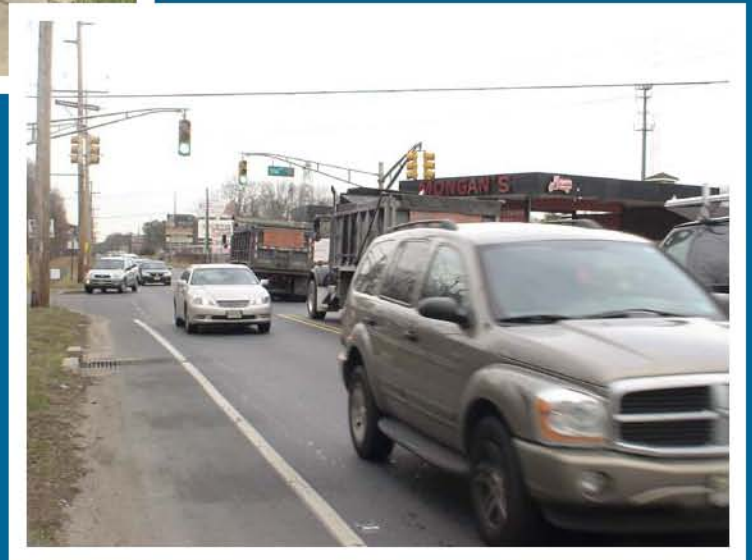


Intersection Road Safety Audit

Williamstown Road & Erial Road



Winslow Township,
Camden County



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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ERIAL ROAD and WILLIAMSTOWN ROAD INTERSECTION ROAD SAFETY AUDIT**1.0 BACKGROUND**

This document represents the final report for the Erial Road and Williamstown Road Intersection Road Safety Audit. This project represents a step towards the implementation of the Delaware Valley Regional Planning Commission (DVRPC) Regional Safety Action Plan. Improving the design and operation of intersections is a priority area for both engineering and enforcement disciplines, as documented in the Plan. DVRPC has been coordinating with Pennsylvania Department of Transportation to address corridors on the District 6 Safety Plan since fiscal year 2007. In fiscal year 2008, intersection road safety audits are being conducted in New Jersey under Transportation Safety Planning in DVRPC's planning work program. The New Jersey road safety audits concentrate on intersections located on county and/or local roads. Implementation of improvement strategies identified through this process may be eligible for Local Federal Safety funds.

Since the goal of this project is to improve and promote transportation safety on the region's roadways while maintaining mobility, the main objective is to address the safe operation of the roadway and ensure a high level of safety for all road users. The road safety audit program is conducted to generate improvement recommendations and countermeasures for roadway segments demonstrating a history of or potential for a high incidence of motor vehicle crashes. The emphasis is placed on identifying low cost, quick turnaround safety projects to address the issues where possible, but it will not exclude the more complex projects.

1.1 The Audit

A road safety audit (RSA) is a formal safety performance examination of an existing or future road or intersection by an audit team. Road safety audits can be used on any size project, from minor maintenance to megaprojects. There are eight major steps involved in conducting a road safety audit, but these can be simplified into a three-step process – identify the corridor/intersection and the audit team; conduct the RSA and report on the findings; and follow-up on RSA findings where feasible. There are major benefits to the road safety audit: it is a proactive tool, not solely dependent on crash data; it is a planning tool, identifying safety issues to be considered in improvement projects; it can determine whether or not the needs of all road users are adequately met; it is adaptable to local needs and conditions; and its recommendations can be implemented in small stages as time and resources permit.

Prior to the road safety audit activities on site, DVRPC collected, reviewed, and analyzed relevant data (video of roadway under different conditions, traffic volume data, turning movement counts, maps, aerial photographs, and crash data). Using the crash data, collision diagrams were produced that showed the crashes and types for the locations where they occurred.

The Road Safety Audit was conducted on April 23, 2008. The day began with a Pre-Audit meeting that involved the definition of a road safety audit and how it differs from

the corridor study process, the required steps of an audit, the presentation of the site issues, and an exchange of ideas and knowledge of the roadway. A video showing the site under nighttime conditions was also shown. The field view followed, during which the audit team, made up of state and local officials and other stakeholders, walked the site and identified transportation safety issues. See **Appendix A** for the list of audit team members. The postaudit meeting followed and was spent discussing the findings from the field view, identifying strategies to address issues, and determining priorities.

1.2 Overview of the Study Area

The study area consists of the signalized intersection of CR 536 Spur (Williamstown Road) and CR 706 (Erial Road) in Winslow Township, New Jersey, see **Appendix B** the study area map.

Williamstown Road, which is functionally classified as an urban minor arterial at the study location, runs north to south. CR 536 Spur runs from US 322/NJ 42 in Monroe Township to US 30 in Winslow Township, for a distance of approximately 7.5 miles. Williamstown Road connects with several major roads. West of the study intersection, Williamstown Road connects with the intersection of US 322/NJ 42, CR 704 (Chews Landing Road), and CR 705 (Sicklerville Road). North of the study intersection, Williamstown Road connects with CR 720 (New Freedom Road), CR 710 (Factory Road), CR 561 (Cedarbrook Road/ Transboro Road), NJ 73 and US 30.

At the study intersection, Williamstown Road has one lane at the eastern approach and one through/left turn lane and a channelized right-turn lane at the western approach. The dedicated right-turn lane is separated by a raised triangular median. Shoulder width is minimal at the study intersection and the speed limit is 45 MPH.

Erial Road, which is functionally classified as an urban collector, generally runs in a north-south direction. Erial Road runs south from CR 705 (Sicklerville Road) in Winslow Township northward to CR 534 in Deptford Township, for a distance of 13 miles. It connects with several major roads, which include CR 705 south of the study area, while to the north Erial Road connects with CR 689 (Cross Keys Road), CR 687 (Jarvis Road), CR 703 (Garwood Road/Erial Clementon Road), CR 688 (Hickstown Road), CR 673 (College Drive), CR 759 (Little Gloucester Road/Peter Cheeseman Road), CR 534 (Blackwood Clementon Road), NJ 168 (Black Horse Pike), CR 681 (Good Intent Road), NJ 41 and CR 534 (Cooper Street).

At the study intersection, Erial Road is one lane in each direction, accommodating all traffic movements.

The land use in the area immediately surrounding the study intersection is mixed, minor commercial, low-density residential and public uses. On the northwest and southwest corners of the intersection the land use is low-density residential, with land adjacent to the intersection approach mainly wooded and undeveloped. On the northeast corner of the intersection the land use is public use. On the southeast corner of the intersection the land use is minor commercial. There is a gas and automobile service station located

at the southeast corner of the intersection with multiple access points along the southeast and northeast legs.

The NJ Transit bus route 400 serves the study intersection. The Route 400, from Philadelphia to Sicklerville, serves Williamstown Road south of the study intersection, and turns onto Erial Road at the study intersection and serves Erial Road east of the intersection. This bus provides access to Center City Philadelphia, Walter Rand Transportation Center, Audubon Crossing Shopping Center, the Deptford Mall, Camden County Community Services Center, Camden County Community College, Pennco Technical Institute, and it connects with other transit routes. There are 15 AM and 11 PM weekday trips to Philadelphia and 9 AM and 17 PM weekday trips to Sicklerville which serves the study intersection. The daily weekday ridership for this route in 2007 was 5,119.

