



Delaware Valley
Regional Planning
Commission



PA 412

Road Safety Audit

November 2007

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.

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The crash data used in this report was provided by the Pennsylvania Department of Transportation for the Delaware Valley Regional Planning Commission's traffic safety related transportation planning and programming purposes only. The raw data remains the property of the Pennsylvania Department of Transportation and its release to third parties is expressly prohibited without the written consent of the Department.

PA 412 ROAD SAFETY AUDIT

1.0 BACKGROUND

This document represents the second of the five Road Safety Audits (RSA) to be conducted in fiscal year 2008. In fiscal year 2007, three RSAs were conducted in three different environments – urban, suburban and rural. The work is now being continued with this “high risk rural” road. This project represents the coordination of the Delaware Valley Regional Planning Commission’s (DVRPC) Planning Work Program and Pennsylvania Department of Transportation (PennDOT) District 6 Safety Plan. DVRPC’s planning work program includes a RSA Program. All state departments of transportation are required to develop a Strategic Highway Safety Plan (SHSP) in order to draw on safety funds according to SAFETEA-LU, the federal transportation legislation. In Pennsylvania each district is required to have a Safety Plan to be incorporated in the state’s SHSP. In PennDOT’s District 6 Safety Plan several corridors are identified under Section 148 Planned Safety Projects eligible for Highway Safety Improvement Program funding. This was an opportunity to analyze corridors which were already on the plan and eligible for dedicated funding.

Whereas, 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 will not exclude the more complex projects.

1.1 The Audit

Prior to the road safety audit activities on site, DVRPC collected, reviewed and analyzed data (video of roadway under different conditions, traffic volume data, turning movement counts, maps, aerial photographs, previous traffic reports and crash data). Using the crash data, crash clusters were identified and mapped for locations along PA 412. These locations were the main focus of the road safety audit. Additional locations were identified by members of the road safety audit team local to the area.

The Road Safety Audit was conducted on September 12th and 13th, 2007. The Pre-Audit meeting was conducted on the first day and involved the definition of road safety audit and how it differs from a corridor study process; the required steps of an audit; presentation of the corridor issues and an exchange of ideas and knowledge of the roadway. A video showing the corridor under night time conditions was also shown. The field view followed where the audit team made up of federal, state, and local officials and other stakeholders walked the corridor and identified transportation safety issues. See

Appendix A for the list of audit team members. On the second day field view was completed and the post-audit meeting 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 approximately 8 miles of PA 412 from PA 611 in Nockamixon Township in Bucks County through Springfield Township to the border with Lower Saucon Township in Northampton County; see **Appendix B** for *Study Area Map*. Locally the road is known as several different names – Durham Road in Nockamixon; Harrow Road, Main Street and Leithsville Road in Springfield. For a portion of the roadway through Springtown, PA 412 is also designated PA 212. The study roadway is functionally classified as a minor arterial and runs in a north-west to south-easterly direction. The land use in the corridor is a mix of residential, agricultural and institutional uses. Overall, the area is rural in character.

PA 412 has two lanes throughout its length, one travel lane in each direction with narrow shoulders in a few areas and no curbs. Lane width varies throughout the corridor but is generally less than 12 feet wide. The roadway consists of numerous curves and steep grades; with no sidewalks except in locations in Springtown. There are thirty seven un-signalized intersections along PA 412 within the study corridor with a signal at PA 611 and an advisory signal at Mountain View Drive (PA 563).

Traffic volumes in the corridor vary. They are highest in the eastern section of the study corridor with an AADT close to 10,000 in 2006. In Springtown and close to Northampton border AADTs hover around 6,000. The middle section of the corridor experiences between 3,000 and 6,000 AADT. The speed limit along the corridor is 45 MPH with curve warning speed limit of 30 MPH.

1.3 Crash Data

According to PennDOT's crash data there were 127 reportable crashes between 2004 and 2006. Reportable crashes are crashes which may result in a fatality, injury and/or property damage rendering the vehicle disabled, requiring it be towed from the scene. A comprehensive analysis of the crash data is shown in **Appendix C**. Of the reportable crashes, there were 37 crashes in 2004 (30%); 45 crashes in 2005 (35%); and 45 crashes in 2006 (35%). When analyzing crash frequency by month, December had the highest number of crashes with 16 (13%), June was next with 14 crashes and January, May and August had 13 crashes each. Crashes occurred in every month of the year with July having the lowest number of crashes at 5.

Hit fixed object (50), angle (38) and rear end (22) crashes represented 87% of the 127 reportable crashes. There were four (3%) fatal crashes during the study period, 59 (46%) injury crashes of varying levels of severity, and 62 (49%) property damage only crashes. The majority of the crashes occurred during fair weather (76%) with 21% occurring during rainy, snowy, sleeting or foggy conditions. In an analysis of roadway surface conditions during the occurrence of crashes, 67% occurred on dry road surface. Sixty-seven percent of the crashes occurred during daylight hours.

2.0 FINDINGS AND RECOMMENDATIONS

The following represents the findings and recommendations of the PA 412 Road Safety Audit. Shaded areas represent recommended strategies requiring low level of effort for implementation with high potential safety benefits.

Corridor Wide

SAFETY ISSUE	REMEDIAL STRATEGIES	LEVEL OF EFFORT	POTENTIAL SAFETY BENEFIT
<p>Centerline Delineation</p> <ul style="list-style-type: none"> ○ The corridor is shadowed during the day in some areas due to the canopy of trees and is extremely dark at night, a result of the lack of street lighting. Safety is further compromised by the narrow pavement width. 	<ul style="list-style-type: none"> ○ Install raised pavement markers (RPMs) the length of the corridor to better delineate the centerline during dark hours and adverse weather conditions. Centerline rumble strips should be installed to assist in the prevention of head-on collisions in accordance with PennDOT’s policy. 	<p>Medium</p>	<p>High</p>
<p>Pavement markings</p> <ul style="list-style-type: none"> ○ Pavement markings are faded and hardly visible in several locations. 	<ul style="list-style-type: none"> ○ Re-stripe the corridor as appropriate. 	<p>Low</p>	<p>High</p>
<p>Signs</p> <ul style="list-style-type: none"> ○ There is a lack of intersection warning signs. Given the geometry of the roadway this could be beneficial to road users. ○ Many curves throughout the corridor are missing chevrons. 	<ul style="list-style-type: none"> ○ Evaluate corridor for complete sign upgrade. Install “intersection ahead” warning signs and add street name signage as appropriate. <u>Nockamixon Township will perform task in that section of the corridor</u> ○ Identify appropriate locations and install chevrons. 	<p>Low</p> <p>Low</p>	<p>High</p> <p>High</p>

SAFETY ISSUE	REMEDIAL STRATEGIES	LEVEL OF EFFORT	POTENTIAL SAFETY BENEFIT
<p><i>Speed Limit</i></p> <ul style="list-style-type: none"> ○ Given the geometry of the roadway and the adjacent land uses, it seems motorists were going too fast. 	<ul style="list-style-type: none"> ○ Re-evaluate the posted speed limit and adjust as necessary. <i><u>Study completed by PennDOT – 40 MPH was justified.</u></i> 	Low	High
<p><i>Speeding</i></p> <ul style="list-style-type: none"> ○ Many drivers were observed traveling above the posted speed limit. 	<ul style="list-style-type: none"> ○ This will require increased enforcement. Given the narrowness of the roadway the relevant Police departments should coordinate with PennDOT to identify potential locations for and create pull-off areas. 	Low	High
<p><i>Delineators</i></p> <ul style="list-style-type: none"> ○ Several plastic pole delineators used to identify curb drop offs in specific areas along the corridor were knocked down or run-over. 	<ul style="list-style-type: none"> ○ Replace delineators. 	Low	High
<p><i>Lane and Shoulder Width</i></p> <ul style="list-style-type: none"> ○ Travel lanes throughout the corridor are narrow. Shoulders either do not exist or are very narrow throughout the corridor. 	<ul style="list-style-type: none"> ○ Program a project that will widen roadway to 12-foot lanes with at least a 2-foot paved shoulder where possible. 	High	High
<p><i>Drop Offs</i></p> <ul style="list-style-type: none"> ○ The corridor is plagued by steep drop offs. 	<ul style="list-style-type: none"> ○ Conduct an inventory of drop off locations and severity and determine the level of effort needed to make repairs. 	Medium	High

SAFETY ISSUE	REMEDIAL STRATEGIES	LEVEL OF EFFORT	POTENTIAL SAFETY BENEFIT
<p>Trees</p> <ul style="list-style-type: none"> ○ Tree canopy covers the roadway in several areas, resulting in many safety hazards – including blocking signs and sight distance. 	<ul style="list-style-type: none"> ○ Trim trees as appropriate throughout the corridor. 	<p>Low</p>	<p>Medium</p>
<p>Drainage</p> <ul style="list-style-type: none"> ○ Drainage facilities are lacking. There is evidence of cross-over pipes that go nowhere and clogged culverts. 	<ul style="list-style-type: none"> ○ Conduct an inventory of drainage cross pipe facilities along the corridor and determine level of effort needed to make repairs and/or clean out. 	<p>Medium</p>	<p>High</p>
<p>Road side hazards</p> <ul style="list-style-type: none"> ○ Concrete and stone headwalls for drainage in the clear zone are potential hazard to motorists who may run off the road. 	<ul style="list-style-type: none"> ○ Widen the road and install new curbs and traversable inlet grates instead of headwall. 	<p>Medium</p>	<p>High</p>
<p>Intersection Edge Line</p> <ul style="list-style-type: none"> ○ The geometry of many intersections requires motorists to pull out in the travel-way to see on-coming traffic. 	<ul style="list-style-type: none"> ○ Install dashed edge line across intersection approach to guide motorists. 	<p>Low</p>	<p>High</p>

Specific Locations

NOCKAMIXON TOWNSHIP			
ISSUES	RECOMMENDATIONS	LEVEL OF EFFORT	POTENTIAL SAFETY BENEFIT
PA 611			
<ul style="list-style-type: none"> ○ Insufficient lane width. 	<ul style="list-style-type: none"> ○ Widen road. 	<p>High</p>	<p>High</p>
<ul style="list-style-type: none"> ○ Inlets at the intersection are clogged. 	<ul style="list-style-type: none"> ○ Clean inlets to prevent flooding. 	<p>Low</p>	<p>High</p>

ISSUES	RECOMMENDATIONS	LEVEL OF EFFORT	POTENTIAL SAFETY BENEFIT
<i>PA 611 (continued)</i>			
<ul style="list-style-type: none"> ○ Too many signs at the intersection resulting in sign clutter and possible motorist confusion. 	<ul style="list-style-type: none"> ○ Remove existing commercial signs. ○ Remove the “No Pedestrian” signs. 	Low	Medium
<ul style="list-style-type: none"> ○ Directional sign on the west side of PA 412 at PA 611 is blocked by trees. 	<ul style="list-style-type: none"> ○ Trim tree. 	Low	High
<ul style="list-style-type: none"> ○ Pavement markings are faded. 	<ul style="list-style-type: none"> ○ Re-stripe pavement markings at the intersection. 	Low	High
<ul style="list-style-type: none"> ○ Delineators are knocked down. 	<ul style="list-style-type: none"> ○ Replace delineators. 	Low	High
<ul style="list-style-type: none"> ○ Problematic left turns from northbound PA 611 to westbound PA 412. 	<ul style="list-style-type: none"> ○ Investigate viability of removing this permissive left turn movement. ○ Inspect signal controller to ensure all loops are working properly. 	Medium	High
<ul style="list-style-type: none"> ○ High number of rear end crashes (non reportable) on right turn slip ramp from southbound PA 412. 	<ul style="list-style-type: none"> ○ Consider the application of a roundabout with the future HOP. 	Medium	High
<i>Mountain View Road</i>			
<ul style="list-style-type: none"> ○ The Mountain View Road approach to the intersection is too wide. This results in confusion and unsafe conditions. ○ Pavement markings are faded. ○ There is a headwall in the clear zone on the northeast quadrant of PA 412 which can be hazardous. 	<ul style="list-style-type: none"> ○ Intersection is scheduled for signalization combined with access management improvements at the commercial property on the north side of the intersection. ○ With the signal improvements the intersection will be re-striped and re-configured. ○ Remove the headwall and redesign with a traversable inlet. 	Medium	High

ISSUES	RECOMMENDATIONS	LEVEL OF EFFORT	POTENTIAL SAFETY BENEFIT
<i>Park Drive East</i>			
○ Sight distance is limited looking north from Park Drive East due to trees and hedge.	○ Trim vegetation. <i><u>Nockamixon Township will perform task</u></i>	Low	High
○ Poor drainage – standing water in ditch. Cross pipe may be clogged.	○ Clean out pipes. May need hydrology evaluation.	Low	High
○ Motorist may tend to pull out in the travel-way to see on-coming traffic.	○ Install dashed edge line across the intersection approach to provide guidance to motorist.	Low	High
<i>Between Park Drive East and Park Drive West</i>			
○ Many of the delineators have been knocked down.	Replace delineators as appropriate.	Low	High
○ Drop off parallel to the roadway on the north side of the road.	Pipe drainage and make traversable.	Medium	High
<i>Park Drive West</i>			
○ “Stop” sign is installed too low.	○ Install “Stop” sign at the appropriate height. <i><u>Nockamixon Township will perform task</u></i>	Low	High
○ Sight distance from Park Drive West looking south is limited due to trees and stone wall.	○ Trim vegetation. <i><u>Nockamixon Township will perform task</u></i>	Low	High
<i>Gessner Road/Church Hill Road</i>			
○ Sight distance is compromised looking south from Gessner Road.	○ Work with local business (Nursery) to trim vegetation around their sign and move back decorations. <i><u>Nockamixon Township will perform task</u></i>	Low	High
○ Cross pipe at Gessner Road has standing water.	○ Clean outlet.	Low	High

ISSUES	RECOMMENDATIONS	LEVEL OF EFFORT	POTENTIAL SAFETY BENEFIT
<i>Between Gessner Road and Meginnes Road</i>			
○ Damaged “watch children” sign on southbound PA 412 near Church Hill Road.	○ Replace sign. <i><u>Nockamixon Township will perform task</u></i>	Low	High
○ School speed limit sign blocked by vegetation.	○ Remove vegetation.	Low	High
○ School children walking between schools.	○ Conduct signal warrant analysis for the intersection of PA 412 and Church Hill Road. ○ Consider making this area a permanent 25 MPH zone. ○ Provide amenities to raise profile of pedestrians – sidewalks between schools; designated crosswalks with appropriate signage; context sensitive design treatments.	Medium/High	High
<i>Meginnes Road</i>			
○ Limited sight distance looking north from Meginnes Road.	○ Remove trees blocking line of sight. <i><u>Nockamixon Township will perform task</u></i>	Low	High
○ There are no pavement markings at the Meginnes Road approach.	○ Add pavement markings – dashed lines and stop bar to help guide motorist where they should be pulling out.	Low	High
○ Blacktop is broken off on the eastside of PA 412 north of Meginnes Road.	○ Repair pavement.	Low/Medium	Medium
○ Both signs for the school zone on PA 412 are blocked by vegetation.	○ Trim back vegetation.	Low	High

ISSUES	RECOMMENDATIONS	LEVEL OF EFFORT	POTENTIAL SAFETY BENEFIT
SPRINGFIELD TOWNSHIP			
<i>Stony Garden Road/Gallow Hills Road</i>			
<ul style="list-style-type: none"> ○ Inadequate sight distance from Stony Garden Road for southbound PA 412. 	<ul style="list-style-type: none"> ○ Remove bushes to the north of Stony Garden Road to enhance sight distance. ○ Install “Intersection Ahead” warning signs with flashers. 	Low	High
<ul style="list-style-type: none"> ○ Gallow Hills Road approach is skewed. 	<ul style="list-style-type: none"> ○ Re-stripe Gallow Hills Road approach to bring traffic perpendicular to the intersection. 	Low	High
<i>School Road/Hunter Road</i>			
<ul style="list-style-type: none"> ○ Limited sight distance from School Road to northbound PA 412. 	<ul style="list-style-type: none"> ○ Remove trees on the curve north of the intersection. 	Low	High
<ul style="list-style-type: none"> ○ Curve north of the intersection is not delineated. 	<ul style="list-style-type: none"> ○ Install chevron signs at the curve to delineate for northbound motorists. 	Low	High
<ul style="list-style-type: none"> ○ At Hunter Road, PA 412 curves to the left with one chevron delineating the curve. 	<ul style="list-style-type: none"> ○ Install additional chevron signs at appropriate intervals. 	Low	High
<ul style="list-style-type: none"> ○ Pavement behind guide rail north of School Road is washing out. Posts are exposed. 	<ul style="list-style-type: none"> ○ Fortify this area. May need to construct a retaining wall. 	Medium/High	High
<ul style="list-style-type: none"> ○ Guide rail north of School Road is too low. 	<ul style="list-style-type: none"> ○ Reset guide rail and extend further north towards the curve. 	Medium	High
<ul style="list-style-type: none"> ○ Super-elevation starts prior to School Road curve and runs off at Hunter Road. ○ The roadway geometry contributes to potential head-on collisions 	<ul style="list-style-type: none"> ○ Re-profile roadway and adjust pavement as needed. ○ Install centerline rumble strips along the curve and RPMs. 	Medium/High	High

ISSUES	RECOMMENDATIONS	LEVEL OF EFFORT	POTENTIAL SAFETY BENEFIT
<i>Bursonville Road/Buckwampum Road</i>			
<ul style="list-style-type: none"> ○ Sight distance at Bursonville Road is severely compromised due to PA 412 profile. 	<ul style="list-style-type: none"> ○ Eliminate left-turns from Bursonville Road and from northbound PA 412. ○ Evaluate the profile to determine the feasibility of lowering the roadway to increase stopping sight distance and corner sight distance. 	Medium/High	High
<ul style="list-style-type: none"> ○ Inadequate intersection warning signs. 	<ul style="list-style-type: none"> ○ Upgrade intersection warning signs with flashers. ○ Re-enforce the advisory speed. 	Low	High
<ul style="list-style-type: none"> ○ Advance warning sign and advisory speed limit sign blocked by vegetation. 	<ul style="list-style-type: none"> ○ Trim vegetation. 	Low	High
<ul style="list-style-type: none"> ○ Curve north of Buckwampum Road is not delineated. 	<ul style="list-style-type: none"> ○ Install chevron signs at appropriate locations to guide motorists. 	Low	High
<ul style="list-style-type: none"> ○ 45 MPH speed limit sign is located on the curve at Bursonville Road. 	<ul style="list-style-type: none"> ○ Relocate speed limit sign. 	Low	High
<ul style="list-style-type: none"> ○ Due to the roadway profile motorist tend to overcompensate into the oncoming lane. 	<ul style="list-style-type: none"> ○ Install centerline rumble strips. 	Low	High
<ul style="list-style-type: none"> ○ Bursonville Road approach is a steep incline making it difficult for motorists to exit on to PA 412. 	<ul style="list-style-type: none"> ○ Level intersection to accommodate normal maneuver. Install dashed white line at the intersection. 	Medium	High
<i>Slifer Valley Road</i>			
<ul style="list-style-type: none"> ○ Excessive and inconsistent grades. (cross slopes and super-elevation) 	<ul style="list-style-type: none"> ○ Determine the feasibility of reconstruction/reprofiling during Surface Treatment Program. 	Medium/High	High
<ul style="list-style-type: none"> ○ Pavement deterioration on east side of PA 412. ○ Drop off on the inside of curve. 	<ul style="list-style-type: none"> ○ Pave ditch on inside of curve, make traversable. 	Medium	High

ISSUES	RECOMMENDATIONS	LEVEL OF EFFORT	POTENTIAL SAFETY BENEFIT
<i>Slifer Valley Road (continued)</i>			
○ Clogged culvert pipe on east side of PA 412.	○ Clean inlet.	Low	High
○ Inlet headwall is a potential hazard	○ Replace headwall – make traversable.	Low	High
○ Roadway covered by tree canopy.	○ Trim trees.	Low	High
○ Missing chevron to the right of the intersection.	○ Replace missing signs.	Low	High
○ Stopping sight distance to turn left on Slifer Valley Road is inadequate.	○ Upgrade advance warning signage.	Low	High
<i>Between Lehnenberg Road and Bodder Road</i>			
○ Southbound PA 412, 45 MPH speed limit sign is located a few feet away from the “curve ahead” sign.	○ Relocate speed limit sign.	Low	High
○ Northbound lane prior to curve has an excessive cross slope and roadway is failing. ○ Vehicles leaving the roadway on the curve northbound.	○ Need to rebuild the embankment to a 2% crown.	Medium	High
○ Small curve ahead sign prior to northbound curve.	○ Upgrade signage.	Low	High
○ Guide rail appears to be too low along northbound side of curve.	○ Reset guide rail.	Medium	High
○ No advisory speed sign on southbound approach to the curve.	○ Install advisory speed limit sign.	Low	High
○ Roadway covered by tree canopy.	○ Trim trees. ○ Install delineation to the inside curve.	Low	High
○ Pavement markings faded.	○ Re-stripe roadway.	Low	High
○ Curve north of Bodder Road is not delineated.	○ Install chevron signs at appropriate intervals on the curve.	Low	High

