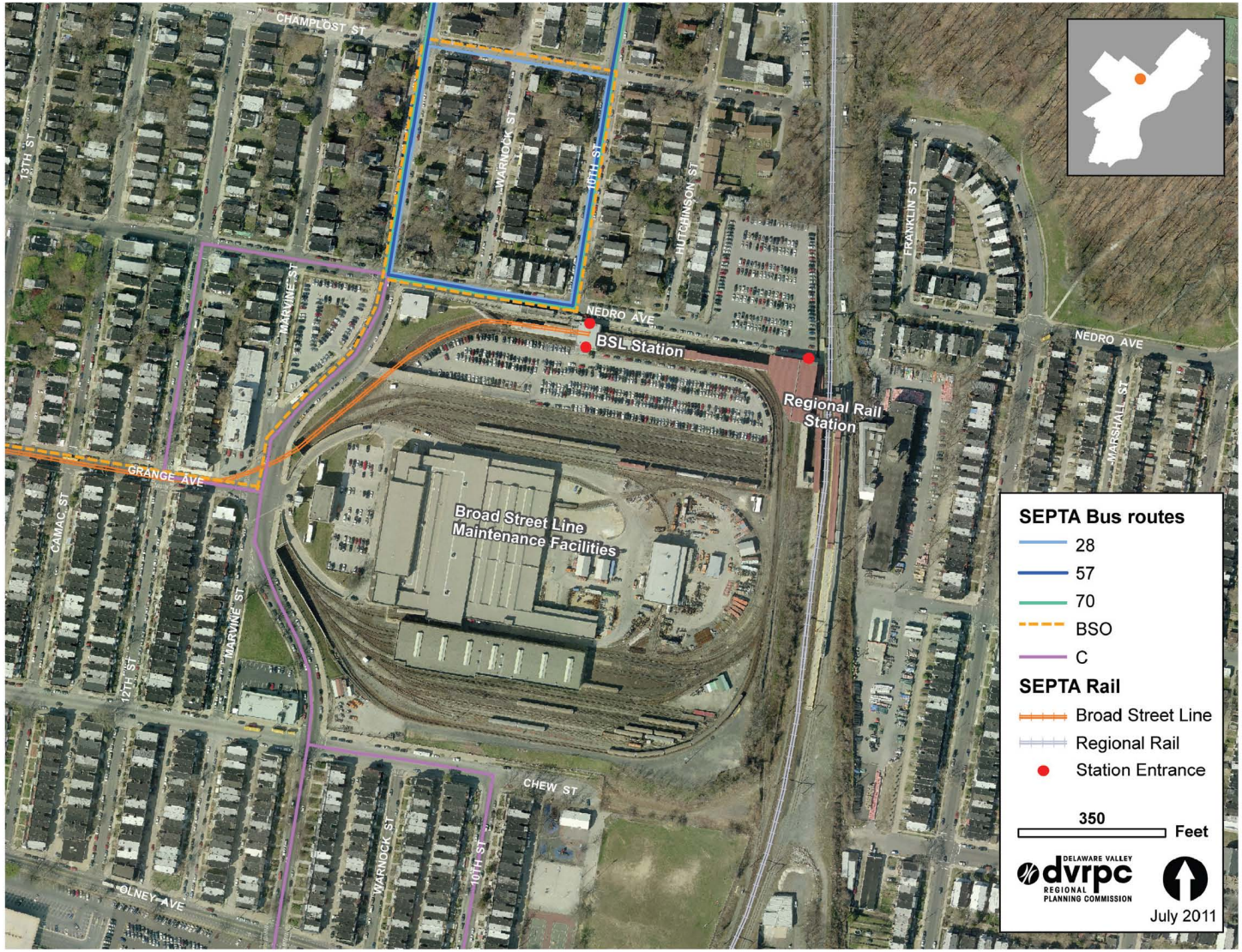
This project was comprised of two broad tasks:

- **A detailed exploration of passenger access and ridership patterns at Fern Rock T.C.** This was accomplished through an analysis of SEPTA ridership data, as well as field observations and data collection.
- **Development of conceptual improvement plans for Fern Rock T.C.**, with improvements prioritized based on identified passenger needs. This task was informed by two stages of engagement with SEPTA and City of Philadelphia staff: a design workshop/charrette, and an online tool that allowed stakeholders to comment on specific aspects of the draft designs.

Location and Service Context

Fern Rock Transportation Center is located east of Broad Street along Nedro Avenue in the Fern Rock neighborhood of Philadelphia, adjacent to the Olney and Logan neighborhoods. This is about 1.25 miles south of the city's boundary with Montgomery County at Cheltenham Avenue. For such a large facility, Fern Rock T.C. is well connected by the city's street grid to points north and west, but comparatively cut off from points east by the Regional Rail right of way. The transportation center is served by five SEPTA bus routes at varying times of day (Routes C, 28, 57, 70, and the Broad Street Owl), as well as five rail lines (the Broad Street Line, Broad-Ridge Spur, Lansdale/Doylestown Line, Warminster Line, and West Trenton Line). Figure 1 illustrates the broader facility site, as well as its roadway and transit network context. The frequencies and connectivity provided by these transit services are detailed in Chapter 2.

Figure 1: Fern Rock T.C. transit and roadway context



Source: SEPTA 2010, City of Philadelphia 2008 orthophotography

CHAPTER 2

Summary of Transit Service at Fern Rock T.C.

Fern Rock Transportation Center is a key facility in the Philadelphia city transit network, and it provides access to (and transfer between) a variety of SEPTA bus and rail services. These services are detailed in this chapter with regard to their frequency, service span (the times of day during which they operate), and the places to which they provide connectivity from Fern Rock T.C.

BROAD STREET LINE

Local service:

- **WEEKDAYS:**
  Every eight minutes during the AM and PM peaks, every 12 to 15 minutes early (5 am to 7:30 am), midday, and late (7:00pm to midnight)
- **WEEKENDS:**
  Every 12 to 15 minutes, 5:00 am to 1:00 am

Express service: same weekday frequencies as local service; no weekend express service. Most express trips terminate at Walnut-Locust Station, but special express trips to AT&T Station are operated for many events at the South Philadelphia Sports Complex.

Broad Street Line platform with express/local Next Train signage (Source: DVRPC 2010)

Broad-Ridge Spur service to 8th/Market:

- **WEEKDAYS:**
  Four southbound trains between 5:30 am and 6:30 am; every 20 minutes northbound and southbound between 7 pm and 9 pm

- **WEEKENDS:**
  Saturdays: About every 20 minutes, 6:00 am to 9:00 pm; no Sunday service

SEPTA BUS SERVICE

Route C:

Alternating trips from Cheltenham and Fern Rock T.C. to Center City and South Philadelphia via Broad Street.

- **WEEKDAYS:**
  Every 12 minutes during the AM and PM peaks, every 15 to 18 minutes early (5 am to 7:30 am) and midday, every 30 minutes evening and late (5 pm to 12:30)

- **WEEKENDS:**
  Saturdays and Sundays: About every 30 minutes, 5:30 am to 12:30 am

Route 28:

Fern Rock T.C. to points north and east (including Cheltenham, Fox Chase, Holmesburg, and Tacony).

- **WEEKDAYS:**
  About every 30 minutes all day (6:00 am to 9:00 pm)

- **WEEKENDS:**
  Saturdays: Hourly 7:00 am to 7:00 pm
  Sundays: every 90 minutes 9:00 am to 6:00 pm

Route 28 bus arriving at Fern Rock bus shelter area
(Source: DVRPC 2010)

Route 57:
Fern Rock T.C. to South Philadelphia via Olney, Feltonville, Northern Liberties, and 2nd/3rd/4th streets (roughly half of all southbound trips begin at Fern Rock T.C.; the remainder begin at Olney Avenue).

- **WEEKDAYS:**
  Every 12-15 minutes 6:00 am to 5:00 pm, every 20 to 30 minutes 5:00 pm to 12:00 am

- **WEEKENDS:**
  Saturdays and Sundays: Every 40 to 60 minutes 6:00 am to 8:00 pm

Route 70:
Fern Rock T.C. to Torresdale via Oak Lane Avenue, Cottman Avenue, State Road, and Torresdale Avenue.

- **WEEKDAYS:**
  Every five minutes outbound and inbound during the AM and PM peaks, respectively; every 10 to 20 minutes otherwise 5:30 am until 2:00 am

- **WEEKENDS:**
  Saturdays: every 30 minutes 6:00 am to 10:00 am; every 15 to 20 minutes 10am to 2am (late outbound frequencies are somewhat lower: every 30 minutes 11:00 pm to 2:00 am)
  Sundays: every 30 minutes morning and evening (6:00 am to 11:00 am and 5:00pm to 2:00 am), every 18 to 20 minutes midday (11:00 am to 5:00 pm)

Broad Street Line OWL Service:
Overnight bus operation serving Broad Street Line stations via Broad Street.

- **WEEKDAYS:**
  Every 10 to 15 minutes, 12:00 am to 5:00 am

- **WEEKENDS:**
  Saturdays and Sundays: Every 10 to 15 minutes, 12:00 am to 5:00 am

REGIONAL RAIL SERVICE

Warminster Regional Rail Line

Inbound service to Temple University and Center City; outbound service to Warminster line destinations (including Jenkintown, Glenside, Willow Grove, and Warminster). Some inbound Warminster Line trips continue through Center City as Airport Line trains.

- **WEEKDAYS:**
  Inbound: every 30 minutes 4:00 am to 7:00 am; every 60 minutes 7:00 am to 12:00 am
  Outbound: every 60 minutes 5:00 am to 1:00 am; one extra train during the 5:00 am hour and 6:00 pm hour

- **WEEKENDS:**
  Inbound: every 30 minutes 4:00 am to 6:00 am; every 60 minutes 6:00 am to 11:00 pm
  Outbound: about every 60 minutes 6:00 am to 1:00 am

Regional Rail train on east-side storage track at Fern Rock T.C. (Source: DVRPC 2010)

West Trenton Regional Rail Line

Inbound service to Temple University and Center City; outbound service to West Trenton Line destinations (including Jenkintown, Noble, Philmont, and West Trenton in Ewing Township, Mercer County, New Jersey). Some inbound West Trenton Line trips continue through Center City as Airport Line trains.

- **WEEKDAYS:**
  Inbound: every 30 minutes 4:00 am to 7:00 am; every 60 minutes 7:00 am to 12:00 am; one extra train during the 8:00 am hour and 8:00 pm hour
  Outbound: roughly every 60 minutes 6:00 am to 2:30 pm (with an extra train in the 7:00 am hour); about every 30 minutes from 2:30 pm to 8:00 pm; hourly from 8:00 pm to 12:00 am

- **WEEKENDS:**
  Inbound: every 60 minutes 6:30am – 11:30pm
  Outbound: roughly every 60 minutes 7:00am – 12:30am

Lansdale/Doylestown Regional Rail Line

Inbound service to Temple University and Center City; outbound service to Lansdale/Doylestown Line destinations (including Glenside, Fort Washington, Ambler, Lansdale, and Doylestown).

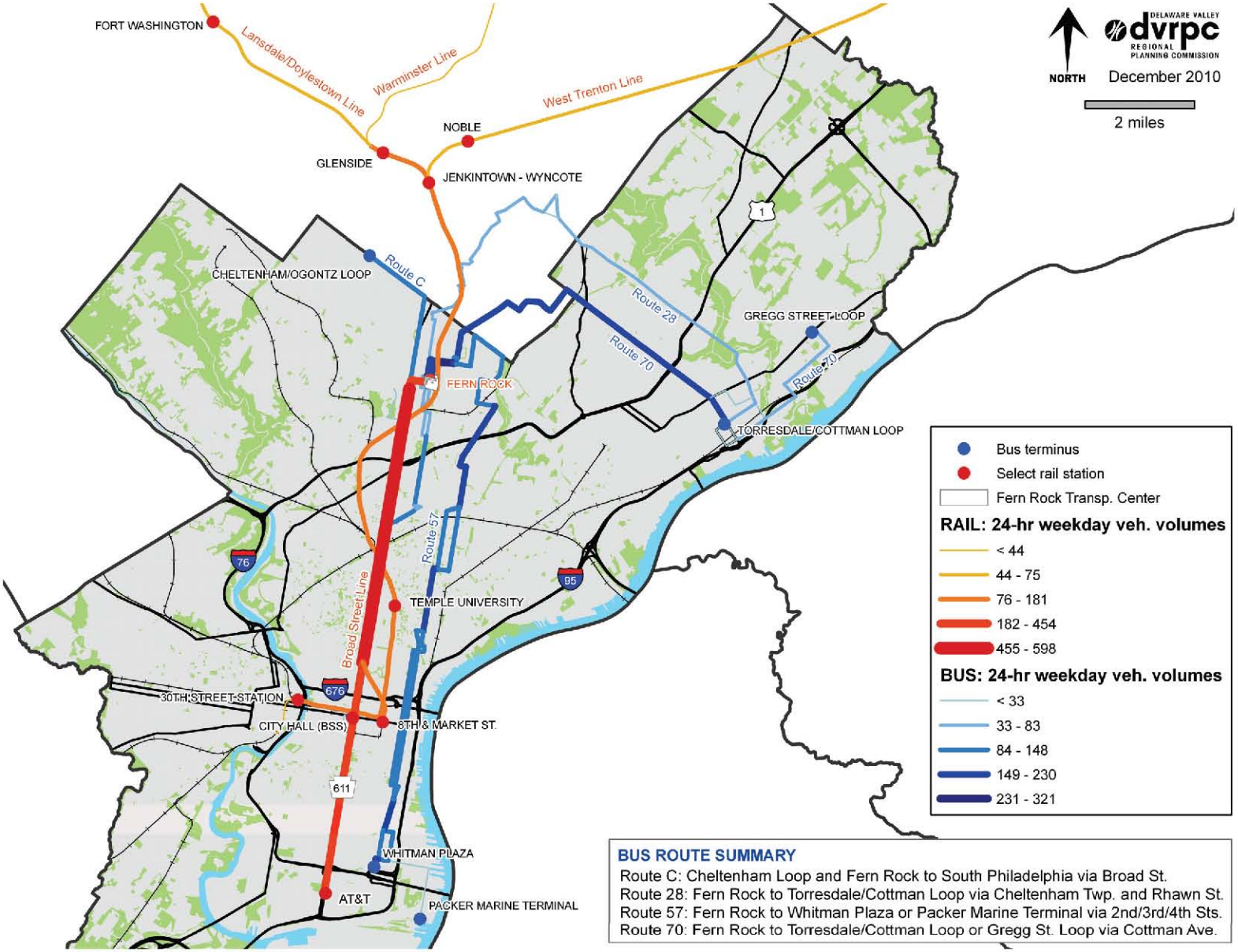
- **WEEKDAYS:**
  Inbound: every 30 minutes 6:00 am to 9:00 pm, with wider gaps in portions of the AM peak and more frequent service in the 6:0 0pm hour. Every 60 minutes 9:00 pm to 12:00 am
  Outbound: every 30 minutes 6:00 am to 8:00 pm; every 60 minutes 8:00 pm to 1:00 am

- **WEEKENDS:**
  Inbound: every 60 minutes 7:30 am to 12:30 am (12:00 am on Sundays)
  Outbound: every 60 minutes 7:30 am to 11:30 pm

With regard to regional rail service, it bears noting that **for trips between Fern Rock T.C. and Center City, the three regional rail lines serving Fern Rock T.C. are interchangeable from a passenger's standpoint**, and so the combined levels of service for this shared segment are roughly triple each line's individual level of service (bringing weekday peak frequencies to about every 10 to 12 minutes, approaching Broad Street Line frequencies). However, as TransPasses may no longer be used for weekday zone 1 regional rail trips, the fare premium for regional rail service would seem to make this an unlikely choice for passengers.

Figure 2 summarizes the level of transit connectivity from Fern Rock T.C. for each of the services detailed above. Key destinations and stations are highlighted, and each route segment is symbolized by the 24-hour weekday service frequencies that are provided.

Figure 2: Summary of SEPTA connectivity from Fern Rock Transportation Center



Source: Google Transit via DVRPC regional travel model 2010

CHAPTER 3

Fern Rock T.C. Passenger Movements and Mode of Access

With so many transit lines providing service to and from Fern Rock T.C., it is useful to understand which routes and transfers are the most widely used in order to begin to prioritize facility improvements. **The overall pattern of passenger activity is clear: Fern Rock Transportation Center principally acts as a funnel of passengers from all modes (transit and private) to the Broad Street Line**. However, passenger movement patterns are more complex and multidirectional at Fern Rock T.C. than at most other SEPTA facilities.

This section explores available data on transit passenger volumes, as well as the primary modes of passenger access[1] to and from Fern Rock T.C., attempting to pull out meaningful bits of information on surprising, evolving, or problematic movements that will inform the facility master plan. **DVRPC staff conducted a comprehensive field view, with counts of all modes during the AM peak period (7 am to 9 am) on Wednesday, November 3, 2010**. This two-hour time period was selected for observation because it represents the 'peak of the peak' for Broad Street Line boardings at Fern Rock T.C. Notes and data from these field observations are used to supplement the available summary data, and also to provide a point of comparison.

Data from this field view also enables an estimated one-day weekday 'peak of the peak' snapshot for Fern Rock T.C. station access mode share (for all modes except the Broad Street Line, which is the primary gatherer of these trips). This snapshot (Table 1) illustrates the truly multimodal nature of passenger activity at Fern Rock T.C., and will help to prioritize possible facility improvements. By way of a validity check, DVPRC staff counted about 1,960 station arrivals

Table 1: Fern Rock T.C. station access mode share, AM peak

Observed mode of access (Nov. 3, 2010, 7 am to 9 am)	Number	%
SEPTA bus	735	37%
Pedestrian	485	25%
Park-and-ride	366	19%
Drop-off/kiss-and-ride	239	12%
Regional rail	136	7%
TOTAL	1,961	100%

NOTE: The number of park-and-ride patrons assumes single-occupant vehicles. Auto mode share may be somewhat undercounted as a result.

Source: DVRPC 2010

[1] Since very few (3) passengers were observed to access the station by bicycle during DVRPC field observations, bicycle access is not detailed in this section (but will be considered as part of the facility planning to follow).

across each of these modes from 7 am to 9 am,
and SEPTA's most recent subway passenger counts (2010) have 2,036 boards at Fern Rock T.C. for the same time period. Data and observations for each mode of access are summarized in the sections that follow.