Average annual daily traffic (AADT) volumes on Erial Road were 10,981 vehicles in 2008. Compared with 1996 volumes of 7,138 just south of this location; the current volumes show an increase in traffic volumes of 54 percent. In 2005, an AADT of 19,495 vehicles was recorded on Williamstown Road south of the Atlantic City Expressway; while the Expressway recorded 30,337 vehicles the same year (**see Appendix B for Traffic Volume Map**). Turning movement counts were taken in January 2008 for the study intersection. These showed that the morning peak hour is between 6:15AM and 7:15AM, and the afternoon peak hour is between 5:00PM and 6:00PM (**see Appendix C**). There were 1,339 and 1,574 vehicles moving through the intersection during the morning and afternoon peak period, respectively. From Williamstown Road there are heavy left-turn movements onto Erial Road during the afternoon peak hour, along with heavy right-turn movements for northwest Erial Road. Erial Road experiences heavy movement from both approaches in the morning peak in the northeast direction on Williamstown Road.

1.3 Crash Data

According to Winslow Township Police crash records, there were 39 reportable and 11 non-reportable crashes for the study area for the three-year period 2005 to 2007. Reportable crashes are crashes that may result in a fatality, injury, and/or property damage of \$500 or more. A comprehensive analysis of the crash data is shown in **Appendix C**.

Rear-end (20), hit fixed object (13) and left turn (6) crashes represented approximately 77 percent of the intersection crashes. Rear-end (39.2%), hit fixed object (25.5%), left-turn (11.76%), and head-on (5.9%) crashes were higher than 2006 New Jersey Statewide County Road Averages of 30.32, 11.89, 7.89, 3.73 percent, respectively. There were two fatal crashes during the study period, one in 2005 and one in 2007. There were 28 (54.9%) property- damage-only crashes and 20 (39.2%) injury crashes of varying levels of severity. The fatality average (3.93%) and the injury average (39.2%) are above the 2006 statewide average of 0.27% and 29.16% for the county road system. Crashes occurring during dusk/dawn were higher than the 2006 statewide averages. In an analysis of roadway surface conditions during the occurrence of

crashes, approximately 65% occurred on dry road surface while 11.76% occurred on road surface condition of ice or snow. The 2006 statewide averages for the county road system showed a 2.13% average of crashes occurring on icy and snowy road surface condition.

2.0 FINDINGS AND RECOMMENDATIONS

The following represents the findings and recommendations of the Erial Road/Williamstown Road Intersection Road Safety Audit. Shaded areas represent recommended strategies requiring a low level of effort for implementation with high potential safety benefits.

Geometry Improvement



Issue

- High intersection volumes, with relatively high left turning volumes from Williamstown Road onto Erial Road.
- Left-turning traffic blocking through movements at Williamstown Road approaches – Aggressive Driving.
- High number of left-turn and angle crashes.

Possible Improvement Strategies

- Consider adding dedicated left-turn lanes for both approaches on Williamstown Road
- Upgrade traffic signal and timing to accommodate protected left-turn movements.
- Consider reconfiguring the channelized island to accommodate additional lane.
- Upgrade all pavement markings at the intersection (lane lines, shoulders, edgelines, and stop bars).

Level of Effort

Medium

Potential Safety Benefit

High

or

High

(If ROW acquisition is required)

The Road Safety Audit team considered this a **HIGH** priority.

* All photographs in this document were taken by DVRPC staff, 2008.

Striping



Issue

- Stop bar on the southeast approach of Erial Road is too close to the intersection. This results in difficult turning movements from Williamstown Road onto northbound Erial Road.

Possible Improvement Strategies

- Move stop bar back from intersection to accommodate safer turning movements.

Level of Effort

Low

Potential Safety Benefit

High

Issue

- Stop bars are missing/faded at all approaches of the intersection.

Possible Improvement Strategies

- Add or repaint stop bars as appropriate.

Level of Effort

Low

Potential Safety Benefit

High

Issue

- The intersection has no crosswalks.

Possible Improvement Strategies

- Install crosswalks at the intersection at the northwest approach of Erial Road and the southwest approach of Williamstown Road.

(Crosswalks will provide guidance for pedestrians who are crossing the roadways and alert motorists)

Level of Effort

Low

Potential Safety Benefit

High

Signs



Issue

- “No Standing Anytime” signs have faded, they are mounted too low, and they are on non-breakaway posts.

Possible Improvement Strategies

- Replace signs and mount according to MUTCD guidance.

Level of Effort

Low

Potential Safety Benefit

High

Issue

- “Reduce Speed Ahead” sign is mounted too low on non-breakaway posts.

Possible Improvement Strategies

- Remount sign according to MUTCD guidance.

Level of Effort

Low

Potential Safety Benefit

High

Issue

- Existing county route designation signs are not up to current standards.

Possible Improvement Strategies

- Replace signs according to current standards and mount according to MUTCD guidance.

Level of Effort

Low

Potential Safety Benefit

Medium

<p><u>Issue</u></p> <ul style="list-style-type: none"> • Several guide signs (church and hospital) are in poor condition and are mounted too low. <p>Possible Improvement Strategies</p> <ul style="list-style-type: none"> • Remove or replace signs as appropriate. <p>Level of Effort Potential Safety Benefit Low Medium</p>	
<p><u>Issue</u></p> <ul style="list-style-type: none"> • Camden County Park guide sign at the intersection is faded. <p>Possible Improvement Strategies</p> <ul style="list-style-type: none"> • Replace sign and mount according to MUTCD guidance. <p>Level of Effort Potential Safety Benefit Low Medium</p>	
<p><u>Issue</u></p> <ul style="list-style-type: none"> • “Traffic signal ahead” signs are redundant. At the sign motorists are able to see the traffic signal. <p>Possible Improvement Strategies</p> <ul style="list-style-type: none"> • Replace these signs with “Junction” signs with county route designation for the intersection. <p>Level of Effort Potential Safety Benefit Low Medium</p>	
<p><u>Issue</u></p> <ul style="list-style-type: none"> • Reflective signs in the right-turn channelized island are leaning and oriented in the wrong direction. <p>Possible Improvement Strategies</p> <ul style="list-style-type: none"> • Upgrade signs according to MUTCD guidance and supplement with raised pavement markers on the edgeline of the northeast Williamstown Road approach lane and the southeast Erial Road receiving lane. <p>Level of Effort Potential Safety Benefit Low High</p>	

Channelized Island



Issue

- No striping for northeast Williamstown Road approach channelized right-turn lane.

Possible Improvement Strategies

- On the Erial Road side of the island, add solid line for southeast Erial Road receiving lane edgeline and extend this line approximately 50 feet further from the island and continue with dashed striping for the merge.

Level of Effort

Low

Potential Safety Benefit

High

Issue

- There are no “yield” or “stop” signs or pavement markings for the channelized right-turn lane.

Possible Improvement Strategies

- Install a “yield” sign and/or saw tooth yield pavement markings.

Level of Effort

Low

Potential Safety Benefit

High

Passing Zone



Issue

- Passing Zone begins too close to the active driveways of the Mongan’s Service Station and the Winslow Court intersection.

