Chapter 2  Traffic and Safety Assessment

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2.1 Today’s Transportation Setting

The Paoli Community is anchored by the existing train station, which is serviced by both SEPTA and Amtrak, located at the intersection of Lancaster Avenue and N./S. Valley Road. Many of the streets within the Paoli Community lead toward or past the Train Station with many local streets serving the neighborhoods that have developed around the Train Station. Lancaster Avenue (U.S. Route 30) carries approximately 21,189 vehicles—a combination of local traffic, pass-through traffic, and Train Station traffic—through Paoli and past the Train Station each day.

The existing transportation network serves the Paoli Community by accommodating many methods (modes) of travel including driving, walking, biking, and riding transit; however, there are many issues, as will be summarized in this Chapter, that make travelling by any mode within Paoli challenging or feel uncomfortable for residents, visitors, commuters, and business owners.

From a broader transportation perspective, the U.S. Route 202 Expressway provides convenient regional access for motorists to the study area. Also, the Pennsylvania Turnpike provides easy access to Paoli, Great Valley and Malvern via the newly opened slip ramp interchange along PA Route 29 in East Whiteland Township. Major state routes in the nearby area include PA Route 252, PA Route 29, PA Route 401, Darby Road, N./S. Valley Road, and Swedesford Road.

Locally, Lancaster Avenue travels through Paoli, through the communities of the Main Line, and into Center City Philadelphia, as well as to communities to the west of Paoli. Both PA Route 252 and PA Route 29 provide access to the U.S. Route 202 Expressway, while PA Route 29 and N Cedar Hollow Road link Paoli to the Great Valley Corporate Center, a major suburban employment center.
Transportation Characteristics

Land use context and roadway type define the transportation characteristics of a community and provide a framework for selecting appropriate roadway design values. Understanding the land use context also provides guidance on who will use the transportation system. Today, the land use context for the downtown Paoli could be most likely characterized as a Suburban Center, in accordance with PennDOT’s Smart Transportation Guidebook, based on development over the years and changes to the transportation infrastructure. However, with the community’s vision and future development potential, the heart of Paoli could be more representative of a more walkable Town Center. Additional land use characteristics and other existing environmental features are described in Section 3 of this Chapter.

The transportation context refers to the function that the roadway provides within the local community and the surrounding region and its interaction amongst other roadways within the network. The transportation context is defined by a road’s classification based upon its role in the transportation hierarchy of the overall road network, as well as operational and design characteristics of the roadway.

The concept of road classification is important in traffic engineering, as a street’s classification, or “type”, identifies its overall purpose within the roadway network, as well as its desirable design characteristics. Traditionally, four primary types of road classifications exist, including: 1) expressways, 2) arterials, 3) collectors, and 4) local roads. The design characteristics (i.e., street width, speed, etc.) and amount of traffic each of these classifications should accommodate varies depending on its purpose. Accordingly, knowing a street’s classification helps to understand its function and role as it relates to surrounding streets. For example, an expressway is designed to provide the greatest mobility and least frequent access while a local road is designed for the greatest access and less mobility. Also, a collector road must provide for both mobility of traffic and accommodate some level of access to properties. Figure 1 summarizes the roadway classifications for streets within and around the study area.

It is noted that some jurisdictions may also have sub-classifications such as “major”, “minor”, “local”, and “community” to differentiate variations in the design and operational characteristics of roads within a single primary classification, and each sub-classification may have different design criteria.

PennDOT’s Smart Transportation Guidebook refines the traditional road classifications to offer a total of five classifications that provide greater flexibility in design (avoiding a one-size-fits-all design approach to a given classification) and also considers adjacent land use context (i.e., neighborhood character). Figure 2 summarizes the assumed Smart Transportation roadway classification for the study area roadways.

2.1 Today’s Transportation Setting

Various land use and densities along the Lancaster Avenue corridor.
2.1 Today’s Transportation Setting

FIGURE 1
Township Roadway Classifications

FIGURE 2
Smart Transportation Roadway Classification
Transportation Inventory

An inventory of the current physical and operational characteristics of the streets and intersections within the study area was conducted to document various roadway design features (i.e., street width, on-street parking, shoulders, sidewalks, crosswalks, etc.) and traffic control.

Traffic Data

Vehicular traffic data was collected throughout the study area during typical operating conditions in the Spring of 2012. This data included daily traffic volumes, weekday morning and afternoon commuter peak hour traffic volumes, heavy vehicle (tractor trailers, busses, delivery trucks, etc.) volumes, and travel speeds at key roadway segments and intersections within the study area.

