HRG
Herbert, Rowland & Grubic, Inc.
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GREATER HERSHEY REGIONAL TRANSPORTATION STUDY

DAUPHIN COUNTY, PA

Submitted to:

TRI-COUNTY REGIONAL PLANNING COMMISION
112 Market Street, 2nd Floor
Harrisburg, Pennsylvania 17101-2015

Submitted by:

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PennDOT Connects
Planning with our communities

Borough of Hummelstown

The Township of Derry
Hershey, PA
Where It's Just Sweeter

Londonderry Township

DRAFT

Date: June 16, 2020

GREATER HERSHEY REGIONAL TRANSPORTATION STUDY

DERRY TOWNSHIP, HUMMELSTOWN BOROUGH, AND LONDONDERRY TOWNSHIP, DAUPHIN COUNTY, PENNSYLVANIA

PREPARED FOR:
TOWNSHIP OF DERRY
600 CLEARWATER ROAD
HERSHEY, PENNSYLVANIA 17033

PREPARED BY:
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Tom Mehaffie	PA House
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This study was made possible through the Tri-County Regional Planning Commission HATS transportation and PennDOT Connects Program.

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EXECUTIVE SUMMARY

Background

The Greater Hershey region is poised to experience significant growth and development in the coming years that will undoubtedly impact regional transportation infrastructure. It is important that stakeholders throughout the Greater Hershey region collectively consider and adequately plan for prospective major developments. In an effort to plan for this future growth, Derry Township in collaboration with Hummelstown Borough and Londonderry Township has led the comprehensive transportation study for the Greater Hershey region through the Tri-County Regional Planning Commission HATS transportation and PennDOT Connects Program. The identified goals and objectives are generally consistent with those established by the Harrisburg Area Regional Transportation Study (HATS) Regional Transportation Plan (RTP 2040), including a focus on multi-modal mobility, safety, and Smart Growth.

Throughout the process, meetings were held with major stakeholders within the planning area to identify long-range plans of each stakeholder. The study includes an assessment of these plans and evaluates compatibility and consistency with each other. Additionally, the study identifies necessary transportation improvements in the Greater Hershey region to accommodate projected long-range plans, with consideration to additional development anticipated based on development trends and existing zoning. The goal of this overall planning effort is to help facilitate the implementation of identified improvements in a coordinated, systematic manner and determine improvements to increase transportation connectivity throughout the Greater Hershey region.

The Greater Hershey region, for the purposes of this study, includes Derry Township, Hummelstown Borough and the northern portion of Londonderry Township. This transportation study considers potential improvements to key regional arterials and collectors as well as multimodal interconnectivity between major transportation corridors and key destinations.

Goals and Objectives

Through the stakeholder process, several goals and objectives were identified to improve transportation conditions and mitigate the collective impact of new development. The goals are objectives, which are generally consistent with those identified in the HATS RTP 2040, include the following:

- Develop "complete streets" that facilitate safe and efficient vehicular flow, while also accommodating bicycle and pedestrian needs throughout the study area.
- Create an integrated, multimodal transportation network while targeting Vision Zero initiatives, which has an established goal of zero roadway fatalities.
- Accommodate Smart Growth - maintain acceptable traffic flow and mobility despite significant anticipated development.
- Accommodate pass-through traffic outside of the Hershey Village and downtown corridor and reinforce "destination" within the Hershey downtown.
    - Protect the character within the Hershey Village.
    - Establish and complement the Hershey downtown corridor.
    - Keep traffic on arterials, not on rural, collector roads that were not designed for heavy through traffic.
    - Mitigate the impact of navigation apps.
- Improve mobility on key corridors – Middletown Road, Hersheypark Drive, Route 322.

- Improve connectivity and north-south mobility.
- Provide safe and efficient integration of the area's comprehensive off-road multi-use trail network with commercial/business destinations, residential neighborhoods and on-road bicycle and pedestrian facilities.
- Improve pedestrian mobility between Hummelstown and Derry Township as development closes the spacing between the two municipalities – Main Street, Walton Avenue, Waltonville Road, and Hanover Street.
- Preserve the safety of pedestrians around school campuses – Lower Dauphin Middle and High Schools, Derry Township School complex, Milton Hershey school.