ISSUES	RECOMMENDATIONS	LEVEL OF EFFORT	POTENTIAL SAFETY BENEFIT
<i>PA412/212 intersection (East of Springtown)</i>			
○ Steep grade approaching intersection making it difficult to stop.	○ Add transverse rumble strips and “stop ahead” pavement marking in advance of stop sign at the intersection. Consider roundabout application for the intersection.	Low/Medium	High
<i>Between Funks Mill Road and Cooks Creek Road</i>			
○ Vehicles are overcompensating on the curve at Cooks Creek Road and drifting into the on-coming lane.	○ Check friction of pavement surface and curve alignment. ○ Add centerline rumble strips and RPMs.	Low/Medium	High
○ Five of the nine crashes at this location occurred in the dark.	○ Add street lighting, RPMs, and centerline rumble strips.	Medium	High
○ Old bridge wall across from Funks Mill Road is in the clear zone and presents a hazard to motorists.	○ Remove old bridge wall.	Low	High
<i>Between Funks Mill Road and Drifting Drive</i>			
○ Steep drop off and edge of shoulder washed out at 3370 Main Street.	○ Repave shoulder.	Medium	High
○ Culvert deterioration and headwall at 3398 Main Street.	○ Consider the extension of the pipe culvert in lieu of guide rail for protection.	Medium	High
<i>PA 412/212 intersection (West of Springtown)</i>			
○ Stop sign on PA 412 is placed far back from the intersection.	○ Relocate stop sign/bar closer to intersection.	Low	High
○ Skewed intersection. ○ Poor turning radius.	○ Consider a roundabout application for this intersection.	Medium	High
○ Junction signs on PA 412 southbound approach is obstructed by trees.	○ Trim trees	Low	High

ISSUES	RECOMMENDATIONS	LEVEL OF EFFORT	POTENTIAL SAFETY BENEFIT
PA 412/212 intersection (West of Springtown) - continued			
<ul style="list-style-type: none"> ○ Speed limit sign northbound on PA 212 is blocked by trees. 	<ul style="list-style-type: none"> ○ Trim trees. 	Low	High
<ul style="list-style-type: none"> ○ Standing water on the southwest corner of the intersection. 	<ul style="list-style-type: none"> ○ Improve drainage at the intersection. 	Medium	High
<ul style="list-style-type: none"> ○ Sight distance is limited at the Hickory Lane approach looking to the left on PA 212. 	<ul style="list-style-type: none"> ○ Remove or trim bushes to improve sightlines. 	Low	High
One lane bridge			
<ul style="list-style-type: none"> ○ Speeding approaching the bridge. ○ Lack of adequate advance warning signs of bridge in both directions. 	<ul style="list-style-type: none"> ○ Install/upgrade advance warning signs ○ Install one-way “yield” sign based on the best directional sight distance. <p><u>Bridge is slated for repair. This is a historical area therefore there will be no widening.</u></p>	Low	High

3.0 CONCLUSION

As discussed earlier, 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 safety issues identified during the audit and documented in this report along with recommended strategies should improve the overall safety of PA 412. These remedial strategies can be implemented as time and budget limitations permit. The study area is identified under PennDOT’s Section 148 Planned Safety Projects and therefore, implementation is eligible for Highway Safety Improvement Program funding. Additionally, many of the strategies identified can be implemented through routine maintenance.

Given that the contributing factor “too fast for condition” represents the highest for the recorded crashes, engineering strategies alone cannot effectively address the traffic safety issues identified along the corridor. Therefore, enforcement and education are necessary components to address the human behavioral aspects to effectively reduce the number of

crashes occurring. This requires coordination between PennDOT, Pennsylvania State Police (they have jurisdiction for the roadway) and the local officials.

APPENDIX A
Audit Team

PA 412 – Road Safety Audit

Audit Team

Name	Organization
Rosemarie Anderson	Delaware Valley Regional Planning Commission
Steve Baluh	Wynn Associates
Richard Brahler	Bucks County Planning Commission
Larry Bucci	Pennsylvania Department of Transportation
Michael Castellano	Federal Highway Administration
Patrick Diehl	Pennsylvania State Police
George Housworth	Nockamixon Township
Dawn Knisley	Pennsylvania Department of Transportation - Maintenance
Mark Laudenslager	Springfield Township Police Department
Michael McDonald	Springfield Township Police Department
Regina Moore	Delaware Valley Regional Planning Commission
Brooke Moran	Bucks County Area Agency on Aging
Kevin Murphy	Delaware Valley Regional Planning Commission

APPENDIX B

Maps

PA 412 Road Safety Audit

Study Area

Segment 0160
Offset 2374

Segment 0010
Offset 0

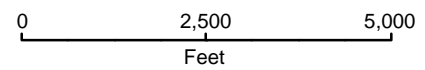
Springfield Township

Nockamixon Township

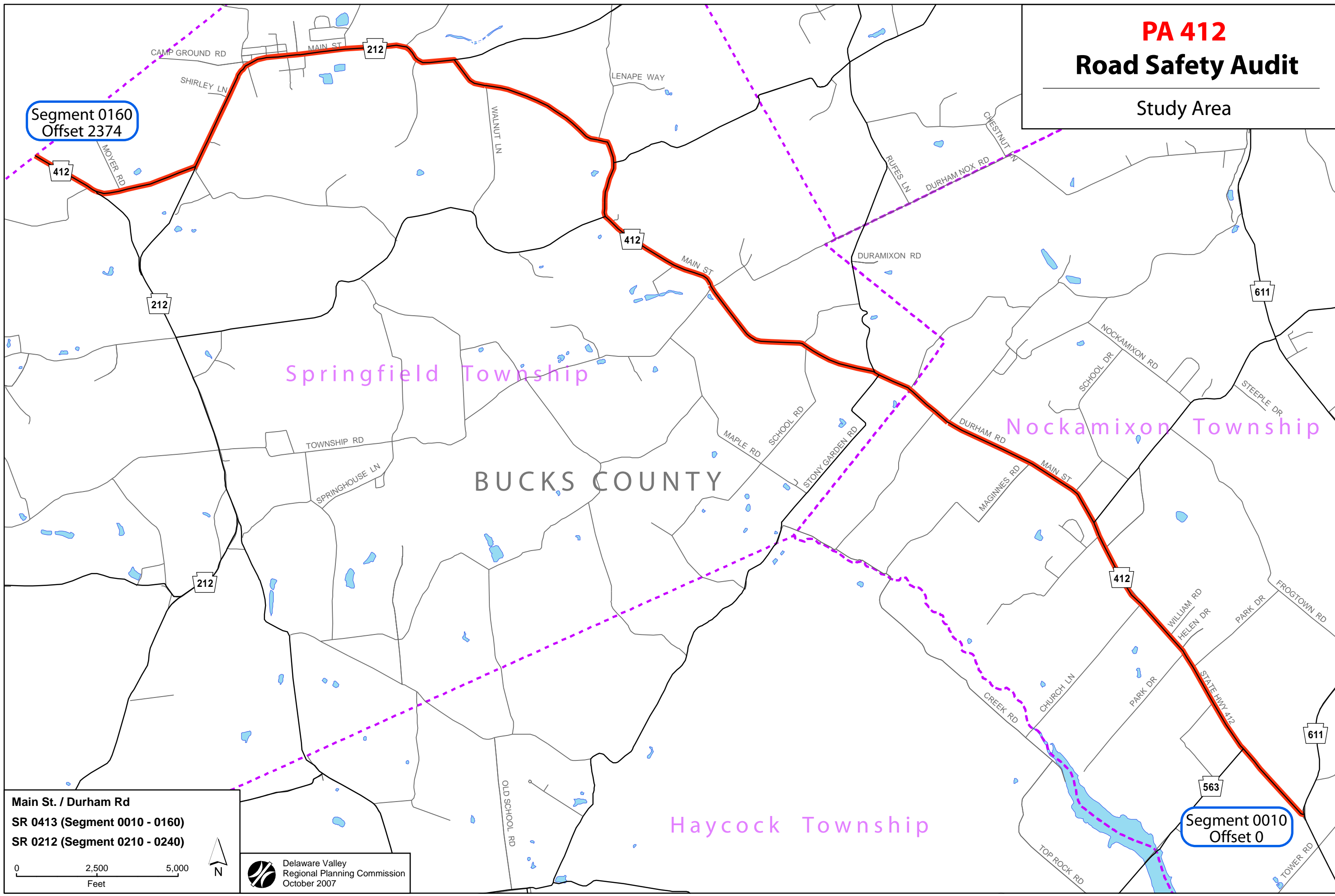
BUCKS COUNTY

Haycock Township

Main St. / Durham Rd
SR 0413 (Segment 0010 - 0160)
SR 0212 (Segment 0210 - 0240)



Delaware Valley
Regional Planning Commission
October 2007

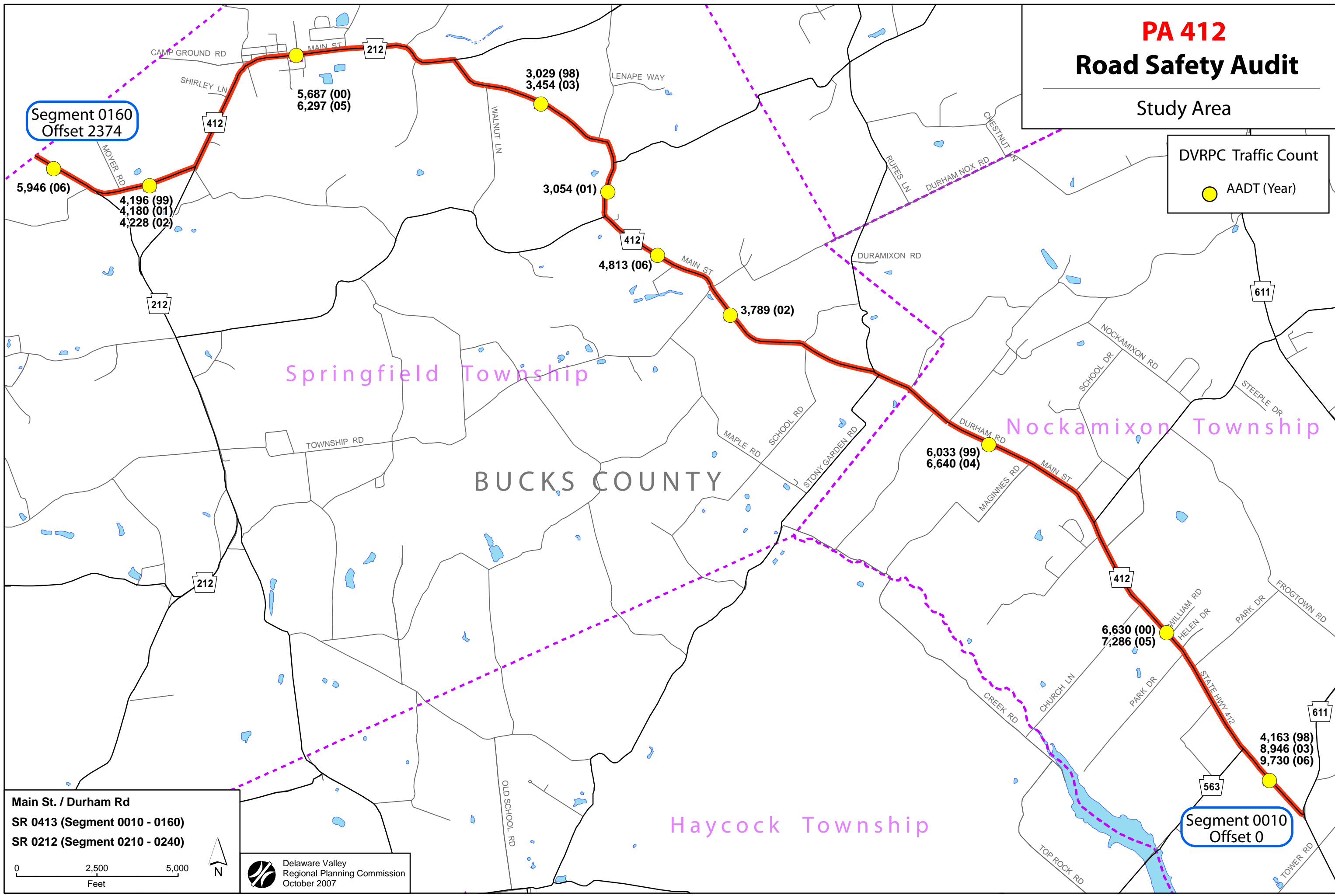


PA 412 Road Safety Audit

Study Area

DVRPC Traffic Count

● AADT (Year)



Segment 0160
Offset 2374

Segment 0010
Offset 0

Main St. / Durham Rd
SR 0413 (Segment 0010 - 0160)
SR 0212 (Segment 0210 - 0240)

0 2,500 5,000
Feet

N

Delaware Valley
Regional Planning Commission
October 2007

BUCKS COUNTY

Springfield Township

Nockamixon Township

Haycock Township

APPENDIX C

Traffic Data

BUCKS CO RSA SR412 SEG 10 TO 160/2374, SR212 210/0000 TO 240/1382 (ALL)



Date Range: 1/1/2004 to 12/31/2006

USER ID/QUERY ID:

lkubli/0620070911001

Area of (In County 09 On State Route 0212(P) Between Segment 0210 Offset 0 and Segment 0240 Offset 1382) or (In County 09

Interest: On State Route 0412(P) Between Segment 0010 Offset 0 and Segment 0160 Offset 2374)

MONTH OF YEAR													DAY OF WEEK								
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC		SUN	MON	TUE	WED	THR	FRI	SAT	
CRASHES	13	6	9	11	13	14	5	13	9	12	6	16	127	10	18	14	11	24	29	21	127
PCT	10%	4%	7%	8%	10%	11%	3%	10%	7%	9%	4%	12%	100%	7%	14%	11%	8%	18%	22%	16%	100%

HOUR OF DAY																							
	01	02	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CRASHES	2	3	1	1	6	11	9	4	4	8	4	1	12	6	10	12	12	3	4	4	7	3	127
PCT	1%	2%	0%	0%	4%	8%	7%	3%	3%	6%	3%	0%	9%	4%	7%	9%	9%	2%	3%	3%	5%	2%	100%

YEAR	COLLISION TYPE		CRASH SEVERITY LEVEL		SEVERITY COUNT		DRIVER ACTIONS			
	CRASHES	PCT	CRASHES	PCT	CRASHES	PCT	PERSONS	ACTIONS	PCT	
2004	37	29%	HIT FIX OBJ	50 39%	FATAL	4 3%	FATALITIES	4	NO CONTRIBUTING ACTION	149 37%
2005	45	35%	ANGLE	38 29%	MAJOR	2 1%	MAJOR	2	TOO FAST FOR CONDITION	52 13%
2006	45	35%	REAR END	22 17%	MODERATE	14 11%	MODERATE	19	IMPROPER/CARELESS TURN	41 10%
TOTAL	127	100%	NON COLL	7 5%	MINOR	36 28%	MINOR	46	PROCEED W/O CLEARANCE	26 6%
			HEAD ON	6 4%	UNK SEVERITY	7 5%	UNK SEVERITY	9	DRIVER WAS DISTRACTED	22 5%
			UNKNOWN	4 3%	UNK IF INJURED	2 1%	UNK IF INJURED	2	OTHER IMPROPER DRIVING	21 5%
			TOTAL	127 100%	PDO	62 48%			TAILGATING	14 3%
					TOTAL	127 100%			OVER/UNDER COMP CURVE	10 2%
									DRIVER INEXPERIENCED	8 2%
									AFFECTED PHYSICAL COND	7 1%
									SUDDEN SLOWING/STOP	7 1%
									RUNNING STOP SIGN	6 1%
									OTHERS	36 9%
									TOTAL	399 100%

VEHICLE TYPE	ROAD CONDITION		ILLUMINATION		WEATHER		ENVIR/ROADWAY FACTORS			
	VEHICLES	PCT	CRASHES	PCT	CRASHES	PCT	CRASHES	PCT	FACTORS	PCT
AUTOMOBILE	118	59%	DRY	85 66%	DAYLIGHT	85 66%	CLEAR	97 76%	NONE	120 81%
SUV	26	13%	WET	29 22%	DARK	32 25%	RAIN	15 11%	DEER IN ROADWAY	7 4%
SMALL TRUCK	24	12%	SNOW	5 3%	STREET LIGHTS	4 3%	SNOW	5 3%	SLIPPERY ICE/SNOW	7 4%
LARGE TRUCK	15	7%	ICE PATCH	4 3%	DAWN	2 1%	FOG	4 3%	OTHER WEATHER COND	4 2%
MOTORCYCLE	9	4%	ICE	2 1%	DUSK	2 1%	SLEET	4 3%	ANIMAL IN RDWY	2 1%
VAN	8	4%	SLUSH	1 0%	UNK	1 0%	RAIN/FOG	1 0%	GLARE	2 1%
OTHER VEHICLE	1	0%	UNK	1 0%	UNK LIGHTING	1 0%	UNK	1 0%	OTHER RDWY FACTOR	2 1%
TOTAL	199	100%	TOTAL	127 100%	TOTAL	127 100%	TOTAL	127 100%	SUBSTANCE ON RDWY	2 1%
									SUDDEN WEATHER COND	2 1%
									TOTAL	148 100%

CDART - CRASH SUMMARY REPORT (09-06)

NOTES:

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Data for the current year, 2007, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.

- 3 Complete data years
Complete records of reportable crashes are available in CDART for the following years: 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005,2006

REPORT PARAMETERS:

Query ID: [0620070911001](#)
User ID: lkubli
Area of Interest: (In County 09 On State Route 0212(P) Between Segment 0210 Offset 0 and Segment 0240 Offset 1382) or (In County 09 On State Route 0412(P) Between Segment 0010 Offset 0 and Segment 0160 Offset 2374)
Date Range: 1/1/2004 to 12/31/2006
Criteria: STATE ROAD

1. SR 412 at SR 611

Segment 10, Offset 0 to Segment 10, Offset 135



COLLISION TYPE

Angle	14
Rear-end	4
Head-on	1
Total	19

ILLUMINATION

Daylight	16
Dark	2
Street Lights	1
Total	19

WEATHER

Clear	19
Total	19

SEVERITY COUNT

Fatalities	0
Major	0
Moderate	4
Minor	9
Unk Severity	1
Unk If Injured	0



● Crash Location

BUCKS CO SR412 0010/0000 TO 0010/0080 RSA



Date Range: 1/1/2004 to 12/31/2006

USER ID/QUERY ID:

Area of Interest: (In County 09 On State Route 0412(P) Between Segment 0010 Offset 0 and Segment 0010 Offset 135)

Ikublii/ 0620070807004

MONTH OF YEAR												
	JAN	FEB	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
CRASHES	1	1	2	5	2	2	1	1	2	1	1	19
PCT	5%	5%	10%	26%	10%	10%	5%	5%	10%	5%	5%	100%

DAY OF WEEK								
	SUN	MON	TUE	WED	THR	FRI	SAT	
CRASHES	1	1	1	4	5	3	4	19
PCT	5%	5%	5%	21%	26%	15%	21%	100%

HOUR OF DAY											
	06	07	08	12	13	14	15	17	18	23	
CRASHES	2	2	4	2	1	1	2	1	3	1	19
PCT	10%	10%	21%	10%	5%	5%	10%	5%	15%	5%	100%

YEAR		
	CRASHES	PCT
2004	7	36%
2005	5	26%
2006	7	36%
TOTAL	19	100%

COLLISION TYPE		
	CRASHES	PCT
ANGLE	14	73%
REAR END	4	21%
HEAD ON	1	5%
TOTAL	19	100%

CRASH SEVERITY LEVEL		
	CRASHES	PCT
MODERATE	2	10%
MINOR	8	42%
UNK SEVERITY	1	5%
PDO	8	42%
TOTAL	19	100%

SEVERITY COUNT	
	PERSONS
FATALITIES	0
MAJOR	0
MODERATE	4
MINOR	9
UNK SEVERITY	1
UNK IF INJURED	0

DRIVER ACTIONS		
	ACTIONS	PCT
NO CONTRIBUTING ACTION	35	41%
IMPROPER/CARELESS TURN	23	27%
TAILGATING	6	7%
DRIVER WAS DISTRACTED	4	4%
RUNNING RED LIGHT	4	4%
FAILURE TO RESPOND TCD	2	2%
OTHER IMPROPER DRIVING	2	2%
PROCEED W/O CLEARANCE	2	2%
RUNNING STOP SIGN	2	2%
TURN FROM WRONG LANE	2	2%
UNKNOWN	2	2%
TOTAL	84	100%

