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- A. Sisters, Servants of the Immaculate Heart of Mary and Immaculata University
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East Whiteland Township Train Station Feasibility Study

Stakeholder Meeting

December 4, 2018 at 2pm

Immaculata University - 1145 King Rd, Immaculata, PA 19345

Villa Maria Hall - Blue Room (2nd Floor)

Agenda

- Introductions

- Background

- Overview
  - Scope
  - Schedule
  - Role of the Stakeholder Committee

- Train Station Vision and Program Elements

- Preliminary Evaluation of Potential Station Site(s)
  - Site Selection Evaluation Criteria
  - Base Maps

- Next Steps
  - Evaluation of Potential Site(s) & Field Visits
  - SEPTA Technical Coordination Workshop: December 18, 2018
  - Technical Memo #1 to Stakeholders for Review and Comment: January 7, 2019
  - Technical Memo #1 Comments Due: January 18, 2019

- Future Stakeholder Meetings
  - Meeting #2 – Station Concept Design Workshop:
    - Availability week of February 11th or 18th
  - Meeting #3 – Ridership Forecasts and Draft Report:
    - Availability week of May 20th

East Whiteland Township Train Station Feasibility Study

Stakeholder Meeting

February 12, 2019 at 2pm

Immaculata University - 1145 King Rd, Immaculata, PA 19345

Villa Maria Hall - Board Room (1st Floor)

Agenda

- Introductions

- Tech Memo #1

- Draft Station Concept Plans

- Access and Circulation Evaluation

- Other Assumptions for Ridership Forecasts

- Public Meeting

  February 27, 2019
  Open House: 6pm – 7pm
  Presentation: During East Whiteland Township Planning Commission Meeting beginning at 7pm

  - Materials
  - Promotion

- Next Steps
  - SEPTA Technical Coordination Meeting #2: February 21st
  - Public Open House & Presentation: February 27th
  - Technical Memo #2 to Stakeholders for Review and Comment: March 8th
  - Technical Memo #2 Comments Due: March 22nd
  - Assumptions for Ridership Forecasts to DVRPC: March 29th
  - Stakeholder Meeting #3 – Ridership Forecasts and Draft Report: May 21st

East Whiteland Township Train Station Feasibility Study

Stakeholder Meeting

May 21, 2019 at 2pm

Immaculata University - 1145 King Rd, Immaculata, PA 19345

Villa Maria Hall - Blue Room (2nd Floor)

Agenda

- Introductions
- Recap of Recent Coordination Activities
  - Future track improvements along the Keystone Corridor
  - Cost Estimates
  - Station Concept Plans
- DVRPC Ridership Forecasts
- Summary Evaluation of Station Sites
- Potential Project Phasing and Next Steps
- Draft Report
  - Draft to Stakeholders: Week of June 3rd
  - Overview Public Presentation
    June 12, 2019
    During East Whiteland Township Board of Supervisors Meeting beginning at 7pm
- Next Steps
  - TMACC Board Presentation: May 31st
  - Draft Report to Stakeholders for Review and Comment: Week of June 3rd
  - Presentation at EWT Board of Supervisors Meeting: June 12th
  - Technical Memo #2 Comments Due: Week of June 17th
  - Final Report: June 28th

East Whiteland Township Train Station Feasibility Study

SEPTA Technical Coordination Meeting

December 14, 2018 at 1pm

Agenda

- Introductions

- Project Background & Overview

- Evaluation of Potential Station Site(s)

- Preliminary Preferred Station Site(s)

- Immaculata Station Site:
    - Advantages and Disadvantages
    - Potential Station Program Elements & Configuration

- Three Tun Station Site:
    - Advantages and Disadvantages
    - Potential Station Program Elements & Configuration

- Technical Memo #1: Input for Preferred Station Site(s)

- Next Steps
    - Technical Memo #1 to Stakeholders for Review and Comment: January 7, 2019
    - Technical Memo #1 Comments Due: January 18, 2019
    - Stakeholder Meeting #2: February 12, 2019 at 2pm
    - Public Presentation #1: February 13, 2019 (*Tentative)*
    - SEPTA Technical Coordination #2 – Conference Call: Week of February 18, 2019

Potential Station Programming Elements

Waiting and Boarding

- ☐ **Platforms – High Level**
  - Length: 528′ (six car consist), with potential to expand to 700′ (eight car consist)
  - Type: Side (12′) OR Center Island (24′)
  - Canopy:
    - Inbound: One-third of platform
    - Outbound: Cover stairs and ramps with short extension onto platform
  - Heated Shelters: One each (Inbound and Outbound)
  - Clearance to interlocking: 250′, with potential to request a waiver to 200′
- ☐ **Cross Track Circulation**
  - Type: Tunnel OR Overpass (Enclosed or Open)
  - Assumed to be 12′ wide clear
- ☐ **Elevators: One with potential for second at each point?**
- ☐ **Station Building**
  - SEPTA Preference?
    - Code Variance could be required if no station building because of toilet room requirement
  - If a station is provided: Standard SEPTA
- ☐ **Ticketing Kiosk(s)**
- ☐ **TOD Potential**
  - Customer driven: Food or amenities
  - Shared parking use (off-hour)
  - Local market / opportunities

Access and Circulation

- ☐ **Parking**
  - Minimum: 250 - 300 spaces ?
  - Capacity for expansion (target): 350 – 400 spaces ?
  - Assumed to be unstructured
- ☐ **Bus**
  - Number/type
  - Schedule overlap
  - Waiting facilities
- ☐ **Private Shuttle**
  - Number/type
  - Staging area
- ☐ **Vehicle Pick-up/Drop-off**
- ☐ **Bike Parking**
  - Covered OR uncovered
- ☐ **Bike/Ped Access**

Comparison of Preferred Station Sites

	Immaculata	Three Tun

Advantages	– Located approximately half way between Malvern and Exton
	– Minimal need for track work
	– Multiple possible access points
	  o Ravine Road
	  o King Road
	  o Route 352 (Sproul Road) to Frazer Road / College Ave/ Grotto Drive
	  o Route 30/Phoenixville Pike – would need coordination with Norfolk Southern
	– Ample developable land for station facilities and parking with room for expansion.
	– Center median station area provides room for different platform and track configurations
	– Opportunity for direct pedestrian connection to Immaculata University
	– 1 parcel privately owned by Immaculata University / Sisters of Immaculate Heart of Mary
		– Three Tun Road easily accessible by automobile via Route 352 (Sproul Road)
		– Land available and ready for development
		– Additional parcels provide opportunity for expansion
		– May be possible to retrofit existing bridge carrying Sproul Road over Norfolk Southern with pedestrian infrastructure

Disadvantages	– Multiple rail lines to cross over for connection and access on the north side of the tracks – Difficulty constructing overpass due to overhead wire configuration – Ravine Road connection to Route 30 limited by 4 low-clearance tunnels – Route 352 (Sproul Road) connection to Route 30 limited by 1 low-clearance tunnel – Connection to Route 30 limited – More difficult to provide higher frequency of service since it is west of Frazer Rail Yard – Some areas with steep slopes (particularly east of the station location)	– Located approximately 2 miles from Malvern Station (4 miles from Exton) – Need to assemble multiple privately owned parcels with development potential – Available parcels not directly adjacent to feasible platform location – Direct connection to Route 30 requires further evaluation – No walk-up access for Immaculata University – Adjacent well established residential area on the south side of the tracks limits access and residents may have concerns regarding potential impacts – Potential hazardous materials, particularly Buckeye Terminals property – Some areas with steep slopes

East Whiteland Township Train Station Feasibility Study

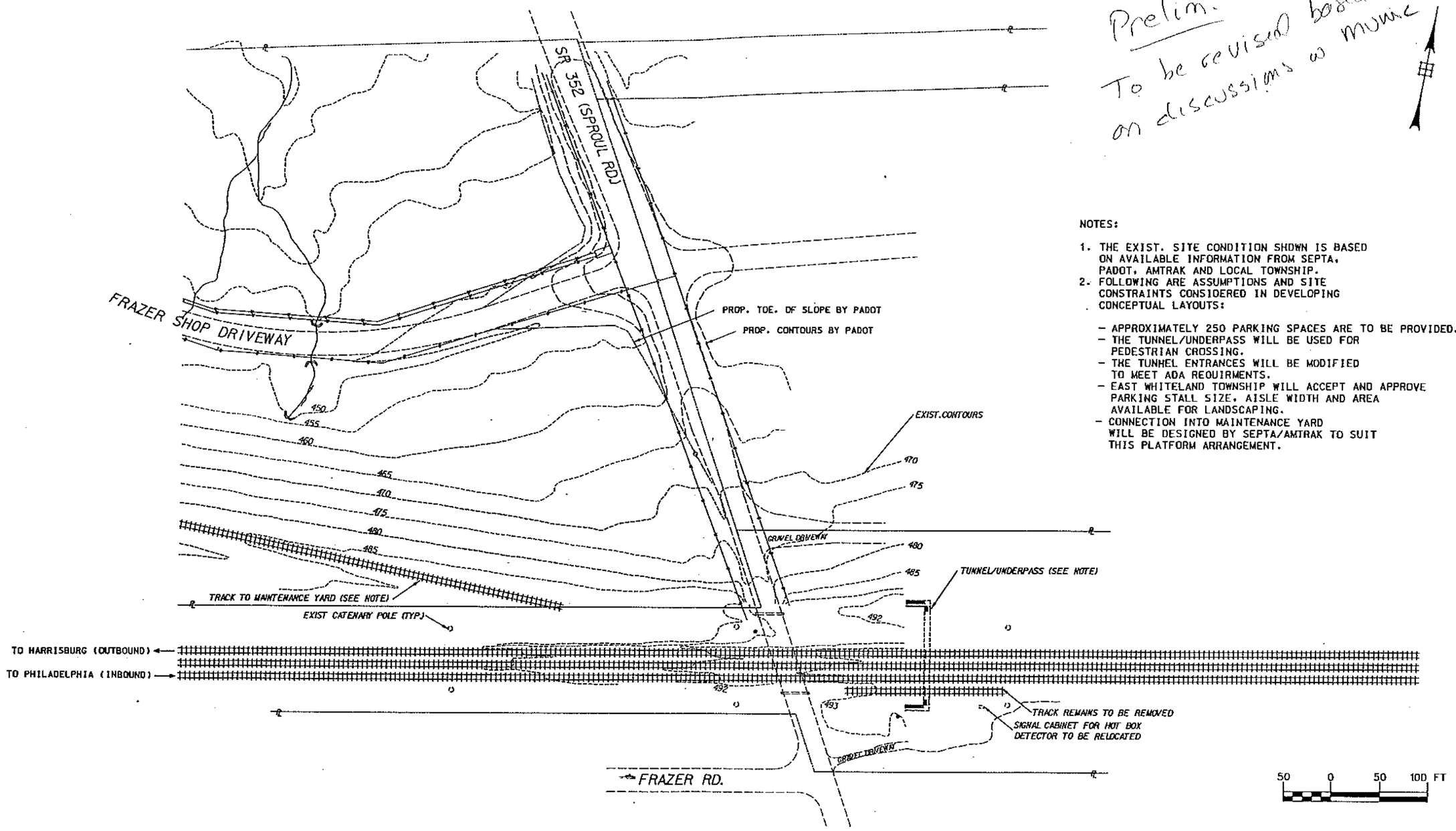
SEPTA Technical Coordination Meeting #2

February 21, 2018 at 1pm

Agenda

- Introductions
- Tech Memo #1
- Train Schedules: Three Tun Site and Immaculata Site
- Track/Platform Configuration
- Draft Station Concept Plans
- Access and Circulation Evaluation
- Cost Estimates and Assumptions
- Other Assumptions for Ridership Forecasts
- Public Meeting
  February 27, 2019
  Open House: 6pm – 7pm
  Presentation: During East Whiteland Township Planning Commission Meeting beginning at 7pm
- Next Steps
  - Public Open House & Presentation: February 27th
  - Technical Memo #2 to Stakeholders for Review and Comment: March 8th
  - Technical Memo #2 Comments Due: March 22nd
  - Assumptions for Ridership Forecasts to DVRPC: March 29th
  - Stakeholder Meeting #3 – Ridership Forecasts and Draft Report: May 21st

Prelim. —
To be revised based on discussions w/ munic



NOTES:

1. THE EXIST. SITE CONDITION SHOWN IS BASED ON AVAILABLE INFORMATION FROM SEPTA, PADOT, AMTRAK AND LOCAL TOWNSHIP.
2. FOLLOWING ARE ASSUMPTIONS AND SITE CONSTRAINTS CONSIDERED IN DEVELOPING CONCEPTUAL LAYOUTS:
   - APPROXIMATELY 250 PARKING SPACES ARE TO BE PROVIDED.
   - THE TUNNEL/UNDERPASS WILL BE USED FOR PEDESTRIAN CROSSING.
   - THE TUNNEL ENTRANCES WILL BE MODIFIED TO MEET ADA REQUIRMENTS.
   - EAST WHITELAND TOWNSHIP WILL ACCEPT AND APPROVE PARKING STALL SIZE, AISLE WIDTH AND AREA AVAILABLE FOR LANDSCAPING.
   - CONNECTION INTO MAINTENANCE YARD WILL BE DESIGNED BY SEPTA/AMTRAK TO SUIT THIS PLATFORM ARRANGEMENT.