Possible Improvement Strategies

- Extend No Passing Zone north of the storage facility driveway located north of Winslow Court.

Level of Effort

Low

Potential Safety Benefit

High

Issue

- There are no warning signs to advise motorists traveling southwest on Williamstown Road of the end of the passing zone.

Possible Improvement Strategies

- Install “No Passing Zone” signage for motorists traveling southwest on Williamstown Road.

Level of Effort

Low

Potential Safety Benefit

High

Pavement



Issue

- Pavement on Erial Road on the south side of the intersection is in disrepair.

Possible Improvement Strategies

- Repave the roadway.

Level of Effort

Medium

Potential Safety Benefit

High

(County paving project is scheduled for Erial Road from the intersection south)

Guide Rail



Issue

- Guide rails are damaged.

Possible Improvement Strategies

- Replace existing guide rail with end treatments consistent with AASHTO guidelines.

Level of Effort

Medium

Potential Safety Benefit

High

Vegetation



Issue

- Shrubs at the intersection are overgrown and interfere with motorist sight distance.

Possible Improvement Strategies

- Trim shrubs at the intersection.

Level of Effort

Low

Potential Safety Benefit

High

Issue

- Channelized island is overgrown and presents a hazard for pedestrians.

Possible Improvement Strategies

- Hardscape the island (low maintenance).

Level of Effort

Low

Potential Safety Benefit

High

Drop Off



Issue

- Edge drop off on the north side of the intersection on Erial Road.

Possible Improvement Strategies

- Pave the shoulder with a tapered transition to make traversable.

Level of Effort

Medium

Potential Safety Benefit

High

Issue

- Crash history of ‘hit fixed object’ crashes in the vicinity.

Possible Improvement Strategies

- Consider installing edge line rumble strips, especially for the Erial Road approach, where there is a history of ‘hit fixed object’ crashes.

Level of Effort

Medium

Potential Safety Benefit

High

Access Management



Issue

- Trucks exiting the Mongan’s Service station block both lanes of traffic on Williamstown Road.
- The service station has no defined access/egress points on both roadways at the intersection.
- Motorists make unsafe turns from service station driveways.

Possible Improvement Strategies

- Coordinate with business owner to define driveway access according to current county access management policy.
- Consider restricting left turns from service station.

Level of Effort
Medium

Potential Safety Benefit
High

Traffic Signal



Issue

- High number of angle and left-turn crashes.

Possible Improvement Strategies

- Revisit the signal timing and possibly increase the all-red phase.

Level of Effort

Low

Potential Safety Benefit

High

Issue

- Sun glare makes it difficult to see the signal at specific times of the day.

Possible Improvement Strategies

- Add backplates to signal heads to enhance visibility.

Level of Effort

Low

Potential Safety Benefit

High

Issue

- There are no pedestrian signal heads.

Possible Improvement Strategies

- Add pedestrian signal heads and push button.

Level of Effort

Medium

Potential Safety Benefit

High

Pedestrians



Issue

- Sidewalk is in poor condition.

Possible Improvement Strategies

- Upgrade/maintain sidewalks.

Level of Effort

Medium

Potential Safety Benefit

High

Issue

- Curb ramps are not ADA compliant.

-

Possible Improvement Strategies

- Install ADA-compliant curb ramps.

Level of Effort

Medium

Potential Safety Benefit

High

Delineation



Issue

- Raised pavement markers are too far apart.

Possible Improvement Strategies

- Install additional raised pavement markers to enhance their safety effect.

Level of Effort
Medium

Potential Safety Benefit
High

3.0 CONCLUSION

As discussed earlier, the road safety audit program is conducted to generate improvement recommendations and countermeasures for roadway segments or intersections demonstrating a history of or potential for a high incidence of motor vehicle crashes. The safety issues identified during the audit and documented in this report, along with the recommended strategies, should improve the overall safety of the study area. Many of the strategies identified can be implemented through routine maintenance. The full impact of the improvement strategies will be realized when they are combined, but time and budget constraints may dictate when remedial strategies are implemented.

Engineering strategies alone will not eliminate the traffic safety issues identified at the study area. Therefore, enforcement and education are necessary components to address the human behavioral aspects to effectively reduce the number of crashes occurring. Policy or legislative issues may be involved in addressing safety concerns, so engaging the appropriate stakeholders is important. Coordination and collaboration is the key to making the roadway safer for all users.

APPENDIX A
Audit Team

DELAWARE VALLEY REGIONAL PLANNING COMMISSION
ERIAL ROAD & WILLIAMSTOWN ROAD INTERSECTION ROAD SAFETY AUDIT

AUDIT TEAM

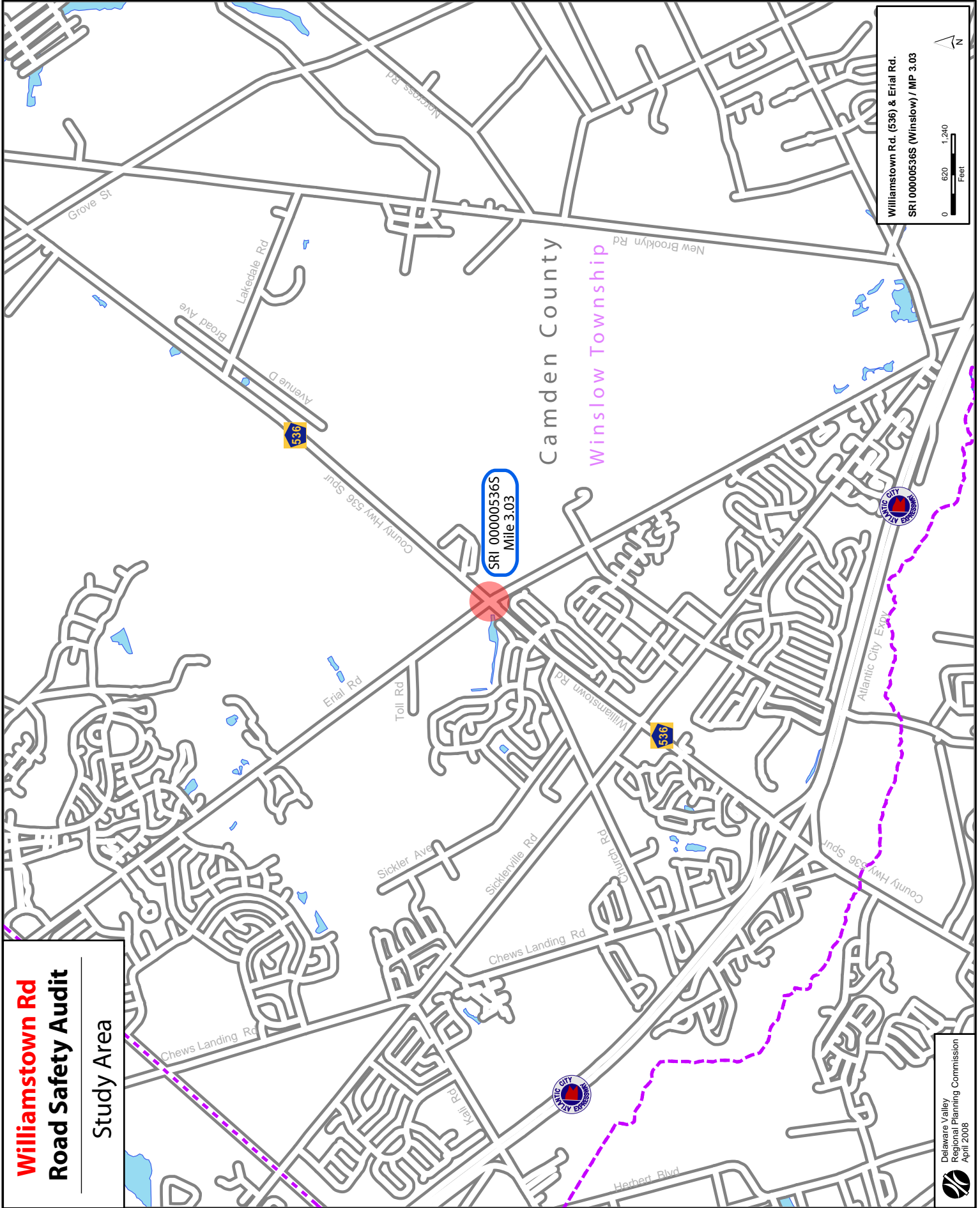
Name	Organization
Rosemarie Anderson	Delaware Valley Regional Planning Commission
Sophia Azam	New Jersey Department of Transportation
Joe Gallagher	Winslow Township Administrator
Ed McGlinchey	Winslow Township Public Works Department
Regina Moore	Delaware Valley Regional Planning Commission
Kevin Murphy	Delaware Valley Regional Planning Commission
Ed O'Connor	New Jersey Division of Highway Traffic Safety
Joe Radday	ABR Consultants (Winslow Township Engineer)
Mark Passanella	Winslow Township Police Department
Caroline Trueman	Federal Highway Administration