VEHICLE TYPE		
	VEHICLES	PCT
AUTOMOBILE	23	58%
SUV	9	23%
SMALL TRUCK	4	10%
VAN	2	5%
LARGE TRUCK	1	2%
TOTAL	39	100%

ROAD CONDITION		
	CRASHES	PCT
DRY	17	89%
WET	2	10%
TOTAL	19	100%

ILLUMINATION		
	CRASHES	PCT
DAYLIGHT	16	84%
DARK	2	10%
STREET LIGHTS	1	5%
TOTAL	19	100%

WEATHER	
	CRASHES PCT
CLEAR	19 100%
TOTAL	19 100%

ENVIR/ROADWAY FACTORS		
	FACTORS	PCT
NONE	24	96%
ANIMAL IN RDWY	1	4%
TOTAL	25	100%

CDART - CRASH SUMMARY REPORT (09-06)

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- 3 Complete data years
Complete records of reportable crashes are available in CDART for the following years: 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005,2006

REPORT PARAMETERS:

Query ID: [0620070807004](#)
User ID: lkubli
Area of Interest: (In County 09 On State Route 0412(P) Between Segment 0010 Offset 0 and Segment 0010 Offset 135)

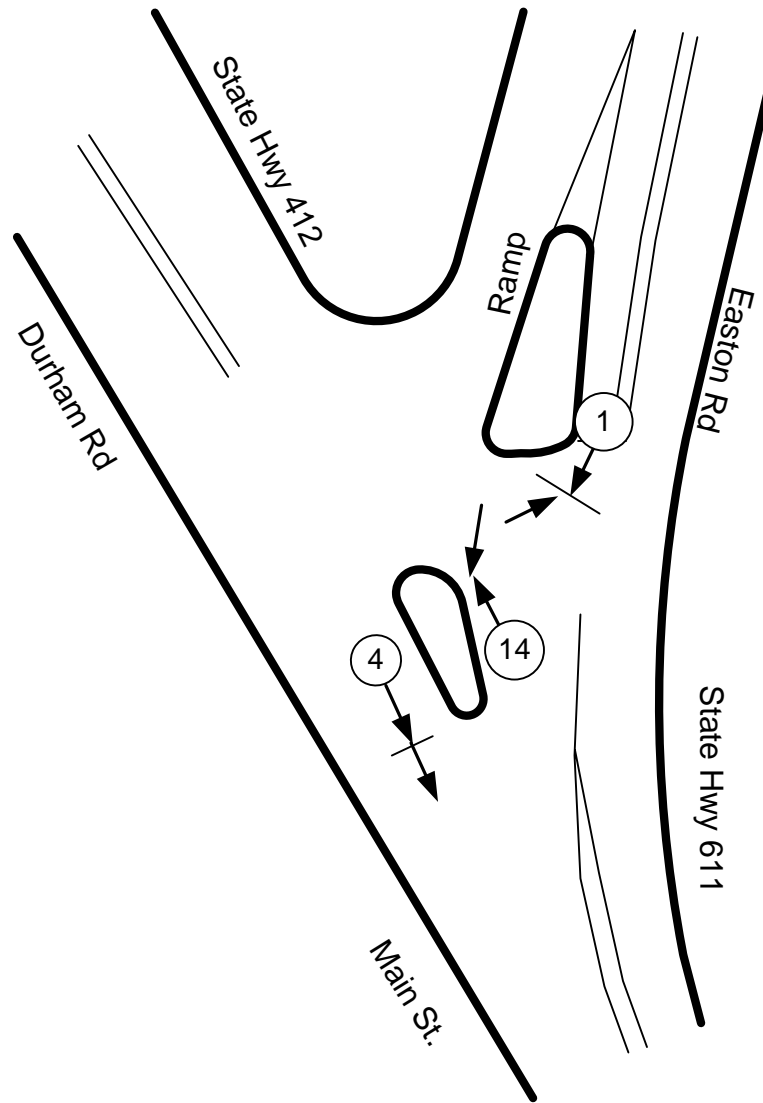
Date Range: 1/1/2004 to 12/31/2006

Criteria: STATE ROAD

ROAD SAFETY AUDIT
Intersection of
SR 412 and SR 611

Collision Diagram
Crash Data Years 2004-2006

Total Crashes = 19
 Pedestrian Crashes = 0



Nockamixon Township

LEGEND

① = # crashes

↙ ↘ Angle

↔ Head On

↔ Rear End

SCHEMATIC NOT TO SCALE



Delaware Valley Regional Planning Commission
 August 2007

2. SR 412 at Mountain View Drive

Segment 10, Offset 2259 to Segment 20, Offset 21



COLLISION TYPE

Angle	3
Hit Fixed Object	2
Head-on	1
Total	6

ILLUMINATION

Daylight	5
Dark	1
Total	6

WEATHER

Clear	4
Rain	1
Rain/Fog	1
Total	6

SEVERITY COUNT

Fatalities	0
Major	1
Moderate	1
Minor	1
Unk Severity	1
Unk If Injured	0



● Crash Location

BUCKS CO SR412 0010/2259 TO 00200021 RSA



Date Range: 1/1/2004 to 12/31/2006

USER_ID/QUERY_ID:

lkubli/ 0620070807008

Area of (In County 09 On State Route 0412(P) Between Segment 0010 Offset 2259 and Segment 0020 Offset 21) or (In County

Interest: 09 On State Route 0412(S) Between Segment 0011 Offset 2259 and Segment 0021 Offset 21)

MONTH OF YEAR							DAY OF WEEK					
	JAN	FEB	MAR	APR	JUN		SUN	MON	WED	THR		
CRASHES	1	1	1	1	2	6	3	1	1	1	6	
PCT	16%	16%	16%	16%	33%	100%	50%	16%	16%	16%	100%	

HOUR OF DAY							
	09	12	14	17	19		
CRASHES	1	1	1	2	1	6	
PCT	16%	16%	16%	33%	16%	100%	

YEAR	COLLISION TYPE		CRASH SEVERITY LEVEL		SEVERITY COUNT	DRIVER ACTIONS		
	CRASHES	PCT	CRASHES	PCT	PERSONS	ACTIONS	PCT	
2004	1	16%	ANGLE	3 50%	MAJOR	1 16%	NO CONTRIBUTING ACTION	8 38%
2005	3	50%	HIT FIX OBJ	2 33%	MODERATE	1 16%	PROCEED W/O CLEARANCE	6 28%
2006	2	33%	HEAD ON	1 16%	MINOR	1 16%	IMPROPER/CARELESS TURN	4 19%
TOTAL	6	100%	TOTAL	6 100%	UNK SEVERITY	1 16%	TOO FAST FOR CONDITION	2 9%
					PDO	2 33%	DRIVER INEXPERIENCED	1 4%
					TOTAL	6 100%	TOTAL	21 100%

VEHICLE TYPE	ROAD CONDITION		ILLUMINATION		WEATHER	ENVIR/ROADWAY FACTORS	
VEHICLES	PCT	CRASHES	PCT	CRASHES	PCT	FACTORS	PCT
AUTOMOBILE	5 50%	DRY	4 66%	DAYLIGHT	5 83%	NONE	8 88%
MOTORCYCLE	1 10%	WET	2 33%	DARK	1 16%	OTHER WEATHER COND	1 11%
SMALL TRUCK	1 10%	TOTAL	6 100%	TOTAL	6 100%	TOTAL	9 100%
LARGE TRUCK	1 10%						
SUV	1 10%						
VAN	1 10%						
TOTAL	10 100%						

CDART - CRASH SUMMARY REPORT (09-06)

NOTES:

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- 3 Complete data years
Complete records of reportable crashes are available in CDART for the following years: 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005,2006

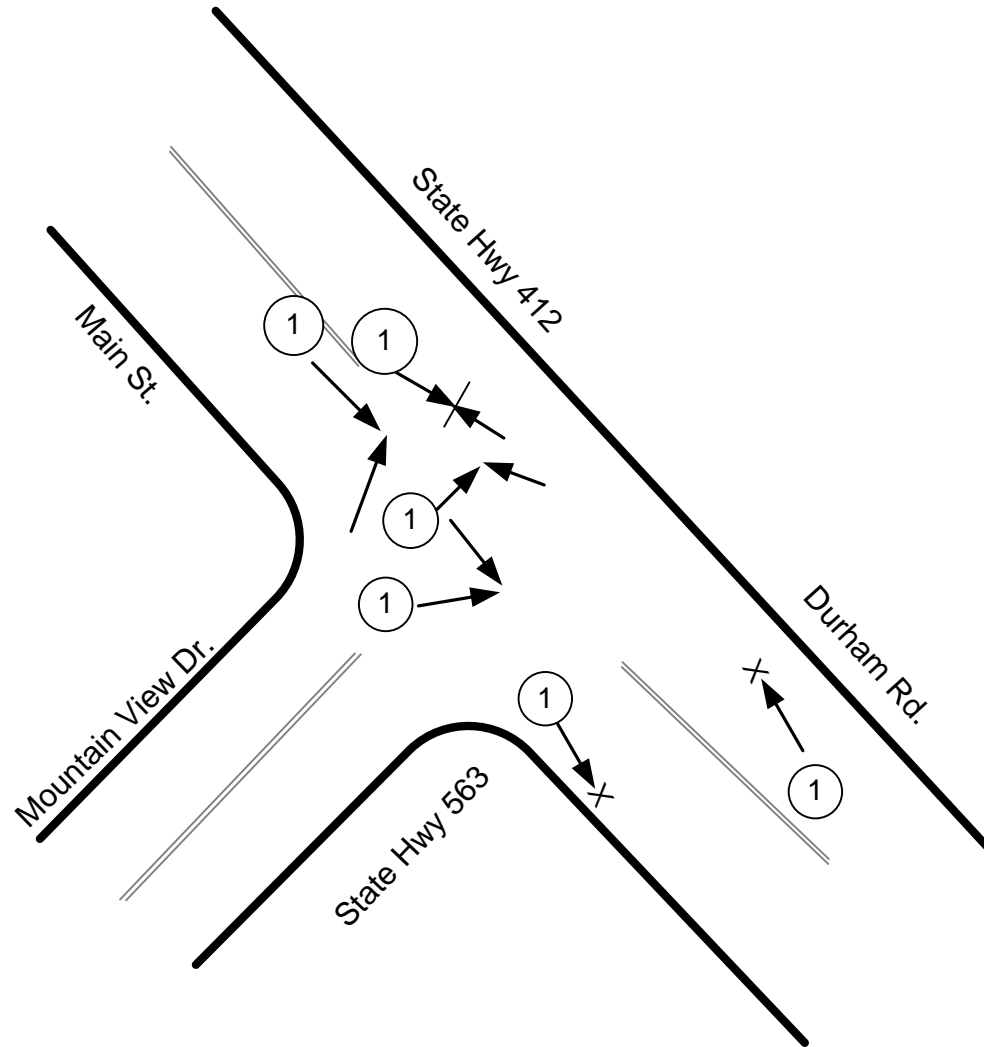
REPORT PARAMETERS:

Query ID: [0620070807008](#)
User ID: lkubli
Area of Interest: (In County 09 On State Route 0412(P) Between Segment 0010 Offset 2259 and Segment 0020 Offset 21) or (In County 09 On State Route 0412(S) Between Segment 0011 Offset 2259 and Segment 0021 Offset 21)
Date Range: 1/1/2004 to 12/31/2006
Criteria: STATE ROAD

**ROAD SAFETY AUDIT
SR 412 at Mountain View Dr.**

**Collision Diagram
Crash Data Years 2004-2006**

Total Crashes = 6
Pedestrian Crashes = 0



LEGEND

- ① = # crashes
- ↙↔↘ Angle
- ↔↔ Head On
- ↙ X Hit Fixed Object

SCHMATIC NOT TO SCALE



Delaware Valley Regional Planning Commission
August 2007

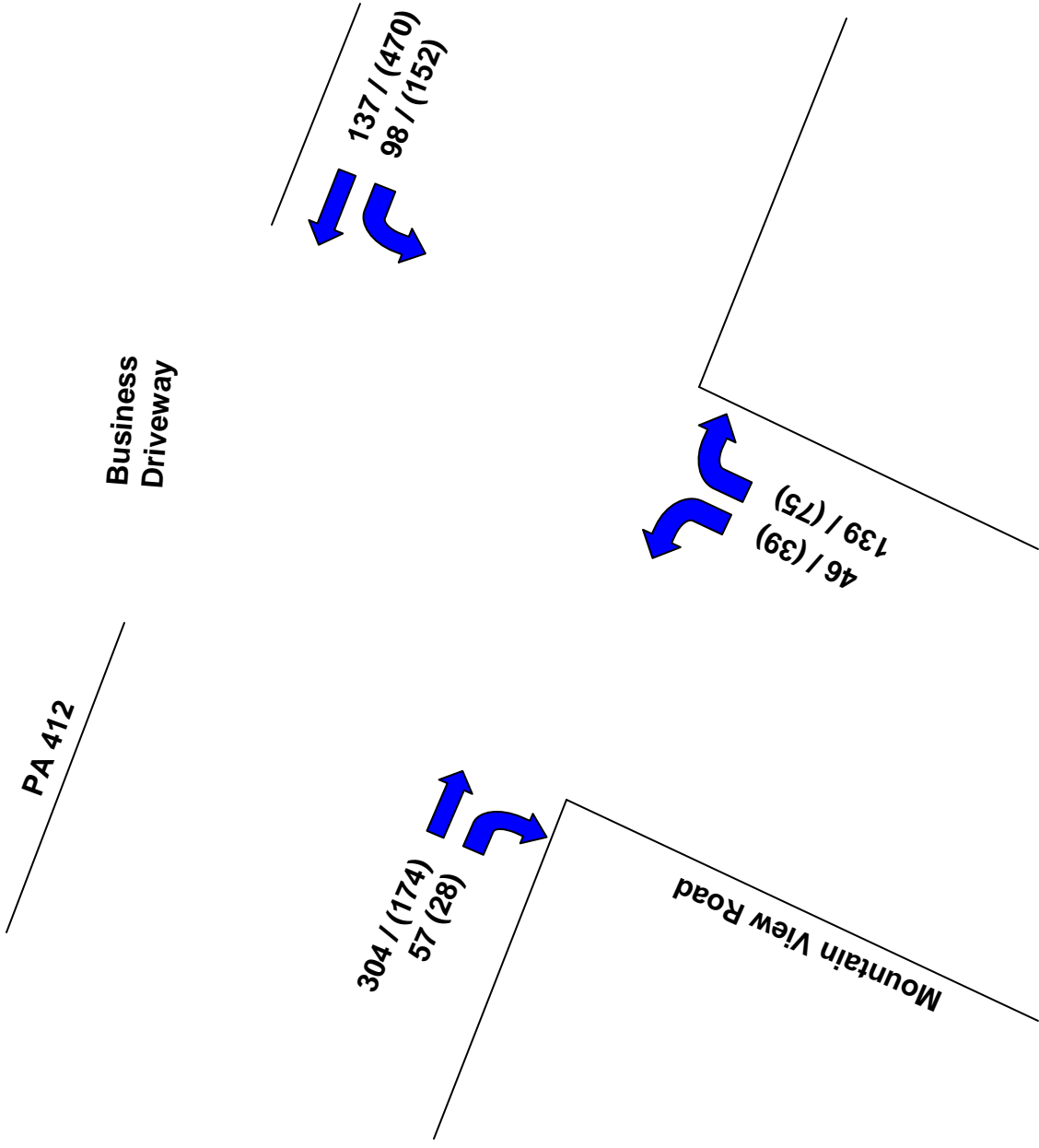
PA 412 and Mountain View Road

Existing Peak Hour Turning Movement Counts AM / (PM)

Peak Hours

AM: 7:00 – 8:00

PM: 4:00 – 5:00



Schematic not to scale

3. SR 412 in the vicinity of Park Drive
 Segment 20, Offset 2614 to Segment 30, Offset 106



COLLISION TYPE

Angle	1
Rear-end	1
Unknown	1
Total	3

ILLUMINATION


Dark	2
Daylight	1
Total	3

WEATHER


Clear	2
Snow	1
Total	3

SEVERITY COUNT

Fatalities	0
Major	0
Moderate	0
Minor	0
Unk Severity	0
Unk If Injured	0



● **Crash Location**



Delaware Valley
Regional Planning Commission
September 2007

BUCKS CO SR412 0020/2614 TO 0030/0106 RSA



Date Range: 1/1/2004 to 12/31/2006

USER ID/QUERY ID:

lkubli/ 0620070807009

Area of (In County 09 On State Route 0412(P) Between Segment 0020 Offset 2614 and Segment 0030 Offset 106) or (In County

Interest: 09 On State Route 0412(S) Between Segment 0021 Offset 2614 and Segment 0031 Offset 106)

MONTH OF YEAR					DAY OF WEEK			
	JAN	SEP	DEC		THR	SAT		
CRASHES	1	1	1	3	CRASHES	1	2	3
PCT	33%	33%	33%	100%	PCT	33%	66%	100%

HOUR OF DAY				
	15	16	23	
CRASHES	1	1	1	3
PCT	33%	33%	33%	100%

YEAR	COLLISION TYPE		CRASH SEVERITY LEVEL		SEVERITY COUNT	DRIVER ACTIONS				
	CRASHES	PCT	CRASHES	PCT	PERSONS	ACTIONS	PCT			
2004	1	33%	ANGLE	1 33%	PDO	3 100%	FATALITIES	0	NO CONTRIBUTING ACTION	5 55%
2005	2	66%	REAR END	1 33%	TOTAL	3 100%	MAJOR	0	ILLEGAL STOPPED ON RD	2 22%
TOTAL	3	100%	UNKNOWN	1 33%			MODERATE	0	PROCEED W/O CLEARANCE	2 22%
			TOTAL	3 100%			MINOR	0	TOTAL	9 100%
							UNK SEVERITY	0		
							UNK IF INJURED	0		

VEHICLE TYPE	ROAD CONDITION		ILLUMINATION		WEATHER	ENVIR/ROADWAY FACTORS			
VEHICLES	PCT	CRASHES	PCT	CRASHES	PCT	CRASHES	PCT	FACTORS	PCT
AUTOMOBILE	3 60%	SNOW	2 66%	DARK	2 66%	CLEAR	2 66%	SLIPPERY ICE/SNOW	2 66%
SMALL TRUCK	1 20%	DRY	1 33%	DAYLIGHT	1 33%	SNOW	1 33%	DEER IN ROADWAY	1 33%
LARGE TRUCK	1 20%	TOTAL	3 100%	TOTAL	3 100%	TOTAL	3 100%	TOTAL	3 100%
TOTAL	5 100%								

CDART - CRASH SUMMARY REPORT (09-06)

NOTES:

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- 3 Complete data years
Complete records of reportable crashes are available in CDART for the following years: 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005,2006

REPORT PARAMETERS:



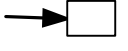
Query ID: [0620070807009](#)
User ID: lkubli
Area of Interest: (In County 09 On State Route 0412(P) Between Segment 0020 Offset 2614 and Segment 0030 Offset 106) or (In County 09 On State Route 0412(S) Between Segment 0021 Offset 2614 and Segment 0031 Offset 106)
Date Range: 1/1/2004 to 12/31/2006
Criteria: STATE ROAD

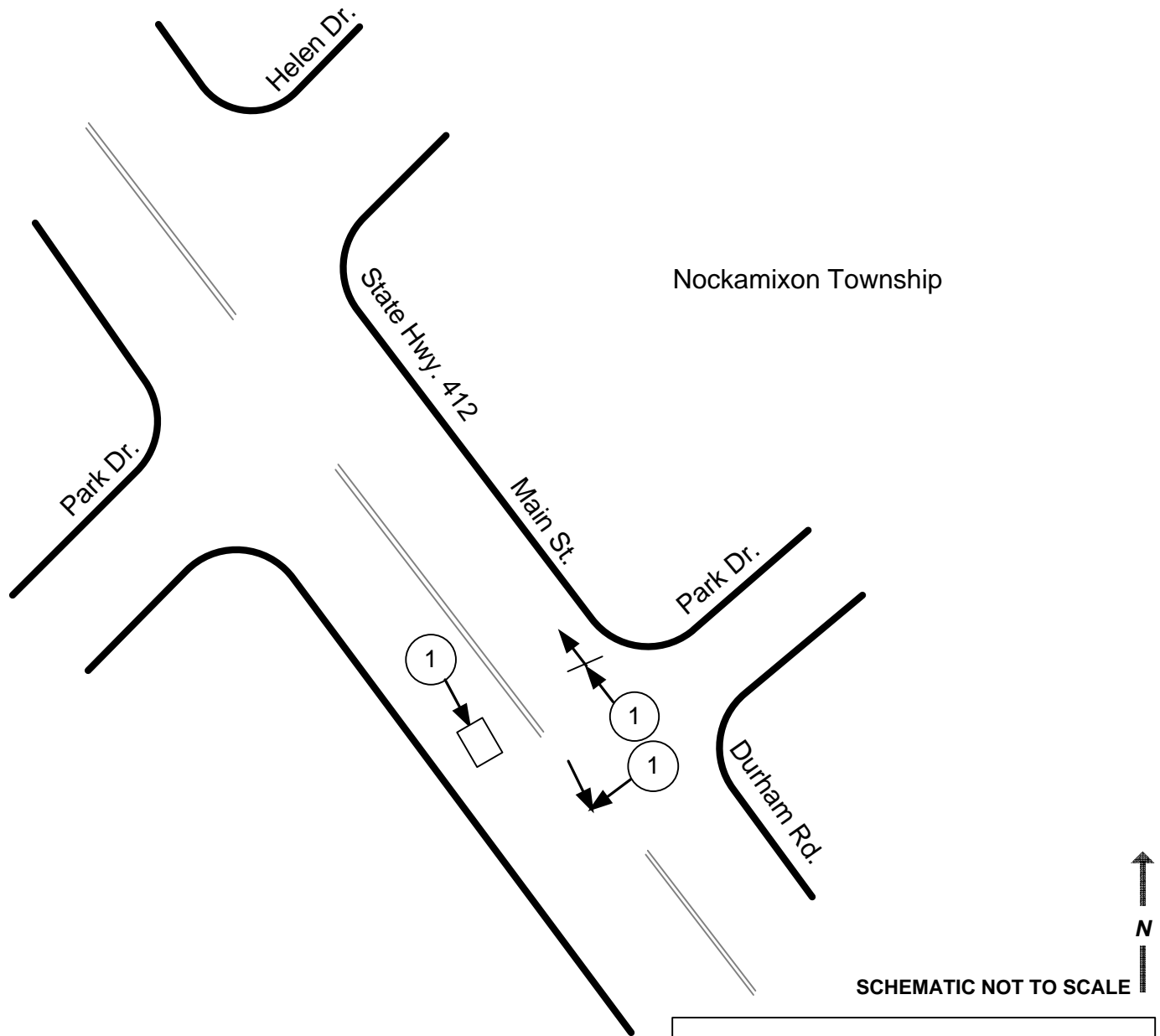
**ROAD SAFETY AUDIT
SR 412 in the vicinity of Park Dr.**