One of the core study goals includes maintaining and re-establishing the Hershey downtown and protecting the character of the Hershey "Village" – the area generally located between Route 322, Route 422 and Homestead Road as detailed in Figure 1. For the purposes of this study, the Hershey Village includes both the Village of Hershey and the Village of Swatara Station. Varying land uses within the Greater Hershey region [Hersheypark, Giant Center, Hershey Foods production facilities and offices, Penn State Health Milton S. Hershey Medical Center (Hershey Medical Center), Milton Hershey School, etc.] contribute significant regional economic benefit while introducing daily and event-related traffic challenges. It is imperative to move traffic safely and efficiently along primary arterials to service these facilities, while minimizing impact to the downtown feel and character of the Hershey Village. As such, the recommendations within the study include enhanced mobility for critical corridors outside of this area with a goal of limiting pass-through traffic within the Hershey downtown and Village areas.

While motor vehicles account for most trips in the region, bicycle and pedestrian mobility is paramount to meet the needs of the community and provide a safe alternate transportation infrastructure. Improved bicycle mobility is a primary goal of this study throughout the Greater Hershey community, and improved pedestrian mobility is of utmost importance within Hummelstown Borough and the Hershey downtown and Village.

Land Use Assumptions

In order to develop future traffic projections for the study area, the growth and development of the study area was projected by determining future land uses. Parcels anticipated to be developed within 20 years were included in the future traffic projections.

Land Use Assumptions were completed with input from each respective municipality. The list of projected developments is provided in Appendix **B**;Map **3** depicts the locations of the parcels projected to be developed. Derry Township anticipates significant growth in the future and has the most parcels with projected development of the three municipalities that cover residential, retail, office, warehousing, and other commercial land uses.

Londonderry Township officials have identified several parcels as candidates for development as residential, retail and warehousing uses and have been included in the study. To note, since the onset of the study, four parcels along Route 230 in Londonderry Township have been identified for potential warehouse development. Two of these parcels were anticipated and included in the traffic projections (Lytle Farms and School Heights Village), though two parcels were not anticipated at the onset of the study and therefore are not included (Saturday's Market and Vision Properties warehouses). Given the size and location of these two developments with proximity to the Greater Hershey region, the additional traffic from these two developments is not anticipated to alter the study area recommendations.

As most parcels in Hummelstown are already developed, minimal future development is anticipated in the Borough. A few parcels were identified to be developed or redeveloped within 20 years by Borough officials encompassing residential and commercial land uses for the purposes of this study.

Transportation Network Assessment

To identify potential traffic flow deficiencies at intersections and roadway segments, the study includes intersection capacity analysis at key intersections in Derry Township and Hummelstown Borough and segment analysis at key segments in Londonderry Township. To account for an anticipated increase in traffic volumes in the study area, traffic forecasting was completed through a three-step model: trip generation, trip distribution, and trip assignment.

Once traffic volumes for the 2028 and 2038 analysis years were established, intersection capacity and segment capacity analyses were completed for the study intersections and segments. The intersection capacity analysis was completed using the procedures outlined in the *6th Edition of the Highway Capacity Manual* as applied by Synchro.

The level of service (LOS) at each intersection was examined to determine if there are projected deficiencies in the 2028 or 2038 analysis years. Based on discussions with the municipalities and the stakeholder and steering committees, acceptable levels of service were established for the study area. If an intersection does not meet the following criteria, the intersection is deemed deficient for study purposes:

- An overall LOS C is to be maintained for key corridors - Middletown Road, Hersheypark Drive, Main Street, Waltonville Road, and the intersections around the Hershey Medical Center on Bullfrog Valley Road, Route 322, Fishburn Road, and Sandhill Road.
- Approaches to intersections must not be failing (LOS F or a volume to capacity (V/C) ratio greater than 1).
- Otherwise an overall LOS D is to be maintained.

In addition to the roadway capacity analyses, the overall connectivity and bicycle/pedestrian mobility was evaluated. Based on community and stakeholder input, multiple new connections are recommended to integrate the transportation network.