APPENDIX B

Maps

Williamstown Rd Road Safety Audit

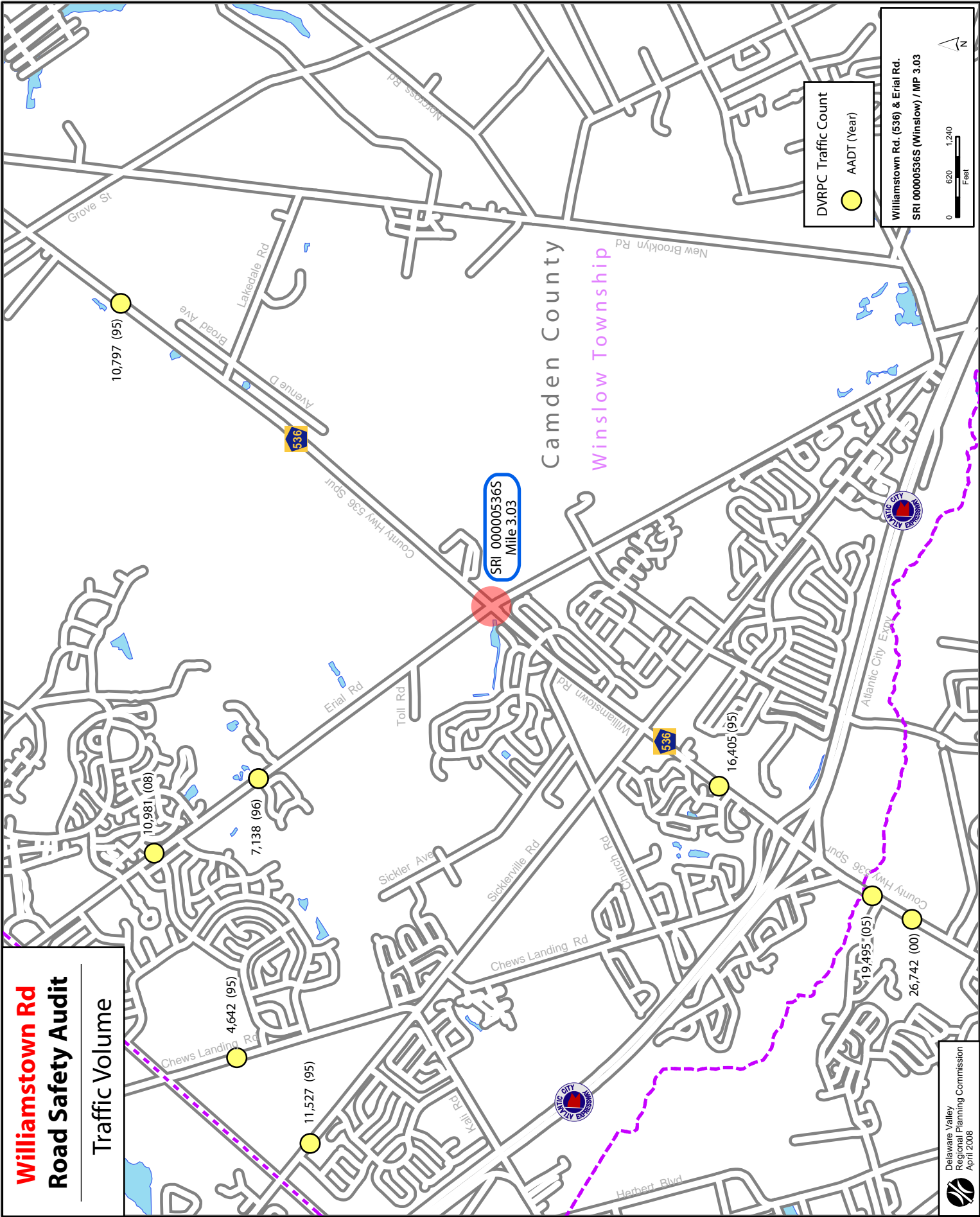
Study Area



Williamstown Rd. (536) & Erial Rd.
SRI 00000536S (Winslow) / MP 3.03

Williamstown Rd Road Safety Audit

Traffic Volume



DVRPC Traffic Count
● AADT (Year)