**Collision Diagram
Crash Data Years 2004-2006**

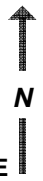
Total Crashes = 3
Pedestrian Crashes = 0

LEGEND

- ① = # crashes
-  Angle
-  Rear End
-  Hit Deer



SCHEMATIC NOT TO SCALE



Delaware Valley Regional Planning Commission
August 2007

4. SR 412 from Buck Rd. to Church Hill Rd.
 Segment 40, Offset 1869 to Segment 50, Offset 410



COLLISION TYPE

Angle	1
Hit Fixed Object	1
Total	2

ILLUMINATION


Daylight	2
Total	2

WEATHER


Clear	1
Rain	1
Total	2

SEVERITY COUNT

Fatalities	1
Major	0
Moderate	0
Minor	1
Unk Severity	0
Unk If Injured	0



● **Crash Location**



Delaware Valley
Regional Planning Commission
September 2007

BUCKS CO SR412 0040/1869 TO 0050/0410 RSA



Date Range: 1/1/2004 to 12/31/2006

USER_ID/QUERY_ID:

lkubli/ 0620070808001

Area of (In County 09 On State Route 0412(P) Between Segment 0040 Offset 1869 and Segment 0050 Offset 410) or (In County

Interest: 09 On State Route 0412(S) Between Segment 0041 Offset 1869 and Segment 0051 Offset 410)

MONTH OF YEAR				DAY OF WEEK		
	AUG	OCT			FRI	
CRASHES	1	1	2	CRASHES	2	2
PCT	50%	50%	100%	PCT	100%	100%

HOUR OF DAY			
	11	14	
CRASHES	1	1	2
PCT	50%	50%	100%

YEAR	COLLISION TYPE		CRASH SEVERITY LEVEL		SEVERITY COUNT	DRIVER ACTIONS	
	CRASHES	PCT	CRASHES	PCT	PERSONS	ACTIONS	PCT
2005	2	100%	ANGLE	1 50%	FATALITIES	2	28%
TOTAL	2	100%	HIT FIX OBJ	1 50%	MAJOR	2	28%
			TOTAL	2 100%	MODERATE	2	28%
					MINOR	1	14%
					UNK SEVERITY	7	100%
					UNK IF INJURED		

VEHICLE TYPE	ROAD CONDITION		ILLUMINATION		WEATHER	ENVIR/ROADWAY FACTORS		
	VEHICLES	PCT	CRASHES	PCT	CRASHES	PCT	FACTORS	PCT
AUTOMOBILE	1	33%	DRY	1 50%	CLEAR	1 50%	NONE	2 100%
MOTORCYCLE	1	33%	WET	1 50%	RAIN	1 50%	TOTAL	2 100%
LARGE TRUCK	1	33%	TOTAL	2 100%	TOTAL	2 100%		
TOTAL	3	100%						

CDART - CRASH SUMMARY REPORT (09-06)

NOTES:

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Complete records of reportable crashes are available in CDART for the following years: 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005,2006

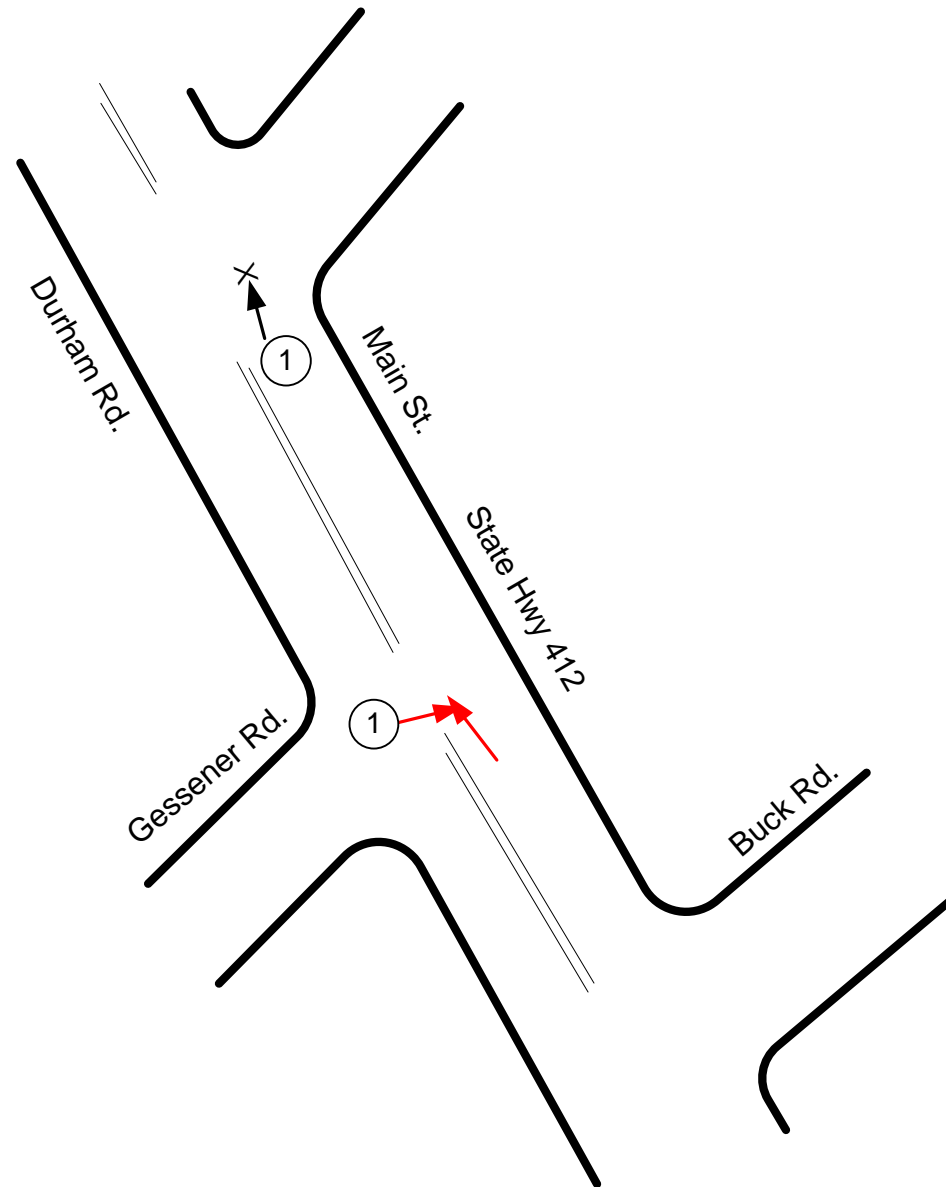
REPORT PARAMETERS:

Query ID: [0620070808001](#)
User ID: lkubli
Area of Interest: (In County 09 On State Route 0412(P) Between Segment 0040 Offset 1869 and Segment 0050 Offset 410) or (In County 09 On State Route 0412(S) Between Segment 0041 Offset 1869 and Segment 0051 Offset 410)
Date Range: 1/1/2004 to 12/31/2006
Criteria: STATE ROAD

**ROAD SAFETY AUDIT
SR 412 from Buck Rd.
to Church Hill Rd.**

**Collision Diagram
Crash Data Years 2004-2006**

Total Crashes = 2
Pedestrian Crashes = 0
Fatalities = 1



LEGEND

① = # crashes

↗ Angle (Fatal)

⊕ Hit Fixed Object

RED = Fatal

SCHEMATIC NOT TO SCALE



Delaware Valley Regional Planning Commission
August 2007

5. SR 412 at Gallows Hill Rd.

Segment 80, Offset 1023 to Segment 80, Offset 1204



COLLISION TYPE

Angle	3
Hit Fixed Object	2
Rear-end	2
Total	7

ILLUMINATION


Daylight	4
Dark	2
Unknown	1
Total	7

WEATHER


Clear	4
Fog	2
Unknown	1
Total	7

SEVERITY COUNT

Fatalities	0
Major	0
Moderate	1
Minor	0
Unk Severity	0
Unk If Injured	0



● Crash Location

 Delaware Valley
Regional Planning Commission
September 2007

BUCKS CO SR412 0080/1023 TO 0080/1204 RSA



Date Range: 1/1/2004 to 12/31/2006

USER ID/QUERY ID:

lkubli/ 0620070808003

Area of (In County 09 On State Route 0412(P) Between Segment 0080 Offset 1023 and Segment 0080 Offset 1204) or (In

Interest: County 09 On State Route 0412(S) Between Segment 0081 Offset 1023 and Segment 0081 Offset 1204)

MONTH OF YEAR							
	JAN	MAR	JUN	AUG	SEP	NOV	
CRASHES	1	2	1	1	1	1	7
PCT	14%	28%	14%	14%	14%	14%	100%

DAY OF WEEK					
	MON	WED	THR	FRI	
CRASHES	1	1	1	4	7
PCT	14%	14%	14%	57%	100%

HOUR OF DAY					
	07	17	18	20	
CRASHES	1	3	1	2	7
PCT	14%	42%	14%	28%	100%

YEAR		
	CRASHES	PCT
2004	3	42%
2005	2	28%
2006	2	28%
TOTAL	7	100%

COLLISION TYPE		
	CRASHES	PCT
ANGLE	3	42%
HIT FIX OBJ	2	28%
REAR END	2	28%
TOTAL	7	100%

CRASH SEVERITY LEVEL		
	CRASHES	PCT
MODERATE	1	14%
PDO	6	85%
TOTAL	7	100%

SEVERITY COUNT	
	PERSONS
FATALITIES	0
MAJOR	0
MODERATE	1
MINOR	0
UNK SEVERITY	0
UNK IF INJURED	0

DRIVER ACTIONS		
	ACTIONS	PCT
NO CONTRIBUTING ACTION	11	45%
PROCEED W/O CLEARANCE	4	16%
OTHER IMPROPER DRIVING	3	12%
AFFECTED PHYSICAL COND	2	8%
IMPROPER/CARELESS TURN	2	8%
TOO FAST FOR CONDITION	2	8%
TOTAL	24	100%

VEHICLE TYPE		
	VEHICLES	PCT
AUTOMOBILE	7	58%
SMALL TRUCK	2	16%
LARGE TRUCK	1	8%
SUV	1	8%
VAN	1	8%
TOTAL	12	100%

ROAD CONDITION		
	CRASHES	PCT
DRY	4	57%
WET	2	28%
UNK	1	14%
TOTAL	7	100%

ILLUMINATION		
	CRASHES	PCT
DAYLIGHT	4	57%
DARK	2	28%
UNK	1	14%
TOTAL	7	100%

WEATHER		
	CRASHES	PCT
CLEAR	4	57%
FOG	2	28%
UNK	1	14%
TOTAL	7	100%

ENVIR/ROADWAY FACTORS		
	FACTORS	PCT
NONE	7	77%
OTHER RDWY FACTOR	1	11%
SLIPPERY ICE/SNOW	1	11%
TOTAL	9	100%

CDART - CRASH SUMMARY REPORT (09-06)

NOTES:

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:

- 2 2007 crash records are incomplete
Data for the current year, 2007, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.

- 3 Complete data years
Complete records of reportable crashes are available in CDART for the following years: 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005,2006

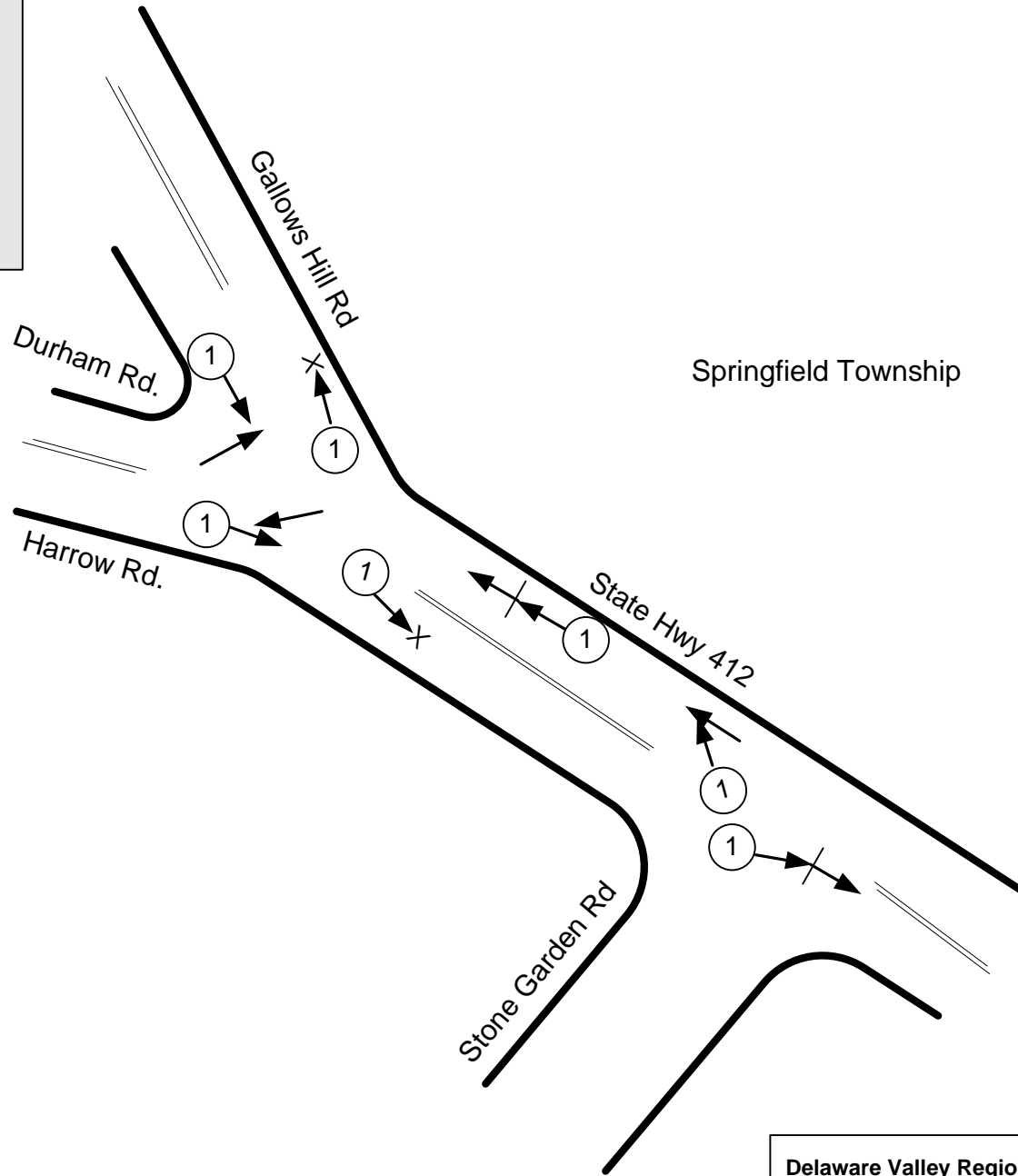
REPORT PARAMETERS:

Query ID: [0620070808003](#)
User ID: lkubli
Area of Interest: (In County 09 On State Route 0412(P) Between Segment 0080 Offset 1023 and Segment 0080 Offset 1204) or (In County 09 On State Route 0412(S) Between Segment 0081 Offset 1023 and Segment 0081 Offset 1204)
Date Range: 1/1/2004 to 12/31/2006
Criteria: STATE ROAD

**ROAD SAFETY AUDIT
SR 412 at Gallows Hill Rd.**

**Collision Diagram
Crash Data Years 2004-2006**

Total Crashes = 7
Pedestrian Crashes = 0



Springfield Township

LEGEND

① = # crashes

↗ ↘ Angle

↔ Rear End

↘ Hit Fixed Object



Delaware Valley Regional Planning Commission
August 2007

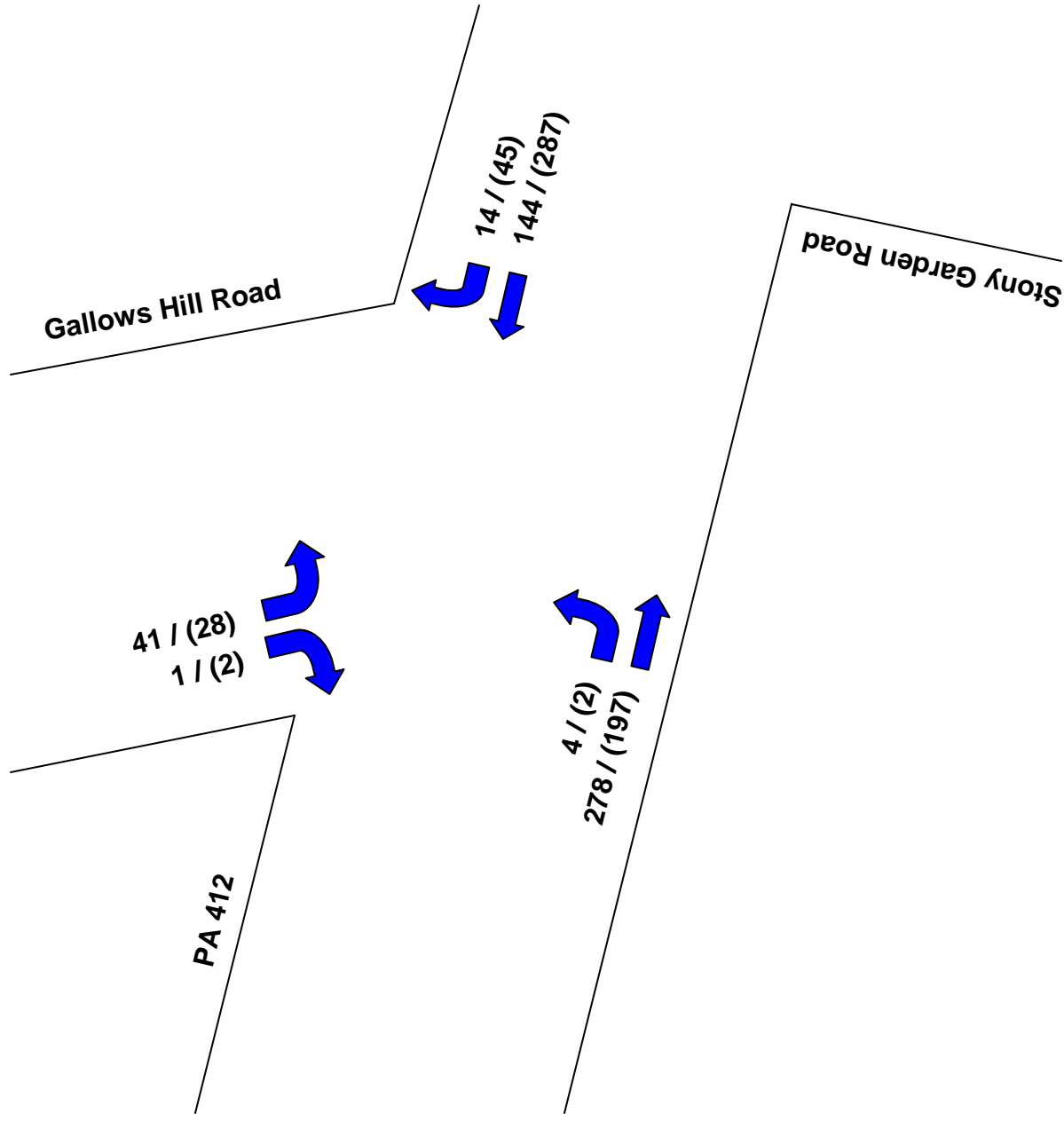
PA 412 and Gallows Hill Road

Existing Peak Hour Turning Movement Counts AM / (PM)

Peak Hours

AM: 7:45 – 8:45

PM: 5:00 – 6:00



Schematic not to scale



6. SR 412 at School Rd.

Segment 80, Offset 3338 to Segment 90, Offset 217



COLLISION TYPE

Hit Fixed Object	3
Head-on	1
Total	4

ILLUMINATION

Daylight	4
Total	4

WEATHER

Clear	3
Snow	1
Total	4

SEVERITY COUNT

Fatalities	0
Major	0
Moderate	0
Minor	0
Unk Severity	1
Unk If Injured	0



● Crash Location

BUCKS CO SR412 0080/3338 TO 0090/0217 RSA



Date Range: 1/1/2004 to 12/31/2006

USER ID/QUERY ID:
lkubli/ 0620070808002

Area of (In County 09 On State Route 0412(P) Between Segment 0080 Offset 3338 and Segment 0090 Offset 217) or (In County

Interest: 09 On State Route 0412(S) Between Segment 0081 Offset 3338 and Segment 0091 Offset 217)

MONTH OF YEAR					DAY OF WEEK				
	MAR	NOV	DEC		MON	TUE	WED		
CRASHES	2	1	1	4	1	2	1	4	
PCT	50%	25%	25%	100%	25%	50%	25%	100%	

HOUR OF DAY				
	08	14	17	
CRASHES	1	1	2	4
PCT	25%	25%	50%	100%

YEAR	COLLISION TYPE		CRASH SEVERITY LEVEL		SEVERITY COUNT	DRIVER ACTIONS				
	CRASHES	PCT	CRASHES	PCT	PERSONS	ACTIONS	PCT			
2004	3	75%	HIT FIX OBJ	3 75%	UNK SEVERITY	1 25%	FATALITIES	0	TOO FAST FOR CONDITION	3 33%
2005	1	25%	HEAD ON	1 25%	PDO	3 75%	MAJOR	0	NO CONTRIBUTING ACTION	2 22%
TOTAL	4	100%	TOTAL	4 100%	TOTAL	4 100%	MODERATE	0	WRONG SIDE OF ROADWAY	2 22%
							MINOR	0	DRIVER WAS DISTRACTED	1 11%
							UNK SEVERITY	1	OVER/UNDER COMP CURVE	1 11%
							UNK IF INJURED	0	TOTAL	9 100%

VEHICLE TYPE	ROAD CONDITION		ILLUMINATION		WEATHER	ENVIR/ROADWAY FACTORS				
VEHICLES	PCT	CRASHES	PCT	CRASHES	PCT	CRASHES	PCT	FACTORS	PCT	
AUTOMOBILE	2	40%	DRY	2 50%	DAYLIGHT	4 100%	CLEAR	3 75%	NONE	4 100%
LARGE TRUCK	2	40%	SNOW	1 25%	TOTAL	4 100%	SNOW	1 25%	TOTAL	4 100%
MOTORCYCLE	1	20%	WET	1 25%			TOTAL	4 100%		
TOTAL	5	100%	TOTAL	4 100%						

CDART - CRASH SUMMARY REPORT (09-06)

NOTES:

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- 2 2007 crash records are incomplete
Data for the current year, 2007, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.