Regional Rail Volumes

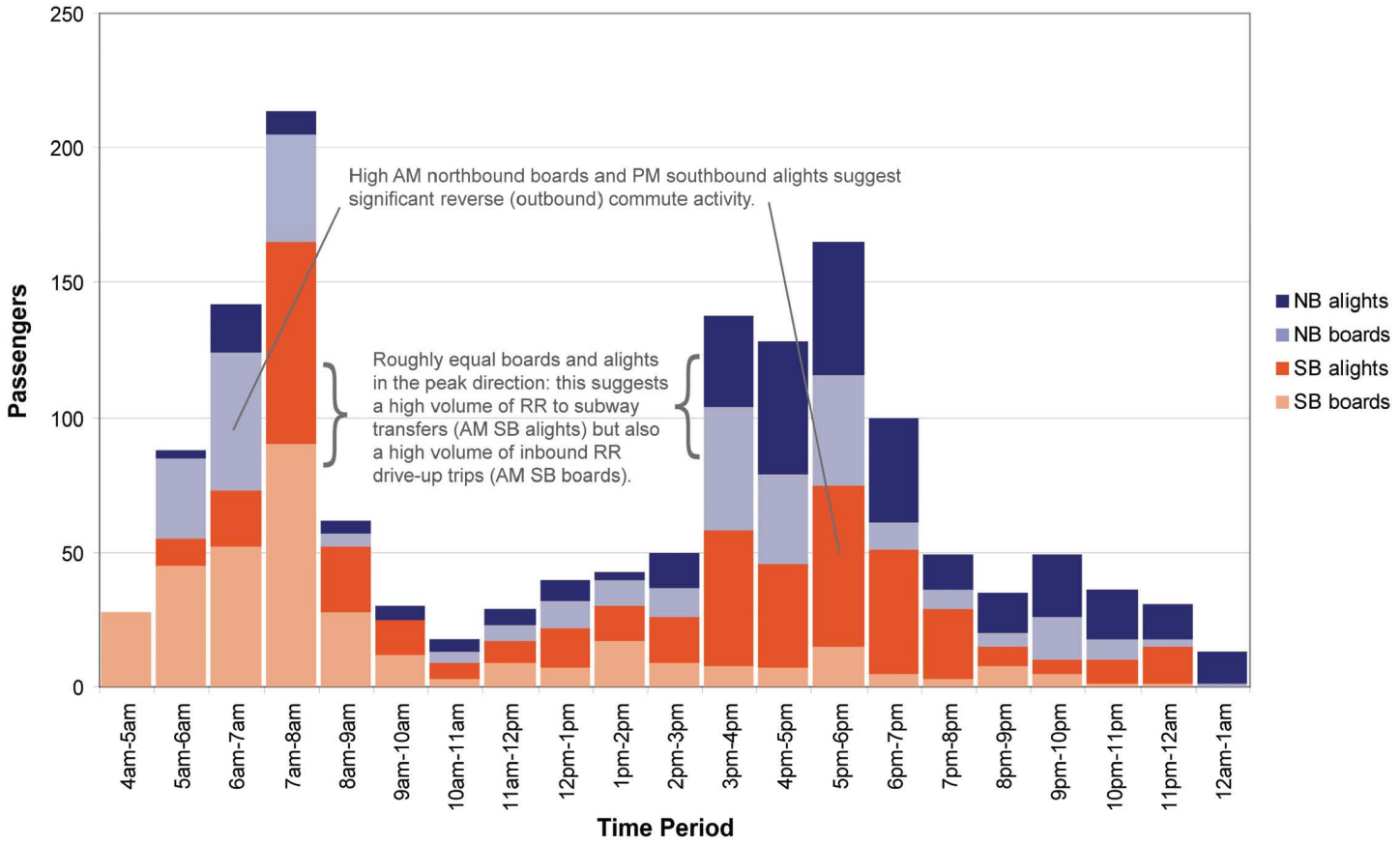
Fern Rock T.C. is served by three Regional Rail lines: Lansdale/Doylestown, Warminster, and West Trenton (with some Warminster and West Trenton trains continuing as airport line trips). Figure 3 summarizes the combined passenger activity for these three lines in terms of boards and alights in each direction by time of day (this data was taken from SEPTA's 2009 Regional Rail Ridership Census). Figure 3 also highlights several interesting findings from the data, namely that:

- **There is a significant level of reverse commute activity at Fern Rock T.C.**, much of it likely involving subway to Regional Rail transfers. DVRPC staff observed 59 subway to Regional Rail transfers from 7 am to 9 am on November 3rd, comparable to the 45 northbound boards occurring for the same time period according to SEPTA's 2009 Regional Rail Census.

- Peak direction passenger volumes (southbound in the AM, northbound in the PM) are roughly evenly split between boards and alights. **The high volume of southbound Regional Rail alights during the AM peak suggests a significant level of Regional Rail to Broad Street Line transfer activity**. The 458 total southbound alights depicted in Figure 3 from the 2009 Regional Rail Census correspond closely with the 516 average weekday turnstile counts for passenger movements entering the Broad Street Line from the Regional Rail side of Fern Rock T.C. (as reported by SEPTA Revenue & Ridership staff). Of the 458 southbound alights from the Regional Rail Census, 99 were from 7 am to 9 am. For comparison, DVRPC staff counted 136 Regional Rail to subway movements during this timeframe on November 3.

- The comparably high level of southbound boards during the AM peak is somewhat surprising, and suggests a significant level of drive-up (or other) southbound Regional Rail trips. **Given the fare premium and shared destinations (with a free Market-Frankford Line transfer from the Broad Street Line at City Hall), it is noteworthy that 353 riders per day board southbound Regional Rail trains instead of Broad Street Line trains**. The travel time for each mode to 30th Street Station is about the same (25 minutes), including transfer time at City Hall for the Broad Street Line – Market-Frankford Line trip. Since West Trenton and Warminster Line trains continue through to University City Station, it seems likely that this one-seat-ride may be responsible for the preponderance of southbound Regional Rail boards at Fern Rock T.C.

Figure 3: Hourly weekday Regional Rail passenger volumes (2009) at Fern Rock T.C.

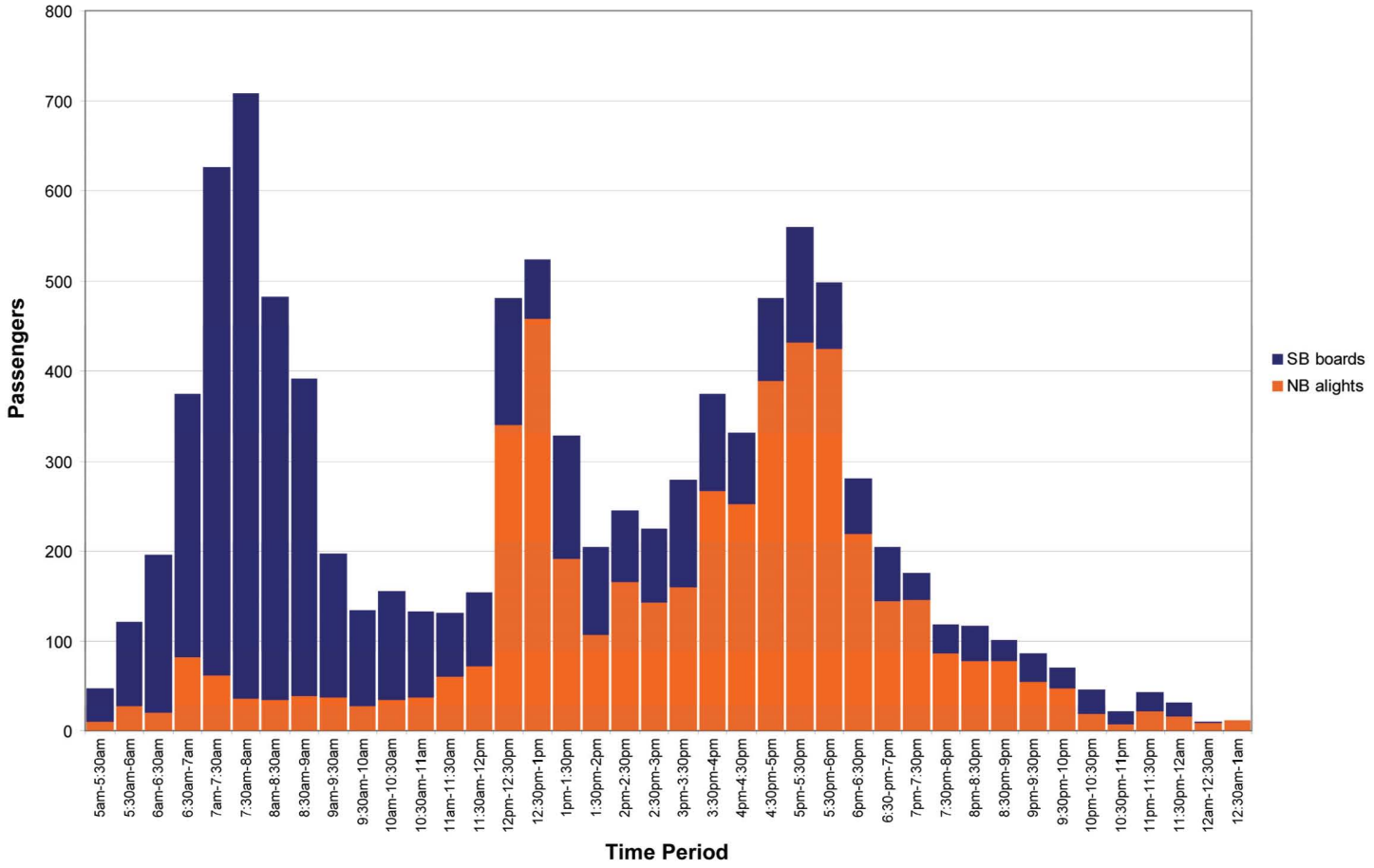


Source: SEPTA 2009

Broad Street Line

Fern Rock T.C. is the northern terminus for all three variations of southbound service on the Broad Street Line: local, express, and Broad-Ridge Spur service to 8th and Market streets. Figure 4 summarizes weekday subway passenger volumes by time of day, taken from SEPTA's 2010 platform census for the Broad Street Line.

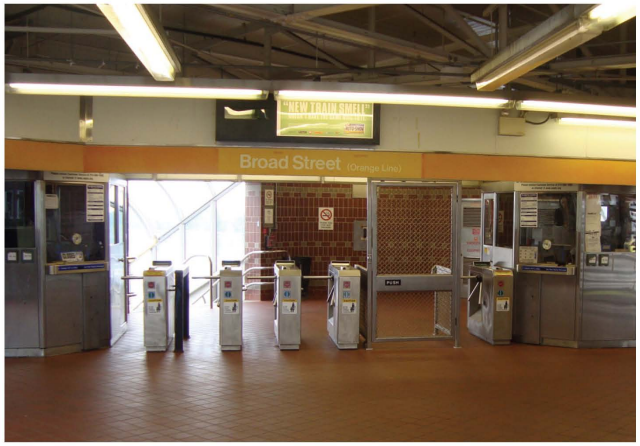
Figure 4: Weekday Broad Street Line passenger volumes at Fern Rock T.C. (2010)



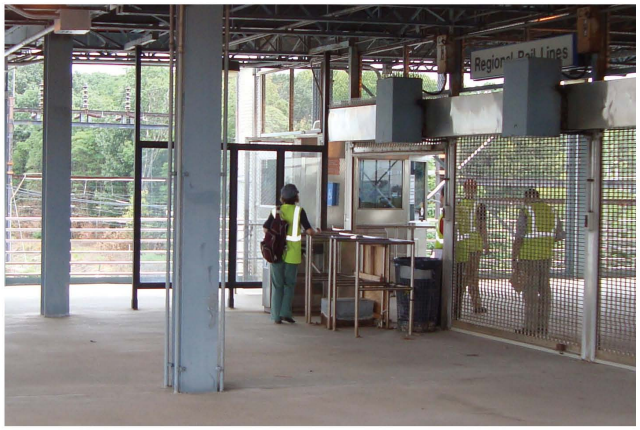
Source: SEPTA 2010

As Figure 4 suggests, subway ridership at Fern Rock T.C. is heavily peaked on weekdays, with heavy southbound boards in the morning and heavy northbound alights in the evening. There is also an interesting spike in northbound passenger activity at midday; this may suggest early shift workers who ride the C or OWL bus southbound in the early morning and return via the subway at midday.

Fern Rock T.C.'s subway platforms have two sets of turnstiles, one each at two entry locations (see photos opposite): the main turnstiles close to the transportation center's central entrance on Nedro Avenue, and the turnstiles that provide entry from Fern Rock T.C.'s Regional Rail platforms (RRD). While this categorization of passengers is not entirely precise (passengers trespassing over the regional rail tracks from the east would also likely enter the subway through the Regional Rail turnstiles, for example), the RRD turnstile counts can be used to approximate RRD to subway transfer activity. SEPTA Revenue & Ridership staff indicate that on a typical weekday, 516 passengers enter the Broad Street Line from the RRD turnstiles. This is close to the 458 total southbound Regional Rail alights at Fern Rock T.C. from SEPTA's 2009 Regional Rail Census,[2] again suggesting that the bulk of southbound alighting Regional Rail passengers are transferring to the Broad Street Line. **The 516 Broad Street Line entries from the RRD turnstiles represent just over 10 percent of total Broad Street Line boards at Fern Rock T.C. (4,852)**.



Main entrance turnstiles


RRD entrance turnstiles

WEEKEND AND EVENT RIDERSHIP

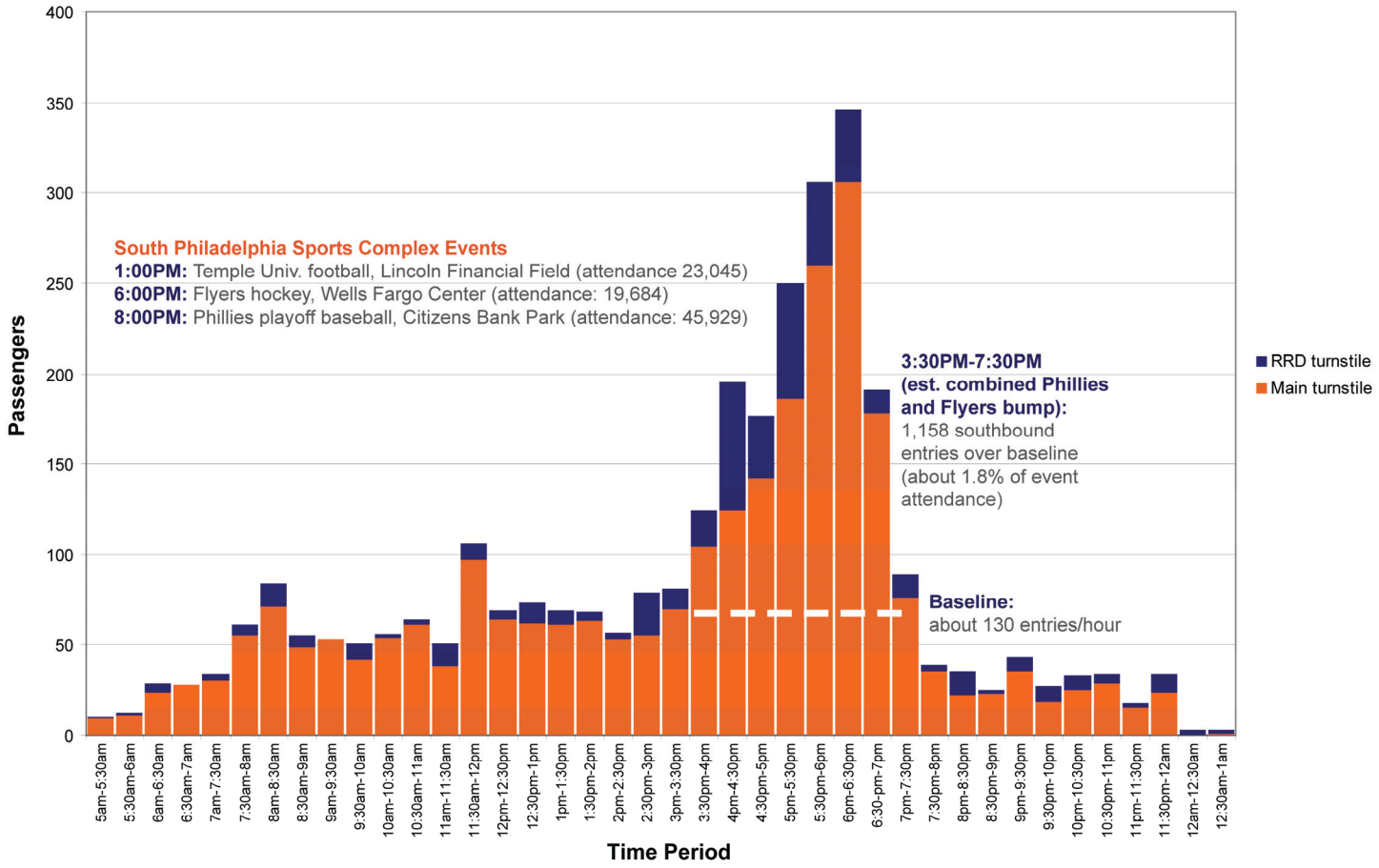
The ridership data examined thus far illustrates weekday passenger activity, where volumes are highest and oriented to the work commute. Weekend and special event activity is also of interest at Fern Rock T.C., however, since the Broad Street

[2] Of the 458 total southbound Regional Rail alights, 99 were counted from 7 am to 9 am. For comparison, DVRPC staff counted 136 Regional Rail to subway movements during this timeframe on November 3rd.

Line provides direct service to events at the South Philadelphia Sports Complex, and anecdotal reports suggest relatively heavy use of Fern Rock T.C. as an event park-and-ride location from points north. **According to SEPTA Revenue & Ridership staff, Saturday and Sunday Fern Rock T.C. boardings are on average 38 and 33 percent (respectively) of weekday boardings, but volumes can be much higher on special event days**. To shed light on this passenger activity, SEPTA was able to share farebox/turnstile count data for two weekend days in October 2010, both with well-attended events at the Sports Complex. As for the weekday data detailed above, RRD turnstile counts can be used to approximate RRD to subway transfer activity for these two weekend event days.

Figure 5 illustrates passenger entries by time of day for Saturday, October 16, a date on which there were three well-attended events at the Sports Complex: Temple University football in the afternoon, and both Flyers hockey and Phillies baseball in the evening. The data in Figure 5 suggests a minimal (or no) “bump” in riders for Temple football, perhaps because university attendees would board at more southerly stations, but a significant evening bump that corresponds with the Flyers and Phillies games. Because these events occurred at close to the same time, it is difficult to parse out the relative ridership impacts of each event. However, it is possible to examine their combined impact.

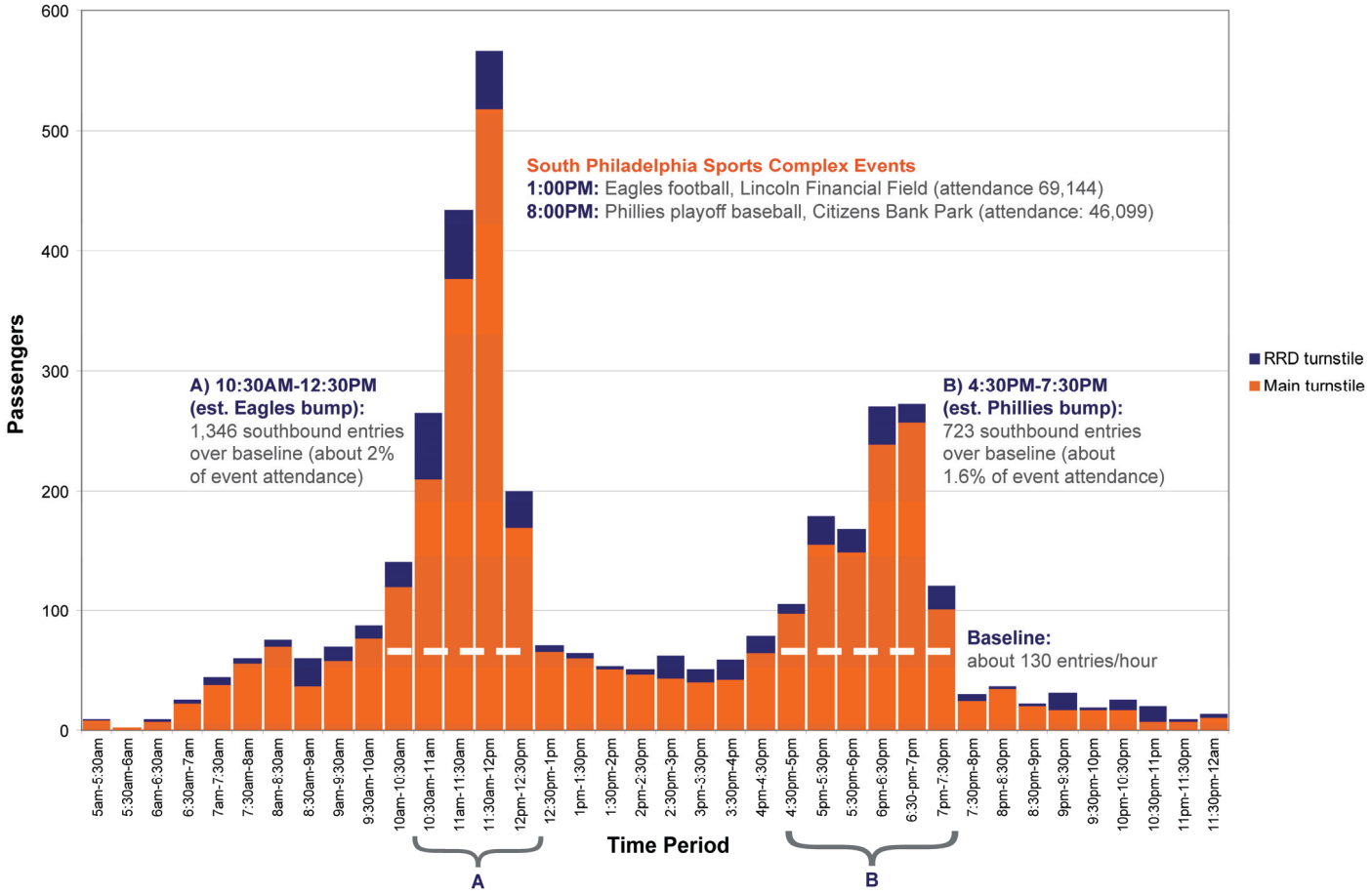
Figure 5: Weekend/event Broad Street Line passenger activity at Fern Rock T.C. (Oct. 16, 2010)



Source: SEPTA 2010, USAToday.com 2010

As detailed in Figure 5, by estimating a rough hourly baseline for boards (based on the rest of the day), it is possible to derive an estimate for the passenger activity specifically associated with the Sports Complex events (the Flyers and Phillies games, in this case). By comparing this estimate to total event attendance, it is then possible to estimate the proportion of all event attendees who travelled to the events by boarding the Broad Street Line at Fern Rock T.C.: in this case, 1,158 southbound entries (302 from the RRD turnstiles) represent about 1.8 percent of total attendance.