Williamstown Rd. (536) & Erial Rd.
SRI 000005365 (Winslow) / MP 3.03

0 620 1,240
Feet

APPENDIX C

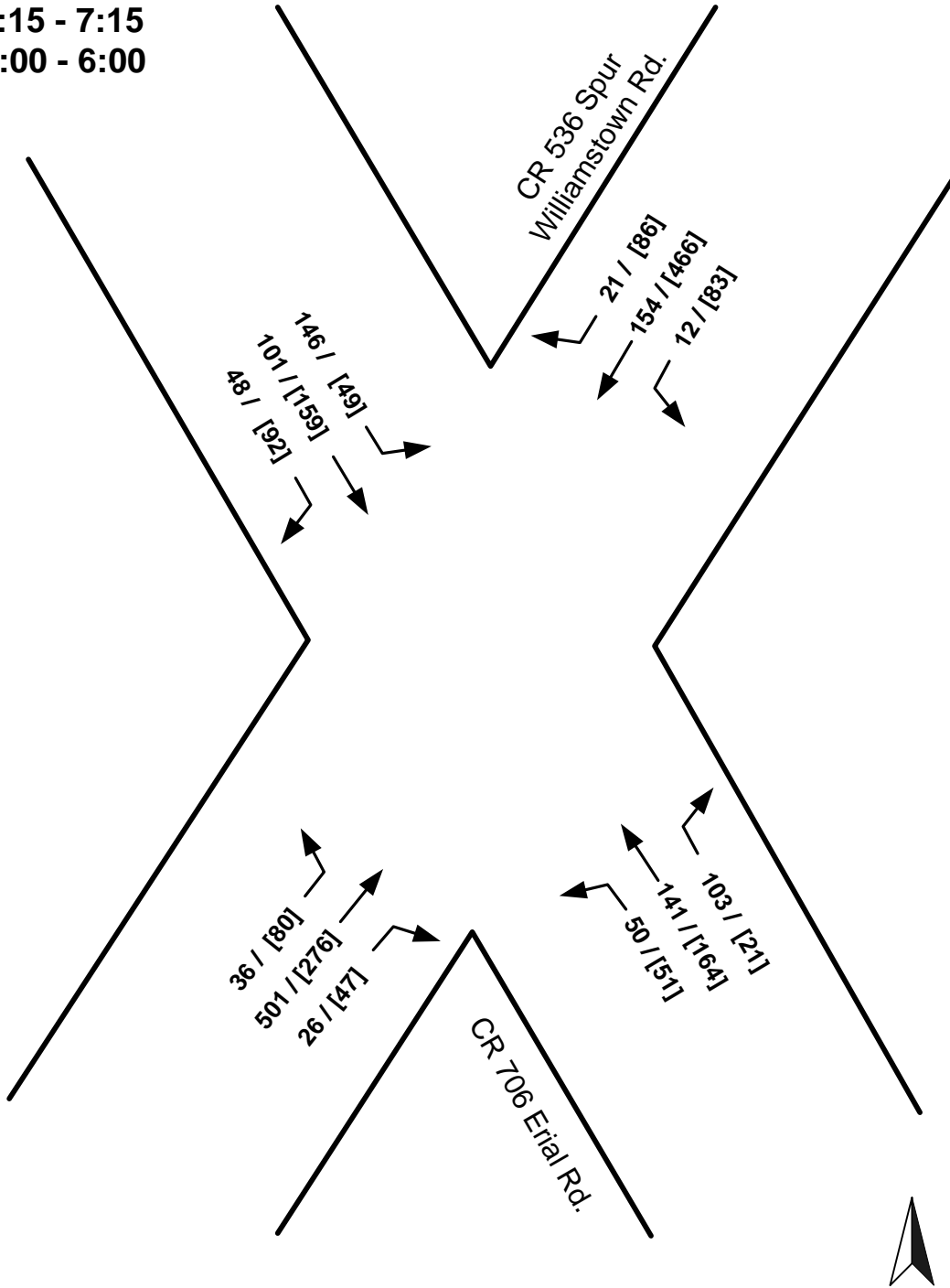
Traffic Data

Erial Road and Williamstown Road Intersection. Peak Hour Turning Movement Counts

Peak Hours

AM : 6:15 - 7:15

[PM]: 5:00 - 6:00

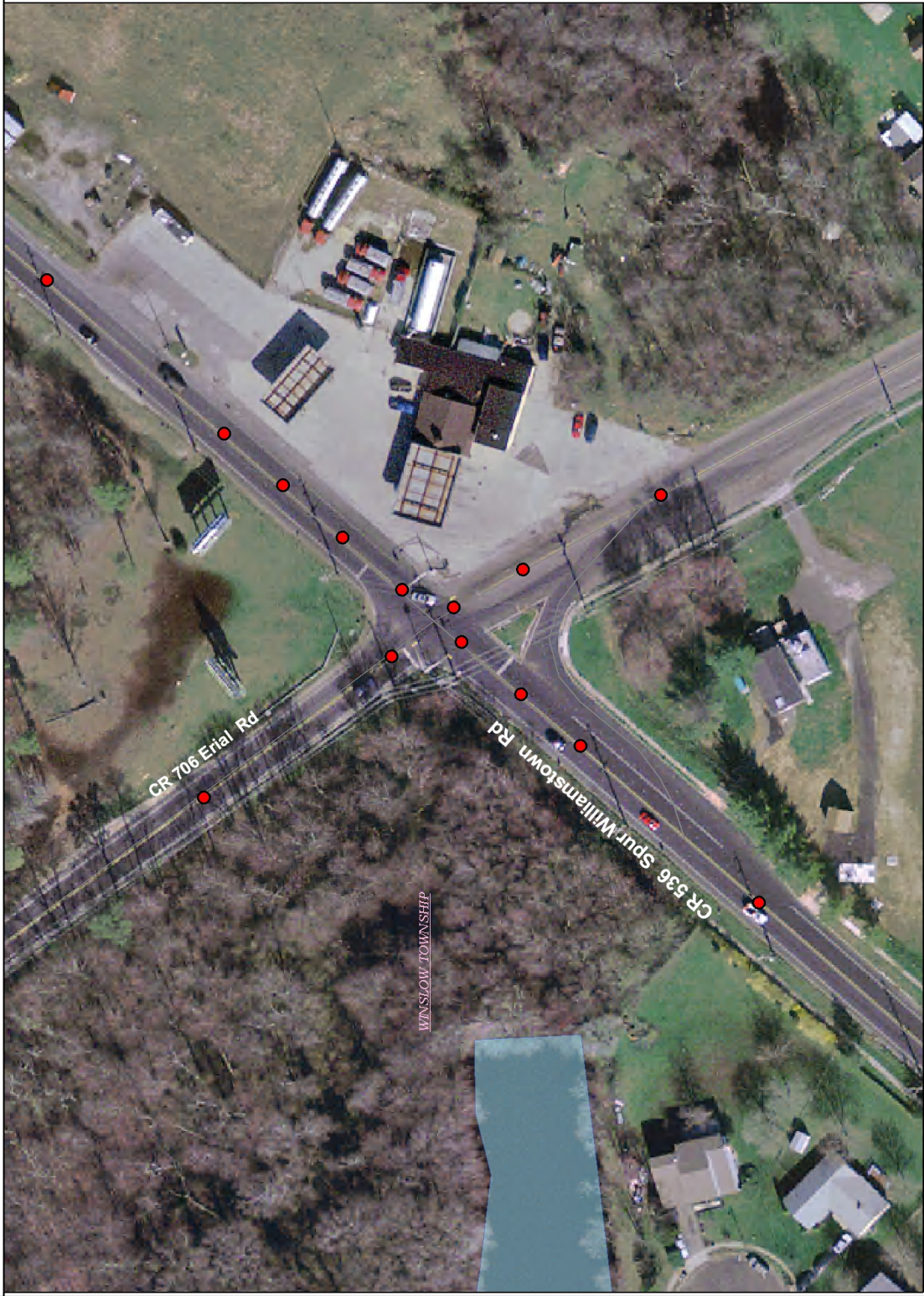


SCHMATIC NOT TO SCALE





Delaware Valley Regional Planning Commission
April 2008


Intersection of CR 706 Erial Road and CR 536 Spur Williamstown Road
Winslow Township, New Jersey



