December2005

Delaware County
Highway-Railroad Grade Crossing Study

Delaware Valley Regional Planning Commission

Created in 1965, the Delaware Valley Regional Planning Commission (DVRPC) is an interstate, intercounty and intercity agency that provides continuing, comprehensive and coordinated planning to shape a vision for the future growth of the Delaware Valley region. The region includes Bucks, Chester, Delaware, and Montgomery counties, as well as the City of Philadelphia, in Pennsylvania; and Burlington, Camden, Gloucester and Mercer counties in New Jersey. DVRPC provides technical assistance and services; conducts high priority studies that respond to the requests and demands of member state and local governments; fosters cooperation among various constituents to forge a consensus on diverse regional issues; determines and meets the needs of the private sector; and practices public outreach efforts to promote two-way communication and public awareness of regional issues and the Commission.

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.

DVRPC is funded by 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 its findings and conclusions, which may not represent the official views or policies of the funding agencies.

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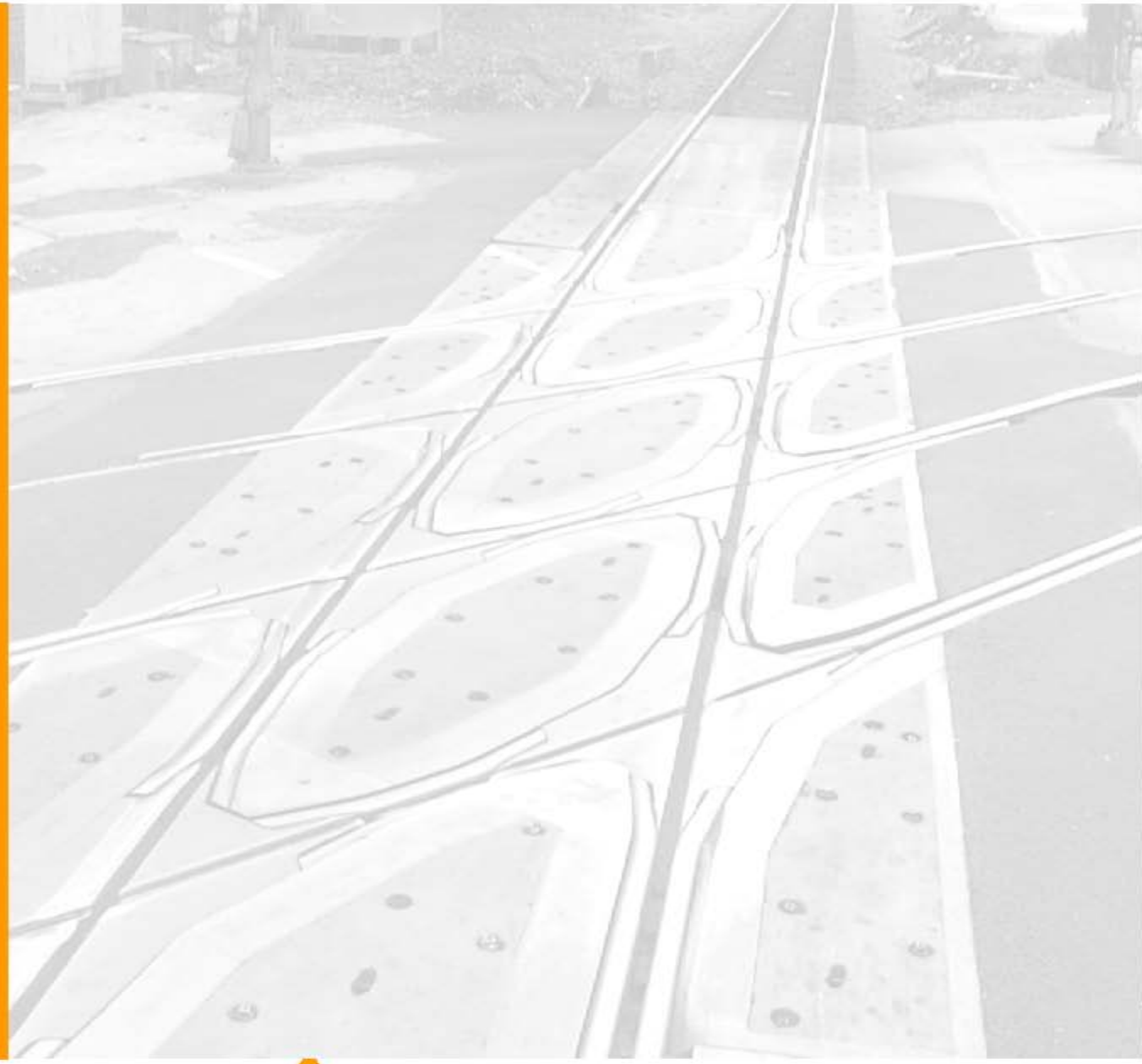


Executive Summary

This study examines a grouping of eleven highway-railroad grade crossings along a major rail freight line in Delaware County, Pennsylvania. The purpose of the study is to document existing conditions at the crossings in the corridor, and to propose an improvement program which simultaneously facilitates the flow of freight and mitigates the impacts of the trains on the surrounding communities.

The report has five key components. Section II provides pertinent background information. Section III offers detailed information, maps, and aerial photographs about each of the corridor's eleven grade crossings. Sections IV and V provide an overview of the range of options available to mitigate crossing conflicts and describe the use of an analytic tool, *Grade.Dec.Net,* to test various improvement scenarios.

Section VI of the report sets forth a broad corridor action plan consisting of capital improvements and next steps. A number of activities which will help integrate rail freight operations with community goals are presented. Also, the report identifies those crossings with the greatest potential to be grade separated.

A technical steering committee made invaluable contributions towards the preparation of this report. The steering committee consisted of all of the affected municipalities (Collingdale, Darby, Folcroft, Glenolden, Norwood, Prospect Park, and Ridley Park boroughs, and Ridley and Upper Chichester townships), CSX Transportation, the Delaware County Planning Department, the Pennsylvania Department of Transportation, the Southeastern Pennsylvania Transportation Authority, and the Pennsylvania Public Utility Commission.

Section I

Introduction

This study examines a grouping of eleven highway-railroad grade crossings along a major rail freight line in Delaware County, Pennsylvania. The purpose of the study is to document existing conditions at the crossings in the corridor, and to propose an improvement program, which simultaneously facilitates the flow of freight and mitigates the impacts of the trains on the surrounding communities.

Freight train traffic has been on the increase in the United States in recent years and there are strong prospects for continued gains. With overall freight volumes predicted to double in the next 20 years, promoting the rail freight network as a vital component of the transportation system is generally supportable from a public policy perspective. However, any significant upgrade of rail freight lines should be carefully coordinated with adjacent municipalities due to traffic, noise, safety, and air quality impacts.

Fortunately, new tools have been created which permit the testing of various grade crossing improvement schemes and the identification of relative costs and benefits. This study employs the Federal Railroad Administration's *GradeDec.Net* software as the analytic basis for the report's findings and for differentiating among a menu of options; namely, crossing closures, separations, and technological enhancements.

The report has five key components. Section II provides background information and a scan of initiatives across the country that demonstrates an increasing public sector interest in crossing and rail freight projects. Section III offers detailed information, maps, and aerial photographs about the subject rail line and each of the corridor's eleven grade crossings. Section IV provides an overview of the range of options available to mitigate crossing conflicts. Section V describes the study's analytic foundation and parameters. Finally, Section VI of the report sets forth a corridor action plan consisting of capital improvements and next steps.

A technical steering committee made invaluable contributions towards the preparation of this report. The steering committee consisted of all of the affected municipalities (Collingdale, Darby, Folcroft, Glenolden, Norwood, Prospect Park, and Ridley Park boroughs, and Ridley and Upper Chichester townships), CSX Transportation, the Delaware County Planning Department, the Pennsylvania Department of Transportation, the Southeastern Pennsylvania Transportation Authority, and the Pennsylvania Public Utility Commission.

The initial impetus and concept for this report as a transportation planning priority was advanced by the Delaware County Planning Department. A regional freight advisory committee, the Delaware Valley Goods Movement Task Force, shared a strong interest in the study and its purpose.

The Delaware Valley Regional Planning Commission (DVRPC) is the Metropolitan Planning Organization (MPO) for the Philadelphia-Camden region, the sixth largest metropolitan area in the country. As reflected in this study, one of DVRPC's primary objectives is to devise strategies for complex transportation issues and to help balance freight movement with quality-of-life concerns.

Section II

Background

This section lays out background information which is important towards fully understanding the specific grade crossings under study. Information is provided about the affected municipalities, the rail line, and relevant national programs.

The eleven grade crossings resulting from the CSX rail line traversing Delaware County occur in nine minor civil divisions (MCDs). Of these boroughs and townships, some contain more than one crossing (e.g., Upper Chichester Township which has 3).

The affected MCDs range in size from 6,000-30,000 in population and from 800-13,000 in employment. For the most part, these MCDs may be regarded as mature communities. Most are forecasted to experience declines in both population and employment from current levels by the Year 2025.

Table I: Year 2000 Population and Employment Totals for Delaware Co. Communities Impacted by CSX Rail Line Grade Crossings

	Population	Employment
Collingdale Borough	8,644	1,870
Darby Borough	10,299	3,020
Folcroft Borough	6,978	3,150
Glenolden Borough	7,476	2,260
Norwood Borough	5,985	770
Prospect Park Borough	6,594	1,590
Ridley Township	30,791	13,860
Ridley Park Borough	7,196	2,370
Upper Chichester Township	16,842	3,140

Source: Delaware Valley Regional Data Bulletin, DVRPC, March 2002

CSX is one of three major, Class I freight railroads operating in the Delaware Valley. The other two Class I railroads are Norfolk Southern and Canadian Pacific. In addition, there are a number of smaller, short line railroad operations.

CSX operates freight trains in the eastern half of the United States. Through agreements, it can also hand off freight for delivery by other railroads to the western portion of the United States, Canada, and Mexico. In the Delaware Valley, CSX has the ability to operate on many rail lines, such as those owned by Norfolk Southern, Amtrak, and even the Southeastern Pennsylvania Transportation Authority (SEPTA). However, most of CSX operations are focused on the line (which it owns) that traverses the region in a north-south fashion (and which is the subject of this study). To lend a bigger picture, it can be said that the line roughly parallels I-95 all the way from Florida to Canada.

CSX also owns and operates several intermodal facilities where goods are transferred from rail to truck. These include terminals in Twin Oaks, Delaware County (automobiles), Chester City and Southwest Philadelphia (dry and wet bulk materials), and South Philadelphia (containers and trailers).

The CSX line through Delaware County is often referred to as the Philadelphia Subdivision. Much of the line is single track, but a recently completed extension of the Feltonville siding added additional capacity to the line. This additional capacity has helped CSX address local concerns created by extended crossing blockages.

The CSX line is heavily used, with an average of 35 trains a day and strong prospects for longer and more trains in the future. Following the break-up of the Contrail system in 1999, the Philadelphia Subdivision line took on added significance, particularly as a route of entrée into the North Jersey and New York markets and as a way to gain additional business.

Freight trains operating on this line haul virtually any substance. This includes consumer products, bulk commodities hazardous materials, and even solid waste. Trains may be either local or long distance in nature, and include various types of rail equipment such as box cars, tank cars, and hopper cars, and intermodal platforms.

I-95 is the major north-south interstate route in the Delaware Valley region, serving both inter and intra-regional travel. Segments of I-95, presently carry 100,000 vehicles a day, volumes that could easily reach 150,000 vehicles a day in the next 25

years based on forecasts of moderate, constant growth. The CSX rail corridor under study parallels I-95 and, for this reason, has been referred to as "R-95."