- 3 Complete data years
Complete records of reportable crashes are available in CDART for the following years: 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005,2006

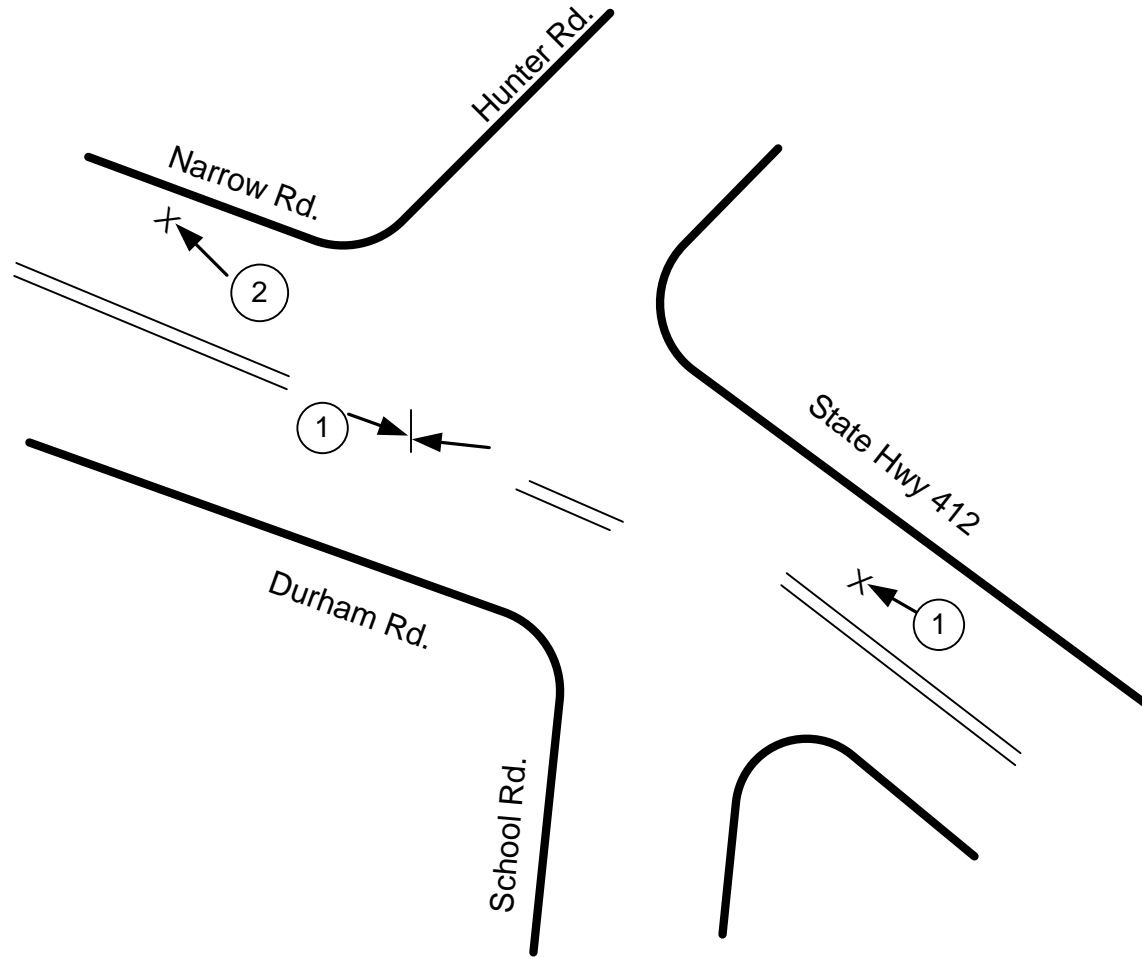
REPORT PARAMETERS:

Query ID: [0620070808002](#)
User ID: lkubli
Area of Interest: (In County 09 On State Route 0412(P) Between Segment 0080 Offset 3338 and Segment 0090 Offset 217) or (In County 09 On State Route 0412(S) Between Segment 0081 Offset 3338 and Segment 0091 Offset 217)
Date Range: 1/1/2004 to 12/31/2006
Criteria: STATE ROAD

**ROAD SAFETY AUDIT
SR 412 at School Rd.**

**Collision Diagram
Crash Data Years 2004-2006**

Total Crashes = 4
Pedestrian Crashes = 0



LEGEND

① = # crashes

↔ Head On

↔ Hit Fixed Object

SCHEMATIC NOT TO SCALE



Delaware Valley Regional Planning Commission
August 2007

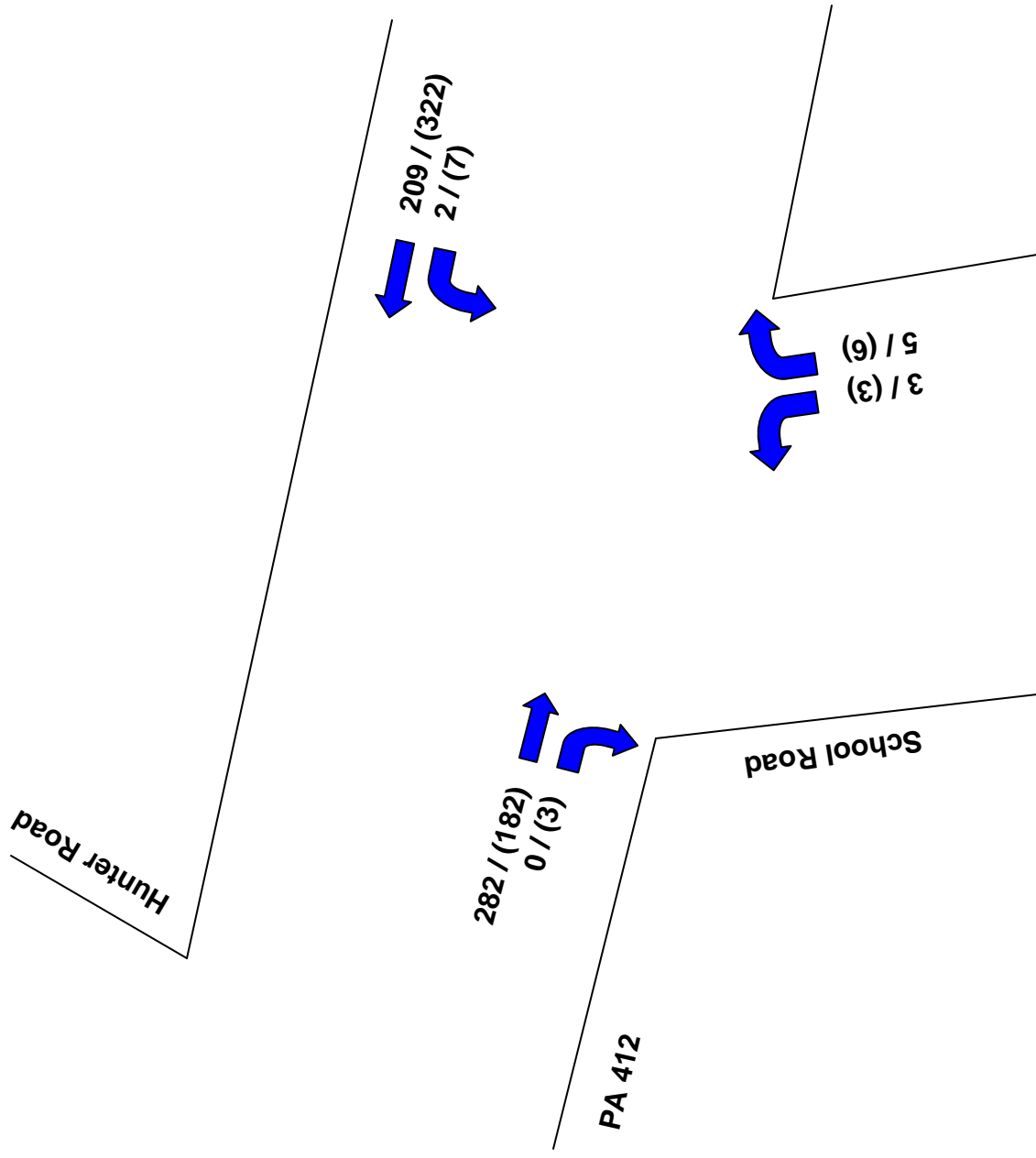
PA 412 and School Road

Existing Peak Hour Turning Movement Counts AM / (PM)

Peak Hours

AM: 8:00 – 9:00

PM: 4:00 – 5:00



Schematic not to scale

7. SR 412 at Bursonville Rd.

Segment 100, Offset 0 to Segment 100, Offset 67



COLLISION TYPE

Angle	2
Hit Fixed Object	2
Unknown	1
Total	5

ILLUMINATION

Daylight	3
Dark	2
Total	5

WEATHER

Clear	5
Total	5

SEVERITY COUNT

Fatalities	1
Major	0
Moderate	1
Minor	3
Unk Severity	0
Unk If Injured	0



● Crash Location

BUCKS CO SR412 0100/0000 TO 0100/0067 RSA



Date Range: 1/1/2004 to 12/31/2006

USER ID/QUERY ID:

lkubli/ 0620070808004

Area of (In County 09 On State Route 0412(P) Between Segment 0100 Offset 0 and Segment 0100 Offset 67) or (In County 09

Interest: On State Route 0412(S) Between Segment 0101 Offset 0 and Segment 0101 Offset 67)

MONTH OF YEAR						
	MAY	JUN	SEP	NOV	DEC	
CRASHES	1	1	1	1	1	5
PCT	20%	20%	20%	20%	20%	100%

DAY OF WEEK					
	MON	TUE	FRI	SAT	
CRASHES	1	1	2	1	5
PCT	20%	20%	40%	20%	100%

HOUR OF DAY						
	08	10	11	16	22	
CRASHES	1	1	1	1	1	5
PCT	20%	20%	20%	20%	20%	100%

YEAR		
	CRASHES	PCT
2004	2	40%
2005	2	40%
2006	1	20%
TOTAL	5	100%

COLLISION TYPE		
	CRASHES	PCT
ANGLE	2	40%
HIT FIX OBJ	2	40%
UNKNOWN	1	20%
TOTAL	5	100%

CRASH SEVERITY LEVEL		
	CRASHES	PCT
FATAL	1	20%
MINOR	2	40%
PDO	2	40%
TOTAL	5	100%

SEVERITY COUNT	
	PERSONS
FATALITIES	1
MAJOR	0
MODERATE	1
MINOR	3
UNK SEVERITY	0
UNK IF INJURED	0

DRIVER ACTIONS		
	ACTIONS	PCT
NO CONTRIBUTING ACTION	6	40%
DRIVER WAS DISTRACTED	3	20%
SPEEDING	3	20%
RUNNING STOP SIGN	2	13%
OTHER IMPROPER DRIVING	1	6%
TOTAL	15	100%

VEHICLE TYPE		
	VEHICLES	PCT
AUTOMOBILE	7	87%
SMALL TRUCK	1	12%
TOTAL	8	100%

ROAD CONDITION		
	CRASHES	PCT
DRY	5	100%
TOTAL	5	100%

ILLUMINATION		
	CRASHES	PCT
DAYLIGHT	3	60%
DARK	2	40%
TOTAL	5	100%

WEATHER		
	CRASHES	PCT
CLEAR	5	100%
TOTAL	5	100%

ENVIR/ROADWAY FACTORS		
	FACTORS	PCT
NONE	4	80%
DEER IN ROADWAY	1	20%
TOTAL	5	100%

CDART - CRASH SUMMARY REPORT (09-06)

NOTES:

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- 3 Complete data years
Complete records of reportable crashes are available in CDART for the following years: 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005,2006

REPORT PARAMETERS:



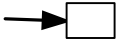

Query ID: [0620070808004](#)
User ID: lkubli
Area of Interest: (In County 09 On State Route 0412(P) Between Segment 0100 Offset 0 and Segment 0100 Offset 67) or (In County 09 On State Route 0412(S) Between Segment 0101 Offset 0 and Segment 0101 Offset 67)
Date Range: 1/1/2004 to 12/31/2006
Criteria: STATE ROAD

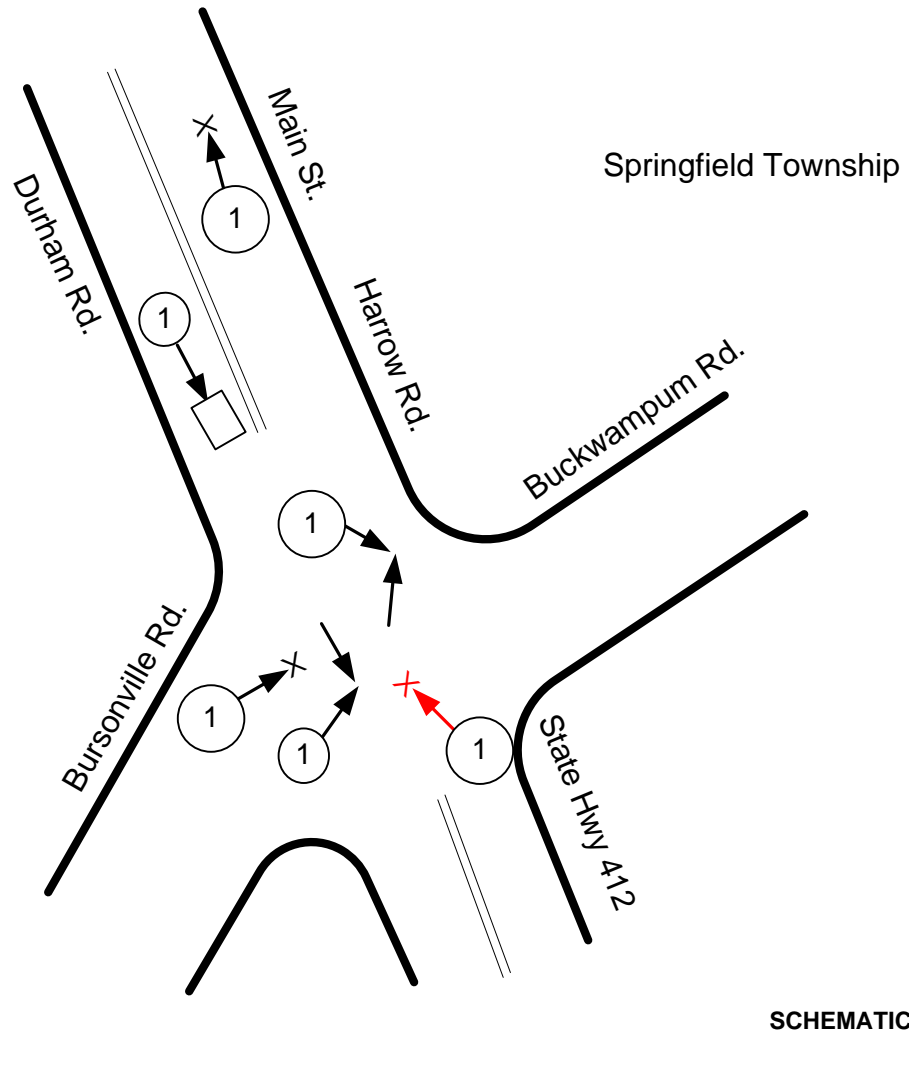
**ROAD SAFETY AUDIT
SR 412 at Bursonville Rd.**

**Collision Diagram
Crash Data Years 2004-2006**

Total Crashes = 5
Pedestrian Crashes = 0
Fatalities = 1

LEGEND

-  = # crashes
-  Angle
-  Hit Deer
-  Hit Fixed Object
- RED = Fatal**



Delaware Valley Regional Planning Commission
August 2007

8. SR 412 from Bodder Rd. to South of Lehenberg Rd.
 Segment 120, Offset 684 to Segment 130, Offset 152



COLLISION TYPE

Hit Fixed Object	7
Rear-end	2
Non Collision	1
Total	10

ILLUMINATION


Daylight	5
Dark	3
Street Lights	2
Total	10


WEATHER


Clear	6
Rain	2
Sleet	2
Total	10

SEVERITY COUNT

Fatalities	0
Major	0
Moderate	5
Minor	3
Unk Severity	1
Unk If Injured	0




Crash Location


Delaware Valley
Regional Planning Commission
September 2007

BUCKS CO SR412 0120/0684 TO 0130/0152 RSA



Date Range: 1/1/2004 to 12/31/2006

USER ID/QUERY ID:

Ikubli/ 0620070808006

Area of (In County 09 On State Route 0412(P) Between Segment 0120 Offset 684 and Segment 0130 Offset 152) or (In County

Interest: 09 On State Route 0412(S) Between Segment 0121 Offset 684 and Segment 0131 Offset 152)

MONTH OF YEAR										DAY OF WEEK					
	JAN	FEB	MAR	APR	MAY	JUL	SEP	OCT			SUN	MON	FRI	SAT	
CRASHES	1	1	1	2	1	1	1	2	10	CRASHES	1	2	5	2	10
PCT	10%	10%	10%	20%	10%	10%	10%	20%	100%	PCT	10%	20%	50%	20%	100%

HOUR OF DAY									
	02	07	08	09	18	19	21	22	
CRASHES	1	1	1	1	2	1	2	1	10
PCT	10%	10%	10%	10%	20%	10%	20%	10%	100%

YEAR	COLLISION TYPE		CRASH SEVERITY LEVEL		SEVERITY COUNT	DRIVER ACTIONS				
	CRASHES	PCT	CRASHES	PCT		PERSONS	ACTIONS	PCT		
2004	2	20%	HIT FIX OBJ	7 70%	MODERATE	3 30%	FATALITIES	0	TOO FAST FOR CONDITION	9 52%
2005	2	20%	REAR END	2 20%	MINOR	2 20%	MAJOR	0	NO CONTRIBUTING ACTION	4 23%
2006	6	60%	NON COLL	1 10%	UNK SEVERITY	1 10%	MODERATE	5	OVER/UNDER COMP CURVE	3 17%
TOTAL	10	100%	TOTAL	10 100%	PDO	4 40%	MINOR	3	DRIVER INEXPERIENCED	1 5%
					TOTAL	10 100%	UNK SEVERITY	1	TOTAL	17 100%
							UNK IF INJURED	0		