Figure 6: Weekend/event Broad Street line passenger activity at Fern Rock T.C. (Oct. 17, 2010)



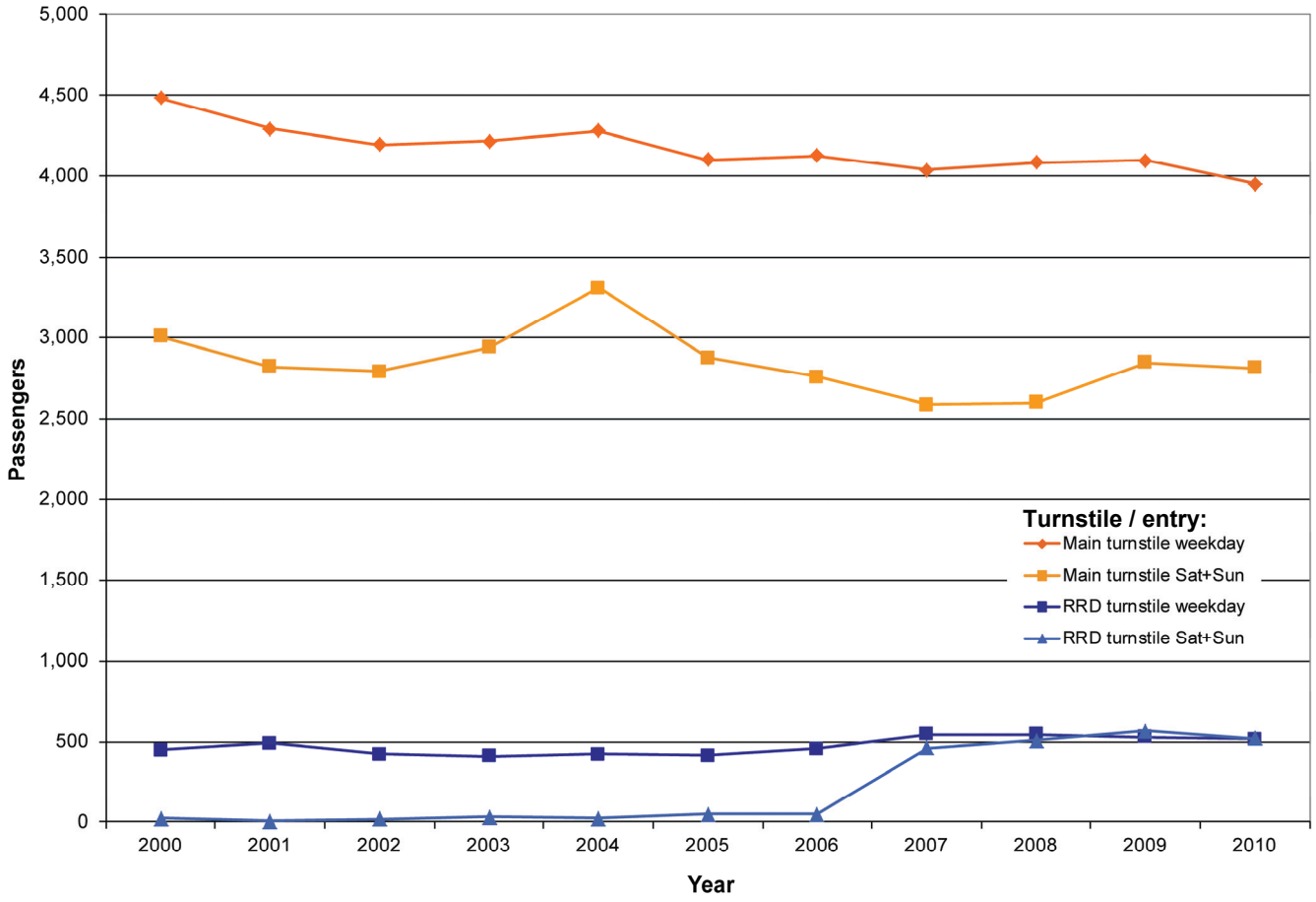
Source: SEPTA 2010, USAToday.com 2010

Figure 6 summarizes comparable data for the following day: Sunday, October 17, 2010. On this day there were two significant Sports Complex events, with enough time separation to explore their individual impacts. As detailed in Figure 6, the proportion of total event attendees who travelled to the events by boarding the Broad Street Line at Fern Rock T.C. was about the same as estimated in Figure 5 (1.6 to 2 percent). This consistency across days and events suggests that this is a fairly consistent ridership pattern. A 2004 Philadelphia City Planning Commission survey estimated a total transit mode share for Stadium Complex events of about eight percent, suggesting that **fully one-fourth of all Stadium Complex event access by transit (two out of eight percent) comes via Fern Rock Transportation Center**.

BROAD STREET LINE RIDERSHIP TRENDS OVER TIME

As the primary driver of passenger activity at Fern Rock T.C., Broad Street Line ridership trends are an important indicator to consider as part of this project. As Figure 7 suggests, passenger volumes have declined slightly over the last decade, but have nevertheless been fairly stable.

Figure 7: Historical Broad Street Line passenger entries at Fern Rock T.C.



Source: SEPTA 2010

Bus Passenger Volumes

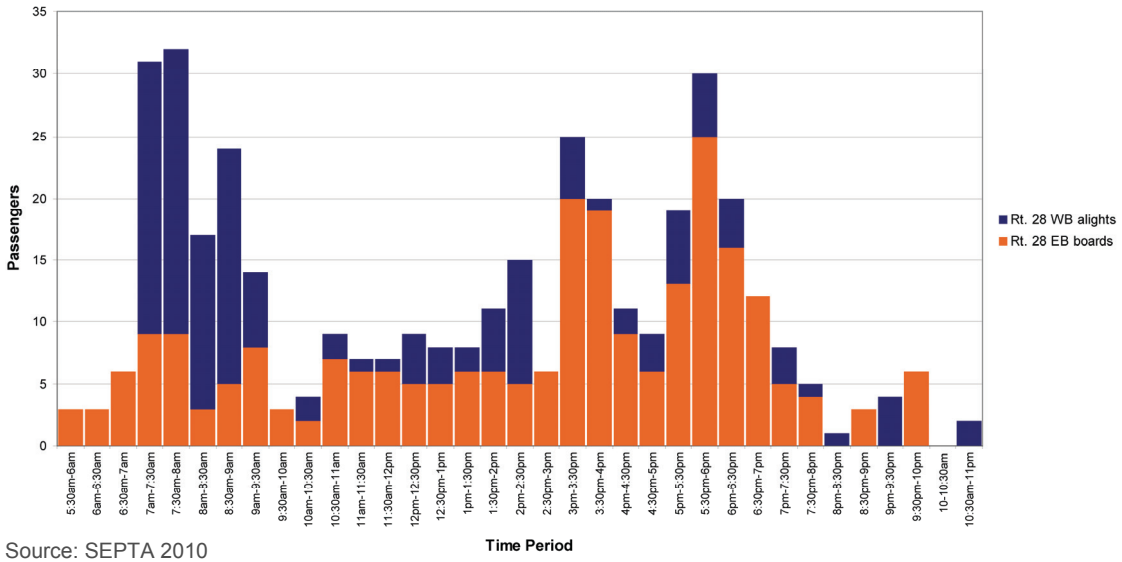
Fern Rock Transportation Center is served by four SEPTA bus routes: C, 28, 57, and 70. Figure 8 summarizes the movements of these four routes in and around the transportation center.

Of the four routes serving Fern Rock T.C., detailed stop-level passenger counts via SEPTA ride check data were available for Routes 28 and 70. In addition, SEPTA provided "corner check" hourly one-day counts for Routes 57 and C. Figures 9, 10, and 11 summarize passenger activity for Routes 28, 57, and 70, respectively, in terms of eastbound boards and westbound alights by time of day (each route has its western terminus at Fern Rock T.C.). Passenger activity at Fern Rock T.C. for Route C was much lower than the other three routes (92 boards and 82 alights all day), and as a result is not detailed here.

Figure 8: SEPTA bus movements in Fern Rock T.C. vicinity

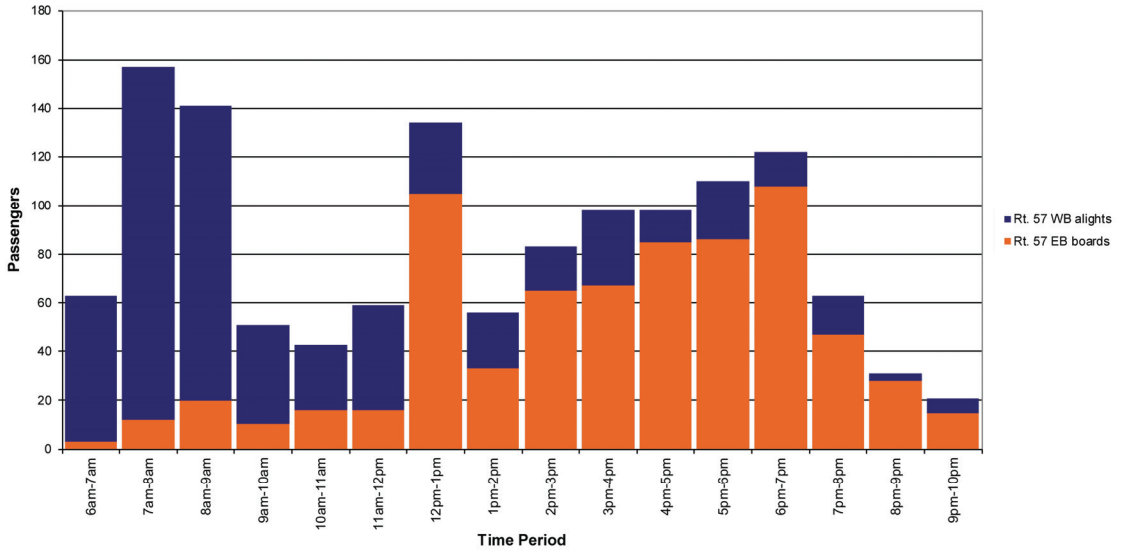
Source: DVRPC 2010

Figure 9: Route 28 weekday passenger volumes at Fern Rock T.C.



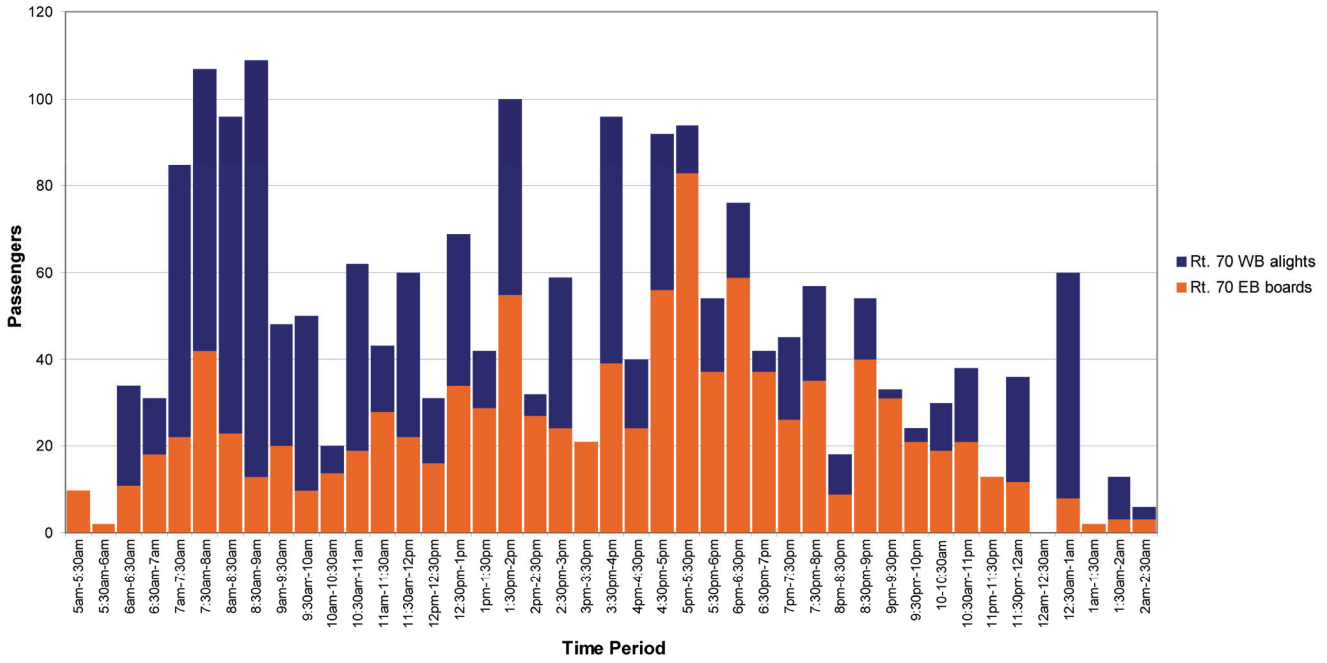
Source: SEPTA 2010

Figure 10: Route 57 weekday passenger volumes at Fern Rock T.C.



Source: SEPTA 2010

Figure 11: Route 70 weekday passenger volumes at Fern Rock T.C.



Source: SEPTA 2010

In reviewing this data, several conclusions emerge:

- Route 70 has much higher levels of passenger activity than Route 58 (this corresponds with the frequencies provided for each route, as summarized in Figure 2).
- All three routes have a traditional commute peaking pattern, with a spike in westbound alights during the AM peak and a spike in eastbound boards in the PM peak. This suggests that each route acts as a feeder to the Broad Street Line for inbound commuters (as would be expected). SEPTA's ride check and corner count numbers show a combined 641 westbound alights for Routes 28, 57, and 70 from 7 am to 9 am,[3] which compares reasonably closely to the combined 735 passengers transferring from buses to the Broad Street Line that were counted by DVRPC staff on November 3rd. In any case, **the bus to subway passenger transfer movement at Fern Rock T.C. is significant**.

[3] Ride check alight times were estimated based on known run departure times and scheduled run length.

- Route 70's usage is less peaked than either Route 28's or Route 57's, with a much more even distribution of eastbound boards specifically. This suggests that trip purpose and direction are more varied for Route 70 riders than for Route 28 and 57 riders.
- The extent to which Route 57's ridership distribution by time of day (Figure 10) corresponds with the Broad Street Line's distribution (Figure 4) is striking. Route 57 even exhibits a comparable midday spike in eastbound boards, suggesting that it captures a sizable portion of the subway's midday spike in northbound alights.

Station Access by Auto: Park-and-Ride & Drop-Off

PARK-AND-RIDE STATION ACCESS

Fern Rock T.C. has three park-and-ride lots, with a total of 715 stalls, plus local on-street parking. These are:

SEPTA daily parking lot:
This lot is located to the south of the Broad Street Line platforms, and accessed via a two-way entry ramp off 11th Street (429 stalls, 100 percent weekday occupancy in 2010).

- Fees are $2.00 cash (in coins), a SEPTA token plus $0.25 cash (in coins), or $1.70 via a SEPTA parking card.
- On the morning of DVRPC's field observations, this lot was already about 40 percent filled by 7:00 am, and was 100 percent filled by 8:30 am.

SEPTA permit parking lot:
This is a triangular parcel located between 11th Street, Marvine Street, and Nedro Avenue, adjacent to a SEPTA police substation (76 stalls, 100 percent sold and occupied in 2010).

- A monthly permit costs $32.00.
- Arrival times at this lot were not observed in detail.

Philadelphia Parking Authority (PPA) daily parking lot:

This lot is located at the end of Nedro Avenue adjacent to the station, between Hutchinson Street and the Regional Rail tracks (210 stalls, 100 percent weekday occupancy in 2010).

- Fee is $1.00 (multiple payment methods available at the PPA kiosks).
- On the morning of DVRPC's field observations, this lot was already about 70 percent filled by 7:00 am, and 100% filled at roughly 7:30 am (fully one hour prior to the SEPTA daily lot). This might be expected given its lower price and smaller capacity.

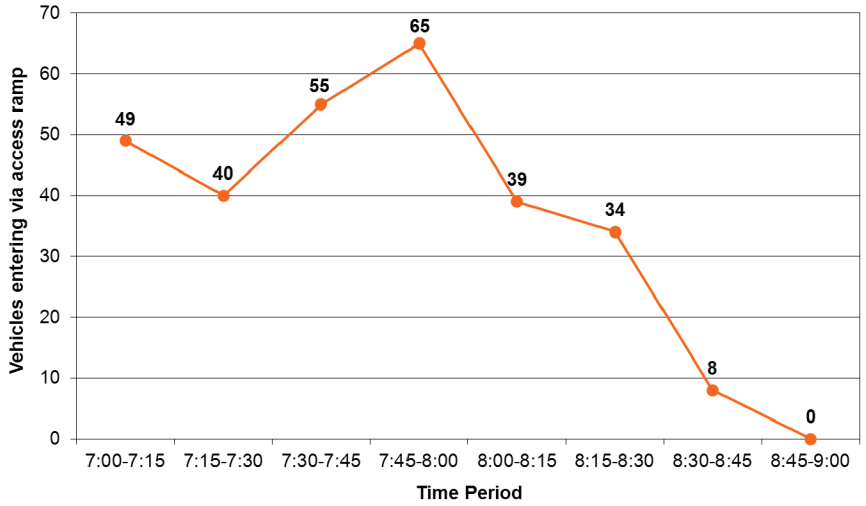
Figure 12 illustrates the location of these parking facilities in the context of the surrounding road network and Fern Rock T.C. facilities, as well as locations of parking lot ingress and egress.

Figure 12: Fern Rock T.C. parking facilities

Source: DVRPC 2010

During morning field observations, DVRPC staff took care to note any congestion issues relating to park-and-ride access, with a particular eye on the SEPTA daily parking lot (the station's largest parking facility). Figure 13 summarizes the volume of lot entries via the access ramp between 7 am and 9 am (note that the lot was already about 40 percent full by 7 am, and that these are total entries rather than net parked vehicles; there were 22 vehicles exiting the lot counted between 8:15 and 8:45). **The high number of lot entries between 7 am and 8:30 am was associated with significant congestion impacts on 11th Street**. At various points in the morning, anywhere from three to 20 cars were stacked on 11th Street north of Nedro Avenue (a stop sign-controlled intersection) on route to the daily lot ramp entrance. This was the only park-and-ride related congestion hotspot noted during field observations, but it is a significant one for overall station access since 11th Street is also the primary route of bus access to Fern Rock T.C.