REV.	DATE	DESCRIPTION	BY	CKD	APD
0		FOR CONSTRUCTION			

EDWARDS AND KELCEY, INC.
484 South Old Middletown Road, Media, PA 19063-4833

SEPTA APPROVALS
Manager Rail Facilities
Chief Engineer

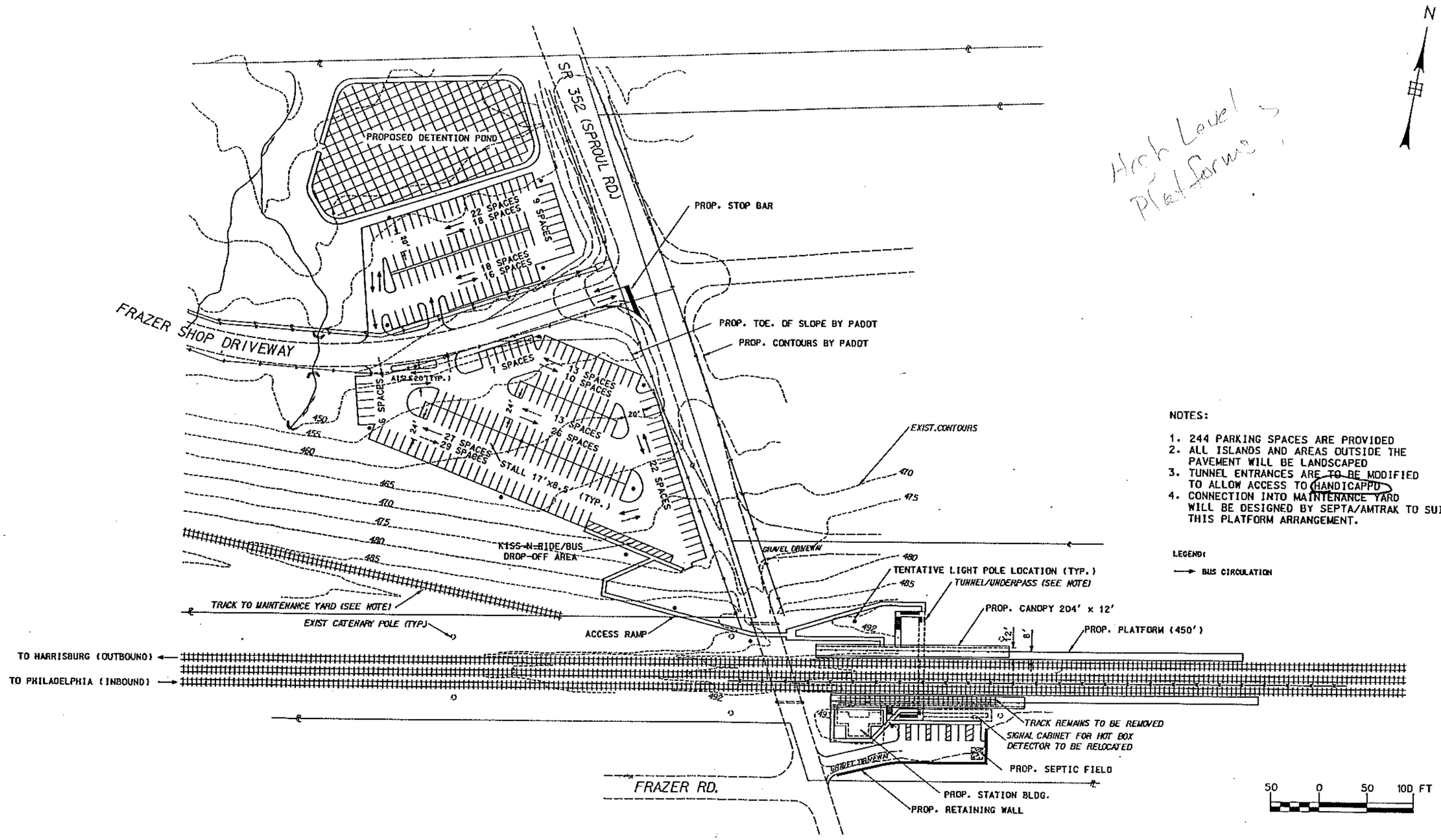
SCALE 1"=50'
DRAWN BY EMH
DATE 6/18/92
CHECKED BY

Southeastern Pennsylvania Transportation Authority
ENGINEERING & CONSTRUCTION DIVISION
RAIL FACILITIES DEPARTMENT
714 Market Street Philadelphia, PA 19106-2385

SEPTA - PARKING AND STATION EXPANSION PROGRAM-PACKAGE "E"

TITLE
FRAZER STATION EXISTING SITE

SUBMITTAL LEVEL 30 %
DRAWING NUMBER
SHEET NUMBER 6
SEPTA DRAWING NUMBER



NOTES:

1. 244 PARKING SPACES ARE PROVIDED
2. ALL ISLANDS AND AREAS OUTSIDE THE PAVEMENT WILL BE LANDSCAPED
3. TUNNEL ENTRANCES ARE ~~TO BE~~ MODIFIED TO ALLOW ACCESS TO HANDICAPPD
4. CONNECTION INTO MAINTENANCE YARD WILL BE DESIGNED BY SEPTA/AMTRAK TO SUIT THIS PLATFORM ARRANGEMENT.

LEGEND:

→ BUS CIRCULATION

REV.	DATE	DESCRIPTION	BY	CKD	APD
0		FOR CONSTRUCTION			

EDWARDS AND KELCEY, INC.
484 South Old Middletown Road, Media, PA 19063-4833

SEPTA APPROVALS

Manager Rail Facilities

Chief Engineer

SCALE 1"=50'
DRAWN BY EMH
DATE 6/18/92
CHECKED BY

Southeastern Pennsylvania Transportation Authority
ENGINEERING & CONSTRUCTION DIVISION
RAIL FACILITIES DEPARTMENT
714 Market Street Philadelphia, PA 19106-2385

SEPTA - PARKING AND STATION EXPANSION PROGRAM-PACKAGE "E"

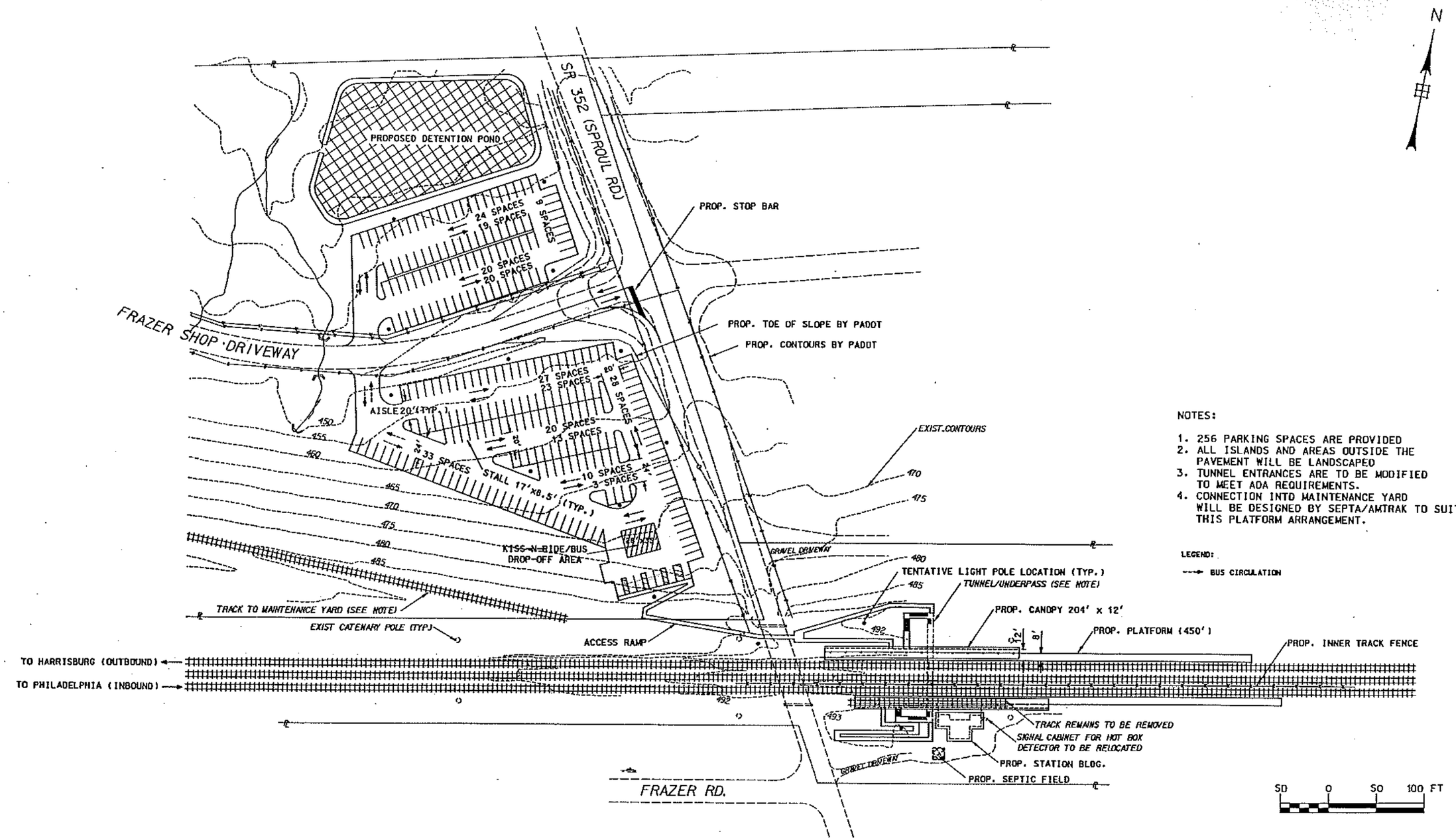
TITLE
FRAZER STATION
(CONCEPTUAL LAYOUT ALT #1)

SUBMITTAL LEVEL 30 %

DRAWING NUMBER

SHEET NUMBER 7

SEPTA DRAWING NUMBER



NOTES:

1. 256 PARKING SPACES ARE PROVIDED
2. ALL ISLANDS AND AREAS OUTSIDE THE PAVEMENT WILL BE LANDSCAPED
3. TUNNEL ENTRANCES ARE TO BE MODIFIED TO MEET ADA REQUIREMENTS.
4. CONNECTION INTO MAINTENANCE YARD WILL BE DESIGNED BY SEPTA/AMTRAK TO SUIT THIS PLATFORM ARRANGEMENT.

LEGEND:

→ BUS CIRCULATION

REV.	DATE	DESCRIPTION	BY	CKD	APD
0		FOR CONSTRUCTION			

EDWARDS AND KELCEY, INC.
464 South Old Middletown Road, Media, PA 19063-4833

SEPTA APPROVALS

Manager Rail Facilities

Chief Engineer

SCALE 1"=50'
DRAWN BY EMH
DATE 6/18/92
CHECKED BY

Southeastern Pennsylvania Transportation Authority
ENGINEERING & CONSTRUCTION DIVISION
RAIL FACILITIES DEPARTMENT
714 Market Street Philadelphia, PA 19106-2385

SEPTA - PARKING AND STATION EXPANSION PROGRAM-PACKAGE "E"

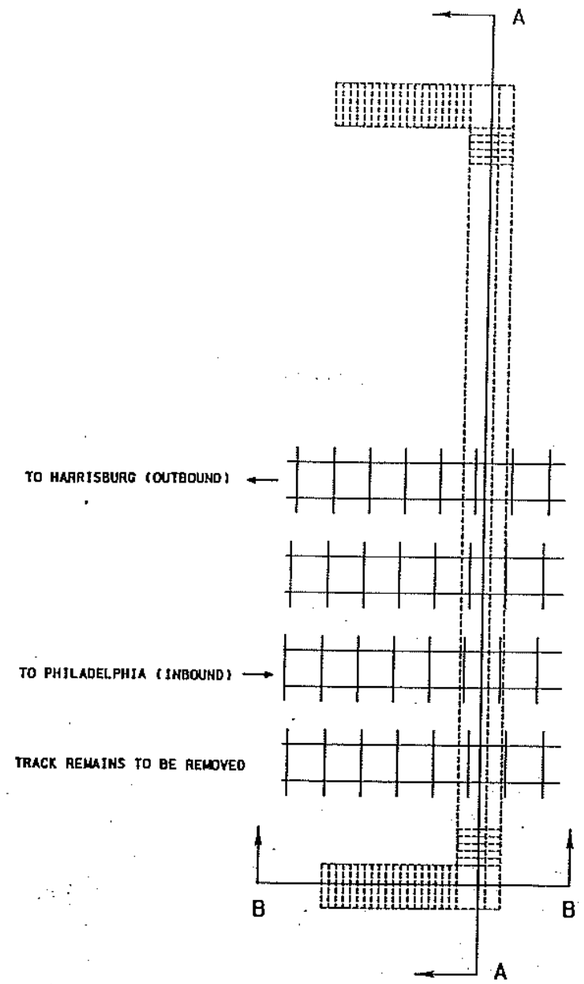
TITLE
FRAZER STATION
(CONCEPTUAL LAYOUT ALT #2)

SUBMITTAL LEVEL 30 %

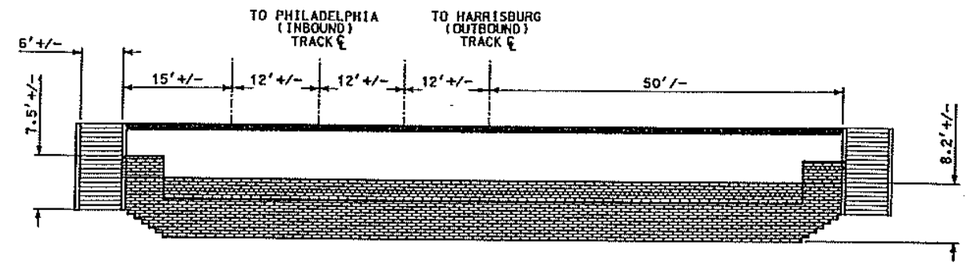
DRAWING NUMBER

SHEET NUMBER 8

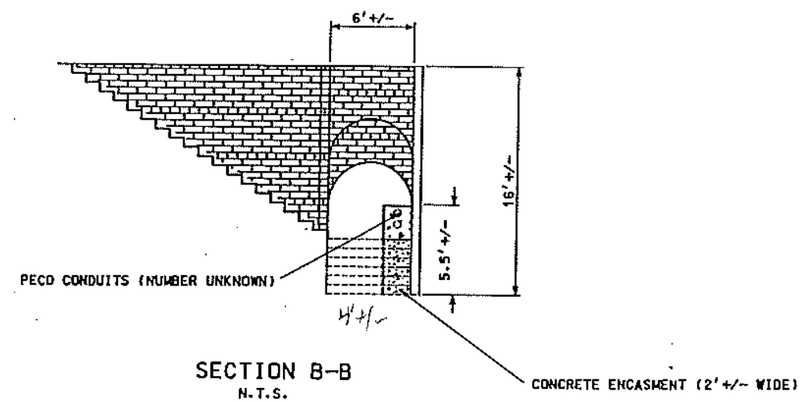
SEPTA DRAWING NUMBER



PLAN VIEW
N.T.S.



SECTION A-A
N.T.S.



SECTION B-B
N.T.S.