VEHICLE TYPE	ROAD CONDITION		ILLUMINATION		WEATHER	ENVIR/ROADWAY FACTORS				
	VEHICLES	PCT	CRASHES	PCT	CRASHES	PCT	FACTORS	PCT		
AUTOMOBILE	6	50%	DRY	6 60%	DAYLIGHT	5 50%	CLEAR	6 60%	NONE	9 75%
MOTORCYCLE	3	25%	ICE	2 20%	DARK	3 30%	RAIN	2 20%	SUDDEN WEATHER COND	2 16%
SUV	2	16%	WET	2 20%	STREET LIGHTS	2 20%	SLEET	2 20%	SLIPPERY ICE/SNOW	1 8%
LARGE TRUCK	1	8%	TOTAL	10 100%	TOTAL	10 100%	TOTAL	10 100%	TOTAL	12 100%
TOTAL	12	100%								

CDART - CRASH SUMMARY REPORT (09-06)

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- 3 Complete data years
Complete records of reportable crashes are available in CDART for the following years: 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005,2006

REPORT PARAMETERS:

Query ID: [0620070808006](#)
User ID: lkubli
Area of Interest: (In County 09 On State Route 0412(P) Between Segment 0120 Offset 684 and Segment 0130 Offset 152) or (In County 09 On State Route 0412(S) Between Segment 0121 Offset 684 and Segment 0131 Offset 152)
Date Range: 1/1/2004 to 12/31/2006
Criteria: STATE ROAD

9. SR 412 at Junction With SR 212

Segment 140, Offset 1285 to Segment 150, Offset 0



COLLISION TYPE

Angle	8
Hit Fixed Object	2
Non Collision	1
Total	11

ILLUMINATION

Daylight	8
Dark	2
Street Lights	1
Total	11

WEATHER

Clear	8
Rain	3
Total	11

SEVERITY COUNT

Fatalities	1
Major	0
Moderate	2
Minor	3
Unk Severity	2
Unk If Injured	0



● Crash Location



Delaware Valley
Regional Planning Commission
September 2007

BUCKS CO SR412 0140/1285 TO 0150/0000 RSA



Date Range: 1/1/2004 to 12/31/2006

USER ID/QUERY ID:

lkubli/ 0620070808010

Area of (In County 09 On State Route 0412(P) Between Segment 0140 Offset 1285 and Segment 0150 Offset 0) or (In County 09

Interest: On State Route 0412(S) Between Segment 0141 Offset 1285 and Segment 0151 Offset 0)

MONTH OF YEAR							DAY OF WEEK						
	MAR	MAY	JUL	AUG	DEC		MON	TUE	THR	FRI	SAT		
CRASHES	1	2	1	4	3	11	CRASHES	3	1	2	4	1	11
PCT	9%	18%	9%	36%	27%	100%	PCT	27%	9%	18%	36%	9%	100%

HOUR OF DAY										
	08	10	11	14	16	17	18	22		
CRASHES	2	1	2	1	1	1	1	2	11	
PCT	18%	9%	18%	9%	9%	9%	9%	18%	100%	

YEAR	COLLISION TYPE		CRASH SEVERITY LEVEL		SEVERITY COUNT		DRIVER ACTIONS		
	CRASHES	PCT	CRASHES	PCT	CRASHES	PCT	PERSONS	ACTIONS	PCT
2004	2	18%	ANGLE	8 72%	FATAL	1 9%	1	NO CONTRIBUTING ACTION	19 48%
2005	2	18%	HIT FIX OBJ	2 18%	MODERATE	2 18%	0	PROCEED W/O CLEARANCE	8 20%
2006	7	63%	NON COLL	1 9%	MINOR	2 18%	2	IMPROPER/CARELESS TURN	4 10%
TOTAL	11	100%	TOTAL	11 100%	UNK SEVERITY	1 9%	3	FAILR MAINT PROP SPEED	2 5%
					PDO	5 45%	2	RUNNING STOP SIGN	2 5%
					TOTAL	11 100%	0	TOO FAST FOR CONDITION	2 5%
								OVER/UNDER COMP CURVE	1 2%
								SPEEDING	1 2%
								TOTAL	39 100%

VEHICLE TYPE	ROAD CONDITION		ILLUMINATION		WEATHER		ENVIR/ROADWAY FACTORS		
VEHICLES	PCT	CRASHES	PCT	CRASHES	PCT	CRASHES	PCT	FACTORS	PCT
AUTOMOBILE	11 55%	DRY	8 72%	DAYLIGHT	8 72%	CLEAR	8 72%	NONE	11 84%
SUV	4 20%	WET	3 27%	DARK	2 18%	RAIN	3 27%	OTHER WEATHER COND	1 7%
LARGE TRUCK	3 15%	TOTAL	11 100%	STREET LIGHTS	1 9%	TOTAL	11 100%	SUBSTANCE ON RDWY	1 7%
SMALL TRUCK	2 10%			TOTAL	11 100%			TOTAL	13 100%
TOTAL	20 100%								

CDART - CRASH SUMMARY REPORT (09-06)

NOTES:

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Data for the current year, 2007, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.

- 3 Complete data years
Complete records of reportable crashes are available in CDART for the following years: 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005,2006

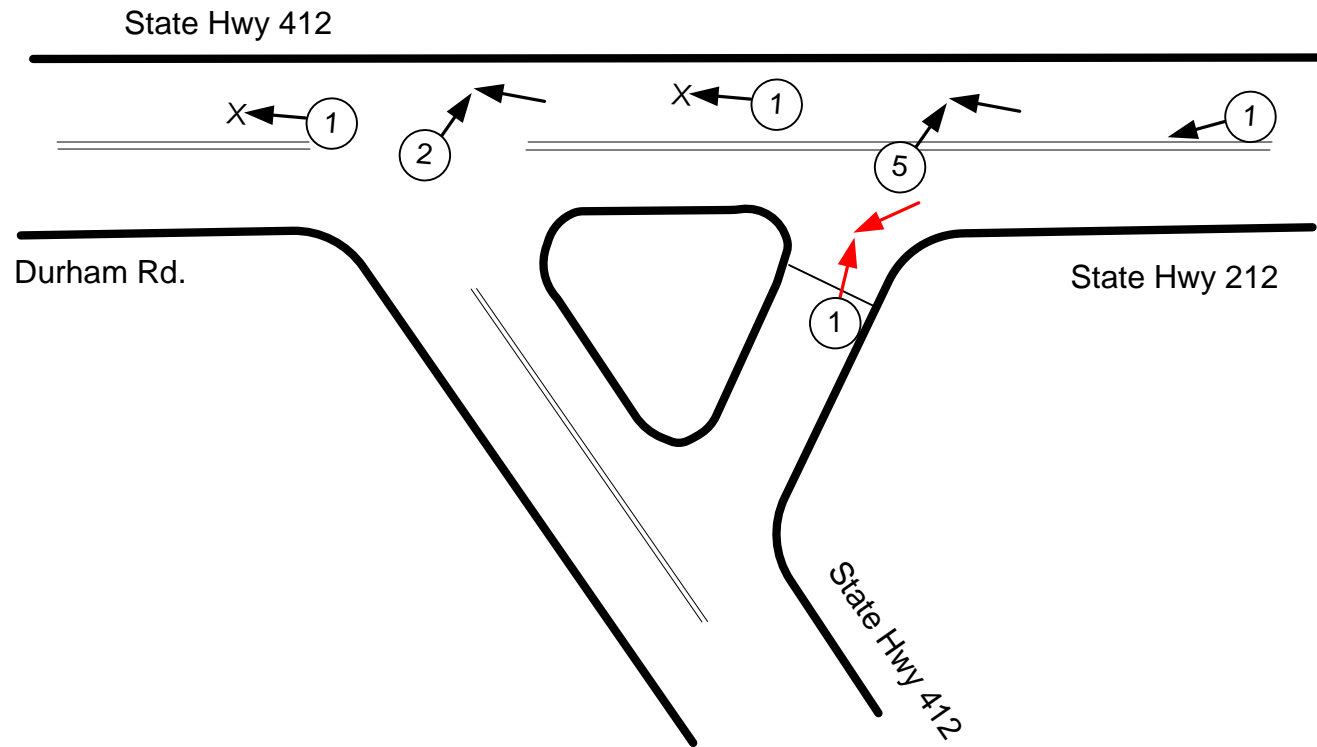
REPORT PARAMETERS:

Query ID: [0620070808010](#)
User ID: lkubli
Area of Interest: (In County 09 On State Route 0412(P) Between Segment 0140 Offset 1285 and Segment 0150 Offset 0) or (In County 09 On State Route 0412(S) Between Segment 0141 Offset 1285 and Segment 0151 Offset 0)
Date Range: 1/1/2004 to 12/31/2006
Criteria: STATE ROAD

**ROAD SAFETY AUDIT
SR 412 at Junction with SR 212**

**Collision Diagram
Crash Data Years 2004-2006**

Total Crashes = 11
Pedestrian Crashes = 0
Fatalities = 1



LEGEND

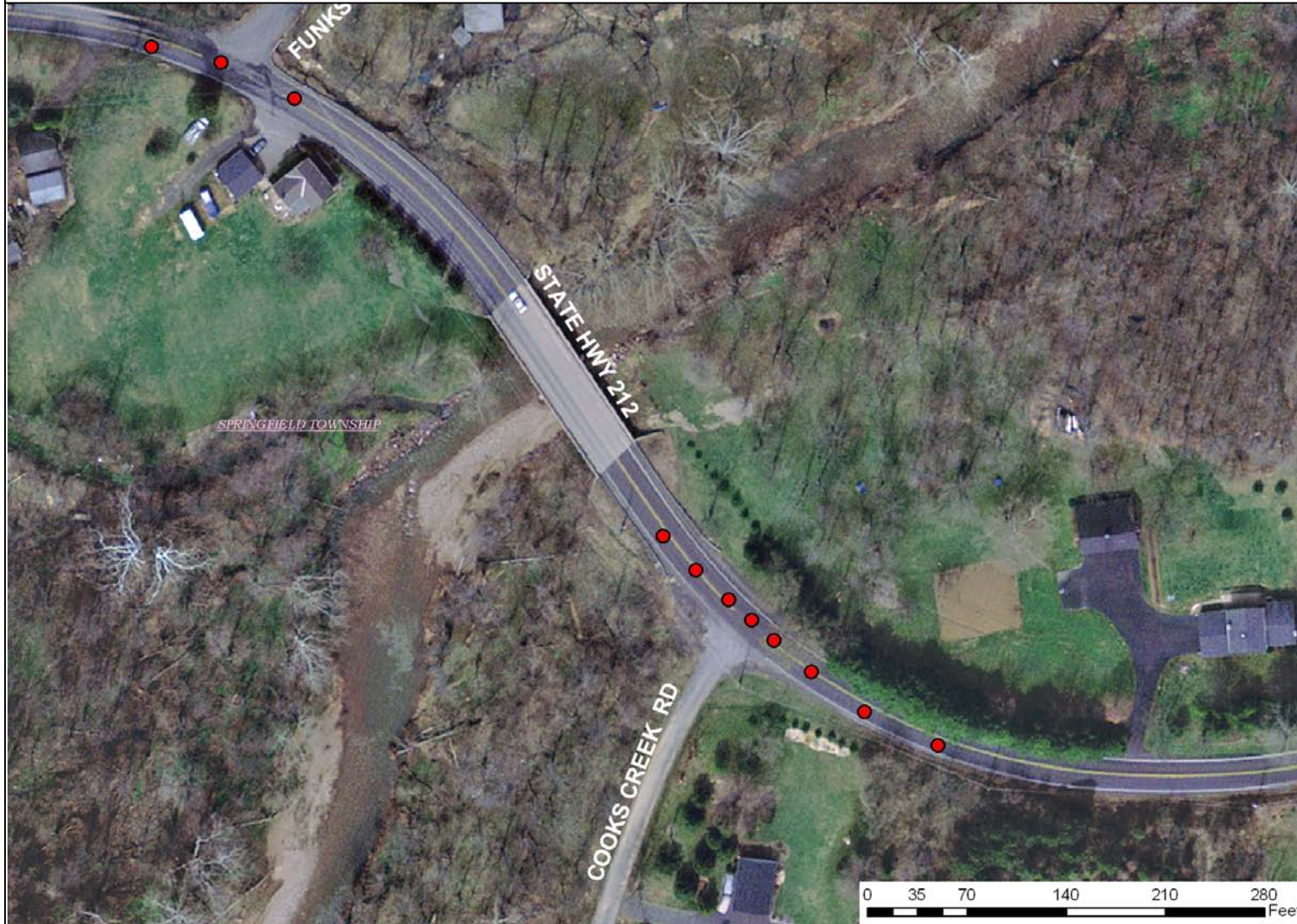
- ① = # crashes
- ↙ Angle
- Non-Collision
- ↙ X Hit Fixed Object
- RED = Fatal

SCHEMATIC NOT TO SCALE

↑
N
↓

Delaware Valley Regional Planning Commission
August 2007

10. SR 212 from Cooks Creek Rd. to Funks Mill Rd.
 Segment 230, Offset 1729 to Segment 240, Offset 385



COLLISION TYPE	
Hit Fixed Object	7
Angle	1
Non Collision	1
Total	9
ILLUMINATION	
Dark	5
Daylight	4
Total	9
WEATHER	
Clear	6
Rain	3
Total	9
SEVERITY COUNT	
Fatalities	1
Major	0
Moderate	2
Minor	4
Unk Severity	0
Unk If Injured	0

● **Crash Location**

Delaware Valley
Regional Planning Commission
September 2007

BUCKS CO SR212 0230/1729 TO 0240/0385 RSA



Date Range: 1/1/2004 to 12/31/2006

USER_ID/QUERY_ID:

lkubli/ 0620070808016

Area of (In County 09 On State Route 0212(P) Between Segment 0230 Offset 1729 and Segment 0240 Offset 385) or (In County

Interest: 09 On State Route 0212(S) Between Segment 0231 Offset 1729 and Segment 0241 Offset 385)

MONTH OF YEAR								DAY OF WEEK					
	JAN	MAY	AUG	SEP	OCT	NOV		MON	THR	FRI	SAT		
CRASHES	2	2	2	1	1	1	9	4	3	1	1	9	
PCT	22%	22%	22%	11%	11%	11%	100%	44%	33%	11%	11%	100%	

HOUR OF DAY								
	01	07	11	16	18	20	22	
CRASHES	1	1	1	1	2	1	2	9
PCT	11%	11%	11%	11%	22%	11%	22%	100%

YEAR	COLLISION TYPE		CRASH SEVERITY LEVEL		SEVERITY COUNT	DRIVER ACTIONS		
	CRASHES	PCT	CRASHES	PCT	PERSONS	ACTIONS	PCT	
2004	1	11%	HIT FIX OBJ	7 77%	FATAL	1 11%	NO CONTRIBUTING ACTION	7 31%
2005	5	55%	ANGLE	1 11%	MODERATE	2 22%	TOO FAST FOR CONDITION	6 27%
2006	3	33%	NON COLL	1 11%	MINOR	3 33%	AFFECTED PHYSICAL COND	2 9%
TOTAL	9	100%	TOTAL	9 100%	PDO	3 33%	DRIVER INEXPERIENCED	2 9%
					TOTAL	9 100%	SPEEDING	2 9%
							UNKNOWN	2 9%
							OVER/UNDER COMP CURVE	1 4%
							TOTAL	22 100%

VEHICLE TYPE	ROAD CONDITION		ILLUMINATION		WEATHER	ENVIR/ROADWAY FACTORS	
VEHICLES	PCT	CRASHES	PCT	CRASHES	PCT	FACTORS	PCT
AUTOMOBILE	9 81%	WET	6 66%	DARK	5 55%	NONE	5 55%
MOTORCYCLE	1 9%	DRY	3 33%	DAYLIGHT	4 44%	DEER IN ROADWAY	1 11%
SMALL TRUCK	1 9%	TOTAL	9 100%	TOTAL	9 100%	GLARE	1 11%
TOTAL	11 100%					OTHER WEATHER COND	1 11%
						SUBSTANCE ON RDWY	1 11%
						TOTAL	9 100%

CDART - CRASH SUMMARY REPORT (09-06)

NOTES:

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:

- 2 2007 crash records are incomplete
Data for the current year, 2007, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.

- 3 Complete data years
Complete records of reportable crashes are available in CDART for the following years: 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005,2006

REPORT PARAMETERS:

Query ID: [0620070808016](#)
User ID: lkubli
Area of Interest: (In County 09 On State Route 0212(P) Between Segment 0230 Offset 1729 and Segment 0240 Offset 385) or (In County 09 On State Route 0212(S) Between Segment 0231 Offset 1729 and Segment 0241 Offset 385)
Date Range: 1/1/2004 to 12/31/2006
Criteria: STATE ROAD

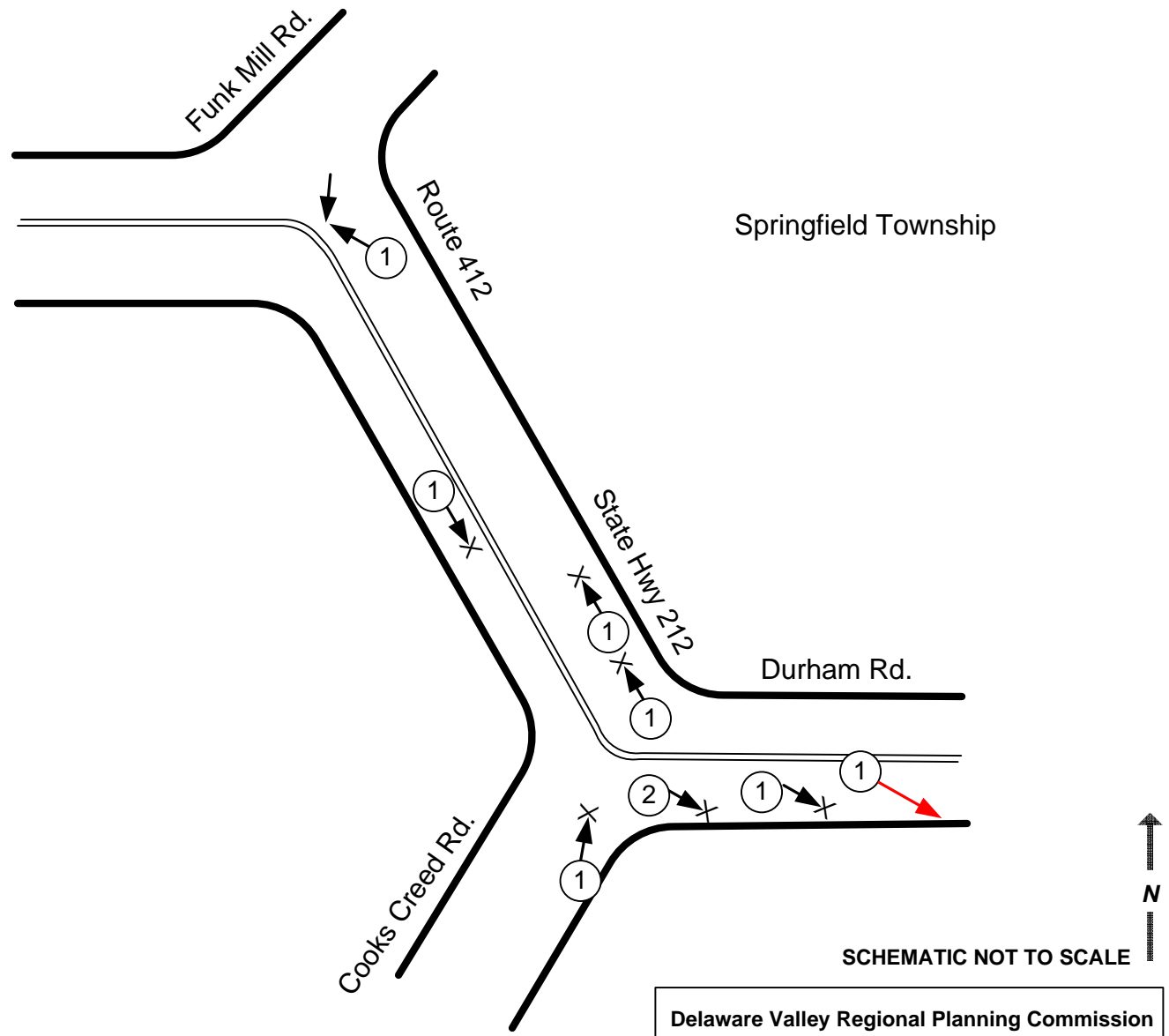
ROAD SAFETY AUDIT
SR 212 from Cooks Creek Rd.
to Funks Mill Rd.