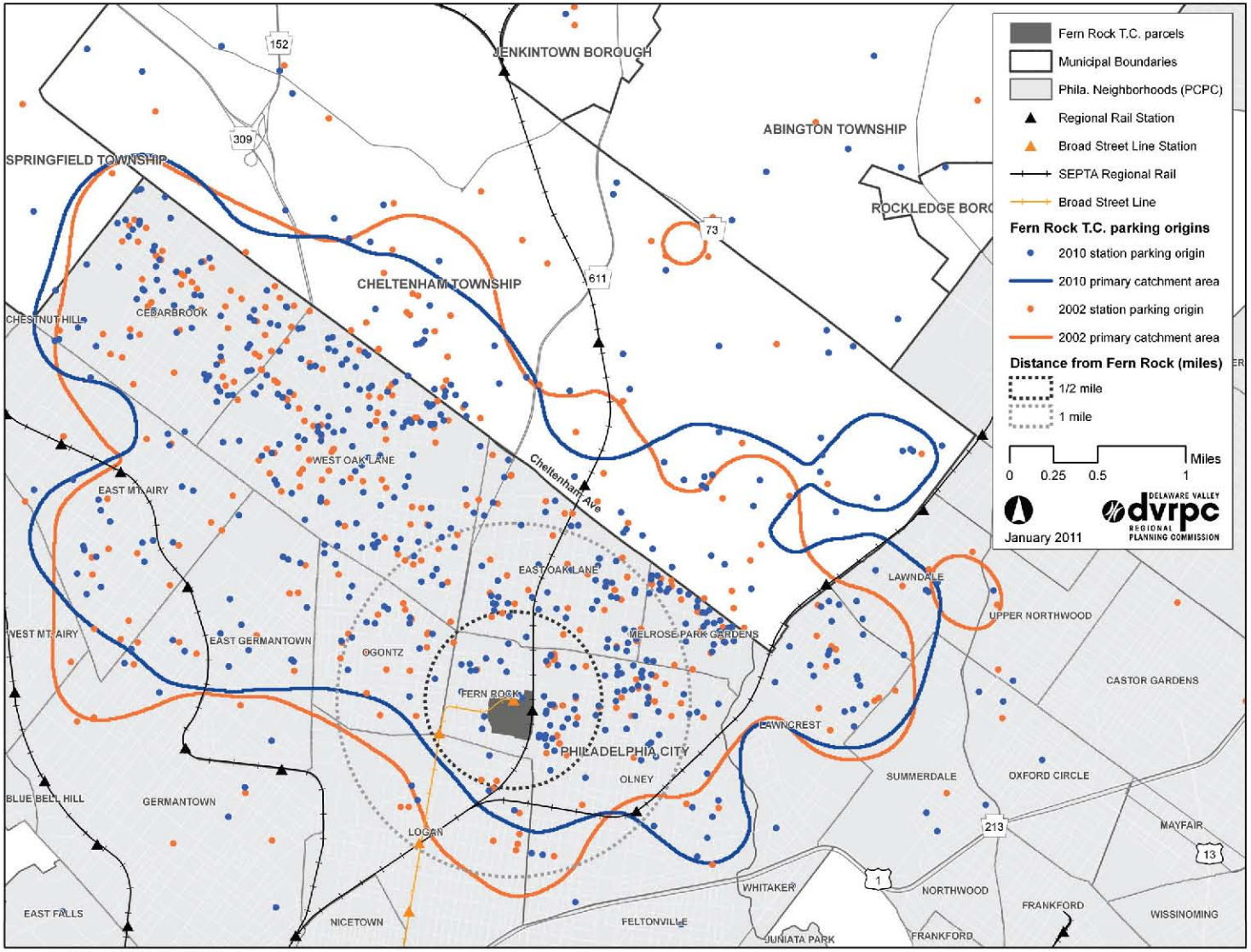
Figure 13: SEPTA daily lot entries, 7 am to 9 am (Wed. Nov. 3, 2010)



Source: DVRPC 2010

Nearly every SEPTA daily lot ramp entry occurred via a left turn off 11th Street, suggesting that nearly all park-and-ride patrons come from points north. To more precisely understand the distribution of park-and-ride patrons, DVRPC conducted a license plate survey at each of the station's parking lots in August 2010. After data processing by PennDOT, this enabled mapping of where each car originates in order to understand the station's primary shed (or catchment area). Figure 14 summarizes the results of this exercise, as well as an equivalent exercise in 2002 for purposes of comparison.

Figure 14: Fern Rock T.C. parking origins



Source: DVRPC 2002, 2010

The primary catchment area boundaries in Figure 14 were derived through DVRPC's updated method for processing the densities of station origins (for more details, see DVRPC pub. 10025). The points and boundaries in Figure 14 suggest that **Fern Rock T.C.'s catchment area (at least for weekday commuters) has not changed since 2002**. Several other conclusions can be drawn from this data:

- The bulk of Fern Rock T.C.'s park-and-ride patrons originate in the Olney, Melrose Park Gardens, East Oak Lane, West Oak Lane, and Cedarbrook sections of Philadelphia.
- Fern Rock T.C. draws a significant number of park-and-ride patrons from upwards of three miles to the northwest, but relatively few patrons from anywhere outside Philadelphia (North of Cheltenham Avenue in Montgomery County), even at much closer distances.
- The concentration of origins to the immediate east of Fern Rock T.C. (closer than ½ mile) speaks to the challenges in accessing the station from the east by foot, which will be examined elsewhere in this report.

DROP-OFF STATION ACCESS

During field observations for this project, DVRPC staff noted significant volumes of drop-off activity at multiple locations:

- Along both Nedro Avenue and 10th Street, where these streets intersect adjacent to the main station entrance (most cars dropped off passengers at or near this intersection, and then left the station area northbound via 10th Street or Hutchinson Street). Drop-offs at this location were often problematic, with idling or temporarily parked cars competing for space with SEPTA buses and other vehicles (see photo, opposite).
- In the southeast corner of the PPA daily lot (a number of cars temporarily parked close to the Regional Rail platform area and then exited via the lot's loop drive).

Above: significant conflicts along Nedro Avenue at 10th Street (primary drop-off zone).

Drop-off volumes at Fern Rock T.C. are significant, despite the lack of a designated drop-off location. DVRPC staff counted 239 total drop-offs between 7 am and 9 am on November 3rd. For comparison, 268 cars were counted

entering the SEPTA daily parking lot over the same timeframe. While staff did not conduct corresponding PM peak counts, as a general rule pick-up, activity has a greater impact on congestion than drop-off activity, since vehicles often idle longer as they wait for arrivals.

Table 2: Historic AADTs near Fern Rock T.C.

Location	Date of count	AADT
Nedro Ave. (west of Marvine St.)	10/15/1999	3,549
Nedro Ave. (west of Marvine St.)	3/26/2002	2,929
Nedro Ave. (west of Marvine St.)	4/14/2005	2,132
Nedro Ave. (west of Marvine St.)	3/19/2008	1,591
11th St. (north of Champlost St.)	12/22/1998	8,111
11th St. (north of Champlost St.)	3/13/2001	8,464
11th St. (north of Champlost St.)	5/18/2004	7,851
11th St. (north of Champlost St.)	3/1/2007	7,443
11th St. (north of Champlost St.)	7/7/2010	6,434

Source: DVRPC 2010

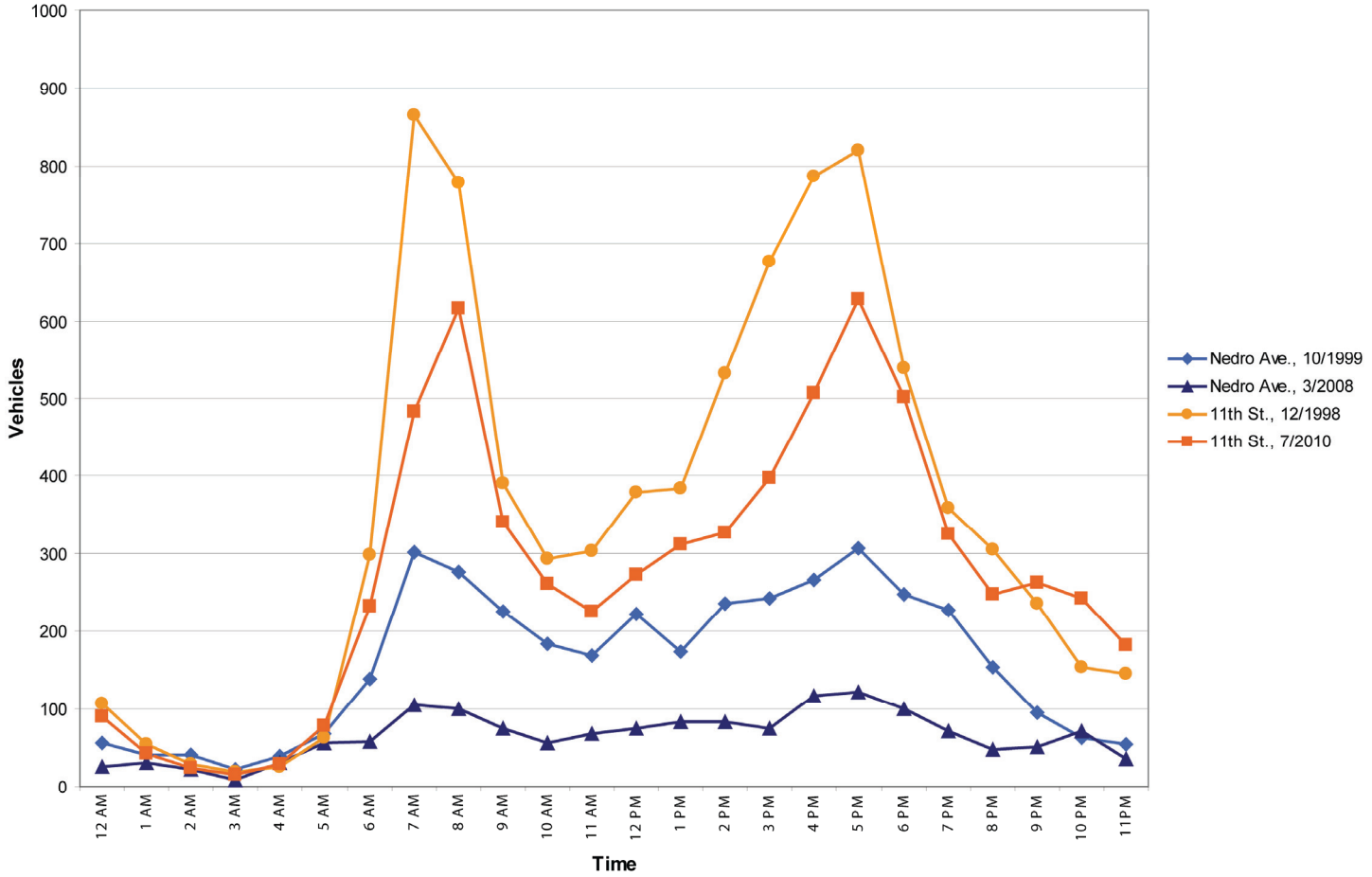
AREA TRAFFIC VOLUMES

There are two PennDOT/DVRPC recurring traffic count locations in the vicinity of Fern Rock T.C. which may shed some light on station access by car: on Nedro Avenue just west of Marvine Street, and on 11th Street just north of Champlost Street (an east-west street one block to the north of Nedro Avenue). The historic traffic volumes (expressed as annual average daily traffic, or AADT) for these two locations are summarized in Table 2.

It is noteworthy that for both locations, **traffic volumes have trended downward over the last decade** (declining by about 55 percent for Nedro Avenue and 21 percent for 11th Street). This is surprising since passenger activity at Fern Rock T.C. does not exhibit a similarly clear downward trend (Figure 7 depicts much more modest declines), nor do other local roadways for which a time series of counts exist (volumes on Godfrey Avenue east of 10th Street, for example, increased by about 12 percent between 1998 and 2006).

Figure 15 details the oldest and most recent 24-hour traffic count for both Nedro Avenue and 11th Street. Perhaps most striking is the fact that in this most recent count, Nedro Avenue no longer exhibits much of a peaking in volume during the AM and PM commute peaks (in comparison, Broad Street Line volumes are heavily peaked – see Figure 7).

Figure 15: Fern Rock T.C. local traffic volume comparison (1998/99 and 2008/10)



Source: DVRPC 2010

Considering that 11th Street volumes are still heavily peaked, one possible explanation for the change in Nedro Avenue usage is a diversion of traffic to other station access routes. Knowing that the specific count location for Nedro Avenue is west of Marvine Street, it could be that some patrons accessing the station by car have shifted their approach streets since 1999 to other roadways such as 11th Street (an 11th to Nedro movement would not be captured by this count location) or Grange Avenue. As noted above, DVRPC field observations suggest that nearly all patrons of Fern Rock T.C.'s largest park-and-ride lot access it via 11th street (with significant congestion along 11th Street resulting).

Additionally, Nedro Avenue adjacent to the station's main entrance was observed to be particularly chaotic, with numerous conflicting movements. If this conflict has worsened over the last decade, many vehicles may have adjusted their route of approach in response.

LOCAL CRASH ANALYSIS

A review of PennDOT records for reportable vehicle crashes (involving a vehicle being towed from the scene, an injury, or a fatality) can also help to identify problematic local roadways that warrant particular attention. **A review of crashes for the five years from 2005 to 2009 (Figure 16) revealed no obvious clustering of crashes along station access routes, with the exception of a minor concentration of crashes along 11th Street:** Between Godfrey and Olney avenues, 25 reportable crashes occurred over these five years. This is still a relatively small number of crashes and does not represent a large enough sample to draw meaningful conclusions on specific problems. In addition, 21 of these 25 reportable crashes occurred at the intersections of 11th Street with Godfrey or Olney avenues. These higher-volume roadways have higher levels of crash activity in their own right, unrelated to Fern Rock T.C. access. This modest crash patterning nevertheless reinforces the sense from field observations that movements on 11th Street may warrant particular attention when considering station access improvements.

Figure 16: Reported crashes in Fern Rock T.C. vicinity, 2005-2009

Source: PENNDOT 2010

Pedestrian Station Access

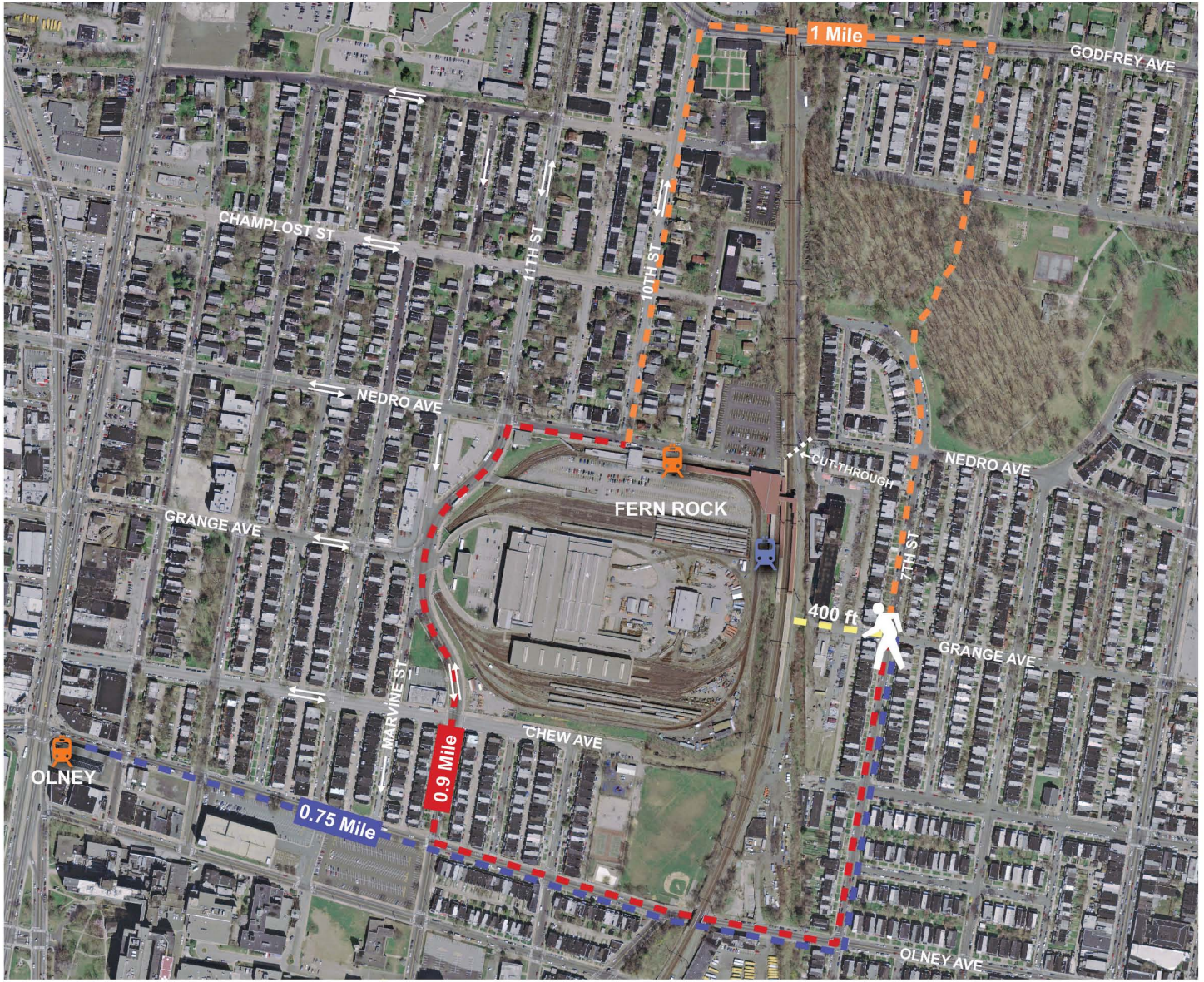
Given its location amidst walkable urban neighborhoods, it is no surprise that there is significant pedestrian demand for access to Fern Rock T.C. from all directions, but especially from the north, east, and west. The station's maintenance and track facilities occupy roughly two square blocks south of its passenger facilities, making it closer for most passengers from the south to use OIney Station instead; Olney is also served by local, express, Ridge Spur, and special express trains. Figure 17 illustrates the chief challenge relating to pedestrian access at Fern Rock T.C., which is that **there is no safe direct access from the east (on the opposite side of the Regional Rail tracks)**. Enabling access from the east is a challenge due to right of way constraints, potential impacts to utilities along the rail right of way, and topography.

As Figure 17 shows, a pedestrian living one block east of the Regional Rail platforms who wishes to access Fern Rock T.C. from the east has no legal option but to walk fully one mile around to the north or south to reach the main station entrance (or walk ¾ mile to access Olney Station instead). Instead, field observations and reports by SEPTA staff suggest that some number of pedestrians choose to trespass across the Regional Rail tracks (a much shorter distance). The most common trespass location is noted on Figure 17 ("cut-through"). The photos below illustrate both ends of this cut through: a worn path on the east side of the tracks and a stack of milk crates used as a temporary stairwell to reach the Regional Rail platform on the west side.