REV.	DATE	DESCRIPTION	BY	CKD	APD
0		FOR CONSTRUCTION			

EDWARDS AND KELCEY, INC.
466 South Old Middletown Road, Media, PA 19063-4833

SEPTA APPROVALS

Manager Rail Facilities

Chief Engineer

SCALE N.T.S.
DRAWN BY EMH
DATE 6/23/92
CHECKED BY

Southeastern Pennsylvania Transportation Authority
ENGINEERING & CONSTRUCTION DIVISION
RAIL FACILITIES DEPARTMENT
714 Market Street Philadelphia, PA 19106-2365

SEPTA - PARKING AND STATION EXPANSION PROGRAM-PACKAGE "E"

TITLE
FRAZER STATION
EXISTING TUNNEL

SUBMITTAL LEVEL 30 %

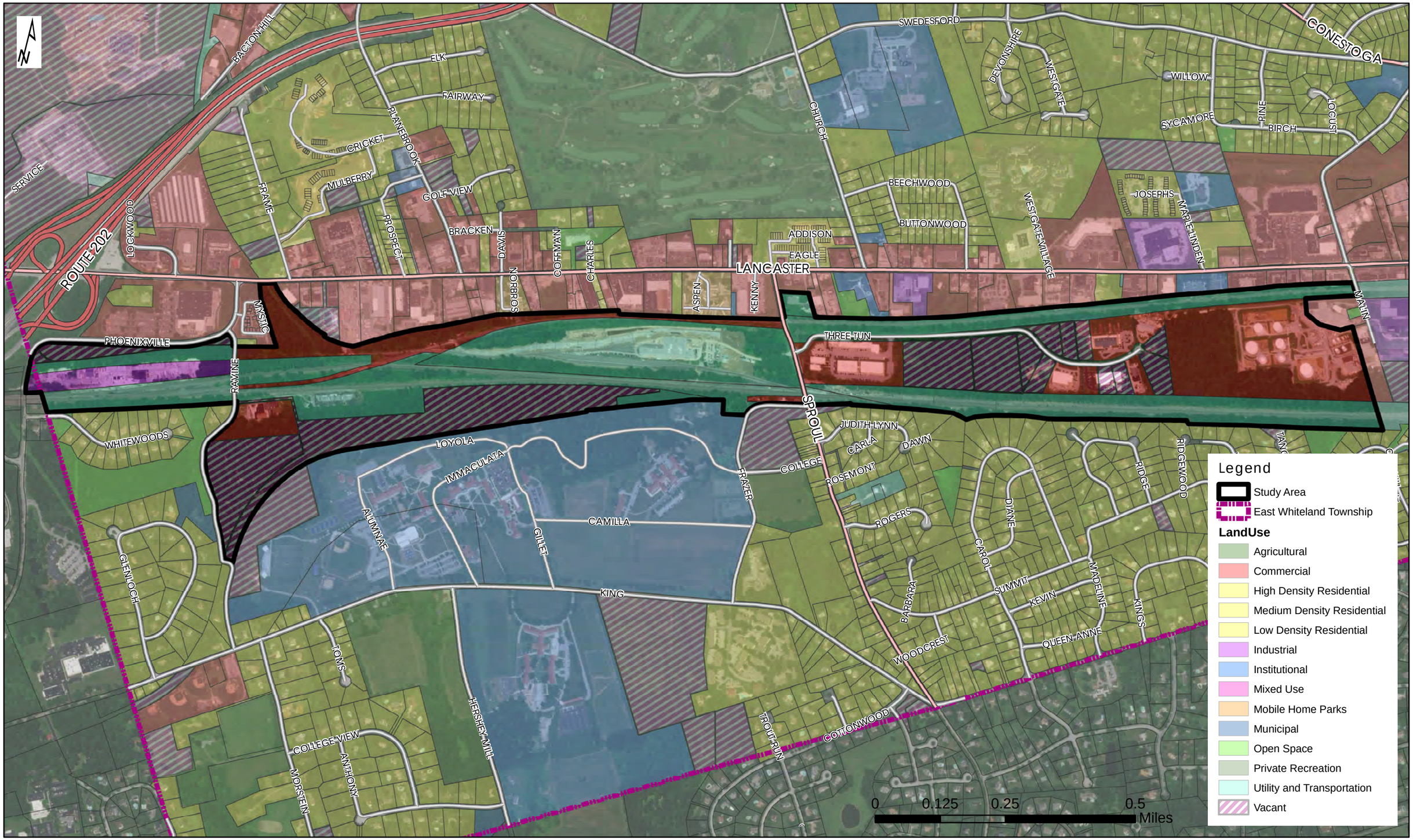
DRAWING NUMBER

SHEET NUMBER 9

SEPTA DRAWING NUMBER

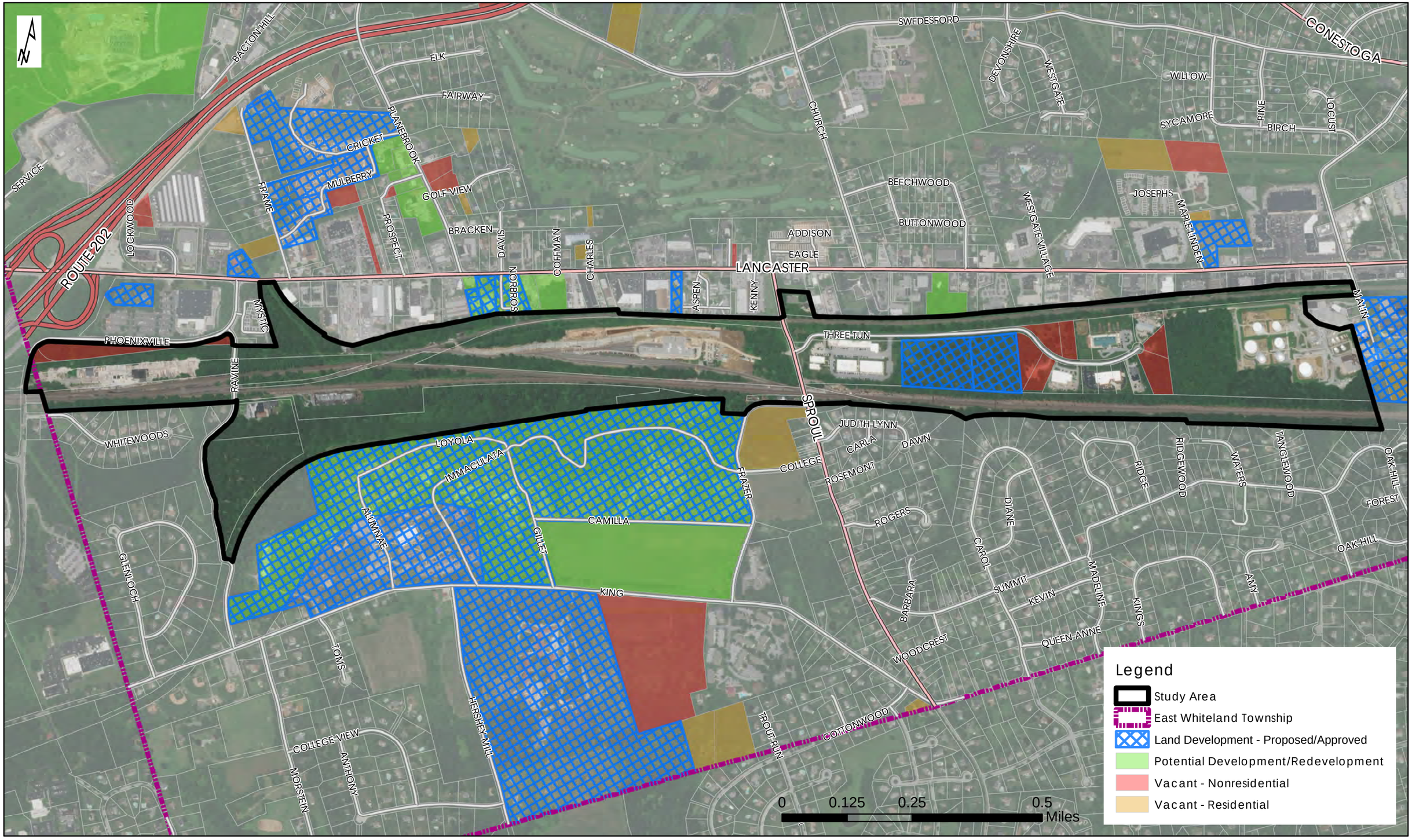
EWT Train Station Feasibility Study

Existing Land Use



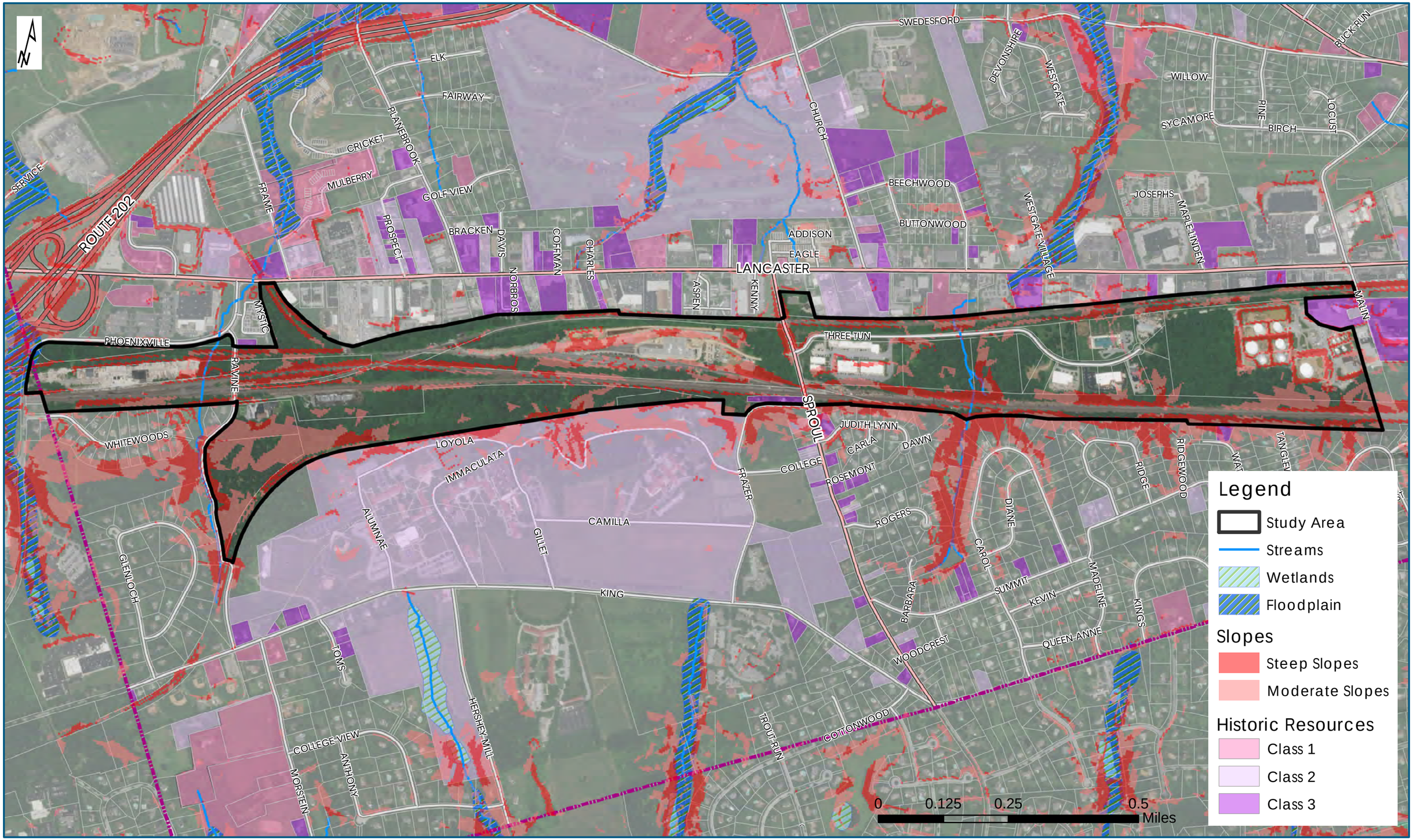
EWT Train Station Feasibility Study

Potential Land Development



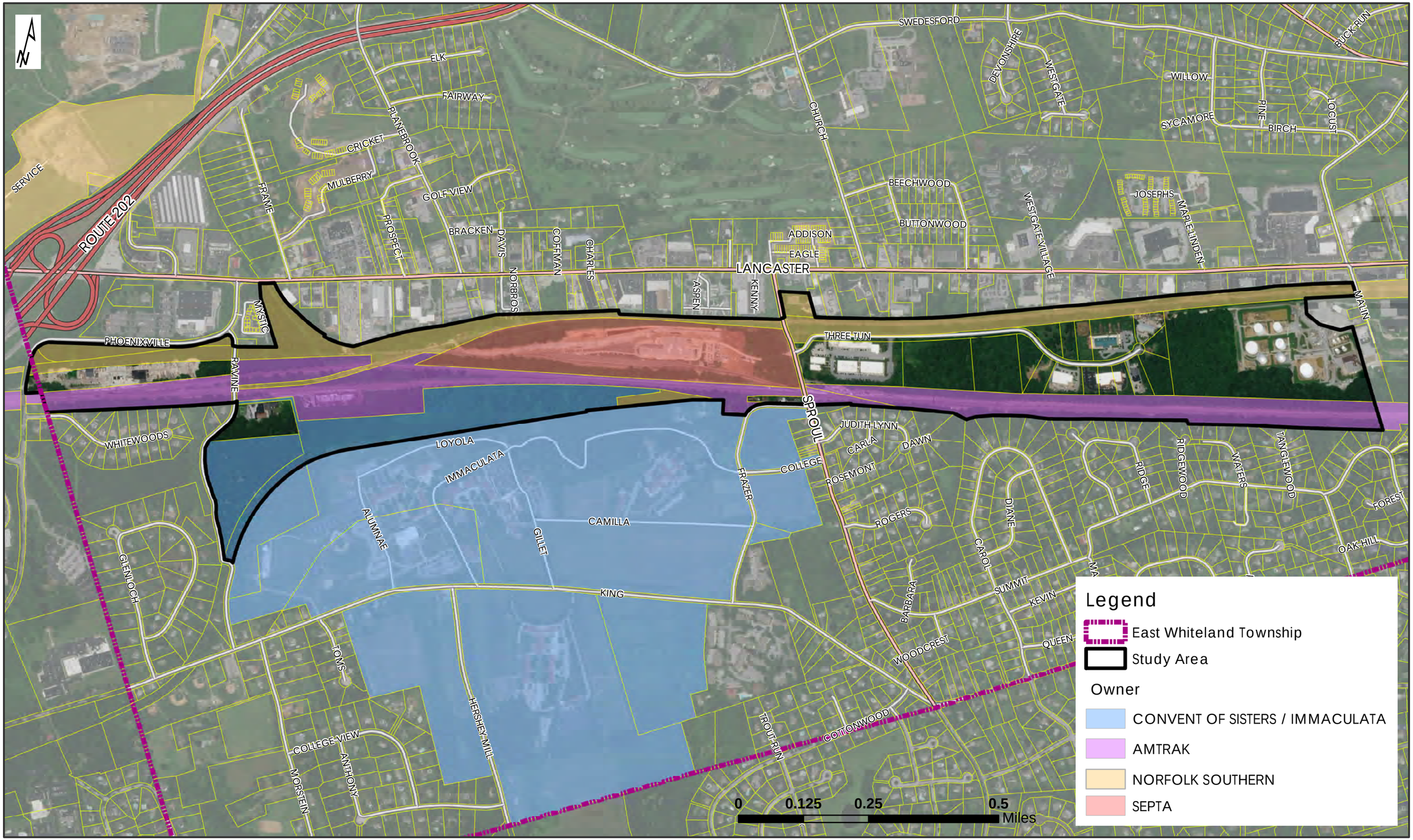
EWT Train Station Feasibility Study

Environmental Features



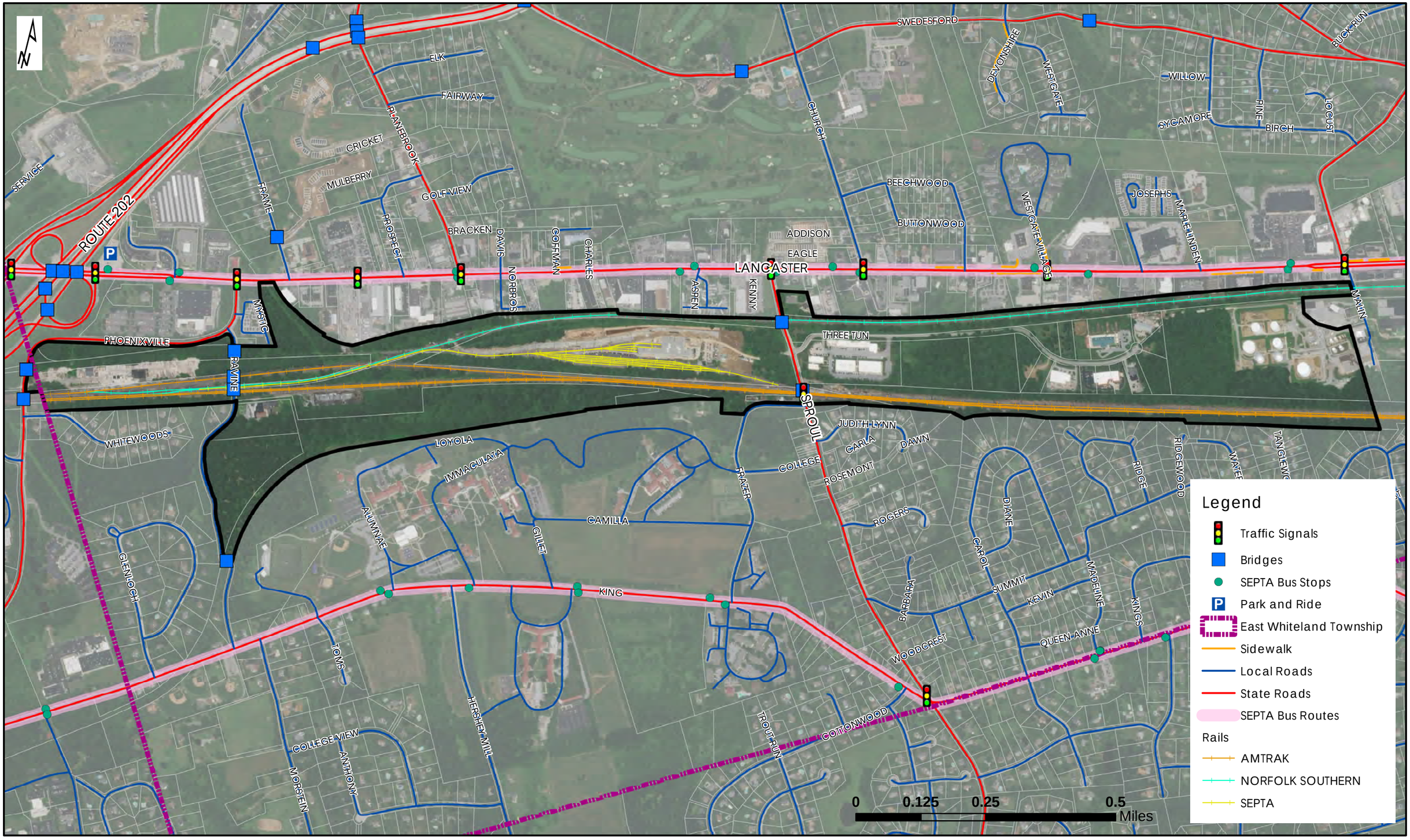
EWT Train Station Feasibility Study

Property Ownership



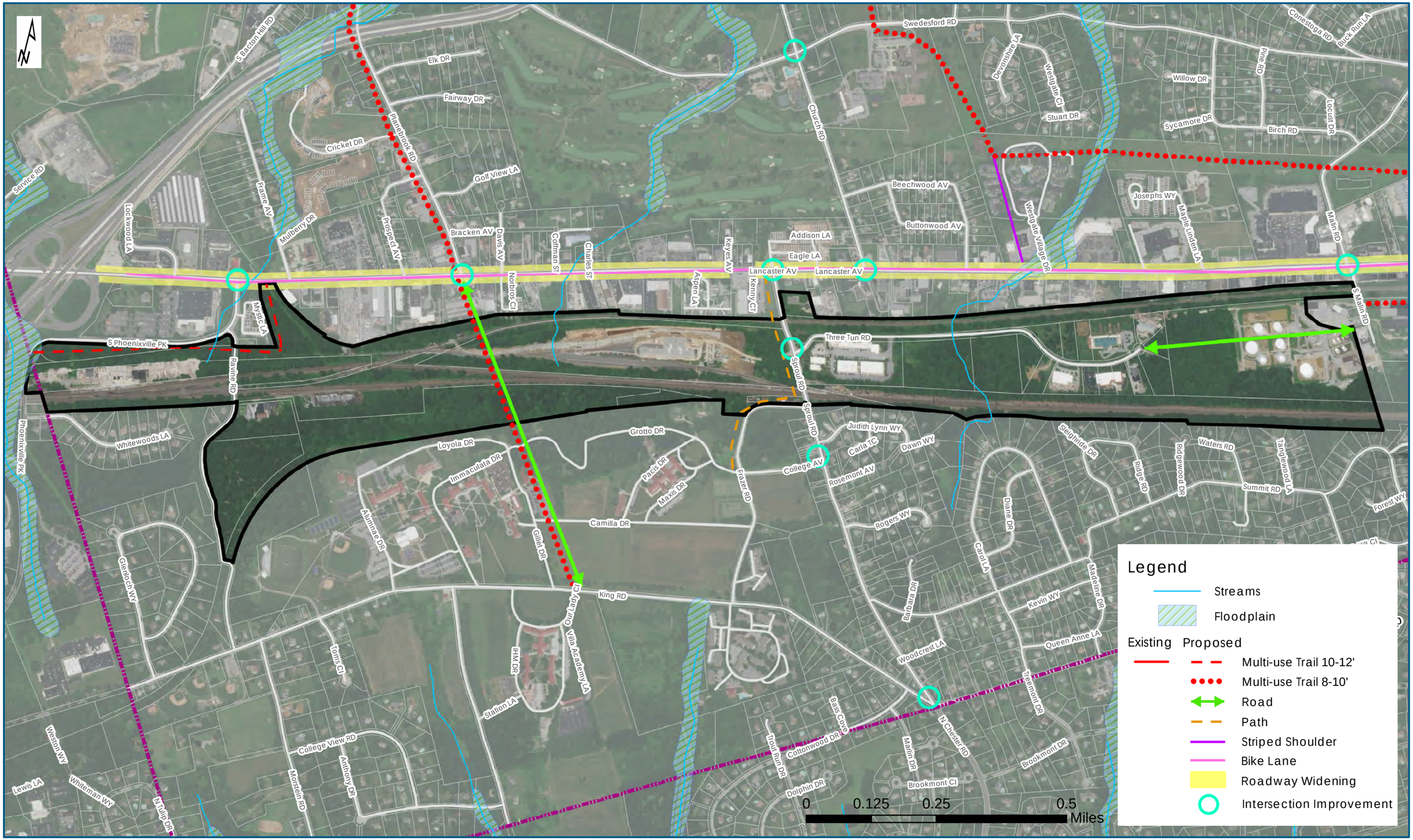
EWT Train Station Feasibility Study