Collision Diagram
Crash Data Years 2004-2006

Total Crashes = 9
 Pedestrian Crashes = 0
 Fatalities = 1

LEGEND


- ① = # crashes
- ↙ ← Angle
- Non-Collision
- ↙ × Hit Fixed Object
- RED = Fatal




11. SR 412 at the Springfield Township Municipal Line.
 Segment 160, Offset 2374 to Segment 160, Offset 2374



COLLISION TYPE	
Angle	1
Head-on	1
Rear-end	1
Total	3
ILLUMINATION	
Daylight	3
Total	3
WEATHER	
Clear	3
Total	3
SEVERITY COUNT	
Fatalities	0
Major	0
Moderate	0
Minor	2
Unk Severity	1
Unk If Injured	0



● **Crash Location**


 Delaware Valley
 Regional Planning Commission
 September 2007

BUCKS CO SR412 0160/2374 TO 0160/2374 RSA



Date Range: 1/1/2004 to 12/31/2006

USER ID/QUERY ID:

Area of (In County 09 On State Route 0412(P) Between Segment 0160 Offset 2000 and Segment 0160 Offset 2374)

Ikubli/ 0620070808017

Interest:

MONTH OF YEAR					DAY OF WEEK			
	JAN	APR	OCT		THR	FRI		
CRASHES	1	1	1	3	CRASHES	1	2	3
PCT	33%	33%	33%	100%	PCT	33%	66%	100%

HOUR OF DAY				
	08	12	15	
CRASHES	1	1	1	3
PCT	33%	33%	33%	100%

YEAR	COLLISION TYPE		CRASH SEVERITY LEVEL		SEVERITY COUNT	DRIVER ACTIONS				
	CRASHES	PCT	CRASHES	PCT	PERSONS	ACTIONS	PCT			
2006	3	100%	ANGLE	1 33%	MINOR	2 66%	FATALITIES	0	NO CONTRIBUTING ACTION	6 50%
TOTAL	3	100%	HEAD ON	1 33%	UNK SEVERITY	1 33%	MAJOR	0	DRIVER WAS DISTRACTED	2 16%
			REAR END	1 33%	TOTAL	3 100%	MODERATE	0	IMPROPER/CARELESS TURN	2 16%
			TOTAL	3 100%			MINOR	2	RUNNING RED LIGHT	2 16%
							UNK SEVERITY	1	TOTAL	12 100%
							UNK IF INJURED	0		

VEHICLE TYPE	ROAD CONDITION		ILLUMINATION		WEATHER	ENVIR/ROADWAY FACTORS			
VEHICLES	PCT	CRASHES	PCT	CRASHES	PCT	FACTORS	PCT		
AUTOMOBILE	4 66%	DRY	3 100%	DAYLIGHT	3 100%	CLEAR	3 100%	NONE	3 100%
SMALL TRUCK	1 16%	TOTAL	3 100%	TOTAL	3 100%	TOTAL	3 100%	TOTAL	3 100%
LARGE TRUCK	1 16%								
TOTAL	6 100%								

CDART - CRASH SUMMARY REPORT (09-06)

NOTES:

- 1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:

- 2 2007 crash records are incomplete
Data for the current year, 2007, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.

- 3 Complete data years
Complete records of reportable crashes are available in CDART for the following years: 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005,2006

REPORT PARAMETERS:

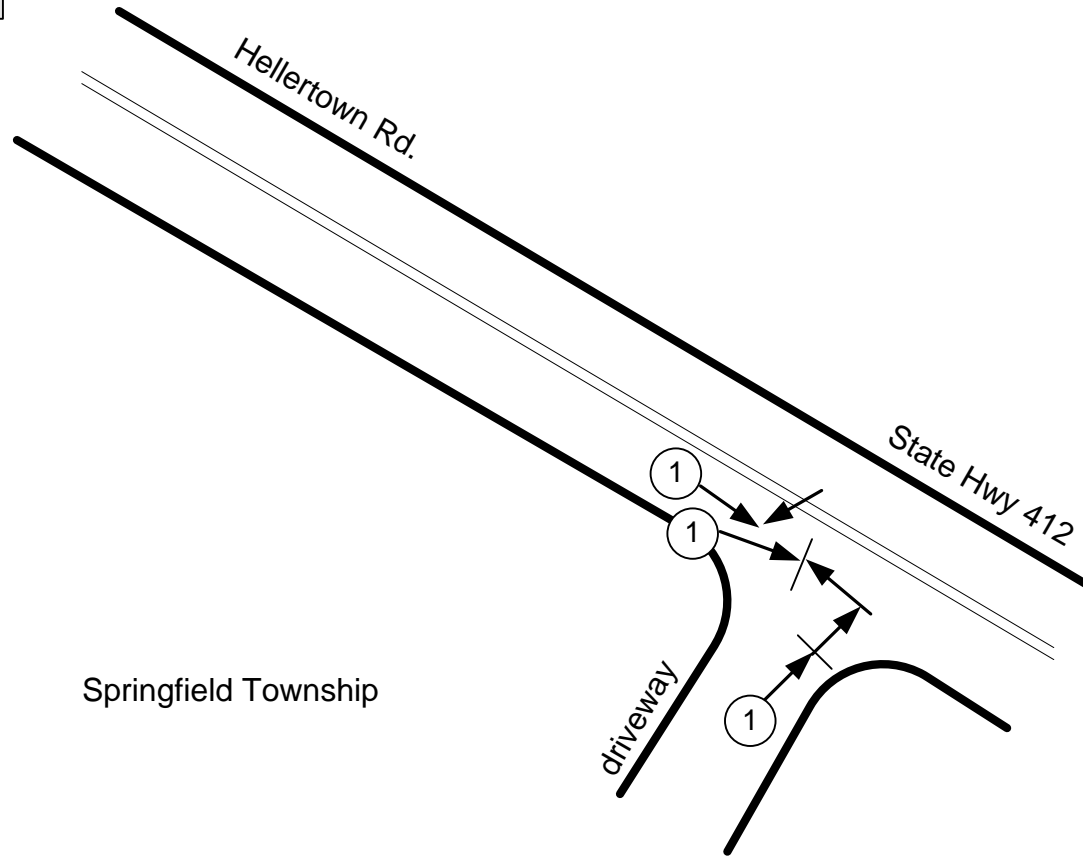
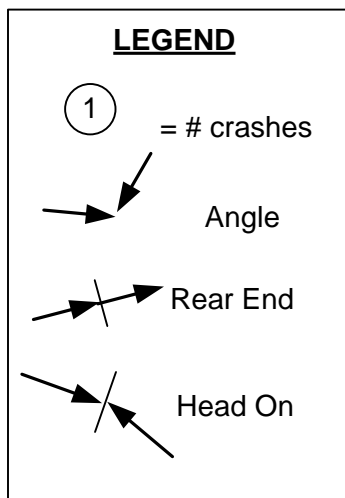
Query ID: [0620070808017](#)
User ID: lkubli
Area of Interest: (In County 09 On State Route 0412(P) Between Segment 0160 Offset 2000 and Segment 0160 Offset 2374)

Date Range: 1/1/2004 to 12/31/2006
Criteria: STATE ROAD

**ROAD SAFETY AUDIT
SR 412 at Springfield Township
Municipal Line**

**Collision Diagram
Crash Data Years 2004-2006**

Total Crashes = 3
Pedestrian Crashes = 0



SCHEMATIC NOT TO SCALE

New Site: SR 412 at Slifer Valley Rd.
 Segment 100, Offset 3750 to Segment 100, Offset 3850



COLLISION TYPE

Hit Fixed Object	1
Rear-end	1
Total	2

ILLUMINATION

Daylight	2
Total	2

WEATHER

No Adverse Conditions	1
Snow	1
Total	2

SEVERITY COUNT

Fatalities	0
Major	0
Moderate	0
Minor	0
Unk Severity	0
Unk If Injured	1

Delaware Valley
Regional Planning Commission
September 2007

New Site: SR 412 at High Point Road & Old Bethlehem Pike
 Segment 160, Offset 71 to Segment 160, Offset 353



COLLISION TYPE

Hit Fixed Object	1
Rear-end	1
Total	2

ILLUMINATION

Dark – no street lights	2
Total	2

WEATHER

Rain	1
No Adverse Conditions	1
Total	2

SEVERITY COUNT

Fatalities	0
Major	0
Moderate	0
Minor	0
Unk Severity	0
Unk If Injured	0

Delaware Valley
 Regional Planning Commission
 September 2007

New Site: SR 412 at Meginnes Rd
 Segment 50, Offset 3054 to Segment 50, Offset 3054



COLLISION TYPE

Hit Fixed Object	1
Total	1

ILLUMINATION

Dark – no street lights	1
Total	1

WEATHER

Rain	1
Total	1

SEVERITY COUNT

Fatalities	0
Major	0
Moderate	0
Minor	1
Unk Severity	0
Unk If Injured	0

Crash Location

Delaware Valley
Regional Planning Commission
September 2007

New Site: SR 412 at One Lane Bridge (Walking Purchase marker)
 Segment 150, Offset 1884 to Segment 150, Offset 2099



COLLISION TYPE

Hit Fixed Object	1
Non collision	1
Total	2

ILLUMINATION

Dark – no street lights	1
Dusk	1
Total	2

WEATHER

No Adverse Conditions	2
Total	2

SEVERITY COUNT

Fatalities	0
Major	0
Moderate	1
Minor	1
Unk Severity	0
Unk If Injured	0



● Crash Location

New Site: SR 412 at SR 212 (west end)

SR 412: Segment 150, Offset 137 to Segment 150, Offset 200; SR 212: Segment 210, Offset 0



COLLISION TYPE

Hit Fixed Object	2
Angle	1
Head-on	1
Total	4

ILLUMINATION


Daylight	2
Dark – no street lights	2
Total	4

WEATHER


Rain	2
No Adverse Conditions	2
Total	4

SEVERITY COUNT

Fatalities	0
Major	0
Moderate	0
Minor	3
Unk Severity	2
Unk If Injured	0



● **Crash Location**



Delaware Valley
Regional Planning Commission
September 2007

APPENDIX D
Photo Log



Pavement markings faded at PA 611/PA 412 intersection



PA 611/PA 412 intersection looking eastbound



Faded pavement markings and illegal sign at PA 611/PA 412 intersection



Right turn slip ramp from PA 412 to PA 611



Wide intersection approach at Mountain View Drive



Wide intersection approach at Mountain View Drive



**Mountain View Drive looking northbound
pavement markings have faded**



**Drop off in the area
between Park Drive
West and Park Drive
East. Delineator pole
are damaged.**



Stop sign at Park Drive West installed too low



Gessner Road intersection evidence of vehicles leaving the roadway to make a right turn on to PA 412. Stop sign and markers are leaning.



PA 412 intersection with Church Hill Road



At Church Hill Road looking northbound on PA 412



Stony Garden Road looking northbound on PA 412, sight distance compromised – curve and bushes



Sign and mirror facing Stony Garden Road to assist motorists exiting on to PA 412



Drop off and damaged delineator pole at Stony Garden Road



Curve at Hunter Road with one chevron sign



Southbound approach to the one lane bridge



Signage before the curve approaching the the one lane bridge



Northbound approach to the one lane bridge



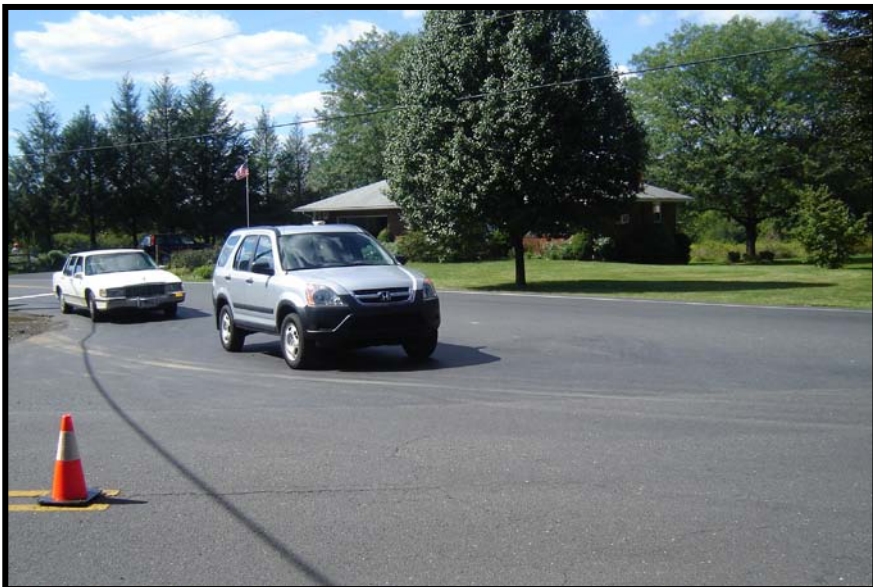
One lane bridge guide rail



High Point Road intersection looking northbound on PA 412



PA 412/PA 212 west intersection – standing water; poor turning radius



PA 412/PA 212 west intersection – vehicles stopped in the intersection to make a left turn



PA 412/PA 212 west intersection – southbound approach



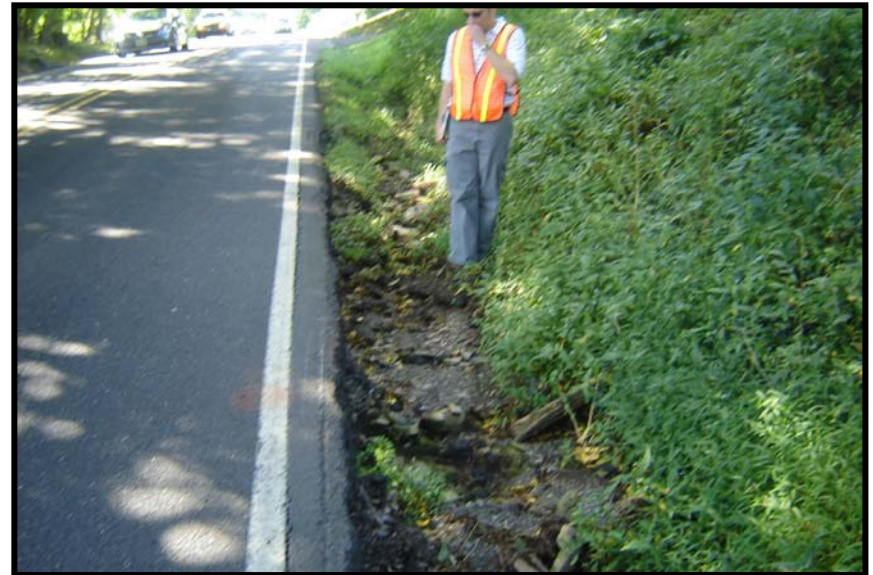
Skewed PA 412/PA 212 west intersection



PA 412/PA 212 west intersection – looking northbound



Steep drop off and edge of shoulder washed out at 3370 Main Street



Steep drop off and edge of shoulder washed out at 3370 Main Street



Culvert and headwall deterioration at 3398 Main Street.



Old bridge wall across from Funks Mill Road is in the clear zone



Narrow shoulder and pedestrian amenities on Main Street



Curve warning sign with advisory speed limit on Main Street



Bridge north of Cooks Creek Road



Problem curve at Cooks Creek Road



Signage on Main Street north of PA 412/PA 212 east intersection



Northbound approach of PA 412/PA 212 east intersection



Downhill curve north of Bodder Road, no delineation



Bodder Road intersection looking southbound – curve warning signs



Guide rail appears too low in the vicinity of Bodder Road



The curves and slope of PA 412 in the vicinity of Bodder Road



Signs approaching curve north of Lehnenberg Road



Signs and utility pole at Lehnenberg Road compromise sight distance



Lehnenberg Road – looking southbound. Tree canopy



Northbound lane prior to curve has an excessive cross slope and roadway is failing.



At Slifer Valley Road PA 412 is covered by tree canopy. Excessive and inconsistent grades.



Drop off on the inside of curve – PA 412 at Slifer Valley Road



Inlet headwall is a potential hazard and clogged culvert pipe – PA 412 at Slifer Valley Road



Drop off on the inside of curve – PA 412 at Slifer Valley Road



Pavement deterioration on PA 412 at Slifer Valley Road



Slifer Valley Road intersection - Stopping sight distance to turn left on Slifer Valley Road is inadequate; excessive and inconsistent grades



Pavement deterioration on north of Meginnes Road



Meginnes Road approach to PA 412 – sight distance compromised by trees



Intersection warning sign for Bursonville Road is blocked by trees



Warning sign for the curve at Bursonville Road



Sight distance at Bursonville Road is severely compromised due to PA 412 profile; 45 MPH speed limit sign at the curve



Grade at the Bursonville Road approach at PA 412



Sight distance at Bursonville Road is severely compromised. Curve north of Buckwampum Road is not delineated.



PA 412 north of th Bursonville Road and Buckwampum Road intersections



Buckwampum Road intersection looking south on PA 412



Buckwampum Road intersection looking north on PA 412

APPENDIX E
Checklist

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 where access management is problematic?		
5 Lighting	Is lighting needed in specific locations?		

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 on PA 412?		
	Is adequate sight distance provided at intersections?		

2 Driver expectation	Are there any sections of the roadway which 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 streetlight and tree lines conform with the road alignment?		
	d. Are curves properly delineated?		
3 Widths	Are all the traffic lanes and roadway widths adequate?		
4 Design Speed	Is the horizontal and vertical alignment suitable for traffic speed? If not:		
	a. Are advisory speed signs posted?		
	b. Are warning signs installed?		
	c. Are posted advisory speeds for curves appropriate?		
	d. Is the speed limit appropriate for all road users?		
5 Shoulders	Are shoulder widths appropriate for broken down vehicles or emergency vehicles?		
	Is the shoulder cross slope sufficient to provide proper drainage?		
	Are there locations where guide rail may		

	be appropriate?		
6 Overtaking	Are adequate passing opportunities provided?		

INTERSECTIONS

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Location	Are there any roadside objects nearby which would intrude on driver's line of sight?		
	Are the intersections adequate for all vehicular movements?		
	Are intersections located safely with respect to horizontal and vertical alignment?		
2 Controls	Are pavement markings and intersection control signing satisfactory?		
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?		
	Are turning radii and tapers appropriate?		
	Are driveways located at or near the intersections?		

5 Visibility, sight distance	Is sight distance adequate for all movements and all users?		
6 Turn Lanes	Do the turning lanes have sufficient storage?		
	Are there locations where left turn lanes need to be provided?		
	Are there locations where right turn lanes need to be provided?		

TRAFFIC SIGNALS

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Signal Operation	Are traffic signals operating correctly? (Example clearance time)		
2 Visibility	Are traffic signals clearly visible to approaching motorists?		

PEDESTRIANS

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Land Use Factors	Are there schools, parks, or other pedestrian generators along the corridor?		
2 Sidewalks	Are sidewalks continuous throughout the corridor as appropriate?		
	Are the sidewalks in good conditions (uneven, cracked, etc.)?		
	Are the sidewalks wide enough to		

	accommodate persons using mobility aides?		
3 Facilities at Intersections	Are crosswalks provided at intersections near the schools?		
	Are there pedestrian signals located at intersections?		
4 Around Schools	Is there a school zone?		
	Are there bus stop locations along the corridor?		
	Are there appropriate advance warning signs provided?		
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 crosswalks (parked vehicles, vegetation, fences, etc.)		

BICYCLISTS

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

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 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)?		
	Are there locations where there is sign clutter?		
	Are all necessary regulatory, warning, and direction signs (including detours) 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?		
	Do signs supports conform to guidelines?		
2 Pavement Markings and Delineation	Does existing pavement markings need to be re-painted?		
	Have raised pavement markers been installed?		
	Are pavement markings easily visible and effective for all likely conditions (i.e. at night, day, inclement weather etc.)?		

	Are guide posts correctly placed, clean, and visible?		
	Are there locations where chevrons are needed?		
3 Lighting	Are the appropriate types of poles used for all locations and correctly installed?		
	Are all locations free of any lighting which may conflict visually with signs?		
	Are there locations where lighting should be installed?		

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) which could result in safety problems?		
2 Ponding	Is the pavement free of areas where ponding may occur resulting in a safety problem?		
3 Skid resistance	Does the pavement appear to have skid resistance on curves, steep grades and approach to intersection?		

APPENDIX F
Response Sheet

PA 412 Road Safety Audit

Corridor Wide

CORRIDOR WIDE ISSUES	Solution	Decision Agree/Reject	Planned Completion Date	Comments
<p><i>Centerline Delineation</i></p> <ul style="list-style-type: none"> ○ The corridor is shadowed during the day in some areas due to the canopy of trees and is extremely dark at night, a result of the lack of street lighting. Safety is further compromised by the narrow pavement width. 	<ul style="list-style-type: none"> ○ Install raised pavement markers (RPMs) the length of the corridor to better delineate the centerline during dark hours and adverse weather conditions. Centerline rumble strips should be installed to assist in the prevention of head-on collisions in accordance with PennDOT's policy. 			
<p><i>Pavement markings</i></p> <ul style="list-style-type: none"> ○ Pavement markings are faded and are several areas hardly visible in several locations. 	<ul style="list-style-type: none"> ○ Re-stripe the corridor as appropriate. 			
<p><i>Signs</i></p> <ul style="list-style-type: none"> ○ There is a lack of intersection warning signs. Given the geometry of the roadway this could be beneficial to road users. ○ Many curves throughout the corridor are missing chevrons. 	<ul style="list-style-type: none"> ○ Evaluate corridor for complete sign upgrade. Install "intersection ahead" warning signs and add street name signage as appropriate. <u><i>Nockamixon Township will perform task in that section of the corridor</i></u> ○ Identify appropriate locations and install chevrons. 			