Milk crates on east side of tracks (Source: DVRPC 2010)

Worn path on west side of tracks, from end of Nedro Ave. (Source: DVRPC 2010)

Figure 17: Distances for pedestrian access routes from the east

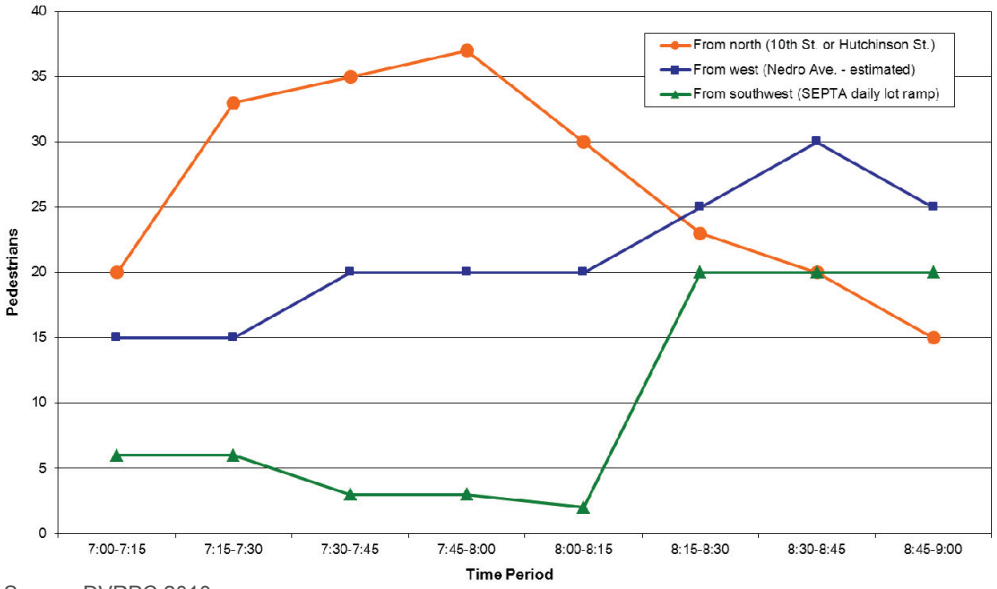


Source: DVRPC 2010; GRAPHIC NOT TO SCALE

In order to understand the relative levels of pedestrian access to the station from various directions, DVRPC staff counted pedestrians during the field view on November 3rd. During DVRPC's 7 am to 9 am counts, there were:

- **213 pedestrians from the north**, generally via 10th Street or Hutchinson Street.
- About **170 pedestrians from the west** via Nedro Avenue – note that pedestrians from this direction were less precisely counted than from other directions, and often difficult to separate from arriving bus passengers.
- **80 pedestrians from the southwest** accessing the station by walking down the auto access ramp to SEPTA's daily parking lot, despite the lack of sidewalks along this ramp.

Figure 18: Fern Rock T.C. pedestrian access counts, 7 am to 9 am (Wed. Nov. 3, 2010)

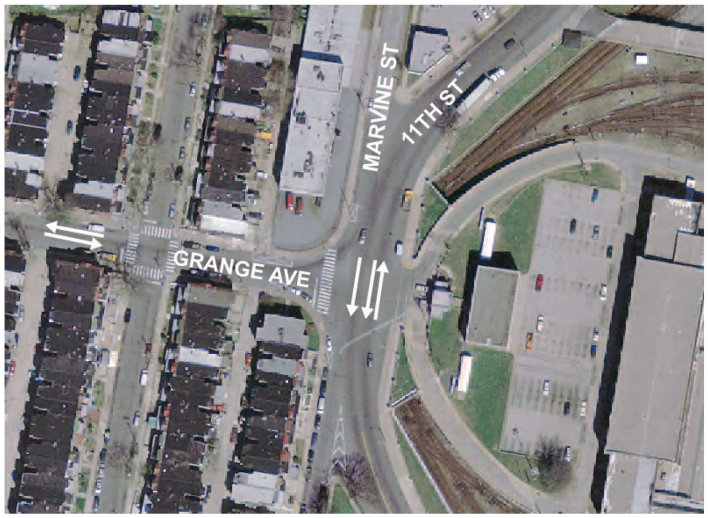


Source: DVRPC 2010

- **Some over-track trespassing by pedestrians from the east was also noted** at the cut-through location pictured above, but at much lower volumes than the other directions of access.

Figure 18 details the counted pedestrian volumes at 15-minute intervals by direction. Relative to the other directions of access, there were comparatively few trespassing pedestrians accessing the station from the east during the hours observed by DVRPC staff. Given the safety issues involved, however, any trespassing is problematic. It is also likely the "tip of the iceberg," representing more significant latent pedestrian demand from the east: passengers who instead may access the station by driving and parking (see Figure 14), being dropped off, or making their trip using another mode.

In addition to the significant issue of basic pedestrian access from the east, there are a variety of other challenges to pedestrian safety and comfort in the vicinity of Fern Rock T.C. Some of these are illustrated in the photos below.



Above, left: Deteriorated sidewalks on north frontage of Nedro Avenue near station entrance.

Above, right: Unsignalized Marvine Street /11th Street merge is a challenge for pedestrians from the west, with no crosswalk.

Left: SEPTA's daily lot access ramp sees pedestrian traffic despite a lack of sidewalks.

CHAPTER 4

Land Use Context

In considering patterns of passenger access to and from Fern Rock T.C., it is important to understand adjacent and nearby land uses: these are the generators of local trips, and they have an important role in both prioritizing improvements and in ensuring that any planned investments are context sensitive. In exploring available land use datasets, Philadelphia's current zoning map was found to be the most accurate in summarizing existing land uses in the Fern Rock T.C. station area. Figure 19 summarizes Philadelphia zoning and parcel boundaries in the vicinity of Fern Rock T.C., and also highlights the locations of three specific sites adjacent to the Transportation Center, which may have some bearing on proposed improvements:

- Saints Tablernacle Day School
- TLC Too child care
- Mutual Industries North, Inc.

The first two of these highlight the need for improved pedestrian accommodations to the southwest (also related to the high number of pedestrians observed walking along the access ramp in the prior section), and the latter may impact options for improving pedestrian station access from the east.

Figure 19: Fern Rock T.C. land use and zoning context

Source: DVRPC 2010, City of Philadelphia 2011

Environmental Justice and Crime

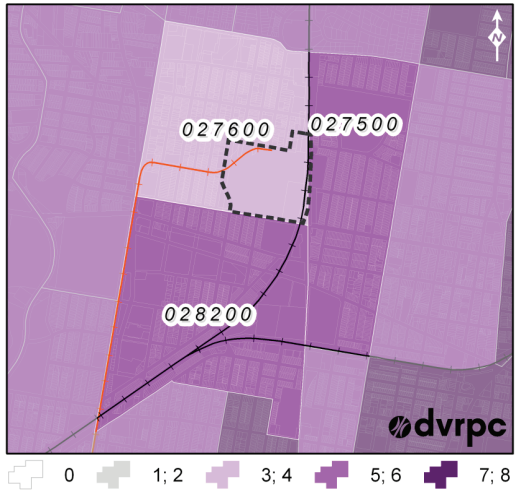
In addition to nearby land uses, an examination of crime data and local demographics can provide insight into some of the challenges and opportunities present in the study area. This information can be used to identify key populations within the community for outreach and strategic locations for safety and access interventions.

ENVIRONMENTAL JUSTICE ANALYSIS AND DEGREES OF DISADVANTAGE

As the Metropolitan Planning Organization (MPO) for the nine-county region, DVRPC is charged with evaluating plans and programs for Environmental Justice (EJ) sensitivity to historically disadvantaged populations. Accordingly, DVRPC has developed an EJ methodology that quantifies levels of disadvantage within the region for eight potentially disadvantaged groups: non-Hispanic minorities, carless households, households in poverty, persons with a physical disability, female heads of household with children, Hispanic, elderly (75 years and over), and limited English proficiency households. Census tracts with a population that exceeds the regional average for any of these defined groups are considered EJ-sensitive. All Degrees of Disadvantage (DOD) analysis is based on 2000 census information.

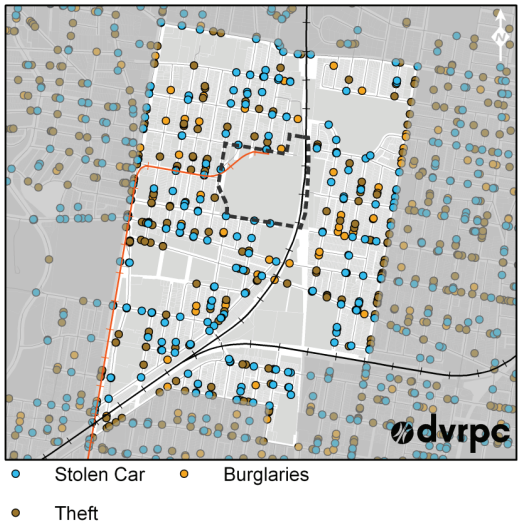
The Fern Rock T.C. study area includes three census tracts, illustrated in Figures 20, 21, and 22. These maps depict the number of DODs in each census tract and the distribution of property crime and violent crime incidents for 2008. All three tracts have between four and six DODs. Aggregated details about DODs across the three study area census tracts are summarized in Table 3.

Figure 20: Environmental Justice – number of DODs per census tract



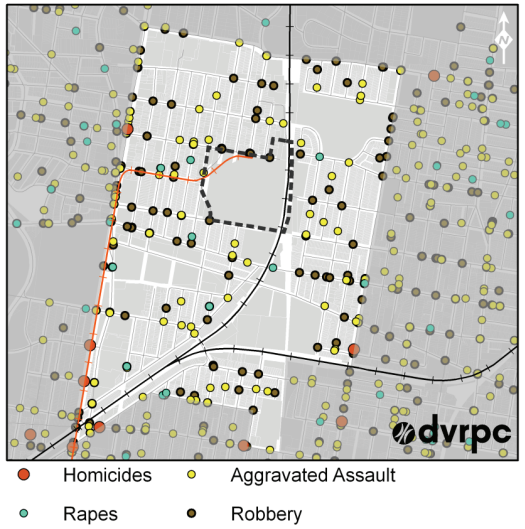
Source: U.S. Census 2000

Figure 21: Property Crime Incidents



Source: Philadelphia Police Department 2008

Figure 22: Violent Crime Incidents



Source: Philadelphia Police Department 2008

Figure 20: Census tracts around Fern Rock T.C. have four to six DODs.

Figure 21: Property crime, including the categories of stolen car, burglaries, and theft, has been reported on every block around the station, with no obvious hotspots.

Figure 22: Violent crimes include homicides, rapes, aggravated assault, and robbery. Among these, homicides occurred with the lowest frequency in the study area, and mostly at its periphery. The remaining crime types occurred with a fairly even distribution across the station area.

Table 3: Fern Rock T.C. study area DODs

Degrees of Disadvantage	Regional Threshold	Station Area Concentration
Non-Hispanic minority	24.9%	**83.4%**
Carless households	16.0%	**33.8%**
Households in poverty	10.9%	**19.9%**
Persons with a physical disability	7.7%	7.7%
Female head of household with child	7.4%	**18.5%**
Hispanic	5.4%	5.1%
Elderly: 75 years and over	6.6%	**6.7%**
Limited English proficiency	2.4%	**3.4%**

Source: U.S. Census 2000

Only the physically disabled and Hispanic population concentrations in this study area are not higher than the regional average. For all other DODs, the station area exceeds the regional threshold, and for many the station area concentration is much higher.

Four of these DODs are significantly higher than the regional average for all three census tracts: non-Hispanic minority, female head of household with child, households in poverty, and carless households.

- All three census tracts have more than twice the regional average concentration of non-Hispanic minority population (all between 2.9 and 3.9 times the regional average).
- All three census tracts have more than twice the regional average concentration of female heads of household with child (all between 2.2 and 2.7 times the regional average).
- All three census tracts have higher than the regional average concentration of households in poverty (all between 1.5 and two times the regional average).
- All three census tracts have higher than the regional average concentration of carless households (all between 1.6 and 2.4 times the regional average).

These DODs represent racial minorities, poverty, poverty indicators, and transit-dependent populations. While the demographics in this study area do not differ significantly from surrounding census tracts, it is important to take the needs of these disadvantaged groups into consideration when developing station improvement plans.

Station area concentrations for households in poverty and female head of household with child, which is widely considered a poverty indicator, both exceed the regional threshold by approximately two times. Carless household concentrations in the station area are more than two times the regional threshold. **Low-income communities with carless households are more likely to be transit dependent, and improved transit access will have a significant impact on job access, employment opportunities, and daily mobility**.

The station area concentration for non-Hispanic minority population exceeds the regional threshold by over three times. This station area has a very high concentration of racial minorities, which have historically often been left out of the planning process. Because these minorities may not be well represented by regional stakeholders and boards, it is very important to seek local community input and maintain direct stakeholder involvement.

CRIME SUMMARY AND IMPACT ON SAFETY PERCEPTIONS

Recent station area crime data (see Figures 21 and 22) illustrates a relatively high incidence of both property and violent crimes throughout the study area's census tracts. While serving a large passenger catchment area, Fern Rock T.C. is located within a relatively disadvantaged community, where both safety and perceived safety around the station directly impact pedestrian access to transit and employment opportunities. There is currently very little commercial land use in the station area, and the inactive frontages surrounding the station result in limited all-hours pedestrian activity, which contributes to actual and perceived crime risk (there is the appearance of few "eyes on the street"). Therefore, **station improvements that would open sightlines and reduce hidden corners, as well as improve lighting and bring new land uses to the station area, would reduce both actual and perceived risk**. As there are no "nuisance businesses" already in place in the vicinity of the station, this area is a relative blank slate and presents many opportunities for improvement.

CHAPTER 5

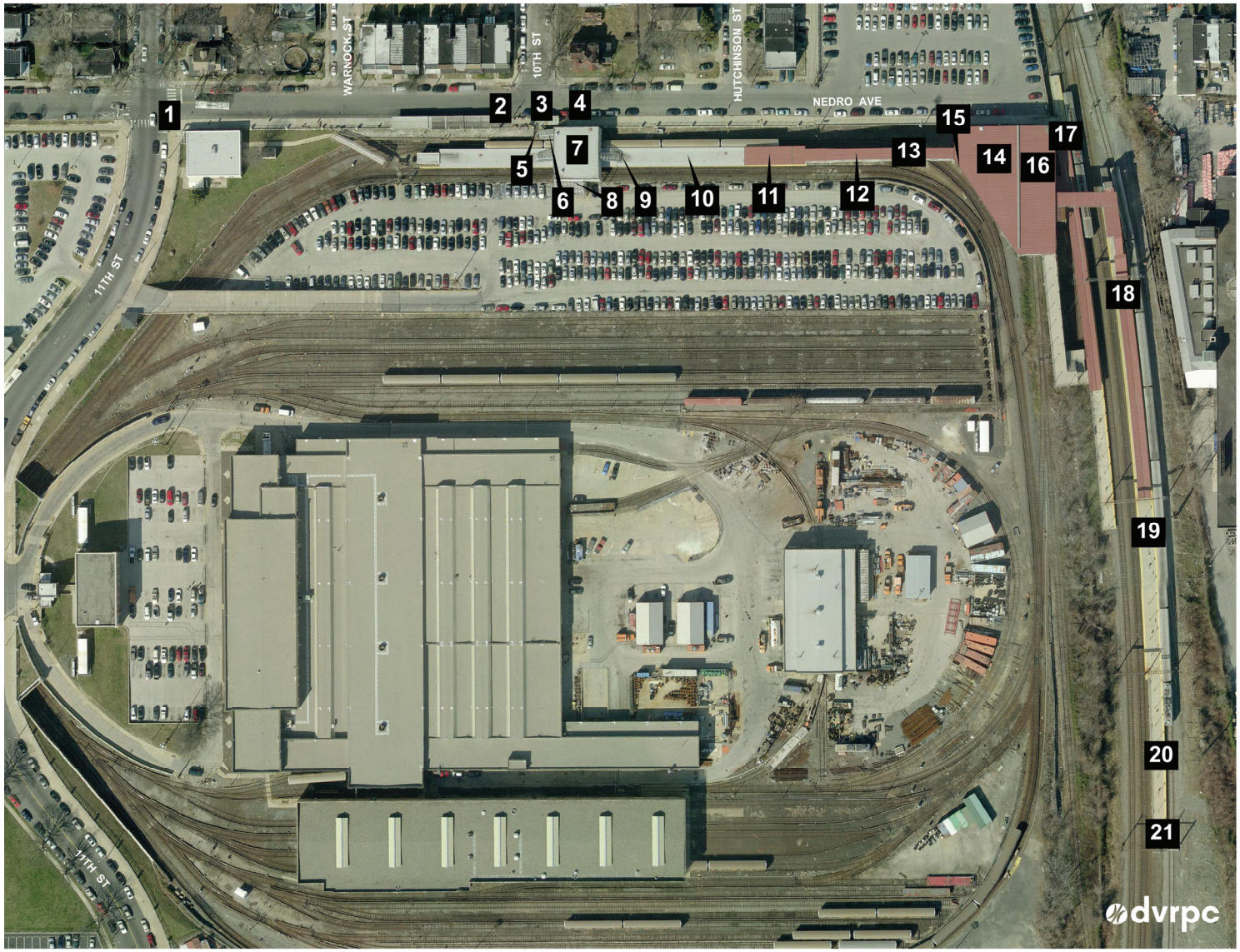
Facilities Photo Tour

The image sequence that follows is a photo snapshot tour through Fern Rock T.C., moving from northwest to southeast. The image sequence begins at the corner of 11th Street and Nedro Avenue, and proceeds:

- Past the Fern Rock bus shelter (shared by Routes 28, 57, and 70) [photos 1-3];
- Into the main Broad Street Line station entrance [photos 4-8];
- Down to and past the Broad Street Line platforms [photos 9-10];
- Up the ramp to the Regional Rail station structure [photos 11-16];
- Down the stairs to the Regional Rail platforms [photos 17-18];
- And finally to the southern tip of the facility [photos 19-21].

This series of images is intended to help orient readers to the scale of the facilities and provide a human-scale context for the maps, figures, and plans found throughout the remainder of this document. Figure 23 shows the locations from which the photos in the sequence were taken.

Figure 23: Photo tour location legend



Source: DVRPC 2010, City of Philadelphia 2008 orthoimagery


metro
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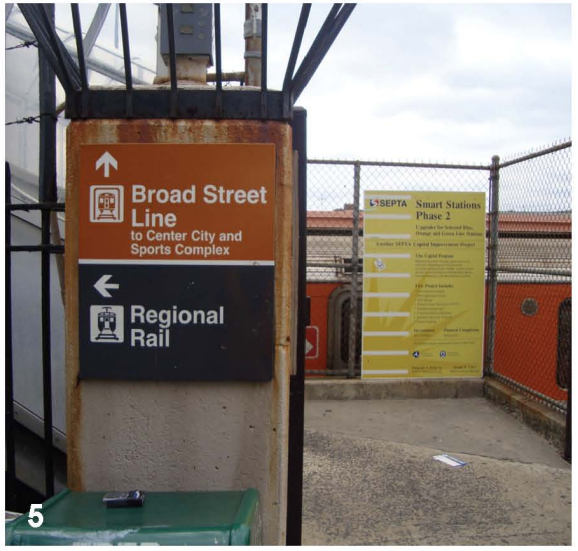
Broad Street Line
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Regional Rail
SEPTA
Smart Stations Phase 2
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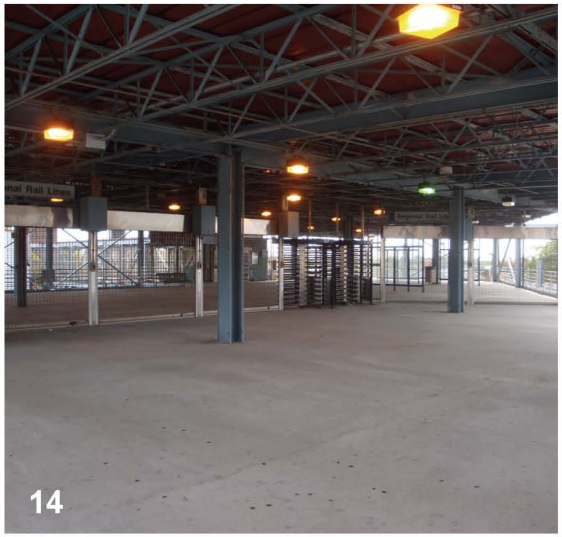
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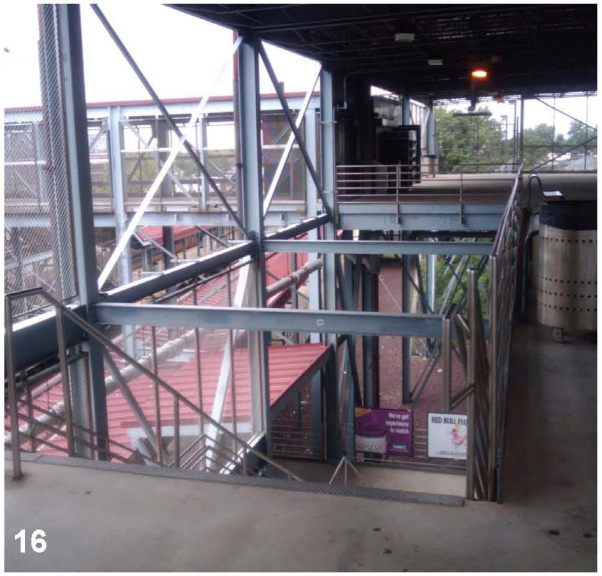
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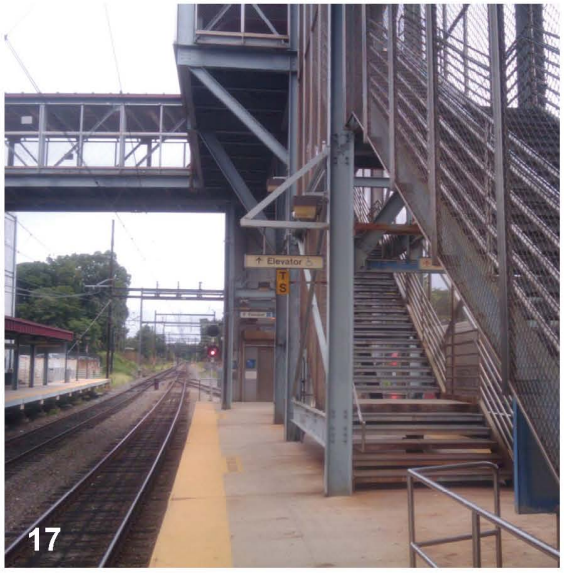