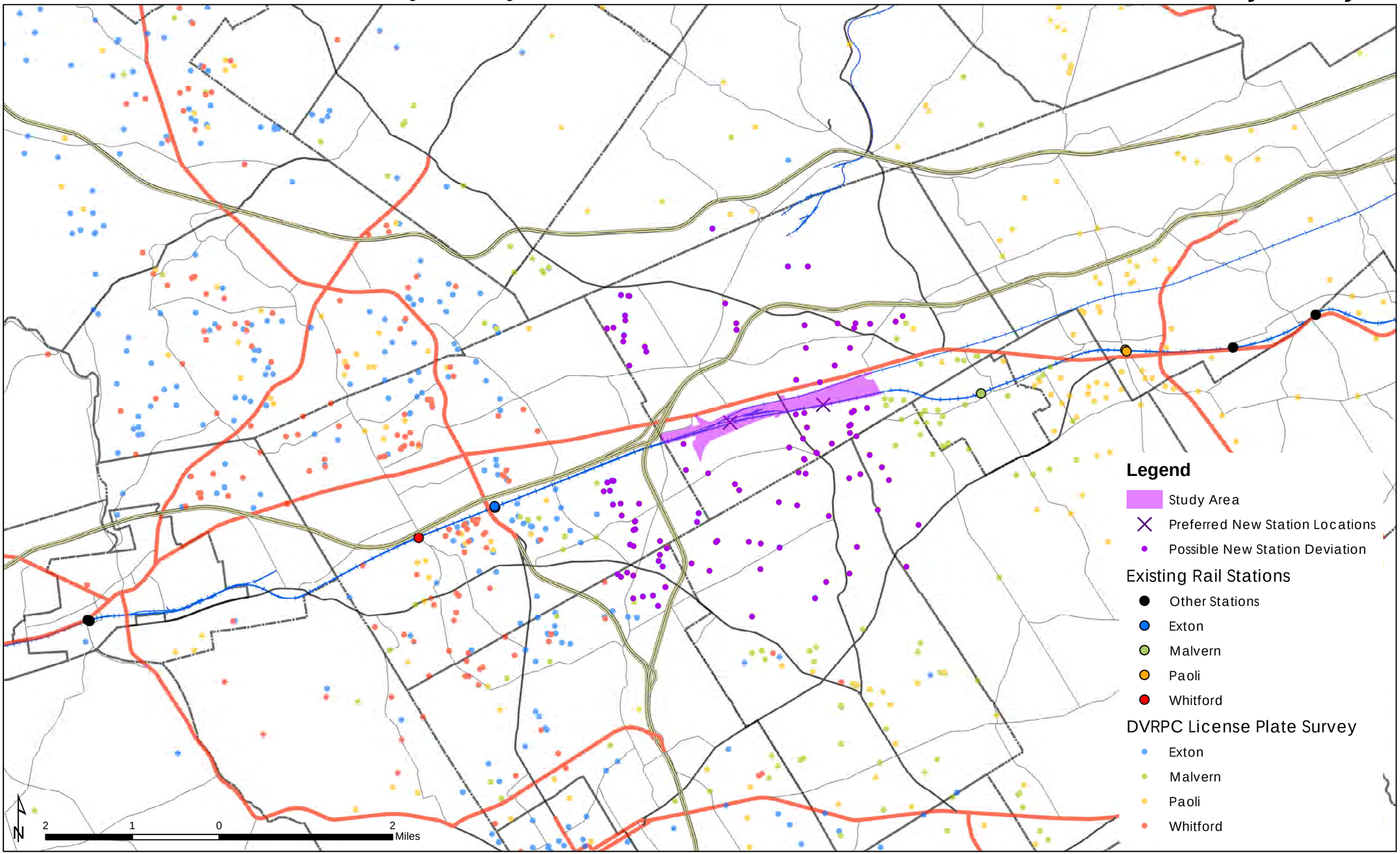
Existing Transportation Features



EWT Train Station Feasibility Study

Proposed Transportation Features




Legend
Study Area
Preferred New Station Locations
Possible New Station Deviation
Existing Rail Stations
Other Stations
Exton
Malvern
Paoli
Whitford
DVRPC License Plate Survey
Exton
Malvern
Paoli
Whitford
2
1
0
2
Miles
N

Appendix 2.1

Platform Configurations

During the initial review of the sites a number of possible configurations of platforms were envisioned. This appendix lists possible configurations, provides sketches for clarity, and contains the analysis of the configurations, and ultimately the reasoning used to conclude which configuration is preferred.

For reference, tracks are numbered sequentially with Track #1 as the southernmost to Track #4 as the northernmost. Presently, Tracks #2 and #3 do not exist, but they once did and could be constructed if necessary.

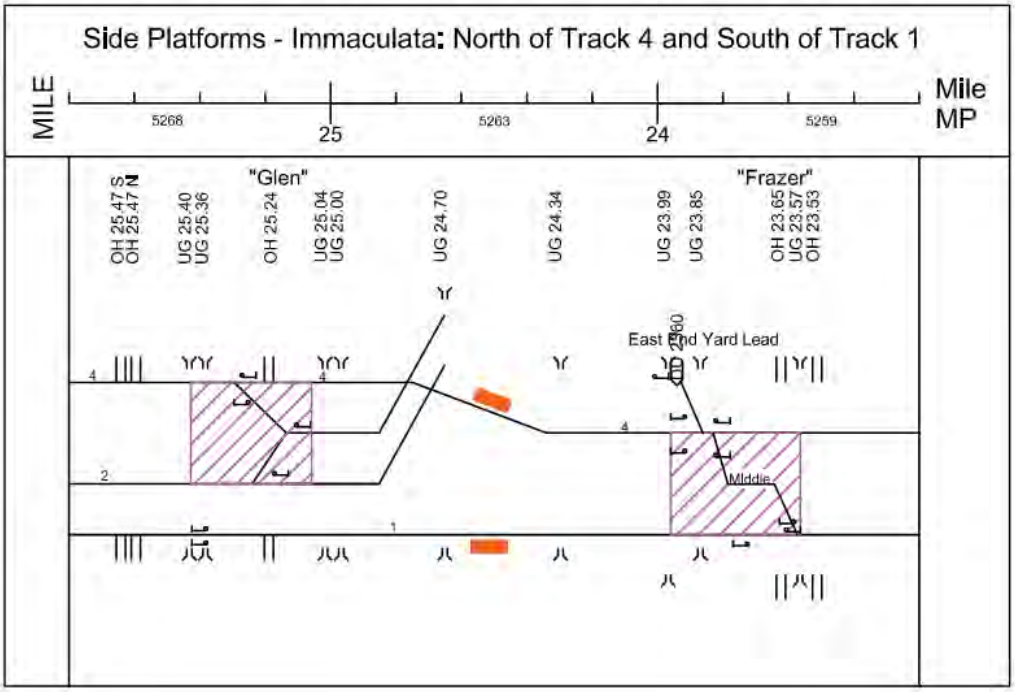
Platform Configurations Considered for Immaculata

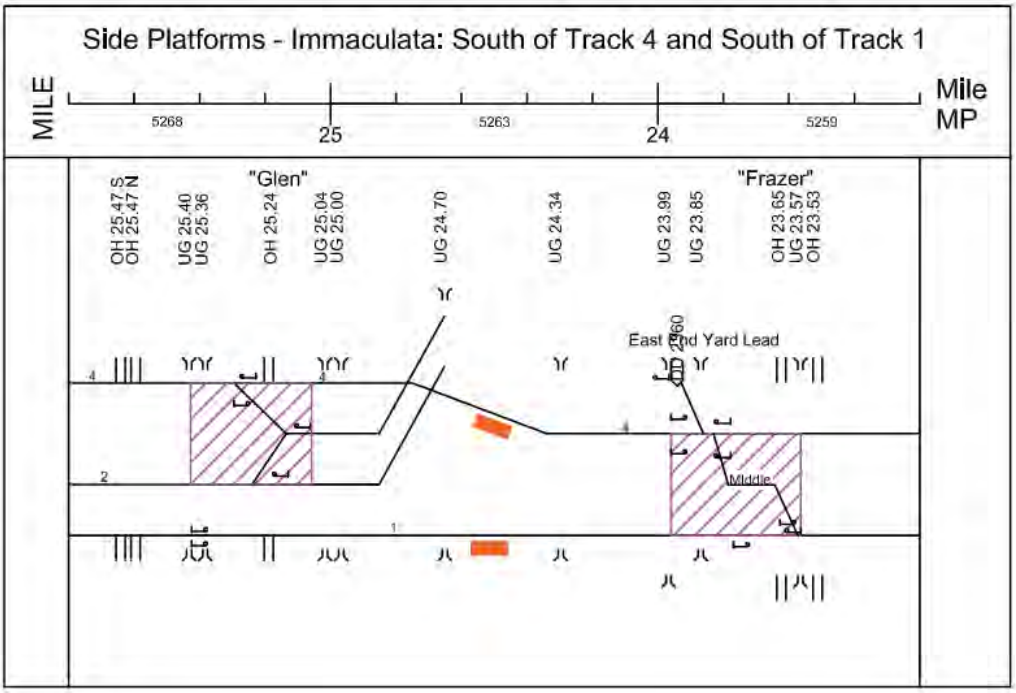
Listed in the table below are the different configurations considered.