I-95 is vital to business and economic development. For example, in the coming years, a number of new development projects in the corridor are already under way or in the planning stages. A sampling of the projects includes: Philadelphia International Airport expansion, new stadiums for the Eagles and Phillies, a Norfolk Southern Intermodal Terminal, the use of Packer Avenue Marine Terminal as a strategic military port, and Penn's Landing. All of these projects depend upon their proximity to I-95, and to I-95's ability to provide reliable operating conditions.

The Mid-Atlantic Rail Operations Study (MAROps) is a joint initiative of the I-95 Corridor Coalition, five member states (New Jersey, Pennsylvania, Delaware, Maryland, and Virginia), and three railroads (Amtrak, CSX, and Norfolk Southern). The Federal Railroad Administration (FRA) and Federal Highway Administration (FHWA) participate as advisors. Over a two-year period, the MAROps participants crafted a 20-year, $6.2 billion program of rail improvements aimed at improving north-south rail transportation for both passengers and freight in the Mid-Atlantic region and helping reduce truck traffic on the region's overburdened highway system. Desired improvements throughout much of the corridor, including the Delaware County portion, include a second track, raised clearances, and the elimination of grade crossings.

The Office of Intermodalism is a branch of the U.S. Department of Transportation. The office deals with issues which cut across various modes of transportation for passengers and freight. One important product prepared by the Office of Intermodalism was, "Accidents that Shouldn't Happen: A Report of the Grade Crossing Safety Task Force to Secretary Federico Peña (March, 1996). This report and effort resulted from a tragic accident involving a school bus at a grade crossing in Illinois in 1995. The report served to highlight the complex issues and processes surrounding grade crossing design, maintenance funding, enforcement, storage space, signal coordination, and other considerations.

Operation Lifesaver is a nationwide, non-profit public awareness program which is designed to draw attention to grade crossing safety. The program's major components are in the areas of education, engineering, and enforcement. As strong advocates of safety, the rail industry including the railroads, the major industry

association, the American Association of American Railroads, the U.S. Department of Transportation, and other partners fully support the goals and objectives of Operation Lifesaver.

Of note, through Operation Lifesaver, certified presenters meet with school children and other groups to outline safe practices at grade crossings. The Federal Highway Administration estimates that safety awareness initiatives through Operation Lifesaver have saved 10,000 lives in 30 years. This emphasis on safety is critical, particularly given the fact that both train and highway volumes are on the rise.

Trains have special operating characteristics, largely due to their size and weight, which often surprise people because they do not behave and react like automobiles. In particular, trains require long distances to come to a complete stop. For example, freight trains traveling at 55 mph and passenger trains traveling at 80 mph require approximately one mile to stop.

Other facts about trains promulgated by the Operation Lifesaver safety program are:

- trains overhang tracks by at least three feet;
- locomotives are not always located at the front of the train;
- trans passing a crossing may conceal a train approaching from the opposite direction
- modern trains are quiet with no telltale "clackety-clack;" and
- trains do not follow set schedules

Significantly, a number of undertakings across the country which are regarded as freight transportation improvements target the elimination of highway-railroad traffic conflicts. For example, one of the nation's largest transportation projects was recently completed in Los Angeles, California. This initiative, the Alameda Corridor Project, resulted in improved highway access and a high-speed rail corridor between the ports and the trans-continental rail yards located on the eastern side of Los Angeles. The new rail corridor is 20 miles in length. It consolidates 90 miles of branch line tracks and eliminates 200 at-grade highway crossings. The elimination of the crossings is due to

the construction of grade separated crossings and a 10-mile trench in which the rail corridor is below ground.

The benefits of the project to freight interests and the surrounding communities are substantial and varied. For example, the elimination of the grade crossings is estimated to reduce noise and vibration by 90%, traffic delays by 90%, truck traffic by 23%, and train stoppages by 75%.

Another metropolitan area which has linked freight improvements and grade crossing eliminations is Seattle, Washington. Seattle has created a FAST Corridor Program to enhance freight flows to and from the ports of Seattle and Tacoma. Central to the program is 20 road and highway grade separation projects worth more than $500 million.

Chicago has also developed a major rail initiative called CREATE (Chicago Regional Environmental and Transportation Efficiency project. This public/private partnership will improve passenger rail service, reduce motorist delay, ease traffic congestion, increase safety and provide economic, environmental and energy benefits for the Chicago region. The project will maximize the use of five rail corridors for a faster and more efficient rail network, eliminate the wait for motorists at 25 grade crossings by creating grade separations that separate motorists from trains, and create six rail-to-rail "flyovers" - overpasses and underpasses that separate passenger trains from freight trains.

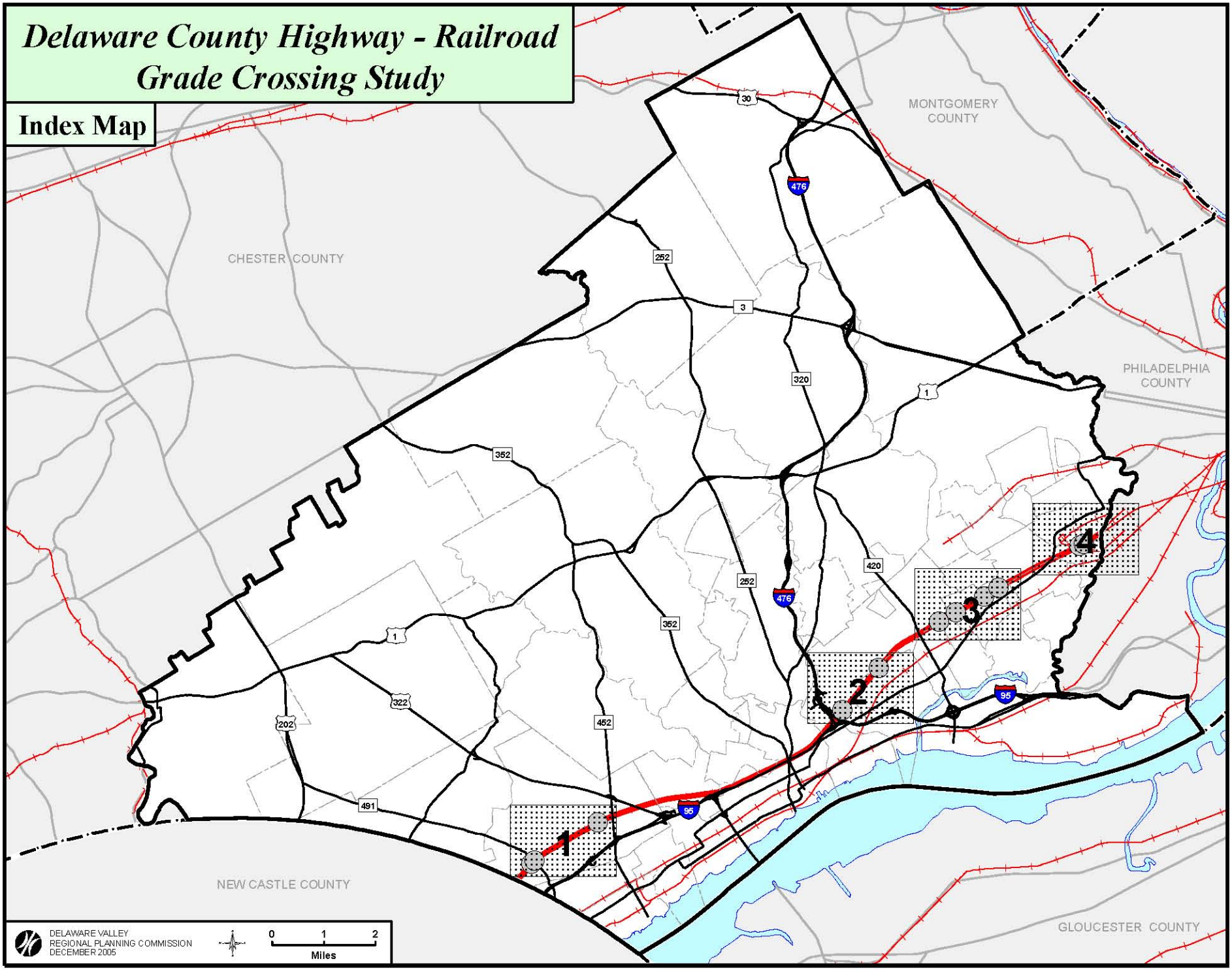
Section III of this report provides in-depth descriptions of existing conditions at each of the eleven grade crossings which are examined in this study. For orientation purposes, a map of the entire rail corridor within Delaware County is displayed on the following page. The map shows that the study crossings admit to being grouped into four clusters due to their relative location to one another.

Highway-Rail Grade Crossing
Kent, WA

Highway-Rail Grade Separation
Kent, WA

Delaware County Highway - Railroad Grade Crossing Study

Index Map



Section III

Existing Conditions and Crossings Descriptions

For each of the eleven grade crossings, there is existing condition information. This includes inset maps depicting the location of the crossing, aerial maps depicting a different overall view of the crossing, and information that was gathered through database searches as well as through field views.

Information for each crossing was available given the correct AAR (Association of American Railroads) number. This is a unique identification number that corresponds with current information for each crossing in the country. This information includes location, physical data, warning devices, accident/incident information, and detailed train data. CSX verified train timetables, types and numbers of trains, and the speeds of the trains at the eleven crossings. All Average Annual Daily Traffic (AADT) counts were performed by DVRPC. A manual traffic count was performed at crossing #10 - Main Street. The trolley tracks at this location prevented the laying of tubes necessary for automatic counting. PADOT crash statistics were consulted in order to determine probable factors for reported accidents in the area of each crossing. Police and municipalities were contacted in order to provide accident and incident data for all crossings.

Field views were also performed for each crossing. This included a verification of database information as well as photographs being taken at each location. Surrounding land use for each crossing was determined from aerial map zoning information. Area road use was determined by the proximity of facilities such as emergency services, industrial and business parks, shopping, schools, and transit to each grade crossing.