The peak hour intersection volumes for the Lancaster Avenue corridor are shown in the chart below. Individual turning movement traffic volumes during morning and afternoon commuter peak hour traffic volumes, heavy vehicle (tractor trailers, busses, delivery trucks, etc.) volumes, and travel speeds at key roadway segments and intersections within the study area were also collected. Traffic data is included in Appendix A.

The busiest intersection along the corridor is the Lancaster Avenue intersection at N./S. Valley Road during both the morning and afternoon peak hours. In contrast, approximately 1,600 and 1,500 vehicles travel through the N. Valley Road and E./W. Central Avenue intersection during the weekday morning and afternoon peak hours, respectively, making it the intersection with the lowest traffic volumes. However, given the fact that this intersection is off of the Lancaster Avenue corridor, it demonstrates that a significant amount of traffic still passes through this off-set intersection located just to the north of the Lancaster Avenue corridor.

Traffic Operations

Current traffic operations at key study intersections were analyzed using standard methodologies found in the Highway Capacity Manual using Synchro and SimTraffic software. In some cases, it is noted that traffic simulation analyses were used to model existing traffic conditions to more accurately reflect observed traffic operations in the study area. The results of the analysis reveals that the overall weekday morning and afternoon traffic conditions in the study area are acceptable at several intersections. There is poor traffic signal progression along Lancaster Avenue, and there are several congested intersections and poorly operating traffic movements throughout the study area that worsen operating conditions. The existing weekday morning and afternoon traffic operating conditions are illustrated in Figure 3 and 4, respectively.

The analysis indicates that the following intersections experience inadequate overall operating conditions (or poor levels of service) during weekday morning and/or afternoon peak hours:

- Lancaster Avenue and Paoli Pike
- Lancaster Avenue and N./S. Valley Road
- Lancaster Avenue and Darby Road
- N. Valley Road and W. Central Avenue
- N. Valley Road and E. Central Avenue

At the intersections noted above, as well as others throughout the study area, some individual traffic movements may also experience longer delays during the peak hours as well.
Further, significant peak hour traffic queues have been observed in the study area, including along Lancaster Avenue (notably between Paoli Pike and Darby Road) along the northbound S. Valley Road approach to Lancaster Avenue (particularly during the weekday morning peak hour), as well as along the East and West Central Avenue approaches to N. Valley Road.

The traffic analyses worksheets are provided in Appendix B.

Pedestrian Data

Pedestrian traffic data was also collected throughout the study area in the Spring of 2012. Pedestrian crossing counts were conducted at key study intersections around the Paoli Train Station during the weekday morning and afternoon peak hours. Sidewalk segment counts were also conducted during the study peak hours. The existing pedestrian traffic volumes are summarized in Figure 5.

The pedestrian traffic counts reveal a higher volume of pedestrians around the existing Paoli Train Station; however, the number of pedestrians beyond the immediate area of the train station drops significantly.

Pedestrian Operations

Current pedestrian observations were analyzed using standard techniques contained in the Highway Capacity Manual. The results of the analysis reveals that from a capacity-standpoint, the existing sidewalks and crosswalks do generally serve the pedestrians today. However, based upon our field observations, a safety assessment, and the community feedback (as will be discussed in future sections), the existing transportation infrastructure does not meet the needs of pedestrian or would-be pedestrians (those that would walk if conditions were improved for pedestrians) today.
2.2 Transportation Data & Operations

FIGURE 3
Existing Weekday Morning Peak Hour Traffic Conditions
2.2 Transportation Data & Operations

FIGURE 4
Existing Weekday Afternoon Peak Hour Traffic Conditions
2.2 Transportation Data & Operations

FIGURE 5
Existing Pedestrian Conditions
2.3 Traffic Safety Assessment

In order to evaluate the existing safety conditions and identify improvement needs for all users of the transportation network within the study area, a Road Safety Assessment (RSA) was conducted in July 2012. The purpose of conducting the RSA as part of this overall feasibility study was to help identify operational, design, and safety issues that could be addressed when developing improvement alternatives for consideration. These issues identified by the RSA supplement those found through the engineering analyses and evaluations of this feasibility study as well as the issues and concerns raised by the Paoli community through the extensive public outreach efforts of this study.

Road Safety Assessment

The RSA Team included a multi-disciplinary team of professionals familiar with traffic operations, engineering design, and safety, as well as those familiar with the transportation issues in the Paoli Community.