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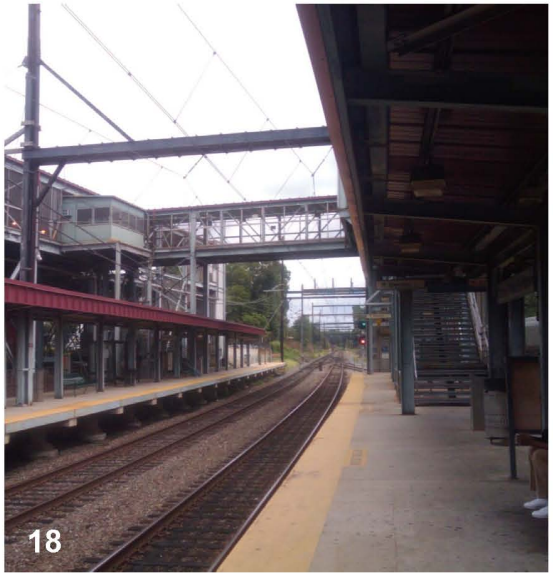
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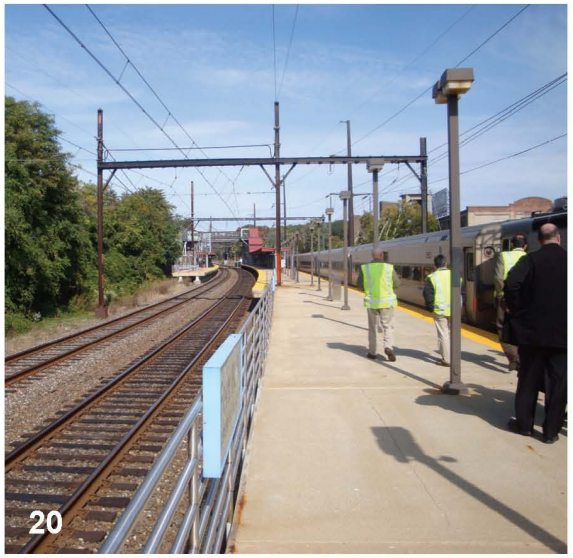
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DANGER
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CHAPTER 6

Facility Needs and Conceptual Plan

Based on field observations, as well as the analyses conducted in the first part of this project, DVRPC staff identified the following set of problem areas and facility needs:

- Safe and convenient pedestrian access from the east
- A well-managed designated drop off (kiss-and-ride) location, separated from bus facilities and park-and-ride traffic
- A separation of bus traffic from other traffic
- Consideration for the provision of reconfigured or additional off-street parking, given typical 100 percent occupancy for all lots
- A generally forbidding environment in and around the facility, contributed to by grade changes, fences with razor wire, and the scale of the site. This leads to the perception that there are safety and security concerns.
- Improved pedestrian access from the southwest

Following this preliminary analysis, DVRPC convened a stakeholder design workshop in March 2011. The purpose of this workshop was to engage technical experts from SEPTA, the City of Philadelphia, DVRPC, and other stakeholder groups to help develop specific design solutions for these and other needs at Fern Rock T.C.

Design Workshop Summary

Workshop participants were divided into four groups, and were first asked to prioritize the problem areas and facility needs that DVRPC staff identified, as well as any additional needs that they wished to raise. Table 4 summarizes each group's preferences, as well as the composite ranking of priorities across all four groups.

Table 4: Workshop problem/need prioritization

Overall rank	Problem/Need	Group rankings				
		Group 1	Group 2	Group 3	Group 4	TOTAL
1	Separate bus traffic from other traffic	3	2	1	2	**8**
2	Pedestrian access from the east	2	1	4	4	**11**
3	Designated drop-off location	5	3	2	3	**13**
4	Reconfigured or additional station parking	4	6	3	5	**18**
5	Forbidding environment/safety perception	7	5	6	1	**19**
6	Improved ped. access from the southwest	6	4	5	6	**21**
n/a	Maximize operations efficiency and access	1				
n/a	Detriment to neighborhood		7			

Source: DVRPC 2011

As Table 4 indicates, the top three consensus priorities across groups were to improve bus access by separating bus movements from other traffic, to provide pedestrian access from the east, and to provide dedicated space for auto drop-offs.

Workshop groups were next asked to sketch out proposed design solutions for each of the issues that they considered to be priorities. While each group developed a unique set of proposed strategies, there were a number of common elements across groups. All four groups:

- Consolidated parking into a new, central structure over the existing SEPTA daily lot and proposed redevelopment for the two current out-parcels (the PPA daily lot and SEPTA permit lot);
- Relocated either the existing SEPTA staff building (at 11th Street and Nedro Avenue), the SEPTA police substation (at the southern end of the SEPTA permit lot), or both into more central locations (typically into the footprint of the current Regional Rail staging area);
- Provided new, dedicated pedestrian access from the east over the Regional Rail tracks;
- Rerouted existing SEPTA bus service onto the street level of the new central parking structure;

- Provided a new, dedicated auto drop-off location along Nedro Avenue; and
- Avoided any significant redesign within the footprints of the existing station platforms, headhouse, and Regional Rail staging area, aside from the consolidation of the police and staff buildings into the staging area.

Additional Site Constraints and Concept Development

Following the stakeholder design workshop, DVRPC's task was to develop concept plan alternatives that draw on the workshop outcomes as well as further analysis. During this concept planning phase, one key limiting factor emerged. Because of the significant grade change from west to east along Nedro Avenue (a downward elevation change of about 10 meters from 11th Street to the eastern terminus of Nedro Avenue near the Regional Rail platforms), **there are limited opportunities along the site's frontage to provide access to a new central parking structure in a way that does not conflict with Broad Street Line tracks.**

At-grade access is possible along only two stretches of frontage at the site's western end:

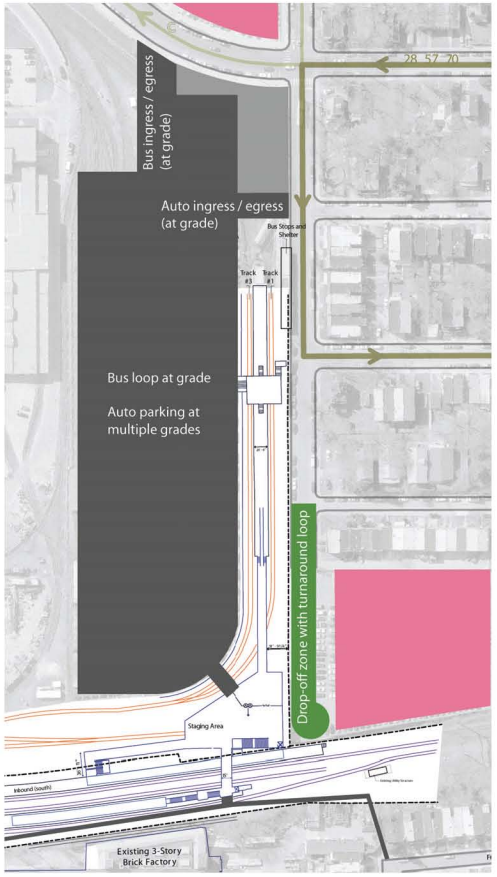
- Along 11th Street between Nedro Avenue and the vicinity of Grange Avenue, south of the existing daily lot access ramp.
- Along Nedro Avenue between 11th Street and Warnock Avenue.

East of Warnock Avenue, the Broad Street Line tracks along Nedro Avenue are roughly at the same grade as the roadway. This means that auto access from Nedro Avenue would need to get up and over the tracks via ramp, connecting to an above-grade level of the parking facility. Because of grade changes, as well as the locations of the existing headhouse and Broad Street Line platforms, such a second-level ingress/egress by ramp would be most feasible at the eastern end of the site, near the connecting ramp between the Regional Rail staging area and Broad Street Line platforms.

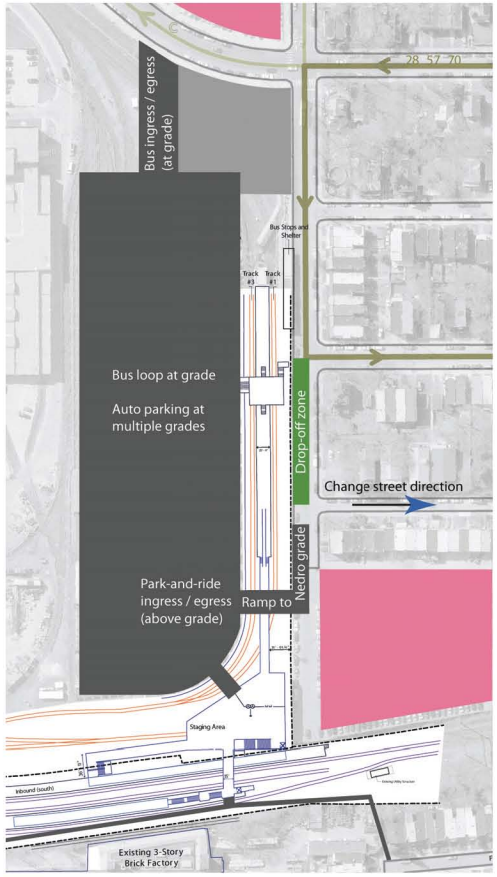
The limited locations for at-grade driveways present a challenge to separating bus and auto access paths, which was the consensus top priority across workshop groups (and a sensible one, since bus has the highest mode share for passenger access). Workshop groups generally proposed to provide both bus and auto access to the new central parking facility via either a shared access drive from 11th Street, or separate but proximate access drives from near the intersection of 11th Street and Nedro Avenue. In either case, it seems unlikely that such a configuration would provide sufficient separation of bus and auto access routes to mitigate the current levels of conflict. A higher degree of separation between buses and autos is preferred.

Accordingly, DVRPC staff developed a handful of sketch site reconfiguration options that focused on separating bus and auto routings such that **one mode would be generally directed toward the western end of the site, and the other to the eastern end.** These three options are summarized in Figure 24.

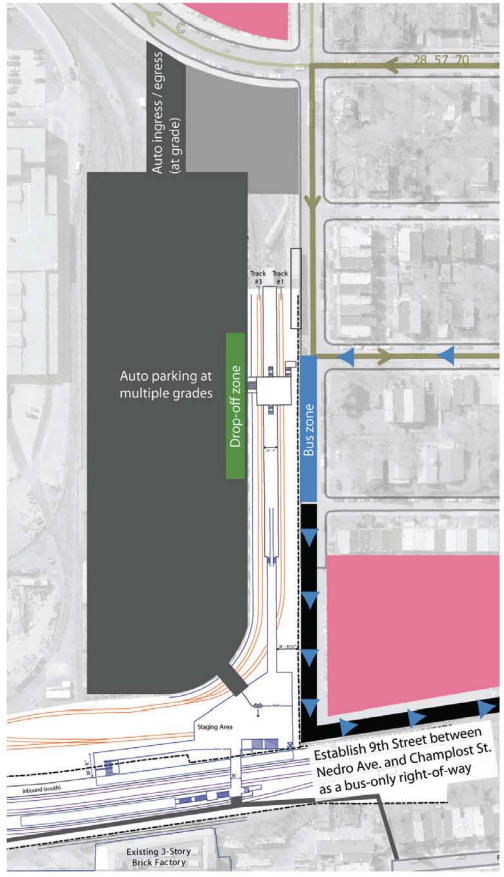
Figure 24: Three site reconfiguration options



Reconfiguration Option 1: bus access to garage from 11th Street; park-and-ride access to garage from Nedro Avenue; drop-off loop along Nedro Avenue



Reconfiguration Option 2: bus access to garage from 11th Street; park-and-ride access to garage via above-grade ramp from Nedro Avenue; drop-off area along Nedro Avenue; Hutchinson Avenue direction reversed for northbound auto egress



Reconfiguration Option 3: buses rerouted (blue) to 10th → Nedro → 9th (new bus-only ROW along 9th Street between Nedro and Champlost); auto access to garage is from 11th Street (both park-and-ride and drop-off)

Source: DVRPC 2011

While differing in several important respects, as summarized in the captions, the three reconfiguration options illustrated in Figure 24 share several core design similarities, drawn from the results of the stakeholder design workshop:

- The central element of each concept, shown in dark gray, is a new parking structure over the current daily parking lot, with a second level (at the grade of 11th Street) that extends over the Broad Street Line storage tracks. This maximizes parking capacity with a minimal (vertical) visual impact from surrounding neighborhoods, while providing weather protection for the storage tracks.
- Each concept includes new, dedicated pedestrian access paths from the east (also shown in dark gray).
- Each concept consolidates the current station outbuildings (the police substation and SEPTA staff building) into a location within the central station structure, making both out-parcels (shown in pink) available for development.

Among the three designs, Reconfiguration Options 2 and 3 are the most effective in maximizing the separation between bus and auto flows; they principally differ in reversing the access locations for these two modes.

Fern Rock T.C. Concept Plans

For two reasons, **Reconfiguration Option 3 was selected for further refinement into a set of proposed Concept Plans** for Fern Rock T.C.:

1. It avoids the need for the construction of access ramps at the eastern end of the site, which would require reconstruction of the existing connecting ramp between the Broad Street Line platforms and Regional Rail staging area. Access ramps may also require a significant footprint in order to achieve reasonable slopes.
2. It maintains bus routings along streets and avoids any structural design challenges that would be necessitated by bringing buses onto the proposed second deck of a new parking structure. Keeping buses off the structure also mitigates the need to devote significant surface space on the structure to bus circulation.

As a result, staff developed a series of refined versions of this reconfiguration option for stakeholder consideration; these are detailed below.

HIGHLIGHTED ELEMENTS

- **A two-level, consolidated station parking facility**
  The first level is comprised of the current SEPTA daily lot, with some redesign of circulation. The second level contains 600 to 700 additional parking stalls over a larger footprint (decked over Broad Street Line storage tracks). Total structured parking capacity is approximately 1,000 to 1,100 stalls, which represents a net increase of 300 to 400 stalls over current off-street station parking (across the three station lots). Existing levels of available parking for SEPTA staff (Broad Street Line operators and district management personnel) would be maintained.

- **Loop and covered drop-off locations for kiss-and-rides**
  A one-way loop of travel lanes rings the second level of the parking structure, with two covered drop-off locations: one for Regional Rail, and one for the Broad Street Line. These two drop-off locations mirror the two informal drop-off locations that are currently used along Nedro Avenue. The Regional Rail drop-off location is proposed to be directly connected to the Regional Rail staging area via a covered pedestrian overpass over the Broad Street Line tracks, forming a new primary gateway to the Regional Rail station.

- **A ramp for pedestrian access from the east**
  SEPTA engineering staff determined that access to the east would be more effectively provided via a connection to Nedro Avenue than a connection to Grange Avenue. The latter is made problematic by grade issues, and a concern that the long, enclosed path that would be required would create a ‘cattle-chute’ impression, exacerbating safety perception concerns. The proposed ramp location generally follows the path of most current over-track trespasses; the implicit path of highest demand. The proposed design reflects a conceptual design by SEPTA engineering staff and includes an ADA-compliant ramp as well as one new elevator.

- **SEPTA police substation and 11th & Nedro staff functions relocated to Regional Rail staging area**
  The activities of the SEPTA police substation at 11th and Marvine streets, as well as the SEPTA staff building at 11th and Nedro streets, are proposed to be relocated and consolidated into new enclosed spaces within the existing Regional Rail staging area. This will create a new node of staff activity within Fern Rock T.C. and bring an increased visible staff presence to the Regional Rail side of the facility, helping to improve security and safety perceptions. The existing buildings for these two facilities will be freed up for repurposing in the near term or redevelopment in the longer term.

- **Significant additional landscaping**
  Multiple participant groups in the design workshop referenced the need for additional landscaping and lighting to help mitigate the facility’s current ‘forbidding’ aesthetic. The Proposed Conceptual Design includes significant additional landscaping, including a planted swale to help manage runoff from the expanded impervious footprint of the parking structure.

TWO SETS OF ALTERNATIVES

In addition to the shared design elements highlighted above, there are two proposed alternatives that differ in terms of how the facility would interface with the surrounding street network:

- **ALTERNATIVE 1: New bus-only ROW (9th Street) between Nedro Avenue and Champlost Street**
  This alternative attempts to mitigate the bus-auto conflict by minimizing the degree to which these two modes share access paths to Fern Rock T.C. Under this alternative, a new bus-only right of way would be constructed along the western edge of the Regional Rail right of way between Nedro Avenue and Champlost Street. This would permit southbound buses to be rerouted from 11th Street (which will remain the principal access route for cars) to 10th Street. This concept is not without precedent in the City of Philadelphia: a similar bus-only ROW is used to connect buses back to Frankford Avenue from Griscom Street in the vicinity of Frankford Transportation Center.

- **ALTERNATIVE 2: Traffic management enhancements for 11th/Nedro vicinity**
  This alternative proposes to mitigate the southbound bus/auto conflict along 11th Street through a variety of traffic management ideas that would improve traffic flow to the daily parking facility from 11th Street. If vehicular flow can be improved, there would be less congestion, and consequently less impact on bus operations. Route 28, 57, and 70 buses would retain their existing routings, and the 9th Street bus-only right of way would not be required.

Five variations on these two main alternatives were developed**. Concepts 1A and 1B are variations of Alternative 1, and Concepts 2C, 2D, and 2E are variations on Alternative 2**. Each concept includes distinct elements that are highlighted in call-out text in each respective graphic.