COLLISION TYPE	
Rear-end	20
Angle	5
Left Turns	6
Hit Fixed Object	13
Hit Animal	2
Head On	3
Same Dir Side Swipe	1
Total	50
LIGHTING CONDITION	
Day	34
Dusk/Dawn	4
Night	12
Total	50
ROAD SURFACE	
Dry	33
Wet	10
Ice/Snow	6
Fog/Smog/Smoke	1
Total	50
SEVERITY	
Fatality	2
Major Injury	0
Moderate Injury	6
Minor Injury	14
PDO	28
Total	50




Crash Location

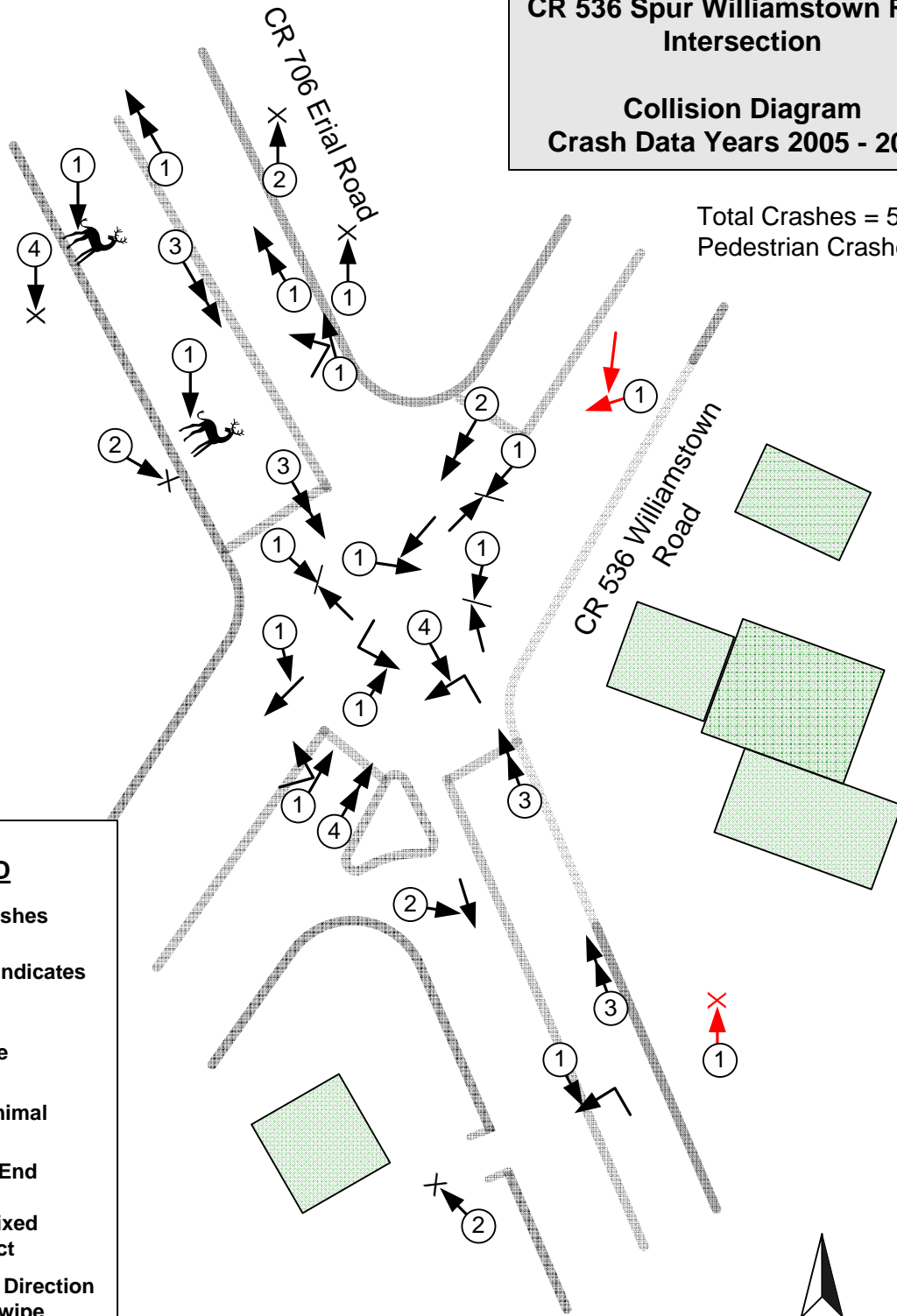


Delaware Valley
Regional Planning Commission
April 2008

**Road Safety Audit
Winslow Township
CR 706 Erial Road and
CR 536 Spur Williamstown Road
Intersection**

**Collision Diagram
Crash Data Years 2005 - 2007**

Total Crashes = 50
Pedestrian Crashes = 0



LEGEND

① = # crashes

Red Color Type Indicates Fatality

- Angle
- Hit Animal
- Rear End
- Hit Fixed Object
- Same Direction Sideswipe
- Left Turn / U Turn
- Head On

SCHEMATIC NOT TO SCALE

Crash Summary

CR 706 & CR 536 Spur	2005		2006		2007		Total		2006 NJ Statewide County Road Average
	Crash	%	Crash	%	Crash	%	Crash	%	
Crash Summary									
*Reportable	8	66.67%	14	77.78%	17	85.00%	39	76.47%	~
Non-Reportable	4	33.33%	4	22.22%	3	15.00%	11	21.57%	~
Collision Type									
Rear-End	4	33.33%	8	44.44%	8	40.00%	20	39.22%	30.32%
Angle	1	8.33%	4	22.22%	~	~	5	9.80%	18.09%
Left Turns	1	8.33%	3	16.67%	2	10.00%	6	11.76%	7.89%
Hit Fixed Object	3	25.00%	2	11.11%	8	40.00%	13	25.49%	11.89%
Hit Animal	2	16.67%	~	~	~	~	2	3.92%	3.80%
Head On	1	8.33%	1	5.56%	1	5.00%	3	5.88%	3.73%
Same Direction Side Swipe	~	~	~	~	1	5.00%	1	1.96%	11.45%
Intersection Type									
At Intersection	4	33.33%	8	44.44%	5	25.00%	17	33.33%	39.52%
Not at Intersection	8	66.67%	10	55.56%	15	75.00%	33	64.71%	60.45%
Severity Type									
Fatality	1	8.33%	~	~	1	5.00%	2	3.92%	0.27%
Injured	5	41.67%	8	44.44%	7	35.00%	20	39.22%	29.16%
Property Damage Only	6	50.00%	10	55.56%	12	60.00%	28	54.90%	70.57%
Lighting Condition									
Day	7	58.33%	14	77.78%	13	65.00%	34	66.67%	70.25%
Dusk/Dawn	1	8.33%	1	5.56%	2	10.00%	4	7.84%	3.84%
Night	4	33.33%	3	16.67%	5	25.00%	12	23.53%	25.49%
Road Surface Condition									
Dry	10	83.33%	13	72.22%	10	50.00%	33	64.71%	77.54%
Wet	1	8.33%	4	22.22%	5	25.00%	10	19.61%	19.67%
Ice/Snow	1	8.33%	1	5.56%	4	20.00%	6	11.76%	2.13%
Fog/Smog/Smoke	~	~	~	~	1	5.00%	1	1.96%	~

Source: Winslow Township Police Department

APPENDIX D

Checklist

DELAWARE VALLEY REGIONAL PLANNING COMMISSION
ERIAL ROAD & WILLIAMSTOWN ROAD INTERSECTION ROAD SAFETY AUDIT

CHECKLIST

Audit Team Member _____

GENERAL ISSUES

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Drainage	Do drainage items seem to be adequate?		
	Are drainage items clear of debris?		
2 Landscaping	Is landscaping in accordance with guidelines (sight distance, clearances, etc.)		
3 Public Utilities	Are boxes, poles, and/or posts located in a safe position?		
	Do the above items interfere with sight distance?		
4 Access Management	Are there locations at and near the intersection where access management is problematic?		
5 Lighting	Is lighting needed in the vicinity of the intersection?		