The RSA focused on the study area roadways within Paoli, and specifically within Tredyffrin Township, including:

- Lancaster Avenue (between Plank Avenue and Chestnut Street);
- N. Valley Road (between Lancaster Avenue and E. Central Avenue);
- S. Valley Road (between Lancaster Avenue and Circular Avenue);
- E. Central Avenue (between Route 252 and N. Valley Road);
- W. Central Avenue (between N. Valley Road and Summit Avenue)

The RSA Team identified 162 specific issues that adversely impact vehicular, pedestrian, bike and transit travel throughout the study area. The full Road Safety Assessment Report is included in the Technical Appendices and fully describes the identified transportation issues. In summary, the major themes identified through the RSA process included the following:

- There is a strong need to improve and expand the transportation infrastructure to accommodate pedestrians and provide ADA-compliant facilities. There are many gaps in the existing sidewalk pedestrian network and an insufficient number of pedestrian crossing opportunities throughout the study area.
- Traffic congestion and poor traffic flow during the peak hours results in operational and safety deficiencies. By reducing congestion, the number of crash incidences in the study area could potentially be reduced significantly.
- Travel speeds through the study area are dramatically higher than the posted speed limit. There is a lack of physical design elements and visual cues along Paoli roadways to alert motorists of the reduced posted speed limit within the study area, which should be addressed during the identification of improvements. In the short term, increased education (radar speed signs) and increased enforcement may help reduce speeding in the study area. Appropriate traffic calming measures should be provided particularly along East and West Central Avenues.
- Atypical intersection alignments (e.g., offset and skewed side street approaches), as well as nearby driveway intersections within the study area that are not controlled by signalization, are impacting intersection operations and resulting in increased collisions. The feasibility of improving these intersection alignments (either through realignment, relocation, or driveway consolidation) should be determined as part of future improvements.
- Poor access management within Paoli has led to a proliferation of individual driveways serving retail parcels throughout the study area. Opportunities to apply access management techniques including, but not limited to, consolidating retail driveways, providing cross access easements, and allowing for shared parking should be considered for the Paoli Road Improvement Feasibility Study, as appropriate, as well as part of other studies and future planning efforts.

Crash History Analysis

As part of the RSA process, crash data was obtained and reviewed in order to identify crash trends, frequencies, contributing factors, and possible countermeasures. A detailed summary of the crash history analysis is provided in the Road Safety Assessment Report, which is included in the Technical Appendices. Figure 6 summarizes five years of crash data within the study area, identifying which areas are the most collision-prone.

As part of the scope of this feasibility study, the four signalized Lancaster Avenue intersections within Willistown Township will be evaluated for improved traffic flow through non-geometric traffic signal optimization. As such, the RSA did not evaluate these intersections; however, reportable crash data was reviewed to identify any apparent safety trends that could be addressed by the scope of this study and signal optimization.
2.2 Traffic Safety Assessment

FIGURE 6
5-Year Crash History
2.4 Environmental Assessment

A preliminary environmental assessment of the existing conditions within the study area was completed as part of this Study. At this time, a Level 2 Environmental Screening was completed and the PennDOT form is included in Appendix C. A summary of the assessment follows:

The results of this Level 2 Screening effort and feasibility study include the identification of:

- potential environmental issues, right-of-way, or utility issues.
- potential range of solutions that might be appropriate, including multi-modal consideration.
- range of costs.
- the level of consistency with the state and regional priorities that enable the sponsor, MPO/RPO and PennDOT to assess the problem, need, or opportunity against other proposals and develop a shortlist of problems/programs to include in the LRTP, or dismiss from further consideration.

The following discussion summarizes potential impacts by the study roadways and intersections for which transportation improvements will be identified.

Potential Impacts to Wild or Stocked Trout Streams

Based on aerial mapping, a review of the Pennsylvania Fish and Boat Commission (PFBC) database, and a review of the 25 PA Code Chapter 93, there are three unnamed tributaries that drain to Little Valley Creek, the closest of which is approximately 1,500 feet north of the Paoli Train Station. The unnamed tributaries were not listed on the PFBC database, but Little Valley Creek is classified as a Naturally Reproducing and a Class A Wild Trout waterway. Crum Creek is not a wild or stocked trout waterway.

Potential Impacts to High Quality/Exceptional Value Streams

Based on aerial mapping and a meeting with Tredyffrin Township engineer, there are no waterways within the immediate project area; however, according to the 25 PA Code Chapter 93, the three unnamed tributaries to Little Valley Creek to the north, approximately 1,500 feet from the Paoli Train Station, are classified as Exceptional Value (EV) waterways and the three unnamed tributaries to Crum Creek to the south, approximately 1,500 feet from the train station, are classified as High Quality (HQ) waterways.

Based on mapping obtained from the Valley Creek Trustee Council, the Central Avenue and North Valley Road intersection area is located within the Valley Creek watershed. The boundary of the watershed is located approximately 700 feet south of the...
intersection. Valley Creek has been designated an Exceptional Value watershed, as well as a Class A Wild Trout Fishery.