CORRIDOR WIDE ISSUES	Solution	Decision Agree/Reject	Planned Completion Date	Comments
<p><i>Speed Limit</i></p> <ul style="list-style-type: none"> Given the geometry of the roadway and the adjacent land uses, it seems motorists were going too fast. 	<ul style="list-style-type: none"> Re-evaluate the posted speed limit and adjust as necessary. <i><u>Study completed by PennDOT – 40 MPH was justified.</u></i> 			
<p><i>Speeding</i></p> <ul style="list-style-type: none"> Many drivers were observed traveling above the posted speed limit. 	<ul style="list-style-type: none"> This will require increased enforcement. Given the narrowness of the roadway the relevant Police departments should coordinate with PennDOT to identify potential locations for and create pull-off areas. 			
<p><i>Delineators</i></p> <ul style="list-style-type: none"> Several plastic pole delineators used to identify curb drop offs in specific areas along the corridor were knocked down or run-over. 	<ul style="list-style-type: none"> Replace delineators. 			
<p><i>Lane and Shoulder Width</i></p> <ul style="list-style-type: none"> Travel lanes throughout the corridor are narrow. Shoulders either do not exist or are very narrow throughout the corridor. 	<ul style="list-style-type: none"> Program a project that will widen roadway to 12-foot lanes with at least a 2-foot paved shoulder where possible. 			

CORRIDOR WIDE ISSUES	Solution	Decision Agree/Reject	Planned Completion Date	Comments
<p><i>Drop Offs</i></p> <ul style="list-style-type: none"> ○ The corridor is plagued by steep drop offs. 	<ul style="list-style-type: none"> ○ Conduct an inventory of drop offs locations and severity and determine the level of effort needed to make repairs. 			
<p><i>Trees</i></p> <ul style="list-style-type: none"> ○ Tree canopy covers the roadway in several areas, resulting in many safety hazards – including blocking signs and sight distance. 	<ul style="list-style-type: none"> ○ Trim trees as appropriate throughout the corridor. 			
<p><i>Drainage</i></p> <ul style="list-style-type: none"> ○ Drainage facilities are lacking. There is evidence of cross-over pipes that go nowhere and clogged culverts. 	<ul style="list-style-type: none"> ○ Conduct an inventory of drainage cross pipe facilities along the corridor and determine level of effort needed to make repairs and/or clean out. 			
<p><i>Road side hazards</i></p> <ul style="list-style-type: none"> ○ Concrete and stone headwalls for drainage in the clear zone are potential hazard to motorists who may run off the road. 	<ul style="list-style-type: none"> ○ Widen the road and install new curbs and traversable inlet grates instead of headwall. 			
<p><i>Intersection Edge Line</i></p> <ul style="list-style-type: none"> ○ The geometry of many intersections requires motorists to pull out in the travel-way to see on-coming traffic. 	<ul style="list-style-type: none"> ○ Install dashed edge line across intersection approach to guide motorists. 			

Specific Locations

NOCKAMIXON TOWNSHIP				
CORRIDOR WIDE ISSUES	Solution	Decision Agree/Reject	Planned Completion Date	Comments
PA 611				
○ Insufficient lane width.	○ Widen road.			
○ Inlets at the intersection are clogged.	○ Clean inlets to prevent flooding.			
○ Too many signs at the intersection resulting in sign clutter and possible motorist confusion. ○ Directional sign on the west side of PA 412 at PA 611 is blocked by trees.	○ Remove existing commercial signs. ○ Remove the “No Pedestrian” signs. ○ Trim tree.			
○ Pavement markings are faded.	○ Re-stripe pavement markings at the intersection.			
○ Delineators are knocked down.	○ Replace delineators.			
○ Problematic left turns from northbound PA 611 to westbound PA 412.	○ Investigate viability of removing this permissive left turn movement. ○ Inspect signal controller to ensure all loops are working properly.			
○ High number of rear end crashes (non reportable) on right turn slip ramp from southbound PA 412.	○ Consider the application of a roundabout with the future HOP.			

CORRIDOR WIDE ISSUES	Solution	Decision Agree/Reject	Planned Completion Date	Comments
<i>Mountain View Road</i>				
<ul style="list-style-type: none"> ○ The Mountain View Road approach to the intersection is too wide. This results in confusion and unsafe conditions. ○ Pavement markings are faded. ○ There is a headwall in the clear zone on the northeast quadrant of PA 412 which can be hazardous. 	<ul style="list-style-type: none"> ○ Intersection is scheduled for signalization combined with access management improvements at the commercial property on the north side of the intersection. ○ With the signal improvements the intersection will be re-stripped and re-configured. ○ Remove the headwall and redesign with a traversable inlet. 			
<i>Park Drive East</i>				
<ul style="list-style-type: none"> ○ Sight distance is limited looking north from Park Drive East due to trees and hedge. 	<ul style="list-style-type: none"> ○ Trim vegetation. <i><u>Nockamixon Township will perform task</u></i> 			
<ul style="list-style-type: none"> ○ Poor drainage – standing water in ditch. Cross pipe may be clogged. 	<ul style="list-style-type: none"> ○ Clean out pipes. May need hydrology evaluation. 			
<ul style="list-style-type: none"> ○ Motorist may tend to pull out in the travel-way to see on-coming traffic. 	<ul style="list-style-type: none"> ○ Install dashed edge line across the intersection approach to provide guidance to motorist. 			

CORRIDOR WIDE ISSUES	Solution	Decision Agree/Reject	Planned Completion Date	Comments
<i>Between Park Drive East and Park Drive West</i>				
○ Many of the delineators have been knocked down.	○ Replace delineators as appropriate.			
○ Drop off parallel to the roadway on the north side of the road.	○ Pipe drainage and make traversable.			
<i>Park Drive West</i>				
○ “Stop” sign is installed too low.	○ Install “Stop” sign at the appropriate height. <i><u>Nockamixon Township will perform task</u></i>			
○ Sight distance from Park Drive West looking south is limited due to trees and stone wall.	○ Trim vegetation. <i><u>Nockamixon Township will perform task</u></i>			
<i>Gessner Road/Church Hill Road</i>				
○ Sight distance is compromised looking south from Gessner Road.	○ Work with local business (Nursery) to trim vegetation around their sign and move back decorations. <i><u>Nockamixon Township will perform task</u></i>			
○ Cross pipe at Gessner Road has standing water.	○ Clean outlet.			

CORRIDOR WIDE ISSUES	Solution	Decision Agree/Reject	Planned Completion Date	Comments
<i>Between Gessner Road and Meginnes Road</i>				
<ul style="list-style-type: none"> ○ Damaged “watch children” sign on southbound PA 412 near Church Hill Road. 	<ul style="list-style-type: none"> ○ Replace sign. <u>Nockamixon Township will perform task</u> 			
<ul style="list-style-type: none"> ○ School speed limit sign blocked by vegetation. 	<ul style="list-style-type: none"> ○ Remove vegetation. 			
<ul style="list-style-type: none"> ○ School children walking between schools. 	<ul style="list-style-type: none"> ○ Conduct signal warrant analysis for the intersection of PA 412 and Church Hill Road. ○ Consider making this area a permanent 25 MPH zone. ○ Provide amenities to raise profile of pedestrians – sidewalks between schools; designated crosswalks with appropriate signage; context sensitive design treatments. 			
<i>Meginnes Road</i>				
<ul style="list-style-type: none"> ○ Limited sight distance looking north from Meginnes Road. 	<ul style="list-style-type: none"> ○ Remove trees blocking line of sight. <u>Nockamixon Township will perform task</u> 			
<ul style="list-style-type: none"> ○ There are no pavement markings at the Meginnes Road approach. 	<ul style="list-style-type: none"> ○ Add pavement markings – dashed lines and stop bar to help guide motorist where they should be pulling out. 			
<ul style="list-style-type: none"> ○ Blacktop is broken off on the eastside of PA 412 north of Meginnes Road. 	<ul style="list-style-type: none"> ○ Repair pavement. 			

CORRIDOR WIDE ISSUES	Solution	Decision Agree/Reject	Planned Completion Date	Comments
<i>Meginnes Road (continued)</i>				
○ Both signs for the school zone on PA 412 are blocked by vegetation.	○ Trim back vegetation.			
SPRINGFIELD TOWNSHIP				
<i>Stony Garden Road/Gallow Hills Road</i>				
○ Inadequate sight distance from Stony Garden Road for southbound PA 412.	○ Remove bushes to the north of Stony Garden Road to enhance sight distance. ○ Install “Intersection Ahead” warning signs with flashers.			
○ Gallow Hills Road approach is skewed.	○ Re-stripe Gallow Hills Road approach to bring traffic perpendicular to the intersection.			
<i>School Road/Hunter Road</i>				
○ Limited sight distance from School Road to northbound PA 412.	○ Remove trees on the curve north of the intersection.			
○ Curve north of the intersection is not delineated.	○ Install chevron signs at the curve to delineate for northbound motorists.			
○ At Hunter Road, PA 412 curves to the left with one chevron delineating the curve.	○ Install additional chevron signs at appropriate intervals.			
○ Pavement behind guide rail north of School Road is washing out. Posts are exposed.	○ Fortify this area. May need to construct a retaining wall.			

CORRIDOR WIDE ISSUES	Solution	Decision Agree/Reject	Planned Completion Date	Comments
<i>School Road/Hunter Road (continued)</i>				
<ul style="list-style-type: none"> ○ Guide rail north of School Road is too low. 	<ul style="list-style-type: none"> ○ Reset guide rail and extend further north towards the curve. 			
<ul style="list-style-type: none"> ○ Super-elevation starts prior to School Road curve and runs off at Hunter Road. ○ The roadway geometry contributes to potential head-on collisions 	<ul style="list-style-type: none"> ○ Re-profile roadway and adjust pavement as needed. ○ Install centerline rumble strips along the curve and RPMs. 			
<i>Bursonville Road/Buckwampum Road</i>				
<ul style="list-style-type: none"> ○ Sight distance at Bursonville Road is severely compromised due to PA 412 profile. 	<ul style="list-style-type: none"> ○ Eliminate left-turns from Bursonville Road and from northbound PA 412. ○ Evaluate the profile to determine the feasibility of lowering the roadway to increase stopping sight distance and corner sight distance. 			
<ul style="list-style-type: none"> ○ Inadequate intersection warning signs. 	<ul style="list-style-type: none"> ○ Upgrade intersection warning signs with flashers. ○ Re-enforce the advisory speed. 			
<ul style="list-style-type: none"> ○ Advance warning sign and advisory speed limit sign blocked by vegetation. 	<ul style="list-style-type: none"> ○ Trim vegetation. 			
<ul style="list-style-type: none"> ○ Curve north of Buckwampum Road is not delineated. 	<ul style="list-style-type: none"> ○ Install chevron signs at appropriate locations to guide motorists. 			

CORRIDOR WIDE ISSUES	Solution	Decision Agree/Reject	Planned Completion Date	Comments
<i>Bursonville Road/Buckwampum Road (continued)</i>				
○ 45 MPH speed limit sign is located on the curve at Bursonville Road.	Relocate speed limit sign.			
○ Due to the roadway profile motorists tend to overcompensate into the oncoming lane.	Install centerline rumble strips.			
○ Bursonville Road approach is a steep incline making it difficult for motorists to exit on to PA 412.	Level intersection to accommodate normal maneuver. Install dashed white line at the intersection.			
<i>Slifer Valley Road</i>				
○ Excessive and inconsistent grades. (cross slopes and super-elevation)	○ Determine the feasibility of reconstruction/reprofiling during Surface Treatment Program.			
○ Pavement deterioration on east side of PA 412. ○ Drop off on the inside of curve.	○ Pave ditch on inside of curve, make traversable.			
○ Clogged culvert pipe on east side of PA 412.	○ Clean inlet.			
○ Inlet headwall is a potential hazard	○ Replace headwall – make traversable.			
○ Roadway covered by tree canopy.	○ Trim trees.			
○ Missing chevron to the right of the intersection.	○ Replace missing signs.			

CORRIDOR WIDE ISSUES	Solution	Decision Agree/Reject	Planned Completion Date	Comments
<i>Slifer Valley Road (continued)</i>				
<ul style="list-style-type: none"> ○ Stopping sight distance to turn left on Slifer Valley Road is inadequate. 	<ul style="list-style-type: none"> ○ Upgrade advance warning signage. 			
<i>Between Lehnenberg Road and Bodder Road</i>				
<ul style="list-style-type: none"> ○ Southbound PA 412, 45 MPH speed limit sign is located a few feet away from the “curve ahead” sign. 	<ul style="list-style-type: none"> ○ Relocate speed limit sign. 			
<ul style="list-style-type: none"> ○ Northbound lane prior to curve has an excessive cross slope and roadway is failing. ○ Vehicles leaving the roadway on the curve northbound. 	<ul style="list-style-type: none"> ○ Need to rebuild the embankment to a 2% crown. 			
<ul style="list-style-type: none"> ○ Small curve ahead sign prior to northbound curve. 	<ul style="list-style-type: none"> ○ Upgrade signage. 			
<ul style="list-style-type: none"> ○ Guide rail appears to be too low along northbound side of curve. 	<ul style="list-style-type: none"> ○ Reset guide rail. 			
<ul style="list-style-type: none"> ○ No advisory speed sign on southbound approach to the curve. 	<ul style="list-style-type: none"> ○ Install advisory speed limit sign. 			
<ul style="list-style-type: none"> ○ Roadway covered by tree canopy. 	<ul style="list-style-type: none"> ○ Trim trees. ○ Install delineation to the inside curve. 			
<ul style="list-style-type: none"> ○ Pavement markings faded. 	<ul style="list-style-type: none"> ○ Re-stripe roadway. 			
<ul style="list-style-type: none"> ○ Curve north of Bodder Road is not delineated. 	<ul style="list-style-type: none"> ○ Install chevron signs at appropriate intervals on the curve. 			

CORRIDOR WIDE ISSUES	Solution	Decision Agree/Reject	Planned Completion Date	Comments
<i>PA412/212 intersection (East of Springtown)</i>				
<ul style="list-style-type: none"> ○ Steep grade approaching intersection making it difficult to stop. 	<ul style="list-style-type: none"> ○ Add transverse rumble strips and “stop ahead” pavement marking in advance of stop sign at the intersection. Consider roundabout application for the intersection. 			
<i>Between Funks Mill Road and Cooks Creek Road</i>				
<ul style="list-style-type: none"> ○ Vehicles are overcompensating on the curve at Cooks Creek Road and drifting into the on-coming lane. 	<ul style="list-style-type: none"> ○ Check friction of pavement surface and curve alignment. ○ Add centerline rumble strips and RPMs. 			
<ul style="list-style-type: none"> ○ Five of the nine crashes at this location occurred in the dark. 	<ul style="list-style-type: none"> ○ Add street lighting, RPMs, and centerline rumble strips. 			
<ul style="list-style-type: none"> ○ Old bridge wall across from Funks Mill Road is in the clear zone and presents a hazard to motorists. 	<ul style="list-style-type: none"> ○ Remove old bridge wall. 			
<i>Between Funks Mill Road and Drifting Drive</i>				
<ul style="list-style-type: none"> ○ Steep drop off and edge of shoulder washed out at 3370 Main Street. 	<ul style="list-style-type: none"> Repave shoulder. 			
<ul style="list-style-type: none"> ○ Culvert deterioration and headwall at 3398 Main Street. 	<ul style="list-style-type: none"> Consider the extension of the pipe culvert in lieu of guide rail for protection. 			

CORRIDOR WIDE ISSUES	Solution	Decision Agree/Reject	Planned Completion Date	Comments
<i>PA 412/212 intersection (West of Springtown)</i>				
<ul style="list-style-type: none"> ○ Stop sign on PA 412 is placed far back from the intersection. 	<ul style="list-style-type: none"> ○ Relocate stop sign/bar closer to intersection. 			
<ul style="list-style-type: none"> ○ Skewed intersection. ○ Poor turning radius. 	<ul style="list-style-type: none"> ○ Consider a roundabout application for this intersection. 			
<ul style="list-style-type: none"> ○ Junction signs on PA 412 southbound approach is obstructed by trees. 	<ul style="list-style-type: none"> ○ Trim trees 			
<ul style="list-style-type: none"> ○ Speed limit sign northbound on PA 212 is blocked by trees. 	<ul style="list-style-type: none"> ○ Trim trees. 			
<ul style="list-style-type: none"> ○ Standing water on the southwest corner of the intersection. 	<ul style="list-style-type: none"> ○ Improve drainage at the intersection. 			
<ul style="list-style-type: none"> ○ Sight distance is limited at the Hickory Lane approach looking to the left on PA 212. 	<ul style="list-style-type: none"> ○ Remove or trim bushes to improve sightlines. 			
<i>One lane bridge</i>				
<ul style="list-style-type: none"> ○ Speeding approaching the bridge. ○ Lack of adequate advance warning signs of bridge in both directions. 	Install/upgrade advance warning signs Install one-way “yield” sign based on the best directional sight distance. <i><u>Bridge is slated for repair. This is a historical area therefore there will be no widening.</u></i>			

Title of Report: *PA 412 - ROAD SAFETY AUDIT*

Publication No.: 07042B

Date Published: October 2007

Geographic Area Covered:

The study area includes a section of PA 412 in Bucks County, Pennsylvania. It runs through the townships of Nockamixon and Springfield from PA 611 to the Northampton County border.

Key Words:

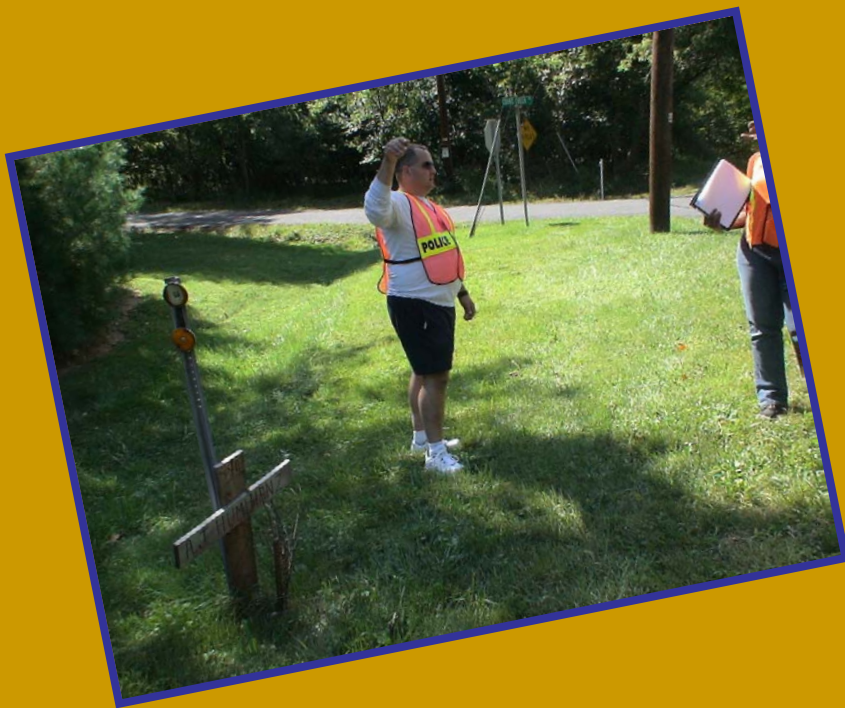
Road, safety, audit, potential, fatalities, injuries, reportable, crashes, issues, strategies, coordination, engineering, enforcement, education, prioritize, intersection, speed limit, traffic volumes, PennDOT, stakeholders, audit team, curve, sight distance, clear zone, geometry, pavement markings, signs, raised pavement markers, rumble strip, drop-offs, drainage.

ABSTRACT: This is a documentation of the process and findings of the PA 412 Road Safety Audit (RSA) undertaken by Delaware Valley Regional Planning Commission (DVRPC) in conjunction with Pennsylvania Department of Transportation (PennDOT). The goal of the audit is 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. The roadways studied are identified in the Safety Plan for PennDOT District 6. This corridor is classified as a high risk rural road with numerous curves and steep gradient. Much of the roadway is covered by the canopy of trees which in many instances are located in the clear zone and presents a potential hazard to road users.

Delaware Valley Regional Planning Commission
190 North Independence Mall West
8th Floor
Philadelphia, PA 19106-1520
Phone: 215-592-1800
Fax: 215-592-9125
Internet: www.dvrpc.org

Contact:

Rosemarie Anderson, Manager, Office of Safety and Security Planning	215-238-2832	randerson@dvrpc.org
Regina Moore, Transportation Engineer	215-238-2862	rmoore@dvrpc.org
Kevin Murphy, Senior Transportation Planner	215-238-2864	kmurphy@dvrpc.org



**Delaware Valley
Regional Planning
Commission**

**190 N. Independence Mall West
8th Floor
Philadelphia, PA 19106-1520
P: 215-592-1800
F: 215-592-9125
www.dvrpc.org**



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PA 412

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