Immaculata Site		
1.	Side Platforms	North of Track 4 and South of Track 1
2.	Side Platforms	South of Track 4 and South of Track 1
3.	Side Platforms	South of New Track 3 and South of Track 1
4.	Side Platforms	North of New Track 2 and South of Track 1
5.	Center Platform	Between Track 1 and Track 4
6.	Center Platform	Between New Track 2 and Track 4
7.	Center Platform	Between New Track 2 and New Track 3
8.	Center Platform	Between Track 1 and New Track 3

Appendix 2.1

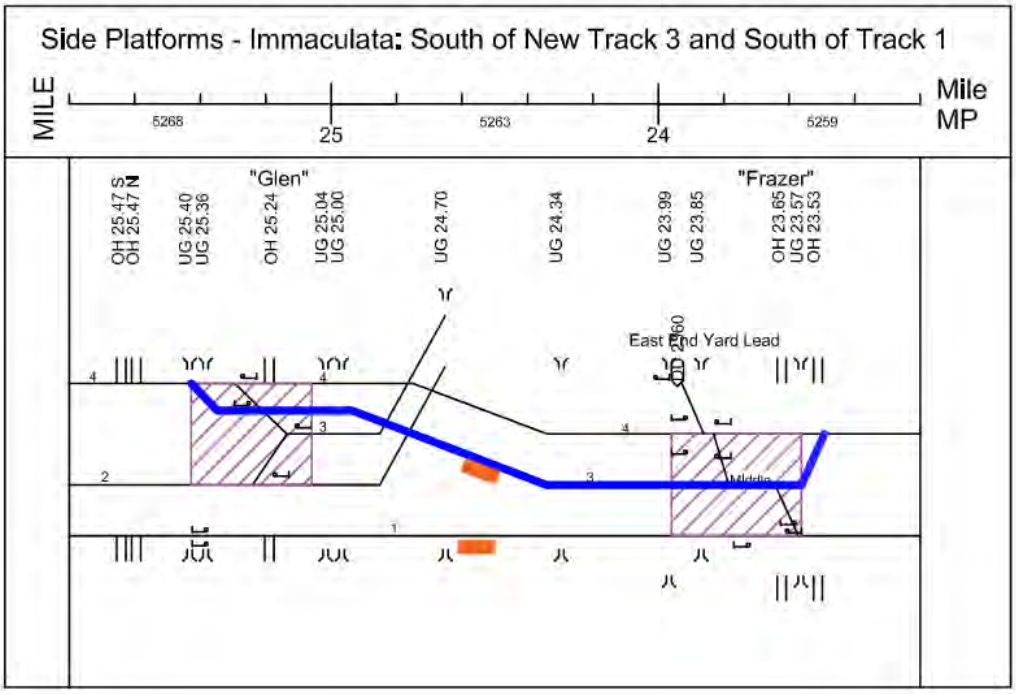
Platform Configurations

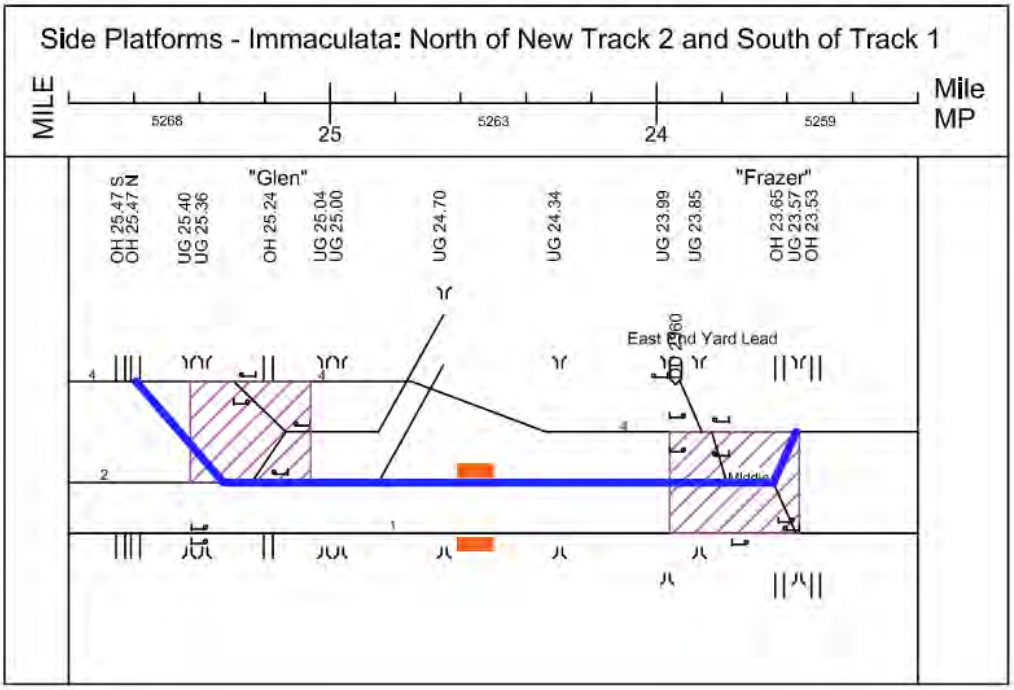




Appendix 2.1

Platform Configurations





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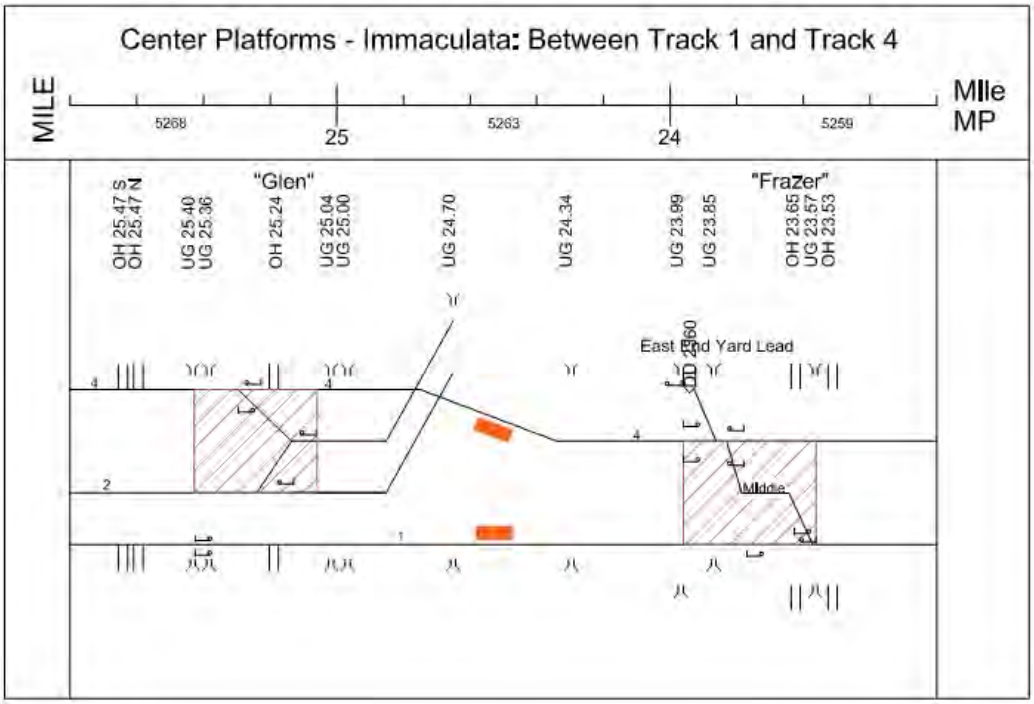
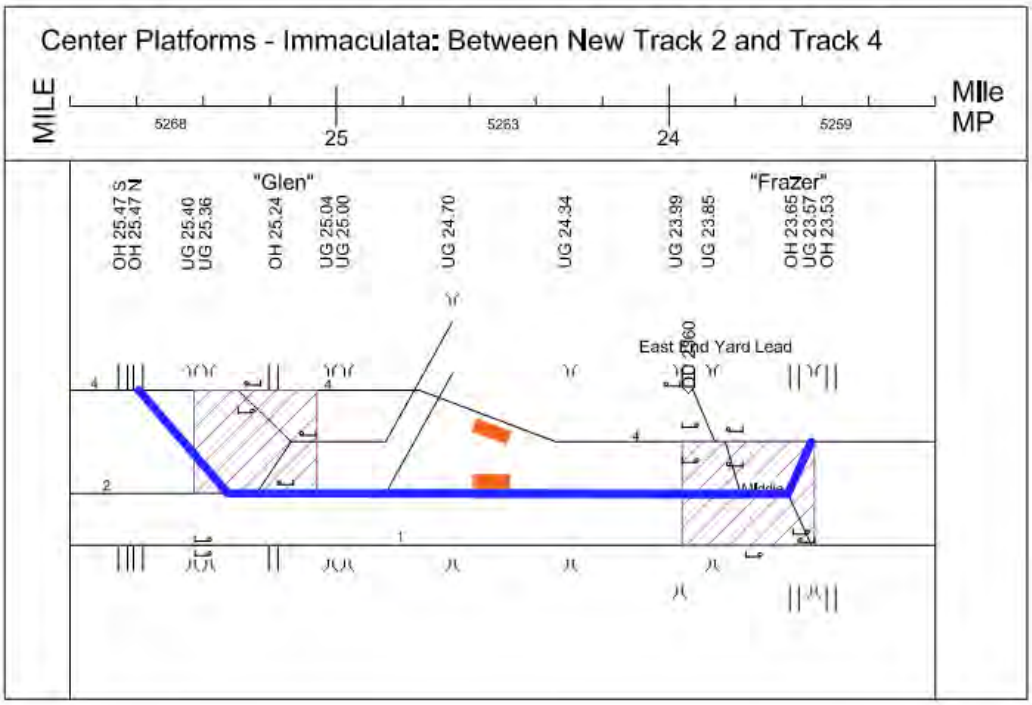
Platform Configurations





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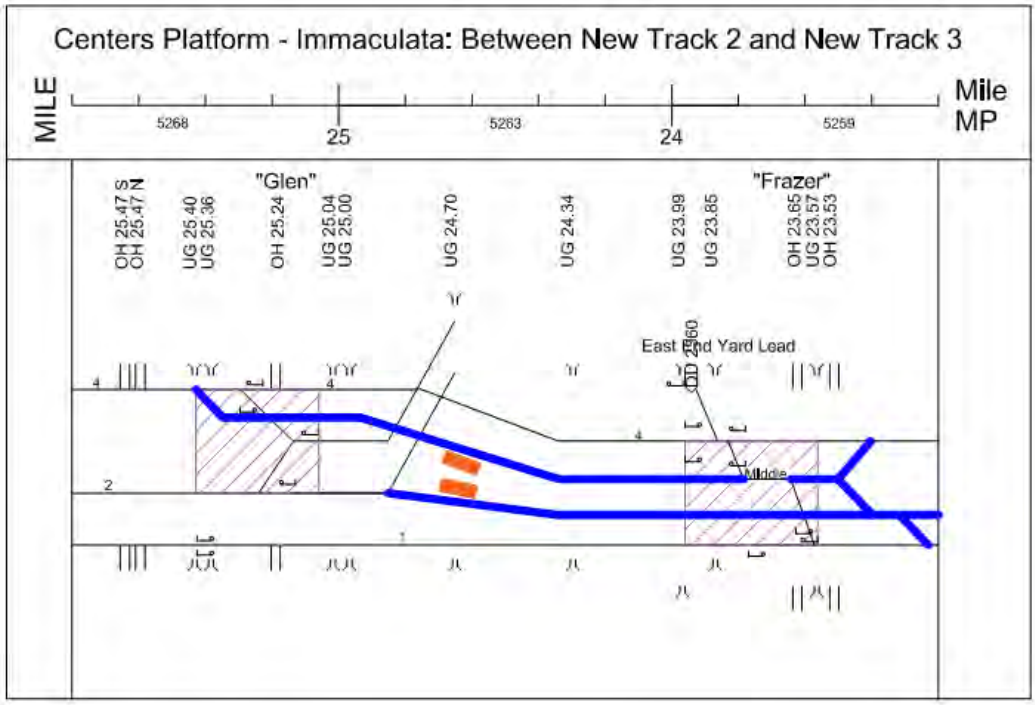
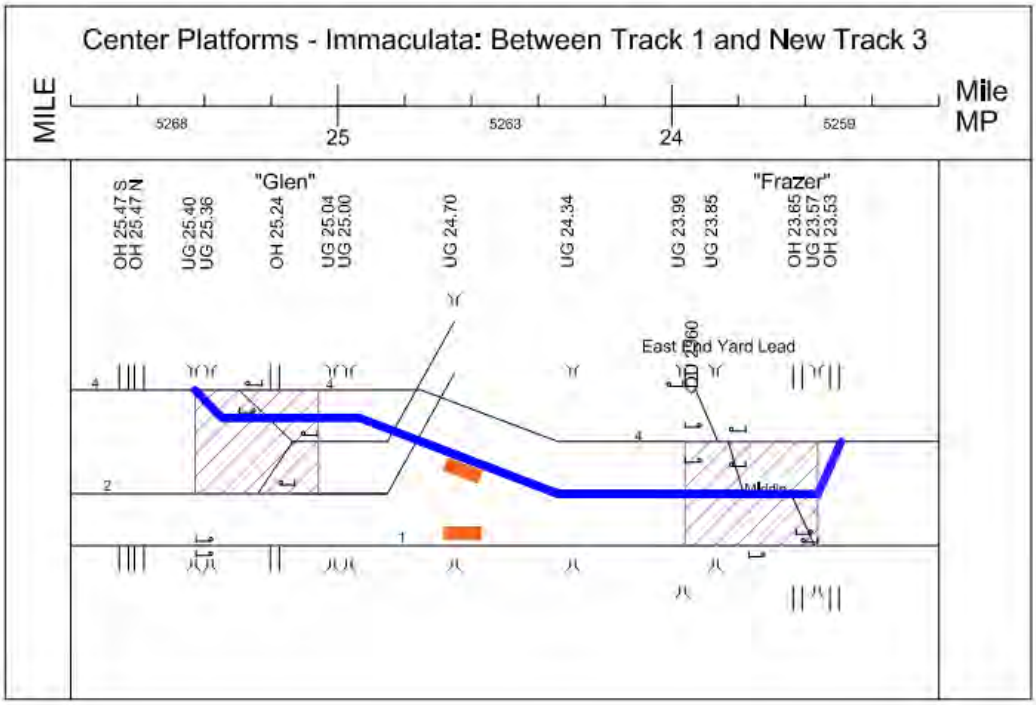
Platform Configurations