Figure 25: Concept 1A - Bus ROW with Single Ramp

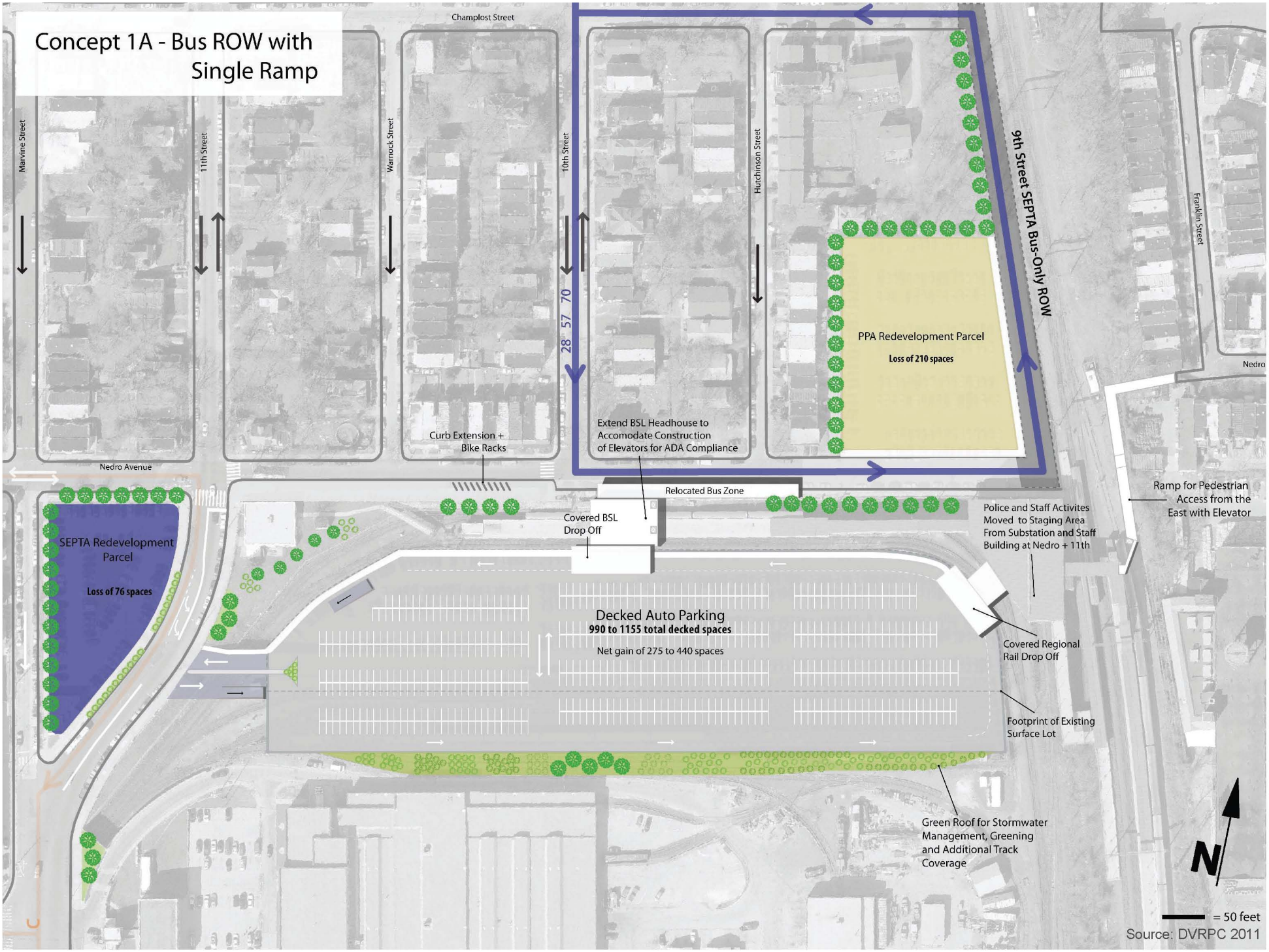


Figure 26: Concept 1B - Bus ROW with Second Ramp

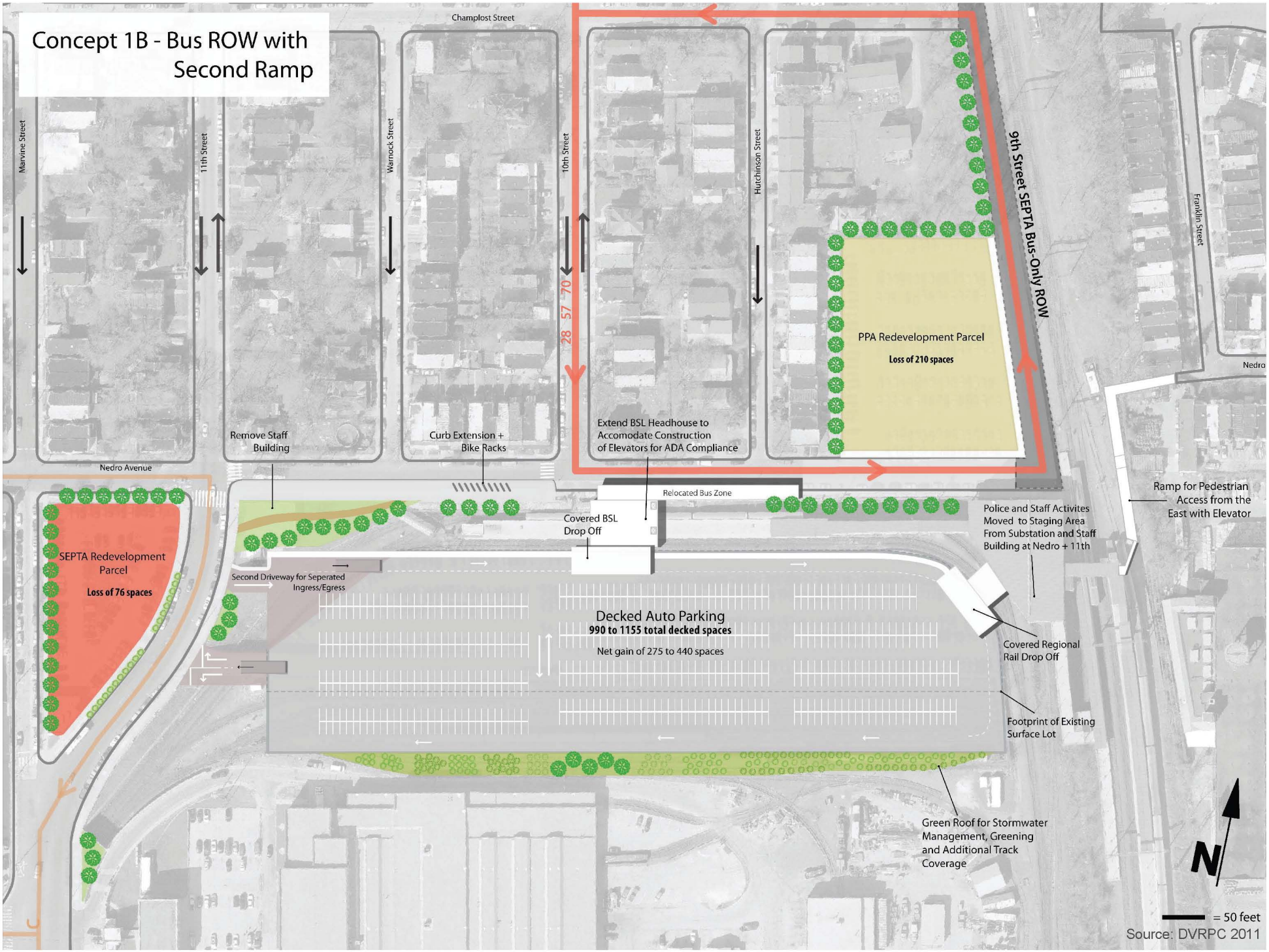


Figure 27: Concept 2C - Street Reconfiguration and Traffic Management

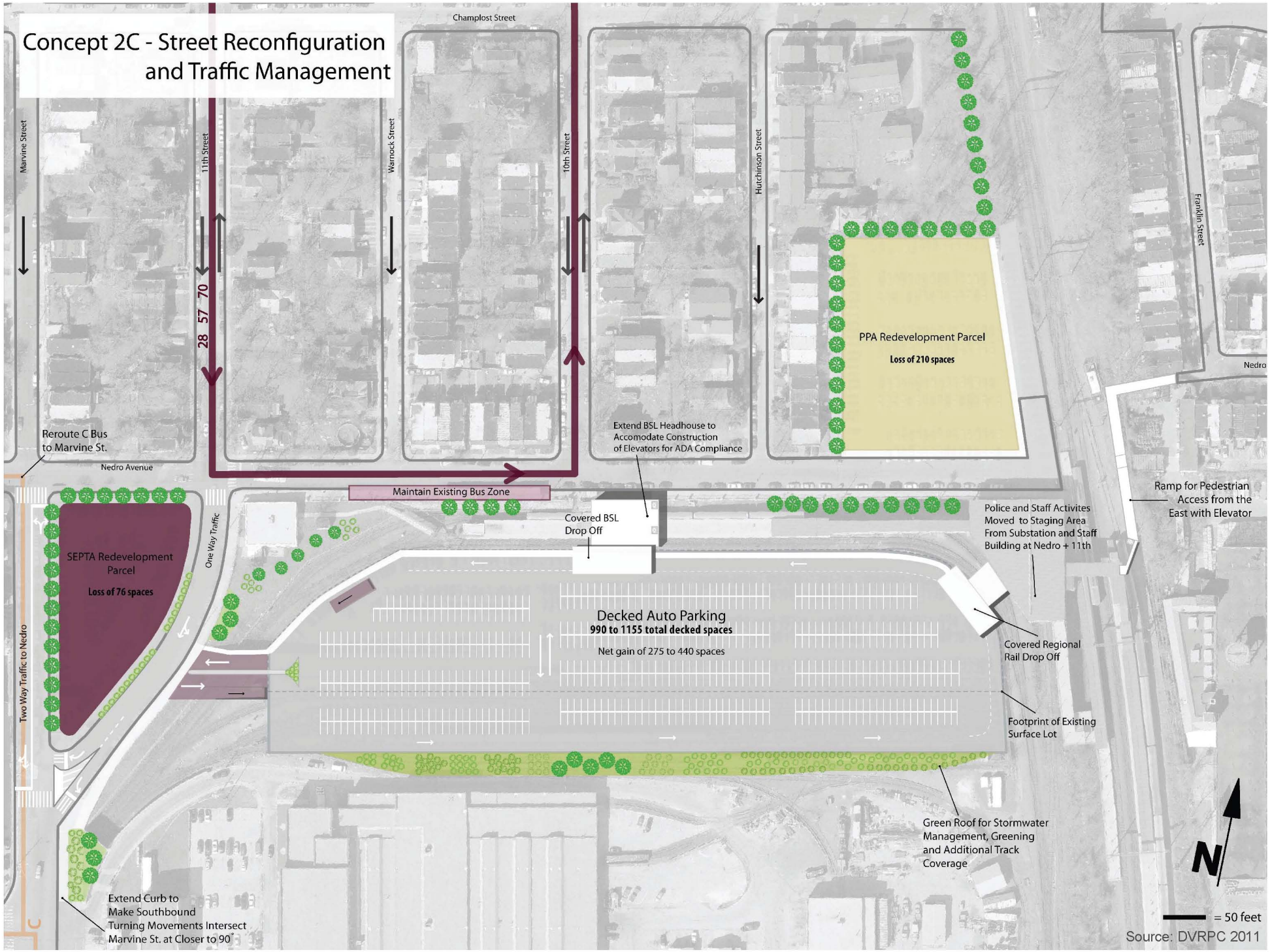


Figure 28: Concept 2D - Major Street Reconfiguration with T-Intersection

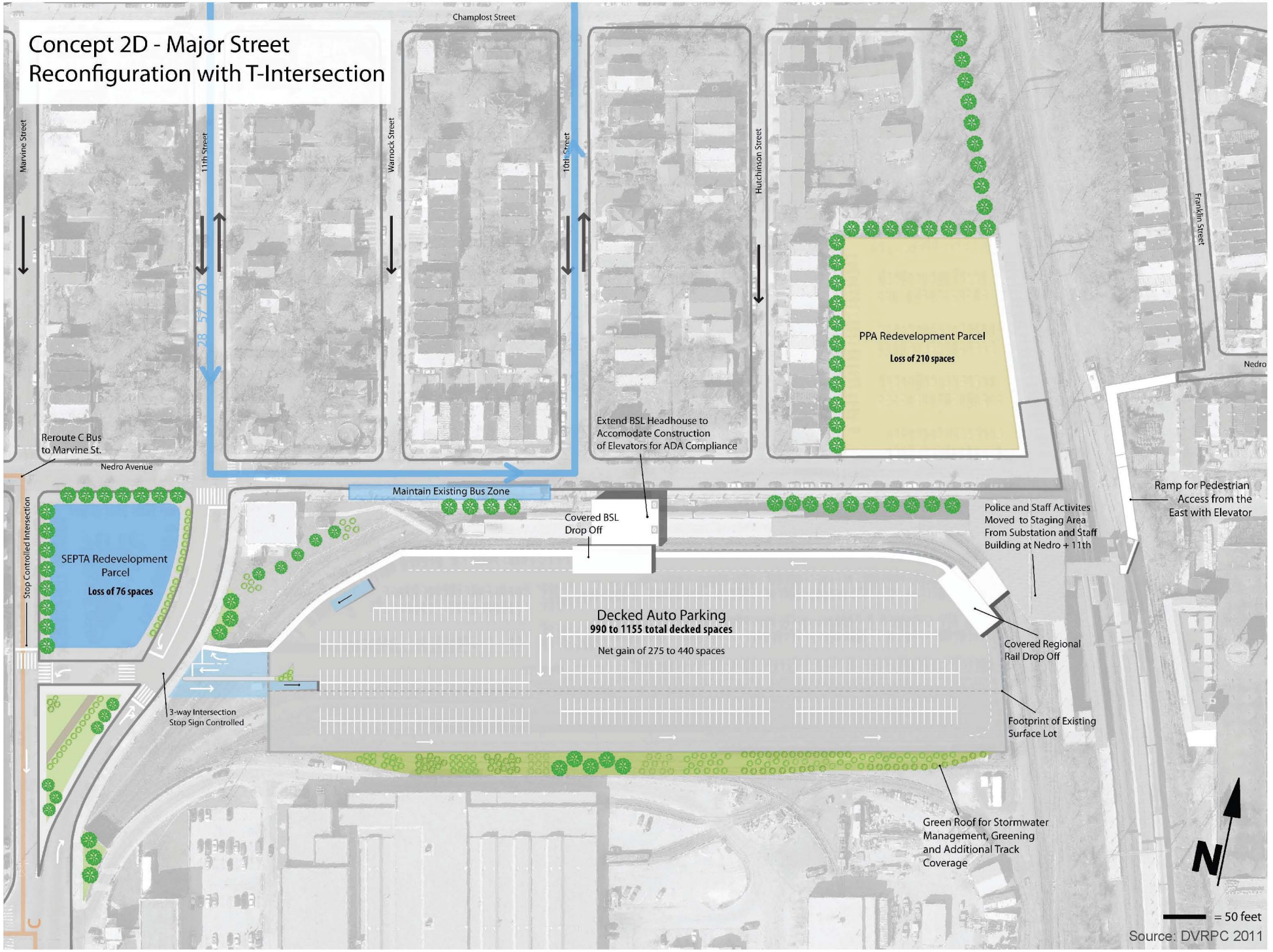
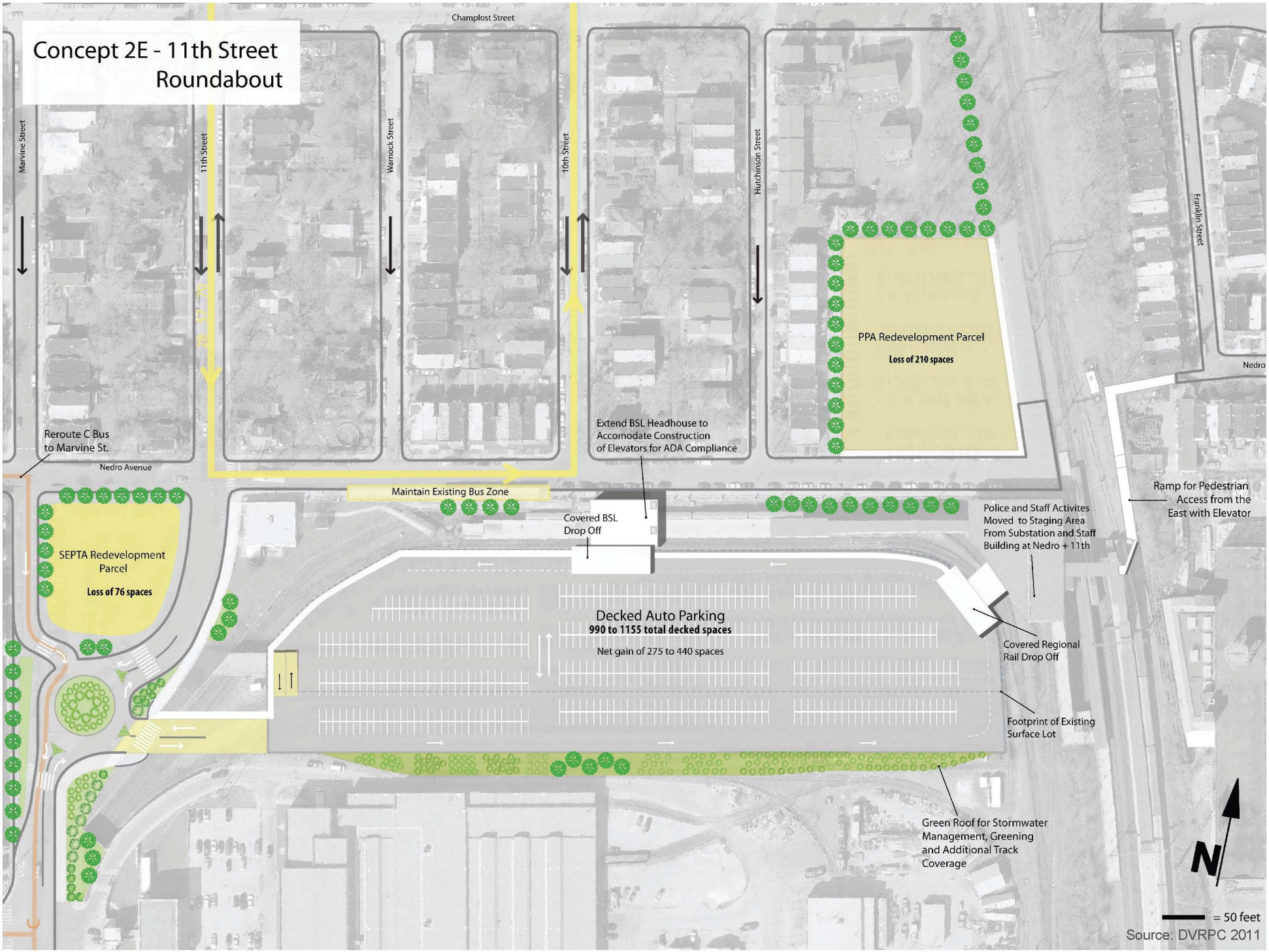


Figure 29: Concept 2E - 11th Street Roundabout



Stakeholder Feedback on Concept Designs

Following development of the five plan variations (Figures 25 to 29), stakeholder comments were received via both direct email and through a project web site that acted as an online continuation of the prior design workshop. Several comments resulted in modifications to the designs, which are already reflected in Figures 25 to 29. Additional comments that were received are summarized below.

- The City Streets Department suggested consideration for reopening 9th Street under any alternative: if one of the options that does not include a bus-only right of way is advanced, 9th Street could be reopened as a general traffic street in order to improve area circulation and enhance the development potential of the Philadelphia Parking Authority parcel.

- The City Streets Department suggested consideration for a larger net increase of parking: an increase of 1,000 spaces or more might enable the availability of additional project funding opportunities, such as I-95 mitigation project funding.

- Various stakeholders suggested that given the alternative, **one site access ramp from 11th Street is preferred to two ramps** by virtue of its lower cost, lower pedestrian conflicts, and simplification of traffic movements in the vicinity of 11th Street and Nedro Avenue.

- According to the Philadelphia Water Department (PWD), the specific stormwater management requirements that would be triggered by the project relate to the total area of earth disturbance. If greater than 15,000 square feet is disturbed, then the project must minimally meet PWD's water-quality rules, which require the management of the first one inch of runoff from any impervious area within the limits of earth disturbance. For the proposed project, this level of site disturbance would not be exceeded unless the current ground-level daily parking lot was to be completely excavated and rebuilt. If the lot is simply milled and repaved as part of construction, then full stormwater management would be voluntary rather than mandatory. In terms of the specific green features identified in the concept plan alternatives, PWD reacted favorably to the proposed linear bioswale along the southern edge of the parking structure, and also suggested the consideration of demonstration green roofs on the proposed drop off structures, as well as the construction of walkways using porous rather than traditional concrete. In addition to being a best practice, **a proactive approach to stormwater management and the incorporation of green infrastructure elements like these may also lead to the availability of additional funding streams**.

- Concepts 1A and 1B would reopen 9th Street as a bus-only right of way and route southbound buses via 10th Street → Nedro Avenue → 9th Street → Champlost Avenue → 10th Street. Various stakeholders correctly noted that this would effectively double bus volumes on 10th Street between Champlost Avenue and Godfrey Avenue. This is a potential complication in terms of both bus operations and neighborhood concerns. Comments from SEPTA service planning staff indicate that from a bus operations standpoint, this is a workable proposal.