ALIGNMENT AND CROSS SECTION

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Visibility	Are sight distances adequate for the speed of traffic approaching the intersection?		
	Is adequate sight distance provided at the intersection?		
2 Driver Expectation	Are there any sections of the intersection that may cause driver confusion, such as:		
	a. Is alignment of roadway clearly defined?		
	b. Are crossroads or hidden driveways properly signed along corridor?		

	c. Do streetlights and tree lines conform to the road alignment?		
3 Widths	Are all the traffic lanes and roadway widths adequate?		

INTERSECTION

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Location	Are there any roadside objects nearby that would intrude on the driver's line of sight?		
	Is the intersection adequate for all vehicular movements?		
2 Controls	Are pavement markings and intersection control signing satisfactory?		
	Are there any pedestrian signals?		
3 Signage	Is the intersection appropriately signed?		
	Are there advance warning signs indicating the intersection?		
	Are signs appropriately located and of the appropriate size?		
4 Layout	Is the intersection layout obvious to all users?		
	Is the alignment of curbs satisfactory?		
	Are turning radii and tapers appropriate?		
	Are there driveways located at or near the intersections?		
5 Transit	Are there bus stops located near the intersections?		
	a. If so, are the bus stops near side or far side?		
6 Turn Lanes	Does the channelized right-turn lane onto CR 536 Spur cause any problems with merging traffic on CR 706?		
	Are there any approaches of the intersection where a left-turn lane is needed?		

TRAFFIC SIGNALS

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Signal Operation	Are traffic signals operating correctly (e.g., clearance time)?		
	Should there be left-turn signal protection for the approaches?		
2 Signal Heads and Visibility	Are traffic signals clearly visible to approaching motorists?		
	Are signal heads adequately placed so as not to cause driver confusion?		
	Are the signals post mounted, wire mounted, or mast arm mounted?		
	Are "signal ahead warning" signs needed?		
	Is the number of signal heads adequate?		
	Are the signal heads too small for motorists to notice?		
	Are the signals hard to see due to sun glare?		

PEDESTRIANS

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Land Use Factors	Are there schools or other pedestrian generators nearby?		
2 Facilities at CR 706 and CR 536 Spur Intersection	Are crosswalks provided at the intersection?		
	a. If so, are the crosswalks clearly marked?		
	Are the pedestrian ramps adequate?		
	Are there pedestrian signals located at intersection?		
	Is the intersection clearly delineated for the visually impaired?		
	Is there adequate drainage at the intersection?		

3 Area Near the CR 706 and CR 536 Spur intersection	Is the speed limit appropriate for all road users?		
	Are there safety concerns for pedestrians walking near the corner gas station?		
4 Lighting	Is the sidewalk in the vicinity near the intersection adequately lit for pedestrians to see and feel safe?		
	Are there dark places or hiding places that represent a personal security issue?		
	Are the pedestrian crosswalks adequately lit for pedestrians and motorists?		
5 Visibility and Sight Distance	Are pedestrians waiting to cross visible to motorists?		
	Can pedestrians see approaching vehicles?		
	Are there temporary or permanent obstructions near the crosswalks (i.e., vegetation, fences, etc.)		

SIGNAGE, PAVEMENT MARKINGS, DELINEATION AND LIGHTING

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Signage	Are there signs missing from key locations?		
	Are the signs easy to understand?		
	Are the correct signs used for each situation? And is each sign necessary?		
	Are signs effective for all likely conditions (i.e., day, night, oncoming headlights, etc.)?		
	Is there sign clutter at the intersection?		
	Are all necessary regulatory, warning, and direction signs in place? Are they conspicuous?		
	Are they redundant?		
	Are traffic signs in their correct locations and properly positioned with respect to lateral clearance and height?		
	Are signs placed so as to restrict sight distance, particularly for vehicles?		

	Do sign supports conform to guidelines?		
2 Pavement Markings and Delineation	Does existing pavement markings need to be repainted?		
	Do raised pavement markers need to be installed at the approach of the intersection?		
	Are pavement markings easily visible and effective for all likely conditions (i.e., at night, day, inclement weather, etc.)?		

PAVEMENT

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Pavement defects	Is the pavement free of defects (i.e., excessive roughness, potholes) that could result in safety problems?		
2 Ponding	Is the pavement free of areas where ponding may occur, resulting in a safety problem?		

BICYCLISTS

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
	Are there share-the-road signs posted?		
	Is the road surface of suitable quality for bicyclists?		

TRANSIT

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Buses	Are bus stops located at or near the intersection of CR 706 and CR 536 Spur?		

APPENDIX E
Response Sheet

DELAWARE VALLEY REGIONAL PLANNING COMMISSION

ERIAL ROAD & WILLIAMSTOWN ROAD INTERSECTION ROAD SAFETY AUDIT
RESPONSE SHEET

ISSUES	IMPROVEMENT STRATEGIES	Decision Agree/Reject	Planned Completion Date	Comments
Geometry Improvement				
<ul style="list-style-type: none"> High intersection volumes, with relatively high left-turning volumes from Williamstown Road onto Erial Road. Left-turning traffic blocking through movements at Williamstown Road approaches – Aggressive Driving. High number of left-turn and angle crashes. 	<ul style="list-style-type: none"> Consider adding dedicated left-turn lanes for both approaches on Williamstown Road. Upgrade traffic signal and timing to accommodate protected left-turn movements. Consider reconfiguring the channelized island to accommodate additional lane. Upgrade all pavement markings at the intersection (lane lines, shoulders, edgelines, and stop bars). 			
Striping				
<ul style="list-style-type: none"> Stop bar on the southeast approach of Erial Road is too close to the intersection. This results in difficult turning movements from Williamstown Road onto northbound Erial Road. Stop bars are missing/faded at all approaches of the intersection. 	<ul style="list-style-type: none"> Move stop bar back from intersection to accommodate safer turning movements. Add or repaint stop bars as appropriate. 			