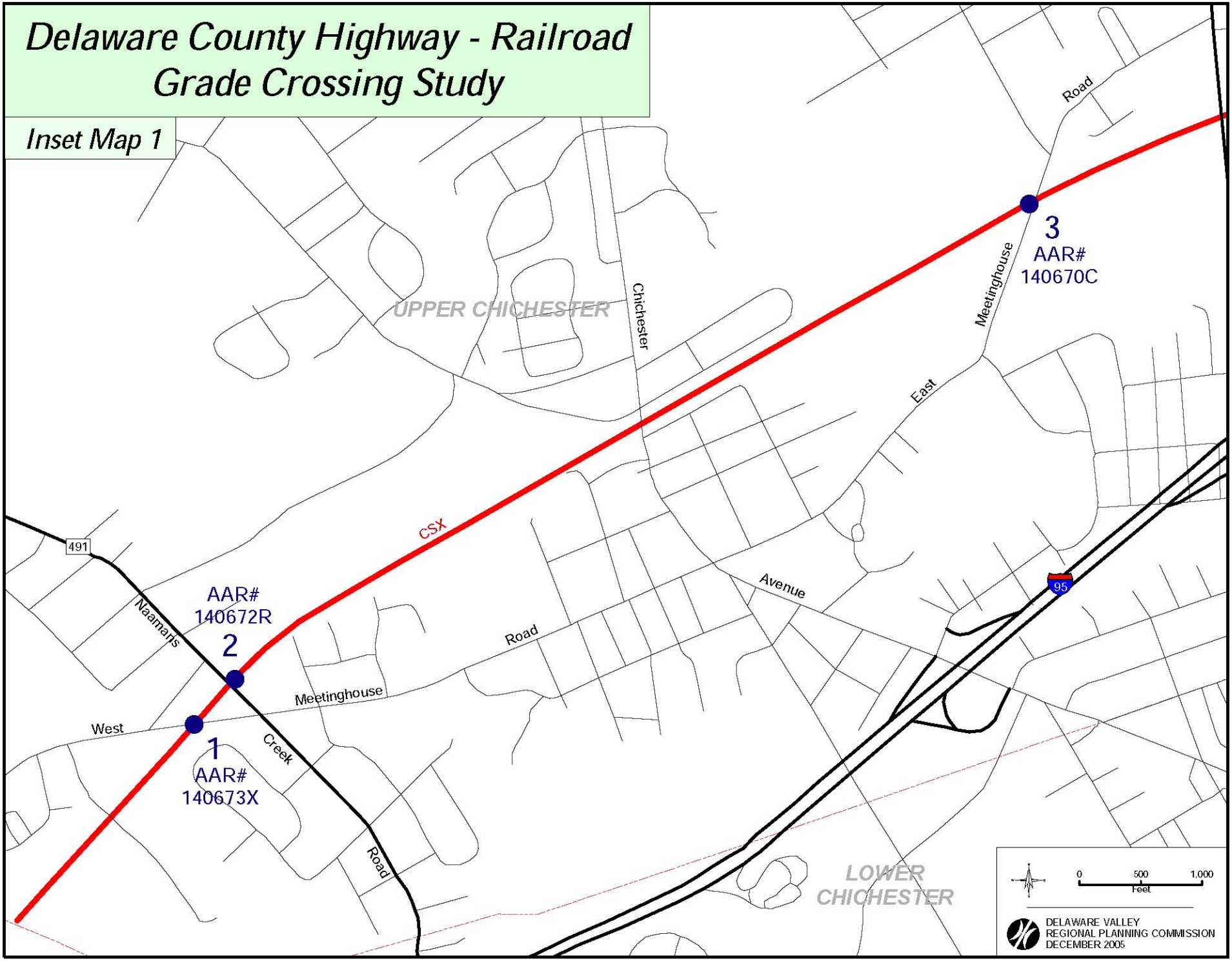
Recent, current, and projected projects and studies were reviewed for their proximity to the rail corridor and any potential impacts to the crossings. A number of transportation improvements are slated for the immediate vicinity of the subject grade crossings or in adjacent areas. Most of these can be expected to improve highway operating conditions and traffic flows. Many of the projects have been programmed through DVRPC in its capacity as the MPO for the Philadelphia-Camden region. The

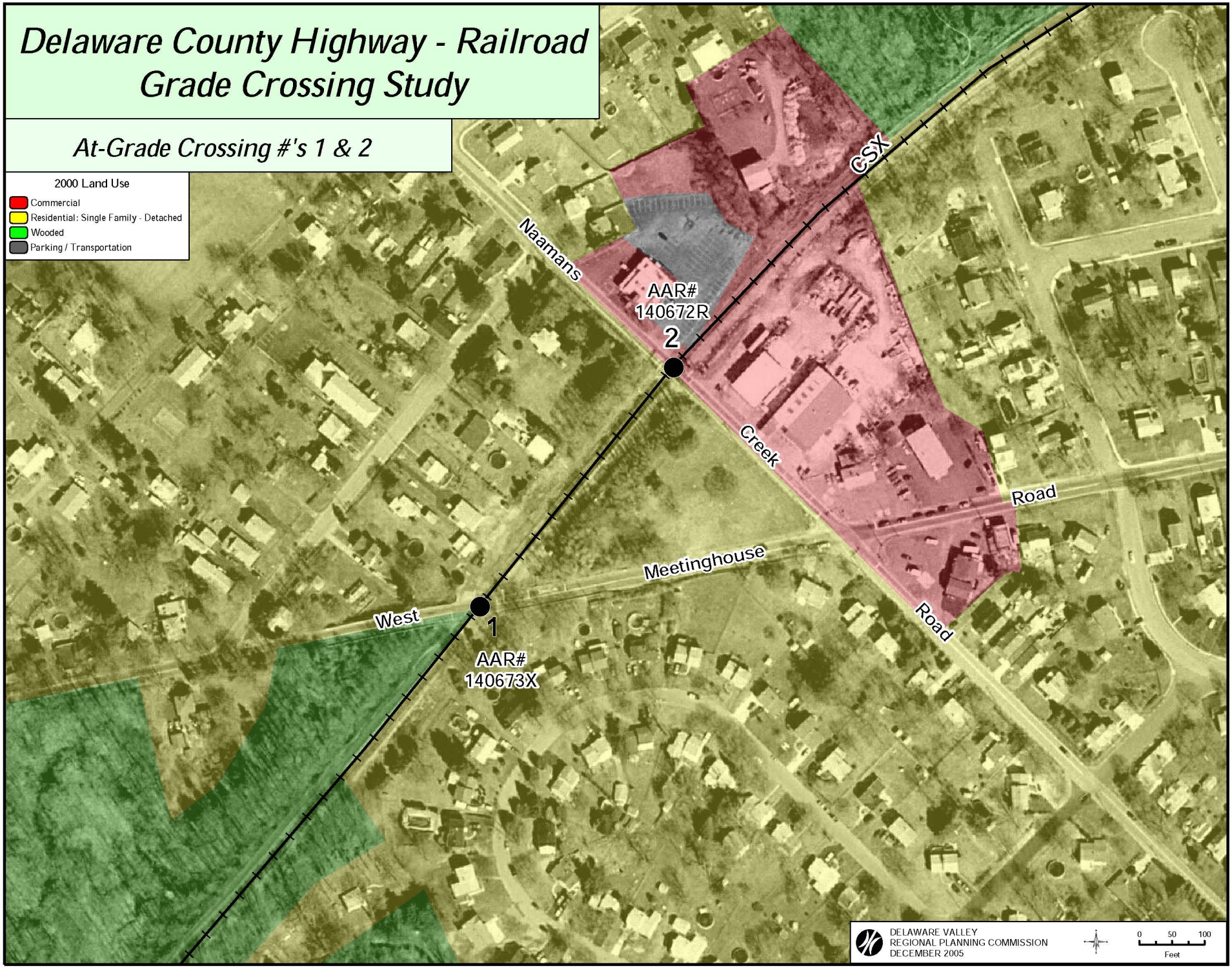
MPO process is driven by both long and short range transportation plans that establish regional priorities and allocate anticipated federal, state, and local transportation funding to specific highway and transit projects. Publications consulted included the DVRPC Transportation Improvement Program for Pennsylvania, DVRPC Horizons: The Year 2030 Land Use and Transportation Plan for the Delaware Valley, PADOT 12-Year Transportation Program, PADOT Highway-Rail Safety Program, and SEPTA Capital Projects.

The affected communities were also consulted to and assure that all concerns were recognized and addressed. The local issues that were raised included safety from malfunctioning warning devices, trespassers, and accidents, noise from trains and train horns, debris from trash and vegetation, congestion from train blockages and traffic, and access for pedestrians and emergency vehicle coordination. Potential improvement scenarios for each crossing and the corridor were also explored.

Delaware County Highway - Railroad Grade Crossing Study

Inset Map 1




Delaware County Highway - Railroad Grade Crossing Study
At-Grade Crossing #'s 1 & 2
2000 Land Use
Commercial
Residential: Single Family - Detached
Wooded
Parking / Transportation
CSX
Naamans
AAR#
140672R
2
Creek
Road
Meetinghouse
West
Road
1
AAR#
140673X
DELAWARE VALLEY
REGIONAL PLANNING COMMISSION
DECEMBER 2005
0
50
100
Feet

Delaware County Highway - Railroad Grade Crossing Study

At-Grade Crossing # 3

Crossing #1: W. Meetinghouse Road

South on W. Meetinghouse Road

North on W. Meetinghouse Road

- AAR #140673X
- Location: Upper Chichester Township
- Road Owner: Township
- Average Annual Daily Traffic (AADT): 4,341 vehicles
- # Trains Daily: 38
- Maximum Speed: 50 mph
- Warning Devices: Gates (new), flashing lights (over lane and mast mounted) and pavement markings
- # Traffic Lanes Crossing Tracks: 2
- # and Type of Tracks: 1 main track
- Area Land Use: Residential single family detached and wooded
- Area Road Use: Fire Co.
- Accident Data
  - FRA accidents reported in 2001: 0
  - Last reported FRA accident: 3/20/78
  - Probable factors for PADOT reported accidents: failure to heed stopped vehicles, improper turning, tailgating

Crossing #2: Naaman's Creek Road / PA 491

- AAR #140672R
- Location: Upper Chichester Township
- Road Owner: State
- Average Annual Daily Traffic (AADT): 7,253 vehicles
- # Trains Daily: 38
- Maximum Speed: 50 mph
- Warning Devices: Gates, flashing lights (over lane and mast mounted), pavement markings, and RR advance warning signs
- # Traffic Lanes Crossing Tracks: 2
- # and Type of Tracks: 1 main track
- Area Land Use: Residential single family detached, commercial/services, and wooded
- Area Road Use: Fire, police, municipal buildings, industrial/business parks, shopping, and schools
- Accident Data
    - FRA accidents reported in 2001: 0
    - Last reported FRA accident: 2/19/94
    - Probable factors for PADOT reported accidents: tailgating, pulling out too soon, driver drinking