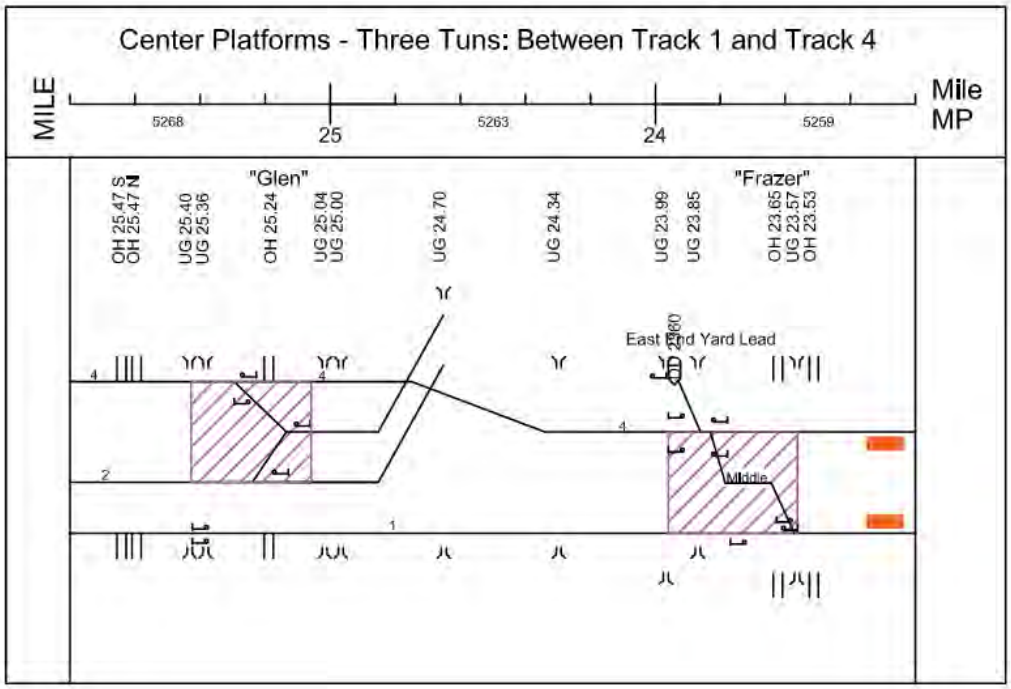


Appendix 2.1

Platform Configurations

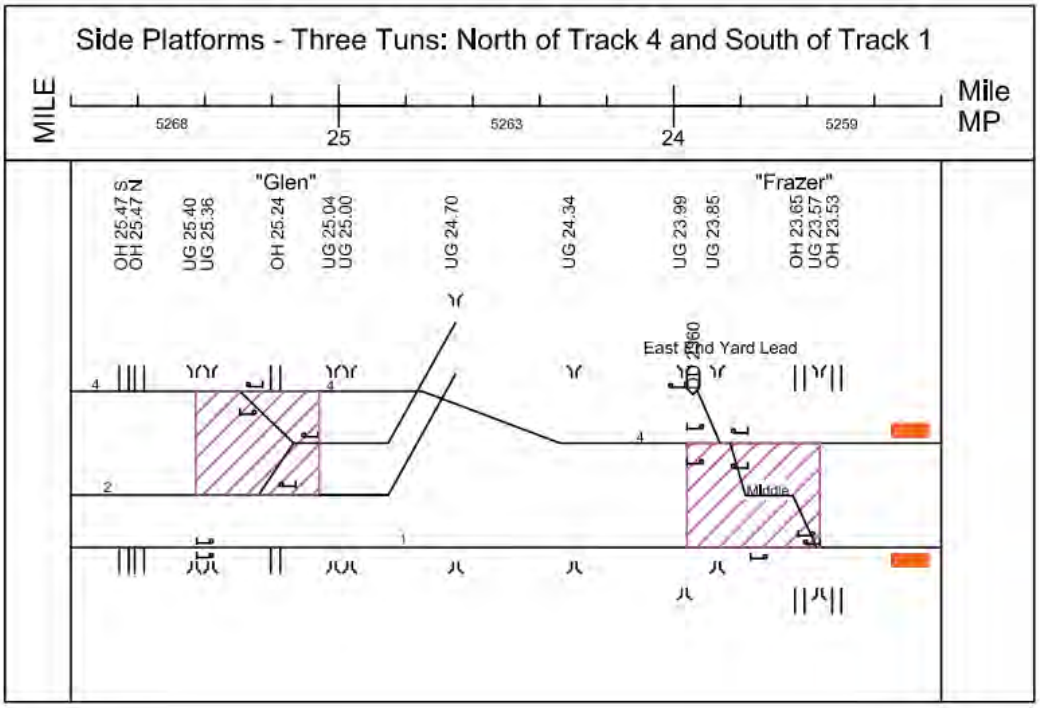
Platform Configurations Considered for Three Tun Site

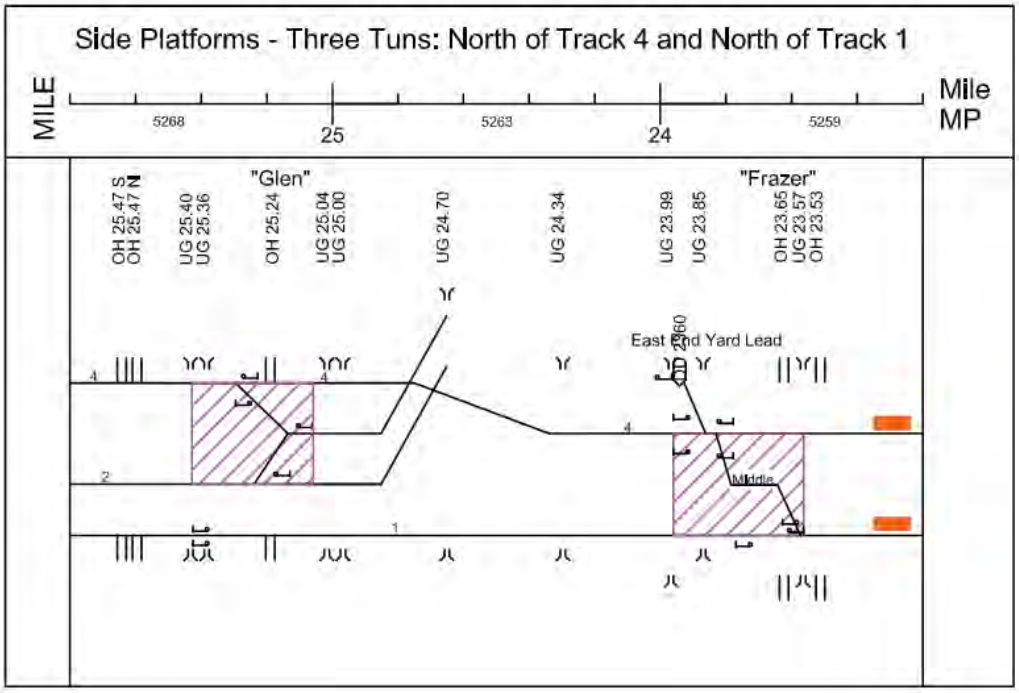
Three Tun		
1.	Center Platform	Between Track 1 and Track 4
2.	Side Platforms	North of Track 4 and South of Track 1
3.	Side Platforms	North of Track 4 and North of Track 1
4.	Side Platforms	South of Track 4 and South of Track 1



Appendix 2.1

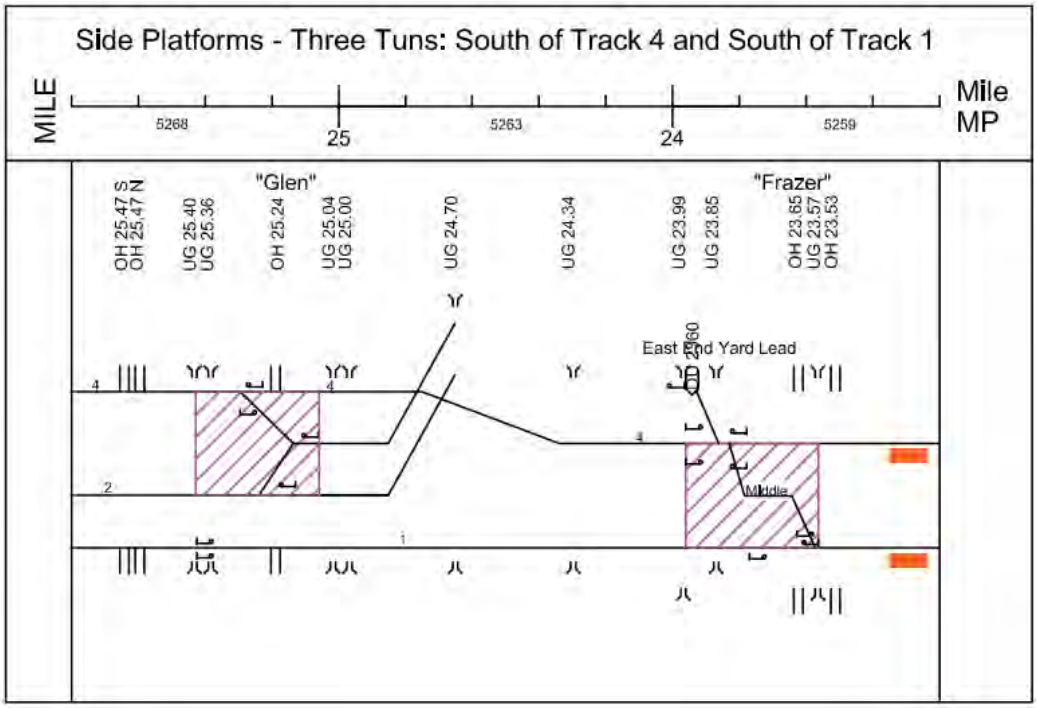
Platform Configurations





Appendix 2.1

Platform Configurations



Platform Configuration Ratings

The tables below compare the platform configuration ratings of the various options considered for each station site.

> Red highlighted items indicate that there are high costs or large operational impacts related to the configuration.
>
> Yellow indicates that as being a limiting factor but would not preclude it from consideration.
>
> Green indicates that the factor would not impact feasibility.
>
> A configuration was dismissed from consideration if it prohibited construction of additional tracks.

The preferred platform configuration for either site is highlighted in blue.

Appendix 2.1

Platform Configurations

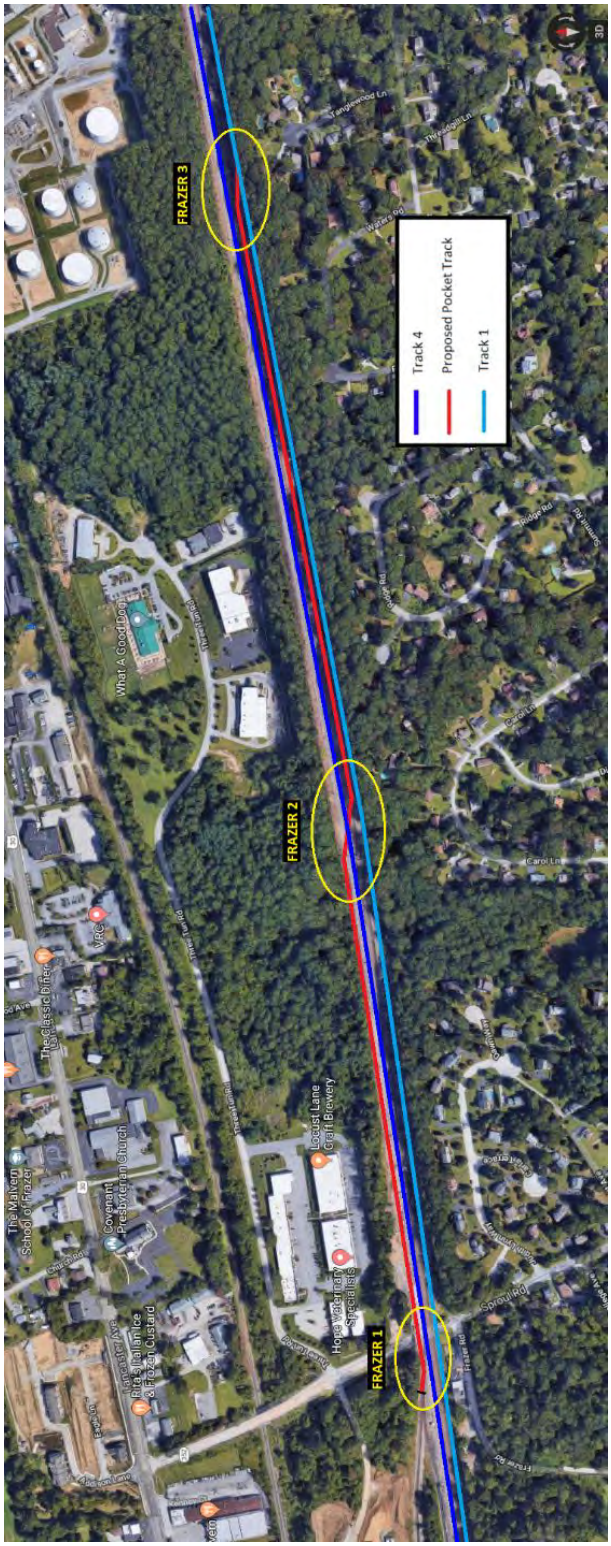
Immaculata								
			A	B	C	D	E	F
1.	Side Platforms	North of Track 4 and South of Track 1						
2.	Side Platforms	South of Track 4 and South of Track 1						
3.	Side Platforms	South of New Track 3 and South of Track 1						
4.	Side Platforms	North of New Track 2 and South of Track 1						
5.	Center Platform	Between Track 1 and Track 4						
6.	Center Platform	Between New Track 2 and Track 4						
7.	Center Platform	Between New Track 2 and New Track 3						
8.	Center Platform	Between Track 1 and New Track 3						

Three Tun								
			A	B	C	D	E	F
1.	Center Platform	Between Track 1 and Track 4						
2.	Side Platforms	North of Track 4 and South of Track 1						
3.	Side Platforms	North of Track 4 and North of Track 1						
4.	Side Platforms	South of Track 4 and South of Track 1						

A. Track, Signal, and Catenary Changes – Adding new track increases cost substantially.
B. Future Operational Considerations – Obstructs future capacity and/or future plans
C. Power and Signal Cable Relocations – Required at all locations.
D. Norfolk-Southern Participation – Increases costs and coordination.
E. Constructability – Crossing two tracks makes it harder to construct.
F. Steep Slopes – Can be mitigated. Steep Slopes are encountered at all combinations.

Appendix 2.2

Frazer Interlocking Future Plans


FRAZER 3
FRAZER 2
FRAZER 1
Track 4
Proposed Pocket Track
Track 1
What A Good Dog
The Classic Grill
Vic's
The Malvern School of Frazer
Covenant Presbyterian Church
Rita's Italian Ice & Frozen Custard
Locust Lane Craft Brewery
Hoag Veterinary Specialists
Lancaster Ave
Frazer Rd
Conestoga Rd
Sproul Rd
Ridge Rd
Carol Ln
Tanglewood Ln
Walker Rd
Thousand Ln
Hunter Ln
Eagle Ln
Lancaster Ave
Frazer

June 2019

DVRPC

PROCESS MEMO

East Whiteland Station Transit Forecasts

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

The Delaware Valley Regional Planning Commission is the federally designated Metropolitan Planning Organization for a diverse nine-county region in two states: Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer in New Jersey.

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

DVRPC's vision for the Greater Philadelphia Region is a prosperous, innovative, equitable, resilient, and sustainable region that increases mobility choices by investing in a safe and modern transportation system; that protects and preserves our natural resources while creating healthy communities; and that fosters greater opportunities for all.

DVRPC's mission is to achieve this vision by convening the widest array of partners to inform and facilitate data-driven decision-making. We are engaged across the region, and strive to be leaders and innovators, exploring new ideas and creating best practices.

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DVRPC is funded through a variety of funding sources including federal grants from the U.S. Department of Transportation's Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), the Pennsylvania and New Jersey departments of transportation, as well as by DVRPC's state and local member governments. The authors, however, are solely responsible for the findings and conclusions herein, which may not represent the official views or policies of the funding agencies.

INTRODUCTION

East Whiteland Station is a proposed Regional Rail station on the SEPTA Paoli/Thorndale Line between Exton and Malvern stations; filling a gap of roughly six rail-miles. The portion of the Paoli/Thorndale Line under study is the four adjacent stations on either side of the proposed site, that is: Whitford, Exton, Malvern and Paoli stations. The major motivation for this study is to investigate the potential ridership of a new Regional Rail station in East Whiteland Township, Chester County, PA.