ISSUES	IMPROVEMENT STRATEGIES	Decision Agree/Reject	Planned Completion Date	Comments
Striping cont'd				
<ul style="list-style-type: none"> The intersection has no crosswalks. 	<ul style="list-style-type: none"> Install crosswalks at the intersection at the northwest approach of Erial Road and the southwest approach of Williamstown Road. <u><i>(Crosswalks will provide guidance for pedestrians who are crossing the roadways and alert motorists)</i></u> 			
Signs				
<ul style="list-style-type: none"> “No Standing Anytime” signs have faded, they are mounted too low, and they are on nonbreakaway posts. 	<ul style="list-style-type: none"> Replace signs and mount according to MUTCD guidance. 			
<ul style="list-style-type: none"> “Reduce Speed Ahead” sign is mounted too low on nonbreakaway posts. 	<ul style="list-style-type: none"> Remount sign according to MUTCD guidance. 			
<ul style="list-style-type: none"> Existing county route designation signs are not up to current standards. 	<ul style="list-style-type: none"> Replace signs according to current standards and mount according to MUTCD guidance. 			
<ul style="list-style-type: none"> Several guide signs (church and hospital) are in poor condition and are mounted too low. 	<ul style="list-style-type: none"> Remove or replace signs as appropriate. 			
<ul style="list-style-type: none"> Camden County Park guide sign at the intersection is faded. 	<ul style="list-style-type: none"> Replace sign and mount according to MUTCD guidance. 			

ISSUES	IMPROVEMENT STRATEGIES	Decision Agree/Reject	Planned Completion Date	Comments
Signs cont'd				
<ul style="list-style-type: none"> • “Traffic signal ahead” signs are redundant. At the sign motorists are able to see the traffic signal. 	<ul style="list-style-type: none"> • Replace these signs with “Junction” signs with county route designation for the intersection. 			
<ul style="list-style-type: none"> • Reflective signs in the right-turn channelized island are leaning and oriented in the wrong direction. 	<ul style="list-style-type: none"> • Upgrade signs according to MUTCD guidance and supplement with raised pavement markers on the edgeline of the northeast Williamstown Road approach lane and the southeast Erial Road receiving lane. 			
Channelized Island				
<ul style="list-style-type: none"> • No striping for northeast Williamstown Road approach channelized right-turn lane. 	<ul style="list-style-type: none"> • On the Erial Road side of the island add solid line for southeast Erial Road receiving lane edgeline and extend this line approximately 50 feet further from the island and continue with dashed striping for the merge. 			
<ul style="list-style-type: none"> • There are no “yield” or “stop” signs or pavement markings for the channelized right turn lane 	<ul style="list-style-type: none"> • Install a “yield” sign and/or saw tooth yield pavement markings. 			

ISSUES	IMPROVEMENT STRATEGIES	Decision Agree/Reject	Planned Completion Date	Comments
Passing Zone				
<ul style="list-style-type: none"> Passing Zone begins too close to the active driveways of the Mongan's Service Station and the Winslow Court intersection. 	<ul style="list-style-type: none"> Extend No Passing Zone north of the storage facility driveway located north of Winslow Court. 			
<ul style="list-style-type: none"> There are no warning signs to advise motorists traveling southwest on Williamstown Road of the end of the passing zone. 	<ul style="list-style-type: none"> Install "No Passing Zone" signage for motorists traveling southwest on Williamstown Road. 			
Pavement				
<ul style="list-style-type: none"> Pavement on Erial Road on the south side of the intersection is in disrepair. 	<ul style="list-style-type: none"> Repave the roadway. <p><i>(County paving project is scheduled for Erial Road from the intersection south)</i></p>			
Vegetation				
<ul style="list-style-type: none"> Shrubs at the intersection are overgrown and interfere with motorist sight distance. 	<ul style="list-style-type: none"> Trim shrubs at the intersection. 			
<ul style="list-style-type: none"> Channelized island is overgrown and presents a hazard for pedestrians. 	<ul style="list-style-type: none"> Hardscape the island (low maintenance). 			
Drop Off				
<ul style="list-style-type: none"> Egde drop off on the north side of the intersection on Erial Road. 	<ul style="list-style-type: none"> Pave the shoulder with a tapered transition to make traversable. 			

ISSUES	IMPROVEMENT STRATEGIES	Decision Agree/Reject	Planned Completion Date	Comments
Drop Off cont'd	<ul style="list-style-type: none"> Crash history of 'hit fixed object' crashes in the vicinity. 			
Guide Rail	<ul style="list-style-type: none"> Consider installing edge line rumble strips, especially for the Erial Road approach, where there is a history of 'hit fixed object' crashes. 			
<ul style="list-style-type: none"> Guide rails are damaged. 	<ul style="list-style-type: none"> Replace existing guide rail with end treatments consistent with AASHTO guidelines. 			
Access Management				
<ul style="list-style-type: none"> Trucks exiting the Mongan's Service station block both lanes of traffic on Williamstown Road. The service station has no defined access/egress points on both roadways at the intersection. Motorists make unsafe turns from service station driveways. 	<ul style="list-style-type: none"> Coordinate with business owner to define driveway access according to current county access management policy. Consider restricting left turns from service station. 			
Traffic Signal				
<ul style="list-style-type: none"> High number of angle and left-turn crashes. 	<ul style="list-style-type: none"> Revisit the signal timing and possibly increase the all-red phase. 			
<ul style="list-style-type: none"> Sun glare makes it difficult to see the signal at specific times of the day. 	<ul style="list-style-type: none"> Add backplates to signal heads to enhance visibility. 			

ISSUES	IMPROVEMENT STRATEGIES	Decision Agree/Reject	Planned Completion Date	Comments
Traffic Signal cont'd				
<ul style="list-style-type: none"> There are no pedestrian signal heads. 	<ul style="list-style-type: none"> Add pedestrian signal heads and push button. 			
Pedestrians				
<ul style="list-style-type: none"> Sidewalk is in poor condition. 	<ul style="list-style-type: none"> Upgrade/maintain sidewalks. 			
<ul style="list-style-type: none"> Curb ramps are not ADA compliant. 	<ul style="list-style-type: none"> Install ADA-compliant curb ramps. 			
Delineation				
<ul style="list-style-type: none"> Raised pavement markers are too far apart. 	<ul style="list-style-type: none"> Install additional raised pavement markers to enhance their safety effect. 			

Title of Report: ***INTERSECTION ROAD SAFETY AUDIT – ERIAL ROAD and
WILLIAMSTOWN ROAD, WINSLOW TOWNSHIP***

Publication No.: **08039**

Date Published: June 2008

Geographic Area Covered:

The study area consists of the signalized intersection of Erial Road (CR 706) and Williamstown Road (CR 536 Spur) and vicinity in Winslow Township, New Jersey.

Key Words:

Road, safety, audit, potential, fatalities, injuries, reportable, crashes, issues, strategies, coordination, engineering, enforcement, education, stakeholders, prioritize, intersection, speed limit, traffic volumes, stakeholders, audit team, breakaway, geometry, pavement markings, signs, traffic signals, crosswalk, sidewalk, curb ramp.

ABSTRACT: This is a documentation of the process and findings of the Erial Road (CR 706) and Williamstown Road (CR 536 Spur) Intersection Road Safety Audit (RSA) undertaken by Delaware Valley Regional Planning Commission (DVRPC). The goal of the audit is to generate improvement recommendations and countermeasures for intersections demonstrating a history of, or potential for a high incidence of motor vehicle crashes. The emphasis is placed on identifying low cost, quick turnaround safety projects to address the issues where possible. This project represents a step towards implementation of the DVRPC Regional Safety Action Plan. Improving the design and operation of intersections is a priority area for both engineering and enforcement discipline, as documented in the Plan. Improvement strategies may be eligible for Local Federal Safety Funds for implementation. The report details safety issues identified by the audit team at the study location and remedial strategies to address them.

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