South on Naaman's Creek Road

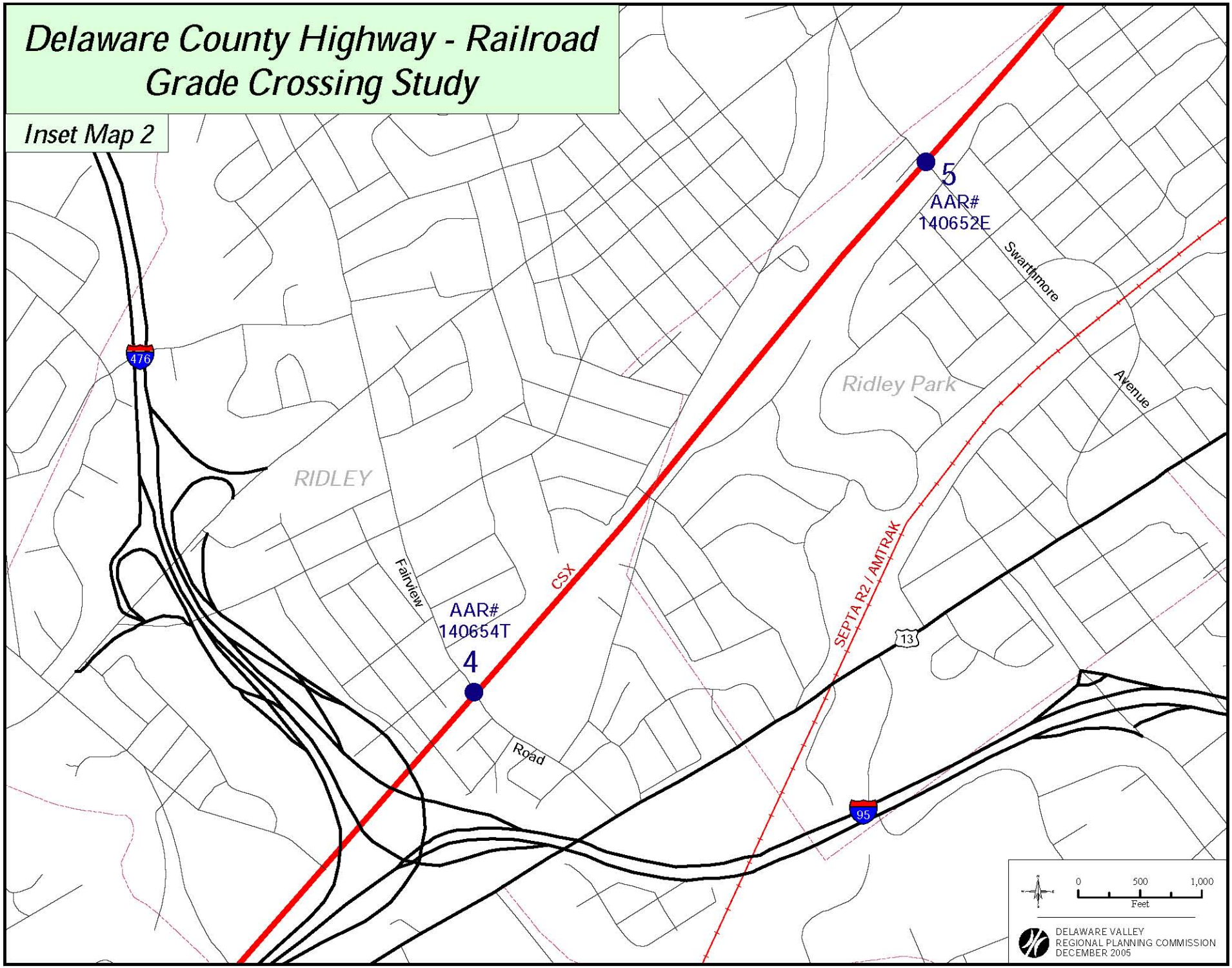
North on Naaman's Creek Road

Crossing #3: E. Meetinghouse Road

South on E. Meetinghouse Road

North on E. Meetinghouse Road

- AAR #140670C
- Location: Upper Chichester Township
- Road Owner: State
- Average Annual Daily Traffic (AADT): 7,101 vehicles
- # Trains Daily: 38
- Maximum Speed: 50 mph
- Warning Devices: Gates, flashing lights (over lane and mast mounted), pavement markings, and RR advance warning signs
- # Traffic Lanes Crossing Tracks: 2
- # and Type of Tracks: 1 main track and 1 siding
- Area Land Use: Residential single family detached, utility, residential multi-family, commercial/services, and wooded
- Area Road Use: Fire, police, hospitals, municipal buildings, industrial/business parks, shopping, and schools
- Accident Data
  - FRA accidents reported in 2001: 0
  - Last reported FRA accident: 2/14/91
  - Probable factors for PADOT reported accidents: tailgating, failure to heed stopped vehicles, driving – wrong side


Delaware County Highway - Railroad Grade Crossing Study
Inset Map 2
5
AAR#
140652E
Swarthmore
Avenue
Ridley Park
476
RIDLEY
Fairview
CSX
SEPTA R2 / AMTRAK
AAR#
140654T
4
13
Road
95
0
500
1,000
Feet
DELAWARE VALLEY
REGIONAL PLANNING COMMISSION
DECEMBER 2005

Delaware County Highway - Railroad Grade Crossing Study

At-Grade Crossing # 4

Delaware County Highway - Railroad Grade Crossing Study

At-Grade Crossing # 5

South on Fairview Road

North on Fairview Road

Crossing #4: Fairview Road

- AAR #140654T
- Location: Ridley Township
- Road Owner: State
- Average Annual Daily Traffic (AADT): 8,656 vehicles
- # Trains Daily: 33
- Maximum Speed: 50 mph
- Warning Devices: Gates, flashing lights (over lane and mast mounted), pavement markings, and RR advance warning signs
- # Traffic Lanes Crossing Tracks: 2
- # and Type of Tracks: 1 main track
- Area Land Use: Residential single family detached, residential multi-family, commercial/services, and transportation
- Area Road Use: Fire, police, hospitals, municipal buildings, industrial/business parks, and schools
- Accident Data
  - FRA accidents reported in 2001: 0
  - Last reported FRA accident: 10/18/85
  - Probable factors for PADOT reported accidents: improper turning, driver drinking, and failure to heed stopped vehicle

Crossing #5: Swarthmore Avenue

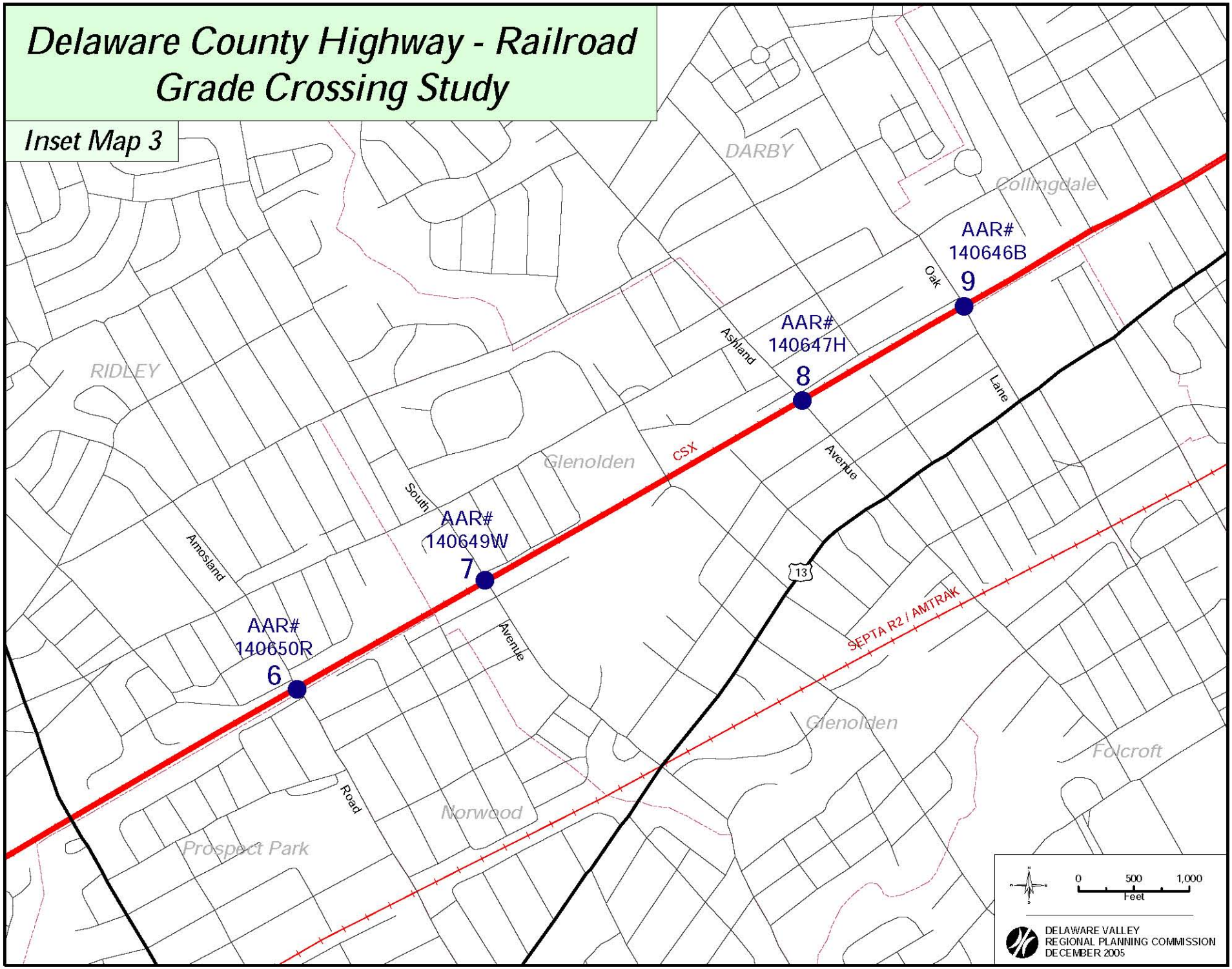
- AAR #140652E
- Location: Ridley Park Borough
- Road Owner: State
- Average Annual Daily Traffic (AADT): 17,991 vehicles
- # Trains Daily: 34
- Maximum Speed: 50 mph
- Warning Devices: Gates, flashing lights (over lane and mast mounted), pavement markings, and RR advance warning signs
- # Traffic Lanes Crossing Tracks: 2
- # and Type of Tracks: 1 main track
- Area Land Use: Residential single family detached, vacant, commercial/services, wooded, and transportation
- Area Road Use: Fire, police, hospitals, municipal buildings, and schools
- Accident Data
    - FRA accidents reported in 2001: 0
    - Last reported FRA accident: none in searchable database
    - Probable factors for PADOT reported accidents: failure to heed stopped vehicle, tailgating, and red light - unknown

South on Swarthmore Avenue

North on Swarthmore Avenue

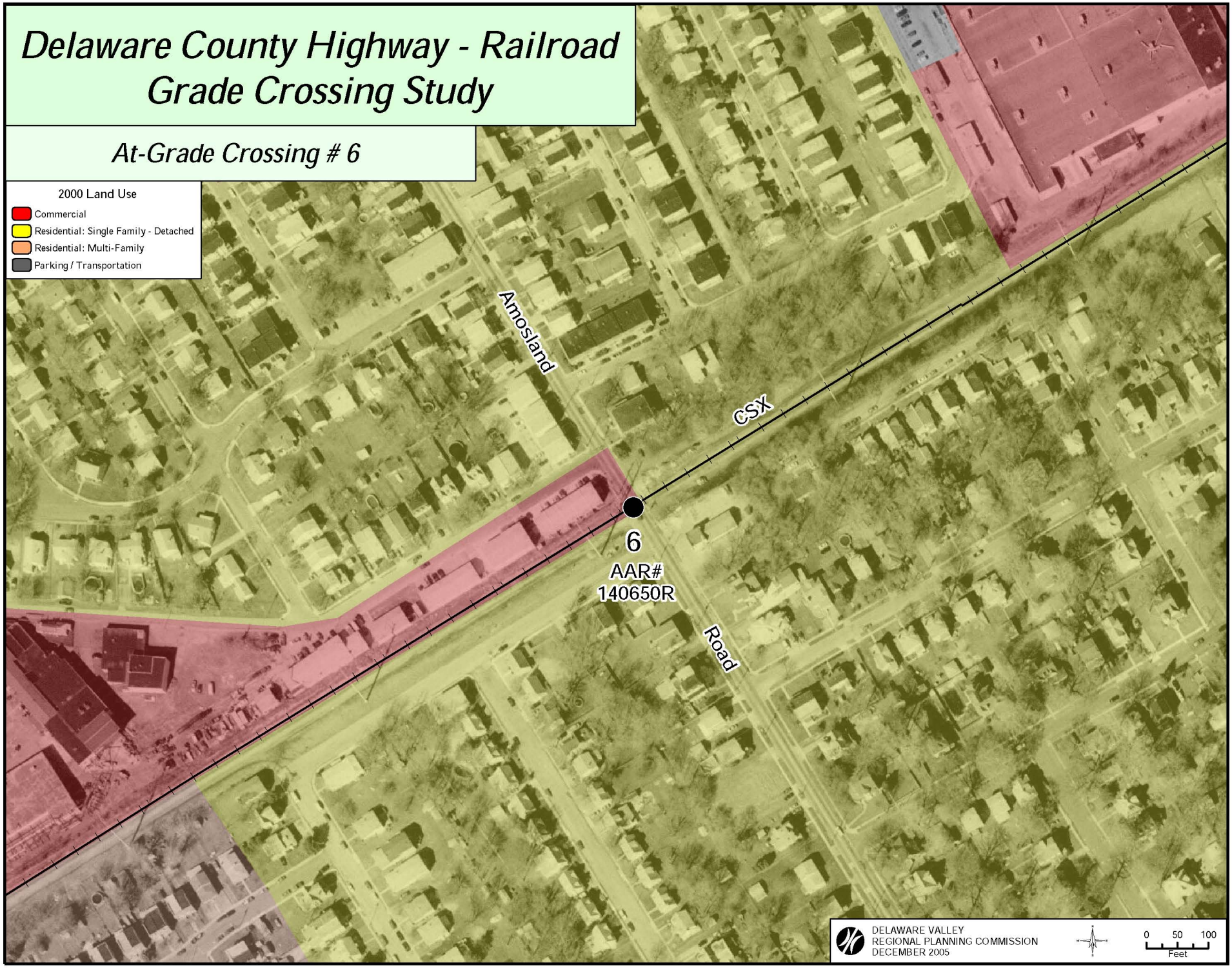
Delaware County Highway - Railroad Grade Crossing Study