There are two proposed sites for the station, "Immaculata" and "Three Tun". The Immaculata Site (Figure 1) is located just north of the Immaculata University campus. This site includes pedestrian access to Immaculata University campus; an extension of Planebrook Road (proposed "Planebrook Loop"), past U.S. 30, connecting to Ravine Road; a pedestrian overpass connecting the Planebrook Loop to the station; and a 400 space parking lot accessible from Frazer Road via a new driveway. The Three Tun Site (Figure 2) is located on Three Tun Road, and includes a 400 space parking lot south of Three Tun Road. With the Three Tun Site, a higher service frequency (hourly) is assumed, while at the Immaculata Site both high (hourly) and lower (half-hour) service are assumed separately.

The DVRPC travel demand model was used to estimate future ridership for stations at both build sites and the adjacent stations.

Figure 1: Immaculata Site

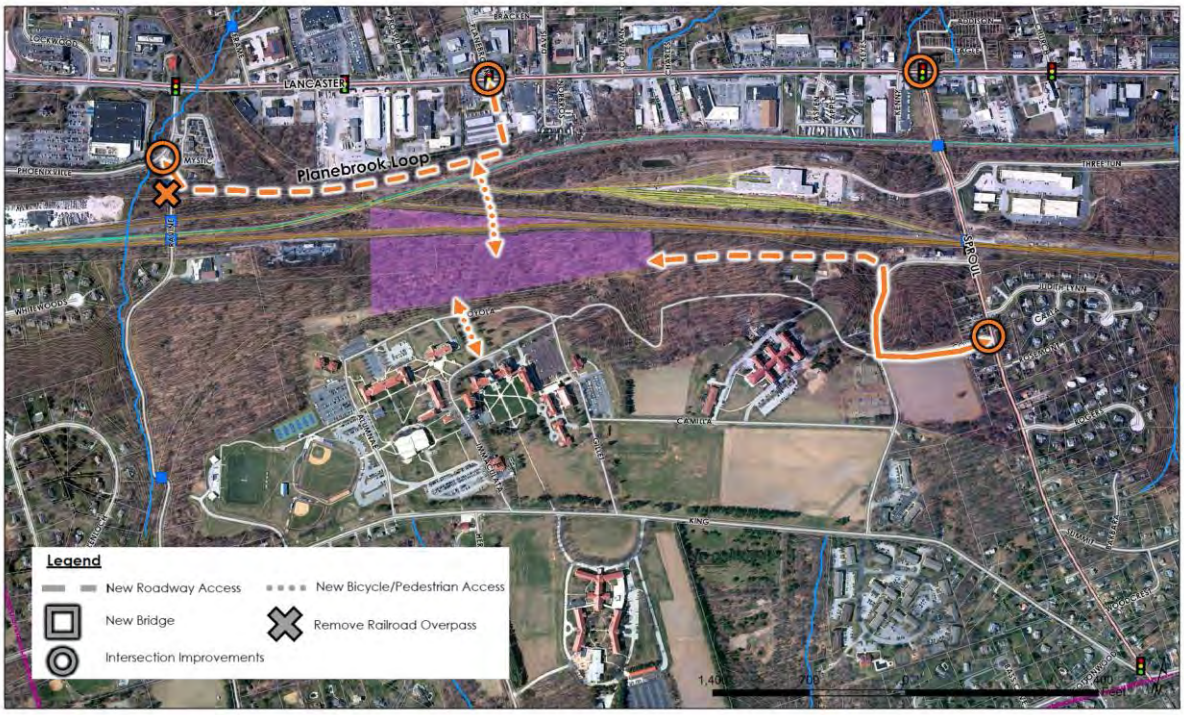
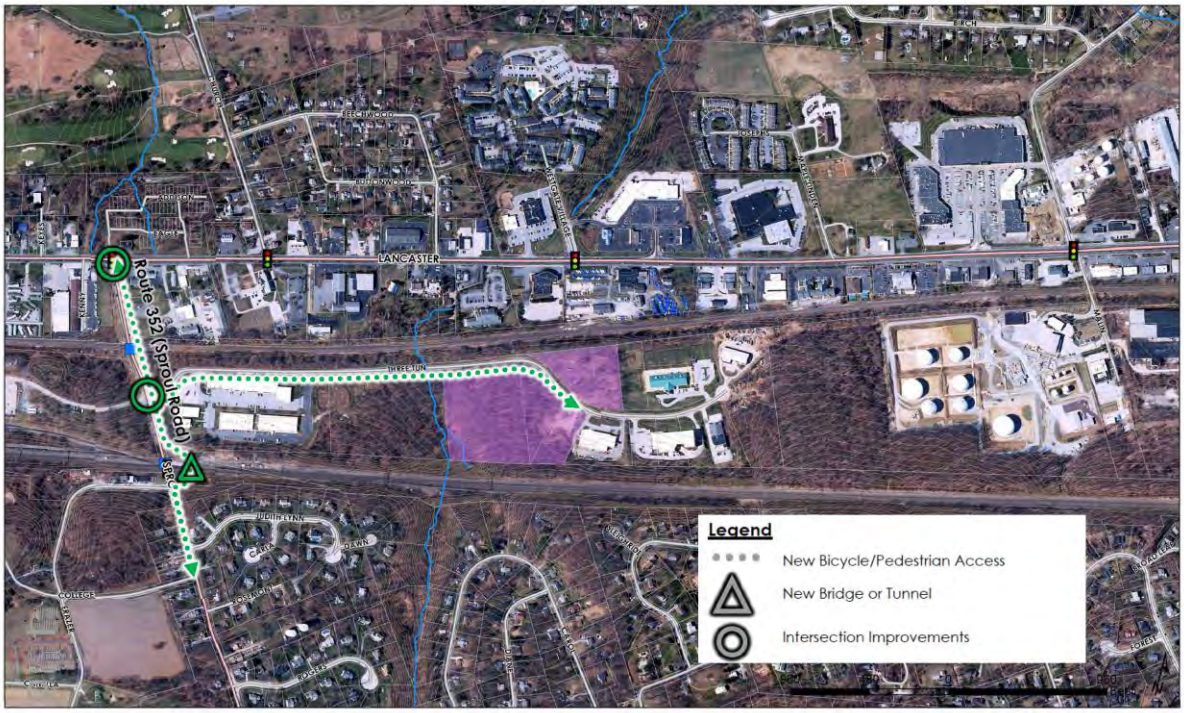


Figure 2. Three Tun Site



DVRPC TRAVEL FORECASTING PROCESS

Travel forecasts for this study were conducted using DVPRC's most recent travel demand model TIM2.3.1 (Transportation Improvement Model version 2.3.1). TIM2.3.1 is a traditional four-step, trip-based model built on PTV's VISUM 15.0 software platform. The model includes representations of the highway and public transit systems in DVRPC's nine member counties plus an extended area of 16 counties (where a less detailed transportation network is modeled) in Pennsylvania, New Jersey, Delaware, and Maryland, immediately surrounding the DVRPC region. The transit network represents operational characteristics of the regional transit system including route alignment, stop locations, service schedules, and fare information.

TIM2.3.1 follows the traditional steps of trip generation, trip distribution, modal split, and traffic assignment. However, an iterative feedback loop is employed from traffic assignment to the trip distribution step. The feedback loop ensures that the congestion levels used by the models when determining trip origins and destinations are equivalent to those that result from the traffic assignment step. Additionally, the iterative model structure allows trip making patterns to change in response to changes in traffic patterns, congestion levels, and changes to the transportation system.

TIM2.3.1 is disaggregated into four time periods: AM peak (6 AM to 10 AM), midday (10 AM to 3 PM), PM peak (3 PM to 7 PM), and evening (7 PM to 6 AM). This disaggregation begins in trip generation, where factors are used to separate daily trips into the individual time periods. TIM2.3.1 then utilizes completely separate model chains for AM peak, midday, PM peak, and evening travel simulation runs. Time-of-day sensitive inputs to the models, such as highway capacities and transit service levels, are disaggregated to be reflective of time-period-specific conditions.

Trip Generation

The trip generation module uses both socio-economic and location attributes to estimate the magnitude of travel demand for any given geographic area. Base year estimates and future year forecasts of population, households by income, employment by industry, land use, retail density, and many other variables are used to determine the number of trips produced by and attracted to small areas known as transportation analysis zones or TAZs. These trips are calculated for several trip purposes on the basis of trip rates applied to the zonal estimates of demographic and employment data. Trip purposes include work, shopping, school/university, and other non-work trips, light and heavy truck trips, and taxi trips.

Trip Distribution

Trip distribution is the process by which the zonal trip ends established in the trip generation analysis are linked together to form origin-destination patterns in a trip table format. AM peak, midday, PM peak, and evening trip ends are distributed separately based on a set of impedance calculations that consider the time and cost of travel. Separate distribution models are applied at the zonal level for each trip purpose.

Modal Split

The modal split model is also run separately for each time period. The modal split module calculates the fraction of each TAZ-to-TAZ cell in the trip table that should be allocated to transit, and then assigns the

residual to the highway side. The choice between highway and transit usage is made on the basis of comparative cost, travel time, and frequency of service, with other aspects of modal choice being used to modify this basic relationship. In general, the better the transit service, the higher the fraction assigned to transit, although trip purpose and auto ownership also affect the allocation. The model further divides highway trips into auto drivers and passengers.

Highway Assignment

For highway trips, the final step in the simulation process is the assignment of vehicle trips to the highway network representative of the alternative being modeled. For AM, midday, PM, and evening travel, the assignment model produces the future traffic volumes for individual highway links that are required for the evaluation of each alternative. The regional nature of the highway network and trip table underlying the assignment process allows the diversion of travel into and through the study area to various points of entry and exit in response to the changes made to the transportation system.

Highway trips are assigned to the network representative of a given alternative by determining the best (minimum time) route through the highway network for each origin-destination pair, and then allocating highway travel to the facilities along that route. This assignment model is "capacity restrained," which means that congestion levels are considered when determining the best route. An iterative equilibrium assignment method is used to implement the capacity constraint. When the assignment and associated trip table reach equilibrium, no path significantly faster than the one actually assigned for each trip can be found through the network, given the capacity restrained travel times on each link.

Transit Assignment

After equilibrium is achieved, the transit trip tables are assigned to the transit network to produce link and route passenger volumes. The transit person trips produced by the modal split model are "linked," which means that they do not include any transfers that occur either between transit trips or between auto approaches and transit lines. The transit assignment procedure accomplishes two major tasks. First, the transit trips are "unlinked" to include transfers, and second, the unlinked transit trips are associated with specific transit facilities to produce link, line, and station volumes. These tasks are accomplished simultaneously within the transit assignment model, which assigns the transit trip matrix to minimum impedance paths built through the transit network. There is no capacity-restraining procedure in the transit assignment model.

Transit Assignment Validation

Before a travel model can be used to predict changes in transit ridership due to the various new station alternatives, its ability to replicate existing conditions is tested. The simulated transit assignments are compared to current transit counts taken at stations serving the study area. The travel model is executed with current conditions and the results are compared with recent transit counts. Based on this analysis, the East Whiteland travel model produced accurate traffic ridership. The validated model was then executed for each of the build alternatives.

The following tabulations summarize the errors in the assigned ridership. Four stations in the study area with available daily ridership counts were used for model validation: Whitford, Exton, Malvern, and Paoli

stations. The total number of boardings at all facilities, 3,175, is within two percent of the total counted volume of 3,233 boardings.

Table 1. Average Travel Model Calibration Error for the East Whiteland study area

Location	Counted Boardings	Assigned Boardings	Difference	Percent Difference
Whitford	399	318	-81	-20.3 %
Exton	797	801	4	0.5 %
Malvern	850	734	-116	-13.6%
Paoli	1,187	1,322	135	11.4 %
All	**3,233**	**3,175**	**-58**	**-1.8 %**

TRANSIT FORECASTS

For each of the 2035 future year scenarios, the inputs to the TIM2.3.1 model were modified to reflect the relevant zonal demographic and employment estimates as well as the necessary changes to the highway and transit networks. The model was then executed with those inputs and the changes in highway volume and transit ridership from a 2015 base year were tabulated and analyzed. All of the results presented in this section are for an average annual weekday.

Future Year Alternatives

Four future year alternatives were modeled: 2035 No-Build, 2035 Build (Immaculata Site, hourly service), 2035 Build (Immaculata Site, half-hour service) and 2035 Build (Three Tun Site). The coded transportation networks for all alternatives includes all of the transportation projects in DVRPC's Transportation Improvement Program (TIP) and Long Range Plan that are scheduled to be open by the analysis year.

There are a number of regionally significant projects that may impact ridership on the Paoli/Thorndale Line that are scheduled to be open in 2035. This includes expanding parking at three stations: at Exton from 610 to 1,043 paces; at Paoli from 486 to 1,086 spaces; and at Downingtown from 360 to 900 spaces. Also included is an extension of the Media/Elwyn Line from Elwyn, PA to Wawa, PA which would provide 600 more spaces to the area and extend the catchment area of the Media/Elwyn Line.

Socioeconomic Projections

DVRPC's long-range population and employment forecasts are revised periodically to reflect changing market trends, development patterns, local and national economic conditions, and available data. The completed forecasts reflect all reasonably known current information and the best professional judgment of predicted future conditions. The revised forecasts, in five-year increments between 2015 and 2045, were adopted by the DVRPC Board in 2016. They support the Region's 2045 Long Range Plan and serve as the basis for DVRPC's planning and modeling activities during the life of the Plan.

DVRPC uses a multi-step, multi-source methodology to produce its forecasts at the county level. County forecasts serve as control totals for municipal forecasts, which are disaggregated from county totals. Municipal forecasts are based on an analysis of historical data trends adjusted to account for infrastructure availability, environmental constraints to development, local zoning policy, and development proposals. Municipal population forecasts are constrained using density ceilings and floors. County and, where necessary, municipal input is used throughout the process to derive the most likely population forecasts for all geographic levels.

Population Forecasting

Population forecasting at the regional level involves review and analysis of six major components: births, deaths, domestic in-migration, domestic out-migration, international immigration, and changes in group quarters populations (e.g., dormitories, military barracks, prisons, and nursing homes). DVRPC uses both the cohort survival concept to age individuals from one age group to the next, and a modified Markov transition probability model based on the most recent US Census and the US Census' recent Current Population Survey (CPS) research to determine the flow of individuals between the Delaware

Valley and areas outside the region. For movement within the region, Census and IRS migration data, coupled with CPS data, are used to determine migration rates between counties. DVRPC relies on county planning offices to provide information on any known, expected, or forecasted changes in group quarters populations. These major population components are then aggregated and the resulting population forecasts are reviewed by member governments for final adjustments based on local knowledge.

Employment Forecasting

Employment is influenced by local, national, and global political and socioeconomic factors. The National Establishment Time Series (NETS) database serves as DVRPC's primary data source for employment forecasting. Employment sectors include mining, agriculture, construction, manufacturing, transportation, wholesale, retail, finance/insurance, service, government, and military. Other supplemental sources of data include the US Census Bureau, Bureau of Economic Analysis, the Bureau of Labor Statistics, Occupational Privilege tax data, and other public and private sector forecasts. As in the population forecasts, county-level total employment is used as a control total for sector distribution and municipal level forecasts. Forecasts are then reviewed by member counties for final adjustments based on local knowledge.