According to watershed mapping obtained from the Chester County website, the Lancaster Avenue and Paoli Pike intersection area is located within the Crum Creek watershed. The boundary of the watershed is located approximately 425 feet north of the intersection. Crum Creek has been designated a High Quality watershed.

**Potential Impacts to Wetlands**

Based on a conversation with the Tredyffrin Township engineer and mapping from the National Wetlands Inventory (NWI), no wetlands are located within the project area. The NWI mapping indicated the closest wetland is located approximately 3,000 feet south of the Paoli Train Station, just south of Devon Road in Malvern, PA.

**Potential Impacts to Threatened and Endangered Species**

Based on the review of the Pennsylvania Natural Diversity Inventory (PNDI) provided by the Pennsylvania Natural Heritage Program on July 16, 2013, one potential impact to a sensitive species under the PA Department of Conservation and Natural Resources (DCNR) may exist within the potential project area. No other impacts to Threatened and Endangered Species were identified by the PNDI inquiry.

**Potential Impacts to Historic Properties or Archaeological Resources**

Based on the review of the Cultural Resources Geographic Information System (CRGIS) mapping, both intersections and streetscapes are located within the Tredyffrin Historical District (Key #111921), identified on August 5, 1999. In addition, one eligible, one aggregate, and multiple undetermined properties were also revealed:

**Eligible:**
- Pennsylvania Railroad: Main Line (Philadelphia to Harrisburg); Key #105675

**Aggregate:**
- Philadelphia and Columbia Railroad; Key #156141

**Undetermined:**
- Fourteen (14) properties (see Appendix C)

**Potential Public Controversy on Environmental Grounds**

Based on the scope of work, preliminary plans, the meeting with the Tredyffrin Township engineer, and the majority of the comments received from the public regarding the intersection improvement project, no significant environmental impacts are anticipated; therefore, no public controversy on environmental grounds is anticipated.

**Potential Impacts to Section 4(f) resources**

Based on field reconnaissance, aerial mapping, meeting with Tredyffrin Township engineer, and mapping and planning from DVRPC, it was determined that there are multiple trails located north and east of the Paoli Train Station. Friendship Park and one pedestrian trail is located east of the furthest extent of East Central Avenue, while multiple trails are located north of West Central Avenue, just west of the intersection with Woodbine Avenue.

Also, a discussion with Randy Waltermyer, the Chester County Planning Commission Transportation Planner, revealed a future link to the Chester Valley trail. The Cedar Hollow Road corridor is being studied by Simone Collins Landscape Architecture as the potential link for this purpose. Cedar Hollow Road intersects with West Central Avenue west of where the streetscape improvements begin.

Woodbine Park, a public township park, is located between Keystone Avenue and Woodbine Avenue north of West Central Avenue. A portion of this park is adjacent to the sidewalk along West Central Avenue which will undergo improvements during the potential streetscape improvement.

**Potential Impacts to Designated Scenic River or Water Trail**

Based on a review of the National Park Service “Nationwide Rivers Inventory” maps, the “Pennsylvania Scenic Rivers Inventory,” and the PFBC’s “Pennsylvania Water Trail Guide,” there are no Designated Scenic Rivers or Water Trails in the project area.
2.4 Environmental Assessment

Potential Impacts to Hazardous/Residual Waste Sites
Based on a review of the Pennsylvania Department of Environmental Protection (PADEP) eMapPA and the United States Environmental Protection Agency (USEPA) “Cleanups in My Community,” the following sites may contain Hazardous/Residual Wastes:
- Seven (7) properties (See Appendix C)

Potential Impacts to Regulated Floodplain
Based on review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) and the PADEP eMapPA, the project area is not located within a floodplain.

Potential Impacts to Agricultural Resources
Based on aerial mapping, field reconnaissance, and a meeting with the Tredyffrin Township engineer, there are no agricultural resources located within the project area. A review of the National Department of Agriculture Web Soil Survey indicated that the soils in the potential project area are Urban land.

Potential Impacts to Navigable Waterways
Based on aerial mapping, field reconnaissance, Keystone Canoeing guidebook, and meeting with the Tredyffrin Township engineer, there are no navigable waterways located within the project area.

Potential Impacts to LWCF Lands Under 6(f)
Based on PennDOT MPMS IQ mapping, field reconnaissance and a review of the National Park Service Land and Water Conservation Fund database, no Section 6(f) resources are present within the project area.

Potential Impacts to Stafford Act Properties
Based on PennDOT Multi-modal Project Management System Interactive Query (MPMS IQ) mapping, the project area is not in the vicinity of Stafford Act land.