Inset Map 3



Delaware County Highway - Railroad Grade Crossing Study

At-Grade Crossing # 6



Delaware County Highway - Railroad Grade Crossing Study

At-Grade Crossing # 7

Delaware County Highway - Railroad Grade Crossing Study

At-Grade Crossing # 8

Delaware County Highway - Railroad Grade Crossing Study

At-Grade Crossing # 9

Crossing #6: Amosland Road

- AAR #140650R
- Location: Ridley Township, Prospect Park Borough, and Norwood Borough
- Road Owner: State
- Average Annual Daily Traffic (AADT): 12,435 vehicles
- # Trains Daily: 34
- Maximum Speed: 50 mph
- Warning Devices: Gates, flashing lights (over lane and mast mounted), pavement markings, and RR advance warning signs
- # Traffic Lanes Crossing Tracks: 2
- # and Type of Tracks: 1 main track
- Area Land Use: Residential single family detached and commercial/services
- Area Road Use: Fire, police, municipal buildings, shopping, and schools
- Accident Data
    - FRA accidents reported in 2001: 0
    - Last reported FRA accident: 5/22/82
    - Probable factors for PADOT reported accidents: improper turning, failure to heed stopped vehicle, and driver drinking

South on Amosland Road

North on Amosland Road

South on South Avenue

North on South Avenue

Crossing #7: South Avenue

- AAR #140649W
- Location: Glenolden Borough
- Road Owner: State
- Average Annual Daily Traffic (AADT): 13,894 vehicles
  - Route 115 bus: 15 NB/13SB
- # Trains Daily: 34
- Maximum Speed: 50 mph
- Warning Devices: Gates, flashing lights (over lane), pavement markings, and RR advance warning signs
- # Traffic Lanes Crossing Tracks: 2
- # and Type of Tracks: 1 main track
- Area Land Use: Residential single family detached, recreation, commercial/services, and transportation
- Area Road Use: Fire, shopping, SEPTA, and schools
- Accident Data
  - FRA accidents reported in 2001: 0
  - Last reported FRA accident: 2/16/93
  - Probable factors for PADOT reported accidents: improper turning, driver drinking, and failure to heed stopped vehicle

Crossing #8: Ashland Avenue

- AAR #140647H
- Location: Glenolden Borough
- Road Owner: Borough
- Average Annual Daily Traffic (AADT): 9,427 vehicles
- # Trains Daily: 34
- Maximum Speed: 50 mph
- Warning Devices: Gates and flashing lights (over lane and mast mounted)
- # Traffic Lanes Crossing Tracks: 2
- # and Type of Tracks: 1 main track
- Area Land Use: Residential single family detached, residential multi-family, recreation, commercial/services, and community service
- Area Road Use: Fire, police, municipal buildings, schools, and shopping
- Accident Data
    - FRA accidents reported in 2001: 0
    - Last reported FRA accident: 7/17/97
    - Probable factors for PADOT reported accidents: n/a – not a state road

South on Ashland Avenue

North on Ashland Avenue

Crossing #9: Oak Lane

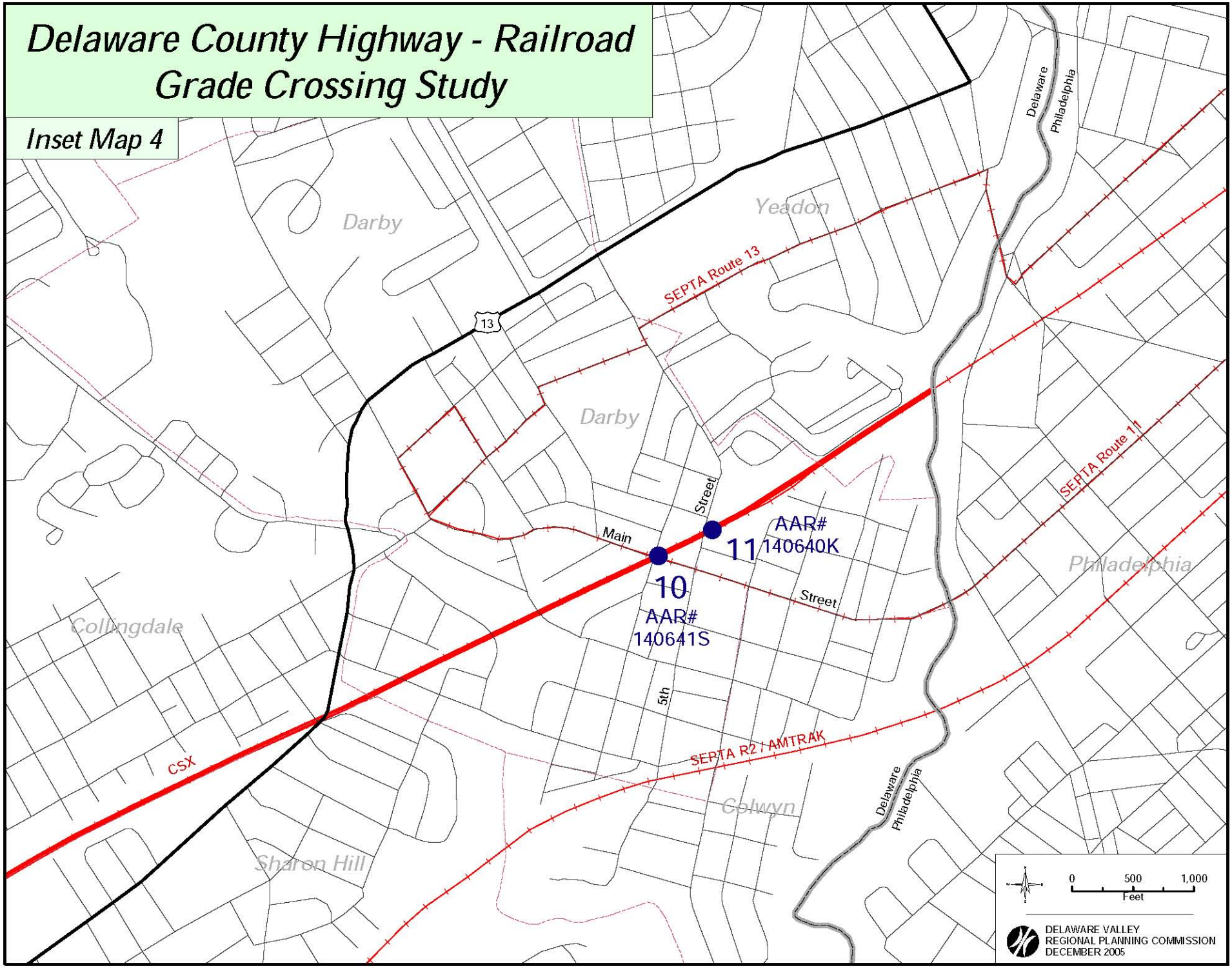
South on Oak Lane

North on Oak Lane

- AAR #140646B
- Location: Glenolden Borough, Collingdale Borough, and Folcroft Borough
- Road Owner: State
- Average Annual Daily Traffic (AADT): 14,536 vehicles
- # Trains Daily: 34
- Maximum Speed: 50 mph
- Warning Devices: Gates, flashing lights (over lane and mast mounted), pavement markings, and RR advance warning signs
- # Traffic Lanes Crossing Tracks: 2
- # and Type of Tracks: 1 main track
- Area Land Use: Residential multi- family, residential – row homes, commercial/services, transportation, and vacant
- Area Road Use: Fire, police, municipal buildings, schools, and industrial/business parks
- Accident Data
  - FRA accidents reported in 2001: 0
  - Last reported FRA accident: 10/2/89
  - Probable factors for PADOT reported accidents: failure to heed stopped vehicle, improper turning, and red light – unknown

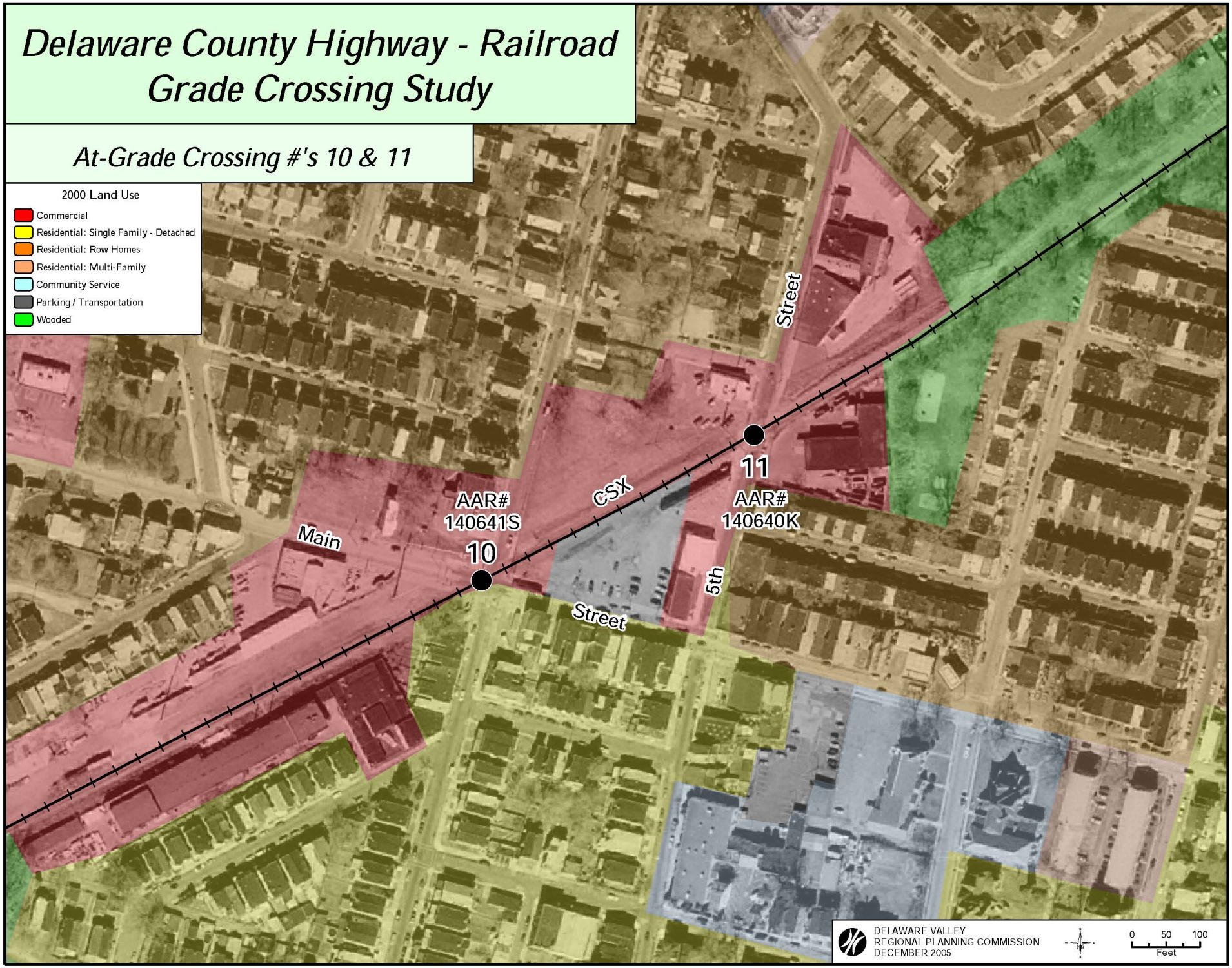
Delaware County Highway - Railroad Grade Crossing Study