- There was favorable consensus from many stakeholders on the roundabout in Concept 2E.
- SEPTA service planning staff expressed concern that kiss-and-ride drop-offs would still occur along Nedro Avenue, even with the new drop-off loop around the garage perimeter, potentially continuing to impair bus movements. The design includes a number of incentives for kiss-and-ride traffic to use the new drop-off loop (by providing designated space, covered waiting areas, and rationalized traffic flows), but perhaps not enough disincentives to discourage continued use of the existing drop off area. To address this concern, a curb extension along Nedro Avenue between 11th and 10th Streets was included in Concepts 1A and 1B. This addition would force "commando drop-offs" to happen in the travel lane, discouraging them by making them feel more conspicuous.
- City staff were able to verify that **the proposed 9th Street right of way, including the wooded area between Champlost Avenue and the PPA lot, is all city-owned**: the 9th Street right of way from the PPA lot north to Champlost Street is dedicated and legally opened on the City Plan.

Final Concept Plans

Following stakeholder discussion and internal review, SEPTA selected the two most straightforward variations from Concept sets 1 and 2 (**Concept 1A** and **Concept 2C**) as a short list for refinement and additional exploration in terms of cost and constructability. This does not mean that elements from the other concepts will be excluded from consideration as the project advances into more detailed design and implementation.

Figure 30: Parking structure and new Regional Rail gateway entrance

Source: DVRPC 2011

Cost and Constructability

SEPTA cost engineering staff developed a construction cost estimate for implementation of the two concept alternatives. This construction estimate mirrors the modular design of the concepts themselves; the individual costs of various component elements that might be pursued independently are delineated and summarized in Table 5 (SEPTA's full itemized cost estimate can be found in Appendix A).

Table 5: Construction cost summary and comparison for Concept Plans 1A and 2C

Project element	Concept 1A cost	Concept 2C cost
SEPTA soft costs for construction management and oversight	$1,800,000	$1,800,000
East-side access via covered walkway from Nedro Avenue, elevator, and Regional Rail track overpass	$3,135,500	$3,135,500
New SEPTA Police substation and staff facility constructed in Regional Rail staging area (cost includes cosmetic enhancements)	$913,000	$913,000
New garage structure over daily lot and storage tracks, including a) kiss-and-ride loop with two weather-protected drop-off locations, b) a pedestrian overpass connecting the garage with the Regional Rail entrance, and c) an extension of the Broad Street Line headhouse to accommodate two ADA-compliant elevators for: 1. Platform access; 2. Headhouse access from Nedro Avenue	$27,638,950	$27,638,950
Relocation of bus drop-off area and shelter to accommodate revised bus loop (10th Street → Nedro Avenue → 9th Street), including curb extension along the southern frontage of Nedro Avenue between 11th Street and 10th Street to remove drop-off lane and provide bicycle parking	$178,300	n/a
Paving and improvements to open 9th Street bus-only ROW between Nedro Avenue and Champlost Street, including construction affecting the eastern edge of the PPA parking lot	$440,000	n/a
Subtotal	$34,105,750	$33,487,450
Permits based on 3% of hard costs	$969,173	$950,624
Overhead 6%	$2,104,495	$2,066,284
Contingency 15%	$5,576,913	$5,475,654
Profit 8%	$3,420,506	$3,358,401
Grand total	**$46,176,837**	**$45,338,413**

Source: SEPTA 2011

It should be noted that Table 5 summarizes only third-party construction costs, plus SEPTA oversight of a third-party contractor. There would be additional design costs and construction-related soft costs that could combine to add an additional 10 to 15 percent to the total project cost. In addition, any costs that could be incurred by the City of Philadelphia for street reconfigurations (aside from the 9th Street bus right of way) and other off-site improvements are not included. Two other aspects of the cost summary in Table 5 are worth highlighting:

- The **incremental cost for the bus loop relocation and 9th Street bus right of way in Concept 1A is relatively small**, suggesting that a decision to pursue one option over the other would not be a primarily cost-driven decision.

- A significant component of the garage structure's estimated cost is a $10 million allowance (estimate) for spanning the approximately 130-foot width of the Broad Street Line storage tracks as part of the design of the parking structure's second deck. Even assuming the availability of this funding, it may be impossible to span this distance without removing one or more of the storage tracks for the installation of support columns. **Should this design element prove unfeasible, an alternative to this span that would provide a comparable level of parking is the installation of a partial or full third deck** over the narrower footprint of the current daily lot. Spanning the storage tracks would accommodate roughly 300 parking stalls. A partial third deck over the eastern half of the current lot footprint could hold roughly 200 stalls, and a full third deck roughly 400 stalls. SEPTA estimates that a full third deck would cost approximately $5 million, or $5 million less than the $10 million allowance for the span.

TEMPORARY PARKING MITIGATION DURING CONSTRUCTION

One practical consideration with regard to project implementation is the management of parking loss during garage construction. The physical constraints of the site mean that it would be difficult or impossible to situate construction equipment for a phased construction approach. This means that **garage construction would result in the temporary loss of the 429 stalls currently provided (and used to 100 percent capacity each day) for the SEPTA daily parking lot**. While some patrons would have the ability to substitute bus or Regional Rail trips from other points of origin for Broad Street Line trips for the duration of construction, there would still be a need to provide some accommodation to mitigate this temporary access loss for passengers.

DVRPC's parking origins analysis (see Figure 14) indicates that most park-and-ride patrons originate from points to the northeast and northwest, and from locations relatively distant from Chestnut Hill East Line and Fox Chase Line stations (in the case of western and northeastern origins, respectively). Since there is very limited parking availability near other northern Broad Street Line stations, and most Regional Rail stations already experience parking constraints, a sensible

strategy might be to ‘meet passengers halfway’ by offering shuttle service between one or more temporary shared-use park-and-ride facilities and Fern Rock T.C. A review of land use data and orthophotography in the context of Fern Rock T.C.’s parking origin mapping suggests a handful of candidate locations:

- Off-street commercial use parking along the north side of Cheltenham Avenue, opposite Broad Street
- The Shoppes at La Salle (Chew Avenue at Wister Street)
- Cedarbrooke Mall (Cheltenham Avenue at Easton Road)
- Cheltenham Square Mall (Cheltenham Avenue at Washington Lane)

Several locations closer to Fern Rock T.C. may also present opportunities, such as the small SEPTA staff lot on the western frontage of the Fern Rock maintenance building, La Salle University, and the Einstein Medical Center at 13th Street and Olney Avenue. Available capacity at these locations appears to be limited, however.

Next Steps and Suggested Early Action Phase

While the combined program of improvements for Fern Rock T.C. developed through this study represent a significant cost and logistical challenge, **this improvement program was designed to be modular so that individual elements can be pursued individually as funding becomes available—and to better match project elements with specific funding streams**.

As a result, there are multiple ways in which project implementation could proceed in a phased way. One approach to developing a first or early action phase is to prioritize relatively low-cost improvements that address the top-priority facility needs that were identified through this study. As summarized in Table 3, the highest-priority needs identified by workshop participants were:

1. Separating bus traffic from other traffic
2. Providing designated space for kiss-and-rides
3. Providing safe pedestrian access from the east

A first phase implementation that would address each of these identified needs is as follows (with estimated costs derived from Table 5):

1. Relocation of bus shelter and construction of 9th Street bus-only right of way ($618,300)
2. Re-sign and restripe existing bus zone for temporary use as a kiss-and-ride zone (cost negligible)
3. Construction of elevator/walkway for east-side pedestrian access ($3,135,500)

Assuming the same level of cost escalation due to overhead, contingency, etc., as for the total project, the combined estimated cost of this suggested first phase is $5,067,630.

Inclusion of the staff and police facility consolidation in this first phase would bring an enhanced staff presence to the eastern side of the site, improving the perceived safety of the new east-side access route. This would add an additional $1.2 million to the cost of the first phase, again assuming equivalent levels of overhead. In either case, SEPTA's cost estimate suggests that it would be possible to address each of the facility's chief identified near-term needs at relatively minor cost and with comparatively minimal disruption to passengers.

APPENDIX A

SEPTA Construction Cost Estimate

Fern Rock Transportation Center - DVRPC Total Conceptual Design Plan
Conceptual Design, Order of Magnitude 3rd Party Construction Cost Estimate
Engineering Maintenance & Construction - Cost Engineering
August 16, 2011

Description	Quantity	Unit	Unit Cost	Total Line Item	Total Division
Division One - General Conditions					
Site Supervision & Project Management	1.00	Lump Sum	$750,000.00	$750,000.00	
Temporary Site Facilities	1.00	Lump Sum	$300,000.00	$300,000.00	
Maintenance & Protection of Traffic, Pedestrians & SEPTA Capital Property	1.00	Lump Sum	$250,000.00	$250,000.00	
Temporary Utilities	1.00	Lump Sum	$150,000.00	$150,000.00	
Site Engineering, Submittals, Operating & Maintenance Manuals, As-Built Drawings, etc.	1.00	Lump Sum	$350,000.00	$350,000.00	
Division One - Total					**$1,800,000**
RRD Fly Over at Regional Rail Station to Nedro St					
Relocate Down Guy at Catenary Pole	1.00	Each	$25,000.00	$25,000.00	
Clearing & Erosion Control	1.00	Lump Sum	$16,500.00	$16,500.00	
Site Grading	1.00	Lump Sum	$39,000.00	$39,000.00	
Permanent Sheeting (Steel Sheet Piling for Slope Stabilization)	3,000.00	Sq Foot	$70.00	$210,000.00	
Assumed 30'-0" Depth 48" Diameter Caissons for Elevator Structure	8.00	Each	$20,000.00	$160,000.00	
Bridge Structure In Place - Including Lighting, CCTV and Alarms	1.00	Lump Sum	$250,000.00	$250,000.00	
Elevator Structure Including Stairway - Steel Frame, Glass Facade Elevator Shaft Only , Lighting & Signage	1.00	Lump Sum	$500,000.00	$500,000.00	
Pedestrian Covered Walk from Elevator to Nedro Street, including ADA Ramp & Steps (+/-200'-0" Long)	1.00	Lump Sum	$350,000.00	$350,000.00	
Two Stop MRL Elevator (+/- 30'-0" Vertical Linear Feet), including Power Feed and Controllers	1.00	Each	$1,100,000.00	$1,100,000.00	
Allowance for Night & Weekend Work	1.00	Lump Sum	$250,000.00	$250,000.00	
Relocate PECO Feeder	1.00	Each	$85,000.00	$85,000.00	
Modify Structure for Planned Bridge Attachment	1.00	Each	$150,000.00	$150,000.00	
RRD Fly Over at Regional Rail Station to Nedro St - Total					**$3,135,500**
New Transit Police & Crew Quarters at RRD Station					
Structural Enhancements to Existing Steel Framing	1.00	Allowance	$200,000.00	$200,000.00	
Reconfigure Paid / Un-paid Zone Demarcation Barrier	1.00	Lump Sum	$75,000.00	$75,000.00	
Windows Glass & Glazing	1.00	Lump Sum	$100,000.00	$100,000.00	
Doors / Frames / Hardware	1.00	Lump Sum	$15,000.00	$15,000.00	
Interior Partitions, Ceilings and Flooring	1.00	Lump Sum	$125,000.00	$125,000.00	
Insulation	1.00	Lump Sum	$50,000.00	$50,000.00	
Finishes	1.00	Lump Sum	$30,000.00	$30,000.00	
Mechanical, Plumbing & Hearting including Fire Suppression	1.00	Lump Sum	$175,000.00	$175,000.00	
Electrical, CCTV & Alarms Tel-Com	1.00	Lump Sum	$125,000.00	$125,000.00	
Security Fence at Ground Level, Below Police & Crew Quarters	1.00	Lump Sum	$18,000.00	$18,000.00	
New Transit Police & Crew Quarters at RRD Station - Total					**$913,000**

Fern Rock Transportation Center - DVRPC Total Conceptual Design Plan
Conceptual Design, Order of Magnitude 3rd Party Construction Cost Estimate
Engineering Maintenance & Construction - Cost Engineering
August 16, 2011

Description	Quantity	Unit	Unit Cost	Total Line Item	Total Division
New Parking Garage					
Allowance for Support Structure Over Train Yard, including Caissons, CIP Columns and Double T Deck	1.00	Allowance	$10,000,000.00	$10,000,000.00	
Parking Deck Over Existing Surface Parking Lot (Structure Only, including Foundations)	275.00	Prkg Slot	$16,000.00	$4,400,000.00	
On Grade Parking Level Paving - Concrete	4,445.00	Sq Yard	$110.00	$488,950.00	
New Vehicle Ramp	1.00	Each	$2,000,000.00	$2,000,000.00	
U/G Storm Management and Utilities	1.00	Lump Sum	$1,500,000.00	$1,500,000.00	
Pedestrian Bridges to Regional Rail Terminal & BSS including (2) Elevators	1.00	Lump Sum	$4,000,000.00	$4,000,000.00	
Signage and Parking & Traffic Painting	1.00	Lump Sum	$125,000.00	$125,000.00	
Parking Revenue Equipment	1.00	Lump Sum	$125,000.00	$125,000.00	
Mechanical / Electrical / Plumbing	1.00	Lump Sum	$5,000,000.00	$5,000,000.00	
New Parking Garage - Total					**$27,638,950**
Relocate Bus Drop Off & Enlarged Concrete Walk at Nedro St					
Demolish Existing	1.00	Lump Sum	$15,000.00	$15,000.00	
New Foundations	1.00	Lump Sum	$15,000.00	$15,000.00	
New Framing	1.00	Lump Sum	$30,000.00	$30,000.00	
New Roofing Including Deck, Gutters & Downspouts	1.00	Lump Sum	$20,000.00	$20,000.00	
Painting	1.00	Lump Sum	$8,500.00	$8,500.00	
Signage & Site Furnishing	1.00	Lump Sum	$25,000.00	$25,000.00	
Replace Concrete walk at Nedro (11th to 10th) at Bus drop off with 16'-0" Concrete Walk & Concrete Curb	2,240.00	Sqrt Feet	$20.00	$44,800.00	
	1.00	Lump Sum	$20,000.00	$20,000.00	
Relocate Bus Drop Off & Enlarged Concrete Walk at Nedro St - Total					**$178,300**
Relocate Bus Loop to W. Champlost St Along Regional Rail Line					
Land Clearing & Grubbing	1.00	Lump Sum	$15,000.00	$15,000.00	
Grading	1.00	Lump Sum	$5,000.00	$5,000.00	
Underground Storm Management Storage and Piping	1.00	Lump Sum	$100,000.00	$100,000.00	
Paving including Curbs & Walkways	1.00	Lump Sum	$200,000.00	$200,000.00	
Landscaping	1.00	Lump Sum	$20,000.00	$20,000.00	
Lighting	1.00	Lump Sum	$100,000.00	$100,000.00	
Relocate Bus Loop to W. Champlost St Along Regional Rail Line - Total					**$440,000**

SUBTOTAL	**$34,105,750**
PERMITS BASED on 3% of HARD COSTS	**$969,173**
OVERHEAD 6%	**$2,104,495**
CONTINGENCY 15%	**$5,576,913**
PROFIT 8%	**$3,420,506**
GRAND TOTAL	**$46,176,837**

Note: The GRAND TOTAL is in August 2011 Dollars

Source: Published from SEPTA original (2011)

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Key Words: Fern Rock, Fern Rock Transportation Center, Broad Street Line, Subway, Transportation Center, Intermodal, Regional Rail Station

Abstract: DVRPC was asked by SEPTA to study the transit services accessible from Fern Rock Transportation Center, as well as the ways in which passengers access and move between these services. Drawing on a better understanding of how the facility is being used and might be used in the future, DVRPC was tasked with developing a conceptual station Master Plan that reflects a near- and long-term strategy for making improvements to Fern Rock Transportation Center in a coordinated way, with improvements prioritized based on identified passenger needs. This task was informed by two stages of engagement with SEPTA and City of Philadelphia staff: a design workshop/charrette, and an online tool that allowed stakeholders to comment on specific aspects of the draft designs. DVRPC developed multiple full-buildout options with estimated construction costs of roughly $46 million, as well as a recommended first phase with an estimated construction cost of roughly $5 million.

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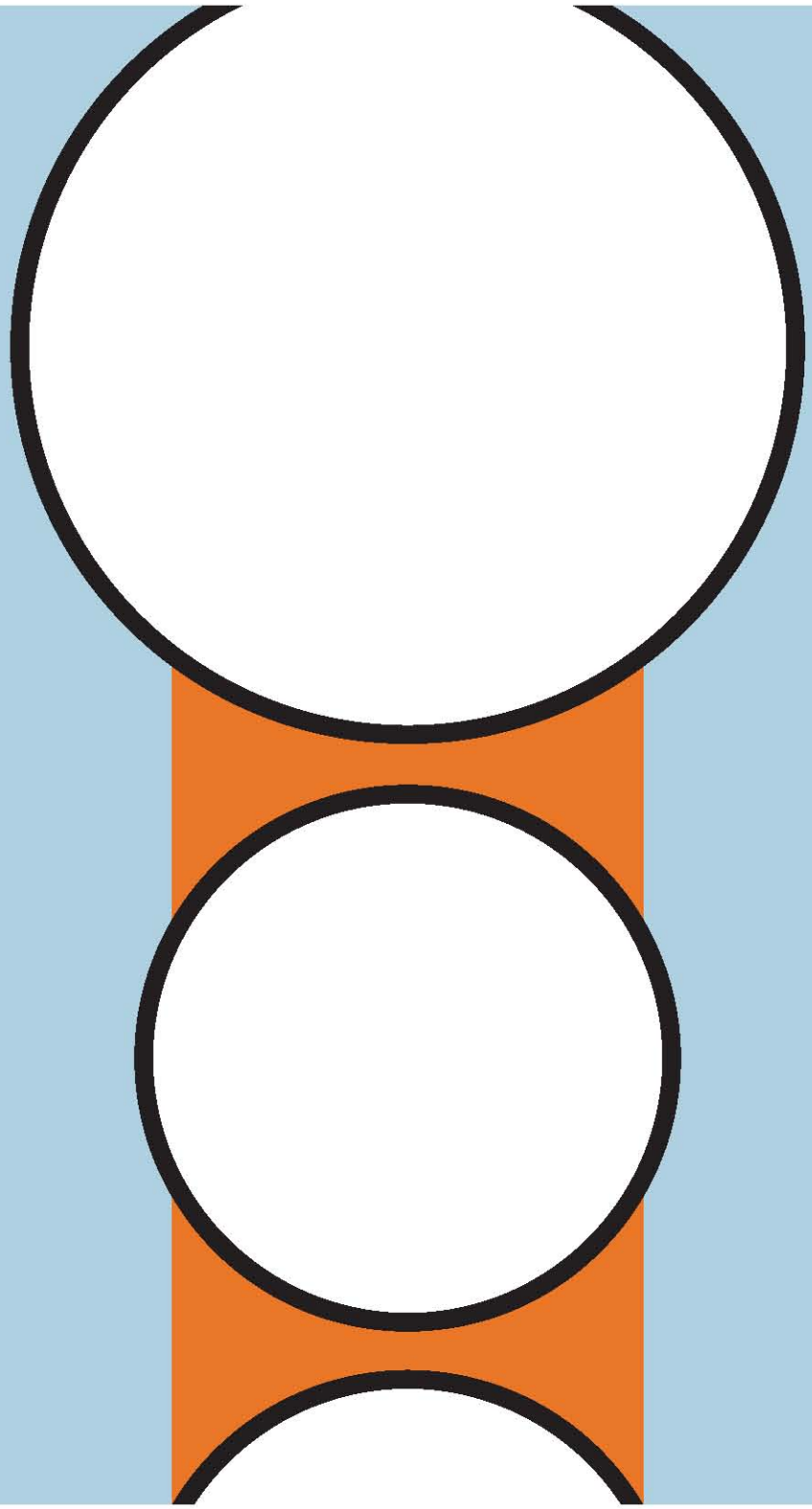

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