Study Area Population and Employment Forecasts

As part of the East Whiteland Station Study, the consultant team reviewed its most recent population and employment estimates, its long-range population and employment forecasts, and all proposed land use developments in the study area. Employment and enrollment forecasts at Immaculata University and affiliated Camilla Hall Nursing Home were provided by Immaculata University to improve demographic estimates for their respective zone. Immaculata University is expecting strong growth at 6% annual increase in undergraduate enrollment and 1%-5% annual growth in other student programs. They expect 4% annual growth in employment and no growth at Camilla Hall Nursing Home. These estimates were applied to the model's zonal data. A summary can be found in Table 2.

Table 2. Immaculata University and Camilla Hall enrollment, residency and employment forecasts

			2015 – 2035 Change	
Immaculata University	**2015**	**2035**	**Abs.**	**Pct.**
Student Enrollment	2,709	5,063	2,354	87%
Student Residents	434	812	378	87%
Immaculata University Workers	No data	619		
Camilla Nursing Home Employees	No data	265		
All workers	-	884		

Between 2015 and 2035, the total population in the study area is projected to increase by 10,902 residents to 73,061. This represents an increase of just under 18 percent from the 2015 value of 62,141. All study area municipalities except Malvern are expected to add more than 2,000 new residents between 2015 and 2035. East Whiteland Township has the greatest relative and absolute increase in

population at 4,656 new residents, a 43 percent increase. The study area's population is growing at a slower rate than Chester County as a whole. Table 3 summarizes the study area's population forecasts.

The study area will also add over 17,000 new jobs between 2015 and 2035, an increase of 16.3 percent. This is lower than the employment growth rate of Chester County. The highest relative growth occurs in Malvern, with 26.4% more jobs, but the other study area municipalities have higher absolute growth rates. Table 4 summarizes the study area's employment forecasts.

Table 3. Study Area Population Forecasts

	Population		2015 – 2035 Change	
Location	**2015**	**2035**	**Abs.**	**Pct.**
Chester County	515,939	624,832	108,893	21.1%
West Whiteland Twp	18,450	21,614	3,164	17.1%
East Whiteland Twp	10,702	15,358	4,656	43.5%
Malvern Boro	3,430	3,924	494	14.4%
Tredyffrin Twp	29,559	32,165	2,606	8.8%
Study Area Municipalities	**62,141**	**73,061**	**10,902**	**17.6%**

Table 4. Study Area Employment Forecasts

	Employment		2015 – 2035 Change	
Location	**2015**	**2035**	**Abs.**	**Pct.**
Chester County	309,605	374,967	65,362	21.1%
West Whiteland Twp	23,476	28,175	4,699	20.0%
East Whiteland Twp	23,399	29,374	5,975	25.5%
Malvern Boro	2,359	2,981	622	26.4%
Tredyffrin Twp	55,459	61,270	5,811	10.5%
Study Area Municipalities	**104,693**	**121,800**	**17,107**	**16.3%**

RESULTS

Travel forecasting models are designed to provide the most likely future travel patterns, traffic volumes, and transit ridership indicative of the model inputs. Travel forecasts are highly influenced by the future transportation network and projected future land use, population, and employment. When these projections are met, travel model outputs generally fall within 15 percent of the actual, future values. Unforeseen changes in the national and regional economies and other market forces can have a profound effect on future land use and therefore travel patterns. The TIM2.3.1 travel model assumes that household income, transit fares, parking charges, tolls, and other auto operating costs will all increase at approximately the same rate thru 2035. Unanticipated policy changes that heavily influence one or more of these variables can cause the margin of error in the transit forecasts to increase.

Average Daily Transit Ridership Forecasts

Table 5: Transit Forecasts at East Whiteland Station

Site	# of trains (Inbound)	Boardings (including Park & Ride)	Park & Ride vehicles	Boardings (Full Study Area)
Immaculata Hourly Service	21	385	90	3,990
Immaculata Half Hourly Service	36	530	175	4,084
Three Tun Half Hourly Service	36	360	240	3,858
No-Build	-	-	-	3,853
Base (2015 counts)	-	-	-	3,233

Transit forecasts for the 2035 build and no-build scenarios are provided in Table 5. For the Immaculata Site, with 21 inbound daily trains (hourly service), the forecasted ridership is 385 daily boardings including 90 park and ride vehicles and 3,990 boardings for the full five-station study area (Whitford, Exton, East Whiteland, Malvern and Paoli). For the Immaculata Site with 36 inbound trains (half-hour service), the forecasted ridership is 530 daily boardings with 175 park and ride vehicles and 4,084 study-area boardings. For the Three Tun Site, with a service frequency of 36 inbound trains daily, the forecasted ridership is 360 daily boardings which include 240 park-and-ride vehicles, and 3,858 study-area boardings. For the No-Build, there were 3,853 study area boardings.

ABSTRACT

Title: East Whiteland Station Transit Forecast

Publication Number:

Date Published:

Geographic Area Covered:
Chester County, East Whiteland Township, West Whiteland Township, Malvern Borough, Tredyffrin Township

Key Words:

Abstract:
East Whiteland Station is a proposed Regional Rail station on the SEPTA Paoli/Thorndale Line between Exton and Malvern stations; filling a gap of roughly six rail-miles. Ridership projections are provided for two site alternatives of the station for an anticipated opening year of 2035.

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dvrpc
REGIONAL
PLANNING COMMISSION

Sisters, Servants of the Immaculate Heart of Mary
1 Our Lady Circle
Malvern, Pennsylvania 19355
TELEPHONE: 610-647-2160
FAX: 610-889-4874

June 6, 2019

Mrs. Natasha G. Manbeck
McMahon Transportation Engineers, Project Manager
840 Springdale Drive
Exton, Pennsylvania 19341

Dear Mrs. Manbeck,

The Sister Servants of the Immaculate Heart of Mary (Sisters) and Immaculata University fully support the location of a new train station on the property owned by the Sisters and sited at Immaculata University.

The train station will satisfy the longstanding unmet transportation needs of both current and potential students, faculty, staff and employees of Immaculata University, Camilla Hall, the Villa Maria House of Studies and the Villa Maria Lower School.

Current conversation regarding a 3P and the solicitation of funding have included the potential of the Sisters providing the land as a contribution for 3P membership or grant match.

Sincerely,

Sister Mary Ellen Tennity IHM

Sr. Mary Ellen Tennity, IHM
General Superior

Barbara Lettiere
President, Immaculata University

TMACC

Transportation Management Association of Chester County

June 2019

Dear Stakeholders:

On behalf of the Board of Directors for the Transportation Management Association of Chester County (TMACC), we were appreciative to be included as a stakeholder, of the process and of the outcome of the East Whiteland Train Station Study. Knowing that a Frazer station located on the Keystone Corridor is feasible, enables the East Whiteland Township, Chester County Planning Commission, Immaculata University and TMACC to advocate for the future station.

We do recognize that the study determined that there are two feasible locations for a train station in East Whiteland Township, Chester County: Immaculata and Three Tun. Each of these two potential sites does hold distinct advantages and disadvantages but **agree that the Immaculata site is the desired location**.

The future of an Immaculata Station in East Whiteland is consistent with the Township's community vision and goals and will help better envision Frazer as a walkable, inviting community. Additionally, the train station is also consistent with Immaculata University's plans to attract and expand opportunities for students and staff. Even though locating a future station on Immaculata's property does have increased cost due to property constraints, the site offers more visibility, eliminates the competing us of a commercial property and improves access and circulation of the road infrastructure network.

While a variety of factors need to fall in line in order for a new station in East Whiteland to become a reality, the project support and leadership is critical for identifying, advocating, and securing funding for continued planning, design and construction of the train station. In conclusion, TMACC, agrees with the committee's findings and recommendations that the Immaculata site represents a better long-term infrastructure project for East Whiteland and Chester County's residents and businesses.

Sincerely,

P. Timothy Phelps
Executive Director

7 Great Valley Parkway, Suite 144 • Great Valley Corporate Center •Malvern, Pennsylvania 19355
Phone 610.993.0911 Fax 610.993.0922 e-mail info@tmacc.org Web www.tmacc.org

Immaculata Station Site Development Potential

The Sisters, Servants of the Immaculata Heart of Mary (Sisters of IHM) own three vacant parcels generally located north and west of Immaculata University's campus and south of Amtrak's Keystone Corridor. The attached map identifies the parcels as A, B, and C and depicts some existing conditions in the area. If the Sisters of IHM (or a subsequent property owner) would elect to develop this area, there are several considerations and constraints that influence the development potential.

The area has steep slopes (15—25%) and very steep slopes (25%+) which are restricted from development in East Whiteland Township's ordinance. Additionally approximately five acres of parcel C are proposed for the train station parking and access roadway. Accounting for the areas of steep slopes and the station area, there are approximately 32 acres available for potential development within these three parcels.

Developable Acreage on Immaculata Site

	Pin	Gross Acres	Woodland[1]	15-25% slope[1]	25%+ slope[1]	Proposed Station and Access	Developable acres[2]
A	42-6-28	12.7	8.76	0	0		12.7
B	42-6-27	12.7	12.7	6.07	0.17		6.46
C	42-6-25	27.2	26.8	5.74	2.80	5.0	13.66
Total							32.82

In East Whiteland Township, the amount of development that can be built on a property is governed by the maximum floor-area ratio (FAR). Floor area ratio is calculated by multiplying the developable area (in square feet) by the FAR. The table below provides a range of gross square feet of potential development given the developable acres. If a train station is developed in this location, the Township may implement a new zoning overlay district specific to the vision for this area. The FAR of the overlay may be within or higher than the range of 0.4 to 0.7, thus changing the development potential within this area.

Potential Gross Square Footage on Immaculata Site

	Pin	Developable acres[3]	Potential FAR range[4,5]	Potential Gross Square Feet Range[6]
A	42-6-28	12.7	0.4 to 0.7	221,200 to 387,200
B	42-6-27	6.46	0.4 to 0.7	112,500 to 196,800
C	42-6-25	13.66	0.4 to 0.7	237,800 to 416,500
Total		32.82		571,500 to1,000,500

Notes:

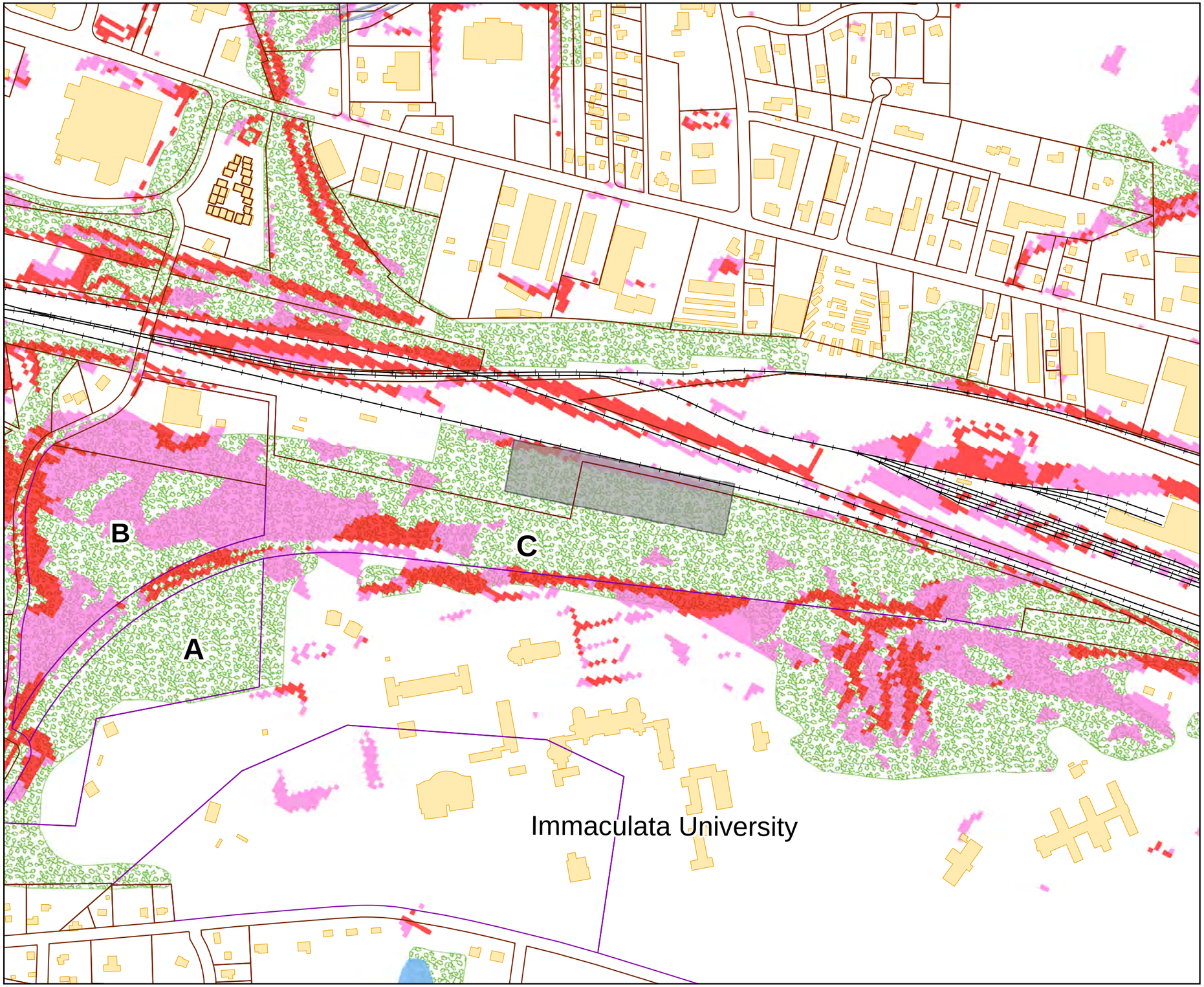
1. *Sources: Consultant measurement of Chester County GIS data.*
2. *Total acreage minus steep slopes (15%-25%) or very steep slopes (25% +) and proposed station and access. Woodlands are not protected by the East Whiteland Township Zoning Ordinance.*
3. *See Developable Acreage table.*
4. *The FAR per existing Institutional District regulations is 0.4 and 0.7 is the same FAR as the village mixed use district along Route 30.*
5. *If a train station is developed in this location, the Township may implement a new zoning district with a different FAR.*
6. *Rounded down to the nearest hundred.*

Immaculata Station Site Development Potential

In addition to FAR, there are several other factors that influence and determine what can be built. Development must meet all other regulations, such as setbacks, building height, and impervious coverage, as well as parking, etc. The configuration of steep slopes on parcel B will pose a challenge to situating any buildings since structures are not permitted in steep slope areas. Furthermore, the developable portions of the parcels could be reduced depending on the right-of-way needs for additional access or circulation to the site. However, if there is interest and support, the Immaculata Station site has land available adjacent to the station with development potential.

East Whiteland Township

Chester County
Pennsylvania



Legend

- Potential Immaculata Train Station
- Building Footprints 2015
- 100 Year Floodplain
- Wetlands
- Woodlands
- Railroads

Slopes

- 0 - 15%
- 15 - 25%
- Greater than 25%

N

500 250 0 500
Feet

Data Sources: All Base Data, 100 Year Floodplain, Wetlands, Woodlands, Steep Slopes, Building Footprints - Cheter County GIS, 2015

June 27, 2019