Inset Map 4



Delaware County Highway - Railroad Grade Crossing Study

At-Grade Crossing #'s 10 & 11



Crossing #10: Main Street

- AAR #140641S
- Location: Darby Borough
- Road Owner: State
- Average Annual Daily Traffic (AADT): 10,350 vehicles
  - Route 11 trolley: 119EB/121WB, Route 13 trolley: 39EB/39WB
- # Trains Daily: 34
- Maximum Speed: 30 mph
- Warning Devices: Gates, pedestrian gates, flashing lights (over lane and mast mounted), and RR advance warning signs
- # Traffic Lanes Crossing Tracks: 2
- # and Type of Tracks: 1 main track
- Area Land Use: Residential single family detached, residential – row homes, commercial/services, and wooded
- Area Road Use: Fire, police, hospitals, municipal buildings, industrial/business parks, SEPTA, and schools
- Accident Data
  - FRA accidents reported in 2001: 0
  - Last reported FRA accident: 12/14/87
  - Probable factors for PADOT reported accidents: improper turning, pulling out too soon, and tailgating

South on Main Street

North on Main Street

Crossing #11: 5th Street

South on 5th Street

North on 5th Street

- AAR #140640K
- Location: Darby Borough
- Road Owner: Borough
- Average Annual Daily Traffic (AADT): 3,589 vehicles
- # Trains Daily: 34
- Maximum Speed: 30 mph
- Warning Devices: Gates, flashing lights (over lane and mast mounted), and RR advance warning signs
- # Traffic Lanes Crossing Tracks: 2
- # and Type of Tracks: 1 main track
- Area Land Use: Residential single family detached, residential – row homes, commercial/services, community service, transportation, and wooded
- Area Road Use: Fire, police, hospitals, municipal buildings, industrial/business parks, SEPTA, and schools
- Accident Data
  - FRA accidents reported in 2001: 0
  - Last reported FRA accident: 7/27/87
  - Probable factors for PADOT reported accidents: n/a – not a state road

Section IV

Options

There are many options available for safety and operational improvements at-grade crossings. These include crossing consolidation and elimination, supplemental safety measures, traffic management measures, and new technological devices. These may be combined in a corridor for maximum benefits in safety and traffic management.

Consolidated crossings improve the environment by reducing noise from train horns. Communities can save money by closing crossings, which eliminates installation and maintenance costs associated with warning devices, crossing surfaces, and sight distance clearance. Transportation efficiency improves when crossings are consolidated and alternate routes are improved. Elimination of crossings can be achieved by grade separating the crossing, closing the crossing to highway traffic, or closure of the crossing to railroad traffic through abandonment or relocation of the rail line. Elimination of a crossing provides the highest level of crossing safety because the intersection of a highway and a railroad is removed. Benefits include reductions in accidents, vehicle delay, rail traffic delay, and maintenance costs. Grade separation, highway relocation, and railroad relocation alleviate safety, congestion, noise, and environmental concerns while retaining the advantages of the railroad service. These benefits must be viewed using engineering judgment to justify their high costs.

Closure of at-grade rail crossings is accomplished by closing the highway through the creation of a T-intersection or connector road to direct traffic to an adjacent crossing or by dead-ending affected streets with a cul-de-sac and rerouting traffic. Alternative routes must be within a reasonable distance and have sufficient capacity to accommodate the diverted traffic. Problems may include negative community attitudes, funding, and lack of or reluctance to use State laws that permit closure. In Pennsylvania, the Public Utility Commission has exclusive authority to eliminate highway-rail grade crossings. After due notice, the Commission may order any crossing relocated, altered, suspended, protected, or abolished. Upon finding immediate danger to safety and welfare of the public, the Commission may order an immediate alteration,

improvement, or suspension. The decision to close a crossing should be based on public necessity, convenience, and safety. Costs of retaining and maintaining the crossing should be compared against costs of alternate access and travel costs.

The decision to grade separate a highway-rail crossing is a matter of economics, safety, and benefits. Long term life cycle costs for both highway and railroad users should be considered rather than initial construction costs. Such analysis should consider elimination of train/vehicle collisions, savings in maintenance costs, driver delay cost savings, fuel and pollution mitigation cost savings, benefits of improved emergency access, and the potential for closing one or more adjacent crossings. However, the cost of grade separation is often prohibitive. Neighborhood and business opposition as well as land acquisition costs must also be considered.

New technology options include any prospective device or combination of devices with a measurable effectiveness for reducing the probability of collisions at a highway-rail grade crossing. These may include Intelligent Transportation Systems (ITS) technologies, traffic signal pre-emption, constant warning time devices, and wayside horns. ITS includes electronics, communications, or information processing, used singly or in combination, to improve the efficiency or safety of a surface transportation system. There are many ITS technologies that perform various functions to improve safety and minimize inconvenience such as variable message signs, gate control, emergency vehicle priority, vehicle detection, and traffic management center. Traffic signal preemption allows an approaching train to preempt highway traffic control signals at intersections within 200' of a crossing. The traffic control signal provides a short green interval to the crossing approach to clear the vehicles. Constant warning time signals consist of motion sensing devices and control logic capable of determining train speed, motion, and distance from the crossing. Theses parameters establish arrival time and provide uniform advance warning time so motorists are not subject to unnecessarily long delays. A wayside horn is a stationary horn mounted at the crossing and directed at oncoming motorists. The wayside horn is sounded in place of the train horn as the train approaches the grade crossing. Activation of such a device would be by an engineer or through track circuitry. The use of wayside horns in lieu of the train horn reduces net community noise impacts.

Another option for improved safety at grade crossings is the addition of supplementary measures to gated crossings. Supplemental safety measures are safety systems or procedures determined to be an effective substitute for the locomotive horn in the prevention of highway-rail casualties. These measures include upgraded signal lights, four-quadrant gates, median separation devices, and photo enforcement. Light emitting diode (LED) technology can retrofit existing warning lights for better range of vision. Four-quadrant gate systems consist of automatic flashing-light signals and gates where the gates extend across the approach and departure side of roadway lanes. Medians, channelization devices, and vehicle presence detectors may supplement four-quadrant gates. Median separation devices restrict driver access to opposing lanes by not allowing crossing of the center lane to drive around lowered gates. Mountable curbs present a visual impediment to crossing opposing traffic lanes. They are less than 6" high and designed to allow a motor vehicle to leave the roadway. Barrier curbs present the driver with a significant difficulty in mounting the island and thus crossing opposing traffic lanes. They are greater than 6" high and are designed to discourage motor vehicles from leaving the roadway. Photo enforcement is an automated way of gathering valid photographic or video evidence of violations of traffic laws relating to highway-rail grade crossings. It is effective with enforcement and support by the law enforcement and judicial communities. State law must authorize use of photographic evidence to bring charges against vehicle owners and prove a traffic violation has occurred. Enforcement includes penalties and collections large enough to deter violations and posting points against a violator's driving license. Public awareness is critical to the success of this program.

The options chosen for application and comparison in this study were grade separation for each crossing and the addition of supplemental safety measures for each crossing. The grade separation option was chosen because it represents the most elaborate solution for reducing accidents, minimizing traffic congestion, increasing safety, and improving environmental benefits. The addition of supplementary measures was chosen as an option it represents the least elaborate solution with a relative ease of implementation.

Section V

GradeDec.Net

DecisionTek developed GradeDec.Net under contract to the Federal Railroad Administration (FRA). GradeDec.Net is an Internet application and database designed as a decision support tool for benefit-cost analyses of investments involving highway-rail grade crossing improvements within a risk analysis pattern. It forecasts the transportation and non-transportation effects of investments and estimates their economic value over the life of the project. These improvements may include upgrades, separations, and closures. The analysis of benefits and costs compares the present value in the alternate case with investment to the base case without investment. The model uses current research on the environment, safety, and traffic analysis. The application allows users to assess anticipated changes in accident risk, travel time savings, vehicle operating cost savings, and air quality benefits while accounting for changes in highway-rail crossing maintenance and capital costs.

Individual or multiple crossings at the corridor and regional level may be analyzed. Regional analysis considers crossings in a geographic region that may or may not be part of a common alignment. The corridor analysis evaluates crossing improvements along a single rail alignment. This analysis accounts for impacts on the nearby highway network and shifts to routes with improved crossings. A corridor-level analysis was used for the Delaware County study. This allowed for the ranking of crossing improvements by benefit category and the identification of investments that may reduce highway traffic congestion.

Grade crossing investments are considered a one-time, capital expense or group of measures that transforms grade crossings in a corridor. The first investment is a grade crossing device type change including passive, lights, gates, new technology, closure, or grade separation. The second investment is the addition of supplementary measures to gated crossings. These supplementary measures may include four quadrant gates, curbs, and photo enforcement. The third investment involves changes to highway traffic flows in a corridor using traffic management measures. These include

signs and signals to re-assign traffic away from high-risk crossings during peak periods. These investments are used in the analysis to determine the expected number and severity of accidents. When the investment includes closure or separation, the analysis evaluates additional re-allocation of traffic.

Scenario and scenario data are necessary for running GradeDec.Net. Scenario data include those variables to which probability distribution can be assigned. Scenario variables are rail operations, highway, social costs, and price indexes. These values are applied to the selected base scenario, strong rail growth scenario, or strong highway growth scenario. For the Delaware County study, the scenario chosen to represent the expected condition was the scenario of strong rail growth. Strong rail growth is expected because CSX plans on running more trains and longer trains on this corridor.

For the Delaware County Grade Crossing Study, the existing conditions of the eleven grade crossings were imported from the FRA database. Then this information was further refined with present day conditions. GradeDec.Net was run using two different improvement schemes for the same scenario of strong rail growth. The first improvement scheme was new supplemental measures at each crossing. The second improvement scheme was grade separation at each crossing. Then the results were compared.

Safety benefits consider accident prediction and severity as well as cost. The rates and predicted accidents are calculated using the US DOT Accident Prediction and Severity Formulas and Resource Allocation Method. The calculated safety benefit with supplemental measures at all crossings is $3,420,500 present value. The calculated safety benefit with grade separation at all crossings is $4,364,300 present value.

Travel time savings are computed from the travel time benefits based on the delay experienced by the highway vehicles at the highway-rail grade crossing. Time-in-queue measures the vehicle time spent waiting in queues behind blocked crossings. Grade separation is the only investment that changes the amount of time that vehicles spend queued behind closed gates. The calculated travel time saving with grade separations at all crossings is $5,878,700 present value.

For the environmental benefits, GradeDec.Net calculates the reduction in highway vehicle emissions due to reduced idle time at the grade crossing. Reduced

emissions can only occur at grade-separated crossings. The calculated environmental benefit with grade separations at all crossings is $77,015 present value.

For the vehicle operating cost benefit, GradeDec.Net computes the vehicle operating cost savings as a result of the improvements at the highway-rail grade crossings. Savings are based on the reduction in delay at the grade crossing following the grade crossing upgrade. A reduction in delay will lead to decreased consumption of fuel and oil by the vehicles. By totaling the change in gasoline, diesel, and oil consumption for the different vehicle types and then multiplying by their respective costs, vehicle operating costs are calculated. Since savings are generated by reductions in delay, vehicle operating cost benefits only occur at grade separations. The calculated vehicle operating cost benefit with grade separations at all crossings is $1,118,500 present value.

Local benefits are calculated as a percentage of the benefits from all benefits categories summed over all the grade crossings. These benefits relate to the value of the grade crossing improvements to local communities. These include improved mobility, reduced noise, and economic benefits. The calculated local benefit with supplemental measures at all crossings is $172,430 present value. The calculated local benefit with grade separation at all crossings is $566,060 present value.

Project costs are calculated from capital expenditures in the alternative case, lifecycle costs for each grade crossing, and the annual operating and maintenance costs for each crossing. The calculated total project cost with supplemental measures at all crossings is $3,751,100 present value. The calculated total project cost with grade separation at all crossings is $164,699,000 present value.

GradeDec.Net computes the corridor level benefits from grade crossing improvements by combining the benefits estimated for each individual crossing and then adding the consumer surplus from induced trips and subtracting the external costs such as congestion and emissions from these trips. Safety, travel time, vehicle operating cost, environmental, and network delay benefits are included as benefits for each crossing. The calculated total benefit with supplementary measures at all crossings is $3,422,000 present value. The calculated total benefit with grade separation at all crossings is $11,776,000 present value.

Therefore, the benefit-cost ratio is the present value benefits divided by the present value costs. The calculated benefit-cost ratio with supplemental measures at all crossings is 0.9122. The calculated benefit-cost ratio with grade separation at all crossings is 0.0715.

The following table shows the results comparison:

Table II: GradeDec.Net Results Comparison (Present Value)

	Supplemental Measures	Grade Separation
Total costs	$3,751,100	$164,699,000
Safety benefits	$3,420,500	$4,364,300
Travel time savings	0	$5,878,700
Environmental benefits	0	$77,015
Vehicle operating cost benefits	0	$1,118,500
Local benefits	$172,430	$566,060
Total benefits	$3,422,000	$11,776,000
Benefit-cost ratio	0.91	0.07

These results compare supplemental measures (i.e. new four quadrant gates with detection) at each crossing versus grade separation at each crossing. Varying the supplemental measure used at each crossing would result in different costs and benefits. In addition, by combining specific options at targeted crossings, the cost to benefit ratios could be improved.

Section VI

Conclusions

The CSX freight line through Delaware County is a main transportation route and a key to increasing the movement of freight by rail. Targeted improvements can maximize the efficiency of this line and, improve safety too. The following eight recommendations represent a comprehensive approach to facilitate freight flows, improve safety, and reduce conflict at the crossings.

Recommendation I: ***perform an in-depth study of creating a grade separation at Main Street.*** An examination of the various crossings in the corridor reveals that the best candidate with the most immediate need for creating a grade separation is at Main Street. This finding is based on considering impacts to the adjacent communities, safety factors, traffic levels, and funding levels. Therefore, undertaking a more detailed feasibility study for a grade separation specifically at Main Street is the highest priority. Due to the joint rail freight, trolley, and vehicle operations, there may be an opportunity for the proposed study to be uniquely funded by both private and public interests. It would be critical that this study be closely coordinated with Darby Borough due to the significant impacts on the crossing at 5th Street and the immediate neighborhood which would result from a grade separation.

In the future, additional grade separations may be warranted in the corridor. As determined by this study in cooperation with the steering committee, the best crossing candidates, in order of priority, are: Swarthmore Avenue, Oak Lane, and Naaman's Creek Road.

Recommendation II: ***coordinate improvements at groupings of the crossings.*** Due to their relative locations, the 11 grade crossings can be readily grouped into the following four clusters: crossings 1, 2, and 3; crossings 4 and 5; crossings 6, 7, 8, and 9; and crossings 10 and 11. It is recommended that these clusters form a basis for coordinating improvements, and that the affected municipalities use this framework to

work together on crossing issues. The usefulness of clustering the crossings is illustrated by the possible strategy of closing 1 or 2 crossings within a cluster, and then seeking to channel all vehicular traffic to a single crossing.

An additional use of the clustering of the crossings relates to the possible creation of *quiet zones*. The Federal Railroad Administration recently issued a Final Rule regarding quiet zones and the use of train horns. The rule does several things, one of which is to identify steps which communities can take to create a quiet zone where trains would not have to sound their horns when approaching a grade crossing. To qualify, communities must equip the crossings with adequate safety measures to compensate for silencing the train horns. The additional safety measures must be constructed at the community's own expense and must meet federal specifications. New quiet zones can be in effect 24-hours a day or just during the overnight period between 10 PM and 7 AM.

Recommendation III: *install supplemental safety measures or new technologies at the crossings*. This may include four quadrant gates to be used as a deterrent, wayside horns to be used for noise reduction, constant warning time systems to reduce congestion and delay, ITS technologies to be used for improved efficiency, photo enforcement to be used for increased public awareness, or additional warning devices to be used for safety. Safety devices may be used separately or in combination at one crossing or along the entire Delaware County corridor.

Recommendation IV: *maintain all safety warning devices at the eleven crossings*. In this corridor, there are many warning devices at the crossings. There are gates, lights, pavement markings, and advance warning signs that must be constantly maintained and possibly updated. Retrofitting the existing warning lights along the corridor to lights with LED technology will increase the range of vision and decrease the maintenance. The coordination with PADOT and local officials must continue. There should also be an opportunity and procedure for the public to report malfunctioning equipment and any other safety concerns.

Recommendation V: ***monitor the progress of capacity improvements recommended in conjunction with the MAROps program.*** Through the MAROps program, significant investments have been proposed to facilitate inter-state freight and passenger travel by rail in the corridor extending from New Jersey to Virginia. Close to $750 million in improvements have been identified in the Delaware Valley region and, more importantly with respect to this study, major capacity improvements have been proposed for the CSX rail line through Delaware County. It is important, therefore, to follow the development of this multi-state program as it unfolds and as efforts to address the growth of freight traffic intensify.

Recommendation VI: ***implement a program to maintain the right-of-way along the rail corridor and to address the concerns of the communities impacted by the railroad.*** This program will look into drainage, trash, and vegetation concerns of the communities along the railroad. There should also be an opportunity to allow responses from CSX. As part of this program, local land use plans for development near the rail corridor should take into account the freight moving on the rail line, recognize the probability for rail growth, and consider the impacts of increasing new businesses near the rail corridor. In addition, there should be an increase in the posting of no trespassing signs / fine information at visible locations, as well as continued enforcement and an understanding of the need for policymakers to work towards increasing the fine amount.

A supporting measure is the provision of well maintained sidewalks in areas which surround the grade crossings and which parallel the rail line. All appropriate entities should monitor the condition of these sidewalks to ensure that they provide a safe and attractive mode of travel and that they discourage people from trespassing on the railroad tracks and traversing the tracks at illegal locations.

Recommendation VII: ***emphasize the Operation Lifesaver program for school children and their parents.*** Operation Lifesaver is a nationwide highway-rail grade crossing safety campaign. It is an active continuing public education program designed to reduce the number of crashes, injuries, and deaths at highway-railroad intersections. This program is sponsored cooperatively by federal, state, and local government

agencies, civic organizations, as well as the nation's railroads. Operation Lifesaver uses education, enforcement, engineering, and evaluation for its efforts. It urges state and local law enforcement agencies to accelerate measures against motorists and pedestrians who disregard warning devices.

The campaign strives to educate people of all ages about the dangers associated with grade crossings and railroad trespassing through the use of schools, driver education programs, and the media. It is important to increase awareness and encourage use of Operation Lifesaver's free highway-rail safety presentations. Although many schools have a full agenda for the year with other presentations and special events, this presentation must be recognized for its importance by principals and supervisors so that all students learn about the dangers and impacts of trespassing. Increased funding may also be used for public service campaigns. These may include public service announcements, information booths at ballparks, and partnering arrangements with local sports teams that appeal to families and kids. Operation Lifesaver train excursions can also help to inform elected and county officials as well as the public about rail safety. The Federal Highway Administration estimates that safety awareness initiatives through Operation Lifesaver have saved 10,000 lives in 30 years. This emphasis on safety is critical, particularly given the fact that both train and highway volumes are on the rise.

Recommendation VIII: ***ensure that the Association of American Railroad (AAR) data is continuously updated.*** The unique AAR identification numbers for each crossing contain current and historical highway-rail crossing information. They are maintained in a searchable national inventory database and can be merged with accident data. It is important that this data be kept up to date so that the AAR ID numbers are useful in analyzing information for planning purposes, in recognizing trends or problem areas for a particular crossing or corridor, and in implementing crossing safety improvement programs. Data to be updated includes railroad information, traffic control devices, physical characteristics, accident and incident reports and predictions, highway information, and contact information.

Appendix A: Existing Conditions for Delaware County Highway-Railroad Grade Crossings Study

Crossing	1: W. Meetinghouse Rd.	2: Nammans Creek Rd	3: E. Meetinghouse Rd	4: Fairview Rd	5: Swarthmore Ave.	6: Amosland Rd.
General						
AAR #	140673X	140672R	140670C	140654T	140652E	140650R
Municipality	Upper Chichester Twp.	Upper Chichester Twp.	Upper Chichester Twp.	Ridley Twp.	Ridley Park Borough	Ridley Township Prospect Park Borough Norwood Borough
City Name	Boothwyn	Boothwyn	Boothwyn	Woodlyn	Ridley Park	Holmes
Owner	Township	State	State	State	State	State
Type	Public	Public	Public	Public	Public	Public
Development Type	Residential	Commercial/ Residential	Residential/ Commercial	Industrial	Residential/ Commercial	Residential/ Commercial (Ford Bros.)
RR Mile Post	17.54	17.45	16.02	10.59	9.55	8.06
Crossing Protection						
Warning Device	Flashing lights over lane (2) Mast mounted flashing lights (2)	Flashing lights over lane (2) Mast mounted flashing lights (2)	Flashing lights over lane (2) Mast mounted flashing lights (2)	Flashing lights over lane (2) Mast mounted flashing lights (2)	Flashing lights over lane (2) Mast mounted flashing lights (2)	Flashing lights over lane (1) Mast mounted flashing lights (1)
Pavement markings	Yes	Yes	Yes	Yes	Yes	Yes (faded)
RR advance warning signs	Yes	Yes	Yes	Yes (2 on south side)	Yes: 2 signs (north side) 1 sign (south side)	Yes
Gates	Yes	Yes	Yes	Yes	Yes	Yes
Other Signs	25 Speed Limit	35 Speed Limit	35 Speed Limit, For Prolonged Train Blockage Call 911	35 Speed Limit	25 Speed Limit, Pedestrian Crossing, Do Not Stop on Tracks	25 Speed Limit,
Railroad						
Daytime Thru Movements	17	17	17	16	16	16
Night Thru Movements	18	18	18	16	17	17
Daytime Switch Trains	3	3	3	1	1	1
Max. Time Table Speed	50	50	50	50	50	50
Type, # Tracks	1 (main)	1 (main)	1 (main), 1 other - SDG	1 (main)	1 (main)	1 (main)
Highway						
SR/SEG/OFF	3012/001/0443	0491/0112/0999	3012/0040/0400	2035/0020/0906	2025/0030/1029	2021/0020/1068
Highway System	8 (non-federal aid)	3 (other federal-aid, not NHS)	3 (other federal-aid, not NHS)	3 (other federal-aid, not NHS)	3 (other federal-aid, not NHS)	3 (other federal-aid, not NHS)
State highway system	No	Yes	Yes	Yes	Yes	Yes
Functional road classification	16 (urban - minor arterial)	16 (urban - minor arterial)	16 (urban - minor arterial)	16 (urban - minor arterial)	16 (urban - minor arterial)	17 (urban - collector)
AADT (2002)	4341	7253	7101	8656	17991	12435
% Trucks	4	4	30	4	2	30
# Traffic lanes crossing RR	2	2	2	2	2	2
Truck pullout lanes	No	No	No	No	No	No
Highway paved	Yes	Yes	Yes	Yes	Yes	Yes
Crossing Surface	Rubber	Rubber	Rubber	Rubber	Rubber	Asphalt
Predicted accidents	0.024935	0.02939	0.030374	0.030565	0.036503	0.031789
Accident reports available	No	Yes	Yes	No	No	No
Additional information	Grade is issue (sight distance). Petroleum pipe line in area along track. Stop bars.	Stop bars.	Stop bars. Fiber optic line along track.	Stop bars. Sidewalks. 39-car train. Bells.	Stop bars. Sidewalks. Pedestrian traffic. 10-car train. Bells.	Sidewalks. Fiber-optic cable line. 118-car train. Bells. No stop bars.

Prepared by DVRPC, 12/31/05

Appendix A: Existing Conditions for Delaware County Highway-Railroad Grade Crossings Study

Crossing	7: South Ave.	8: Ashland Ave.	9: Oak Ln.	10: Main St.	11: 5th St.
General					
AAR #	140649W	140647H	140646B	140641S	140640K
Municipality	Glenolden Borough	Glenolden Borough	Glenolden Borough Collingdale Borough Folcroft Borough	Darby Borough	Darby Borough
City Name	Glenolden	Glenolden	Glenolden	Darby	Darby
Owner	State	Borough	State	State	Borough
Type	Public	Public	Public	Public	Public
Development Type	Residential / Commercial (McDade Mall)	Residential	Industrial/ Commercial (Suburban Materials, Produce Junction)	Commercial	Industrial
RR Mile Post	7.68	7.04	6.72	4.97	4.87
Crossing Protection					
Warning Device	Flashing lights over lane (2)	Flashing lights over lane (1) Mast mounted flashing lights (2)	Flashing lights over lane (1) Mast mounted flashing lights (2)	Flashing lights over lane (2) Mast mounted flashing lights (1)	Flashing lights over lane (1) Mast mounted flashing lights (2)
Pavement markings	Yes	None	Yes	None	None
RR advance warning signs	Yes - 1 on south side (Hillcrest Ave.)	None	Yes: 2 on south side (N. Llanwellyn) 1 on north side (N. Bonsall)	Yes - 1 direction (east side)	Yes
Gates	Yes	Yes	Yes	Yes; additional Pedestrian Gate	Yes
Other Signs	35 Speed Limit, Stop Sign at intersection of Amosland Road and Baltimore Ave	25 Speed Limit, Do Not Block Intersection	25 Speed Limit	Do Not Block Intersection, Septa Rt. 11 trolley, Stop signs (6th St)	
Railroad					
Daytime Thru Movements	16	16	16	16	16
Night Thru Movements	17	17	17	17	17
Daytime Switch Trains	1	1	1	1	1
Max. Time Table Speed	50	50	50	30	30
Type, # Tracks	1 (main)	1 (main)	1 (main)	1 (main)	1 (main)
Highway					
SR/SEG/OFF	2017/0020/0044	LOC	2015/0070/1087	2005/0010/2888	LOC
Highway System	3 (other federal-aid, not NHS)	8 (non-federal aid)	3 (other federal-aid, not NHS)	3 (other federal-aid, not NHS)	8 (non-federal aid)
State highway system	Yes	No	Yes	Yes	No
Functional road classification	16 (urban - minor arterial)	19 (urban-local)	16 (urban - minor arterial)	16 (urban - minor arterial)	19 (urban-local)
AADT (2002)	13894	9427	14536	10350	3589
% Trucks	30	3	4	30	5
# Traffic lanes crossing RR	2	2	2	2	2
Truck pullout lanes	No	No	No	No	No
Highway paved	Yes	Yes	Yes	Yes	Yes
Crossing Surface	Rubber	Asphalt	Rubber	Concrete Slab	Asphalt
Predicted accidents	0.033535	0.069502	0.033321	0.028644	0.019267
Accident reports available	Yes	Yes	Yes	No	No
Additional information	Stop bars. Sidewalks. Fiber-optic cable line. Tracks slightly sunken. Route 115 bus : 15 NB, 13 SB.	No stop bars. Sidewalks. Fiber-optic cable line.	Stop bars. Sidewalks. Fiber-optic cable line.	No stop bars. Sidewalks. Fiber-optic cable line. 108-car train. Bells. Septa Routes 11 and 13 use Main St. track crossing CSX line - Route 11: 119 EB, 121 WB, Route 13: 39 EB, 39 WB.	No stop bars. Sidewalks. Fiber-optic cable.

Prepared by DVRPC, 12/31/05

Appendix B: Municipal Points of Concern

- Upper Chichester Township - Crossing #1: W. Meetinghouse Road
  - Noise from train and train horn
  - Long traffic wait due to trains
  - Looking for some coordination between approaching trains and responding emergency vehicles
  - Happy Harry's drug store coming to corner of PA-491 and W. Meetinghouse Rd. – more potential traffic.

- Upper Chichester Township - Crossing #2: Naaman's Creek Road
  - Noise from train horn
  - Long traffic wait due to trains
  - Looking for some coordination between approaching trains and responding emergency vehicles Commercial/Services

- Upper Chichester Township - Crossing #3: E. Meetinghouse Road
  - Noise from train horn
  - Long traffic wait due to trains
  - Looking for some coordination between approaching trains and responding emergency vehicles Commercial/Services
  - Siding has helped with train blockages

- Ridley Township - Crossing #4: Fairview Road
  - Emergency vehicles affected by crossing
  - Affected by traffic back-ups from crossing 5 (Swarthmore Ave.)
  - Suggest grade separation for crossing 5 (Swarthmore Ave.)

- Ridley Park Borough - Crossing #5: Swarthmore Avenue
  - Pedestrians
  - Traffic backups past MacDade Blvd.
  - Drainage – standing water (Borough does mosquito dunks on CSX property)

Municipal Points of Concern (cont'd)

- Train length adds to traffic congestion
- Highest traffic volume
- Grade separation suggested by Ridley Township (due to road elevation)
- New business/development in area. Additional signage (Do Not Stop on Tracks). Traffic volume a problem.
- Safety issue – elevated approach (hard to see ahead)/light ahead/stuck on tracks until light ahead cleared.
- Ambulances in area (Taylor Hospital) stuck at tracks.

- Ridley Township, Prospect Park Borough, Norwood Borough - Crossing #6: Amosland Road
  - Ridley Township
    - Traffic backups due to train
    - Drainage – West Nile Virus a concern
  - Norwood Borough
    - Drainage problems
    - Trash and debris are an issue.
    - Noise from train and whistle – want new sensor-activated horn
    - Vegetation – overgrown/dead, spray with no notification (spray in neighborhood windows, vegetation/dead brush not removed)
    - Better passage (PA-420/Lincoln Ave. to South Ave.), and due to grade at South Ave. – possibly close Amosland Rd. and grade separate South Ave.
    - Pedestrians are an issue
  - Prospect Park Borough
    - Traffic backups due to train
    - Drainage is a problem – due in part to grade of new switching station. Grading has stopped water from flowing down tracks.
    - Trash an issue
    - Grade separation would be an issue due to flatness of land
    - Note: Prospect Park CSX - spalling problem at Lincoln Ave./PA-420
    - Concern with proposed 4-quad gates getting stuck in down position – police/emergency should have release mechanism.
  - Grade crossing pedestrian suicide?

Municipal Points of Concern (cont'd)

- Glenolden Borough - Crossing #7: South Avenue
  - Horn issue (all times/excessive)
  - Emergency vehicle tie-up, can't get through to other side
  - One of the 3 local thru streets blocked when train present
  - Suicide on CSX tracks?

- Glenolden Borough - Crossing #8: Ashland Avenue
  - Horn issue (all times/excessive)
  - Trash (Ashland Ave. to Oak Ln.)
  - Drainage
  - Emergency vehicle tie-up, can't get through to other side
  - One of the 3 local thru streets blocked when train present
  - Knowles Rd. tunnel – closed am/pm for school kids. Possibly widen (from 1 lane) add pedestrian walkways. This would be a thru street to other side of tracks when train is present.

- Glenolden Borough, Collingdale Borough, Folcroft Borough - Crossing #9: Oak Lane
  - Collingdale Borough
    - Overgrown vegetation is an issue
    - Gates down too long (before/after train present)
    - Noise from train horn
    - Trespassing from Sharon Hill High School
    - CSX – good neighbor (lease ½ of municipal field from CSX)
  - Folcroft Borough
    - Traffic congestion due to train
    - Noise from horn
  - Glenolden Borough
    - Underage keg parties/ overgrown vegetation
    - Horn issue (all times/excessive)
    - Trash (Ashland Ave. to Oak Ln.)

Municipal Points of Concern (cont'd)

- Drainage
- Emergency vehicle tie-up, can't get through to other side
- One of the 3 local thru streets blocked when train present

- Darby Borough - Crossing #10: Main Street
  - Maintenance issues (pot holes/tracks)
  - Accidents – motorcycles?
  - Drainage issues/water
  - Suggestion – reroute freight to nearby tracks (change from 4 to 6 tracks with freight on center 2 tracks).
  - Derailments in area - $ still due to Darby from CSX
  - Traffic congestion due to trains compounded by trolley wait.
  - Darby tunnel – can't double-stack (Glenolden)?

- Darby Borough - Crossing #11: 5th Street
  - If grade separate 5th St., pedestrians are a concern.
  - If close 5th St., truck traffic, pedestrians, and shopping are a concern
  - Drainage issues
  - Noise from whistle is an issue.
  - People going around gates are an issue.

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Delaware County Highway-Railroad
Grade Crossing Study

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Geographic Area Covered: Collingdale, Darby, Folcroft, Glenolden, Norwood, Prospect Park, and Ridley Park boroughs and Ridley and Upper Chichester townships in Delaware County, Pennsylvania

Key Words: Freight, safety, grade crossings, grade separation, supplemental measures, AAR crossing identification number, community goals, MAROps

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ABSTRACT

This study examines a grouping of eleven highway-railroad grade crossings along a major rail freight line in Delaware County, Pennsylvania. The purpose of the study is to document existing conditions at the crossings in the corridor, and to propose an improvement program which facilitates the flow of freight and mitigates the impacts of the trains on the surrounding communities.

The report provides detailed information, maps, and aerial photographs about each of the corridor's eleven grade crossings. A range of options available to mitigate crossing conflicts are summarized and an analytic tool, *Grade.Dec.Net,* is employed to test various improvement scenarios. Drawing from a broad based steering committee, the report sets forth a broad corridor action plan, identifies those crossings with the greatest potential to be grade separated, and recommends a number of activities which will help integrate rail freight operations with community goals.