Recommendations

Intersection and Corridor Improvements

To mitigate the projected traffic deficiencies and improve multimodal connectivity, roadway improvements are recommended to maintain the prescribed acceptable levels of service throughout the study area. However, due to emerging transportation technologies and unknown long range regional transportation planning, there are several caveats that could affect these recommendations. These include:

- Mobile navigation applications
- Autonomous vehicles
- I-81 to PA Turnpike connection (East of Hershey)
- Significant variations from future land use assumptions

The following roadway improvements indicated in the following table are recommended:

Recommended Transportation Improvements					
Project Number	**Location**	**Time Span**	**Improvements**	**Total Estimated Improvement Cost (2020 Dollars)**	**Anticipated Funding Sources**
Middletown Road Corridor					
Long-Term Improvement: Widen Middletown Road to provide an additional northbound and an additional southbound through lane from the SR 283 interchange to the SR 322 Eastbound Off Ramp. *					**TIP**
I-1-M	**Intersection 1: SR 2003 (Middletown Rd) & Route 322 EB Off Ramp/Service Rd**	**MID**	Widen the Route 322 Off Ramp to the south to provide an eastbound right turn lane. Widen Service Road to the south to provide a westbound left turn lane. Add sidewalk along Middletown Road (See Project P-18-L)	**$800K to $1.2M**	**CFA or PennDOT MTF, Developer**
I-2-S	**Intersection 2: SR 2003 (Middletown Rd) & Wood Rd**	**SHORT**	Convert Wood Road approach to right-in/right-out only upon construction of new connector roadway to Waltonville Road.	**$150K to $220K**	**Municipal, Developer**
I-3-L	**Intersection 3: SR 2003 (Middletown Rd) & Deer Run Dr/Stoverdale Rd**	**LONG**	Widen Middletown Road from 1050' south to 1000' north of Deer Run Dr/Stoverdale Road to provide an additional northbound and an additional southbound through lane; this will provide a 5-lane typical section including a center left turn lane.	**$2.4M to $3.6M**	**TIP**
I-4-L	**Intersection 4: SR 2003 (Middletown Rd) & Locust Ln/Kaylor Rd**	**LONG**	Widen Middletown Road from 3500' south to 1050' north of Locust Lane/Kaylor Road to provide an additional northbound and an additional southbound through lane; this will provide a 5-lane typical section including a center left turn lane from.	**$4.9M to $7.3M**	**TIP**
I-35-S	**Intersection 35: SR 2003 (Middletown Rd) & Proposed Connector Rd (Includes construction of Connector Road)**	**SHORT**	Construct connector road to improve east-west flow from Middletown Road to Hershey Medical Center. Install a traffic signal. Construct a westbound left turn lane and a northbound right turn lane. Restripe the two-way left turn lane to provide a southbound left turn lane. Widen for additional NBT and SBT lanes additional through lanes; this will provide a 5-lane typical section on Middletown Road including a center left turn lane.	**$3.8M to $5.7M**	**Municipal, Developer, CFA & PennDOT MTF**
I-35-M		**MID**	Widen Middletown Road to a Four lane section between the Route 322 EB Off Ramp and the southern Gramercy Place intersection. The second northbound through lane will terminate in the north at the NBR turn lane onto the Service Road. The widening to the south will terminate at the southbound right turn lane onto Deer Run until the rest of Middletown Road is widened toward S.R. 283.	**$5.3M to $7.9M**	**TIP**
P-18-L	**Middletown Road**	**LONG**	Construct sidewalk from Grove Street to Willow Street. Extend to southern Gramercy Place intersection (this portion should be done concurrently with land development effort and is not included in cost).	**$400k to $500k**	**DCNR Trail, TA Set-Aside, CFA & PennDOT MTF, Municipal, Developer, CMAQ**
P-28-L	**Middletown Road**	**LONG**	Construct sidewalk from the Proposed Connector Road to Grove Street.	**$179k to $268k**	**Developer**
P-19-S	**East of Middletown Road**	**SHORT**	Construct an off-alignment shared use path between the Middletown Road & Gramercy Place/Proposed Connector Road intersection to the existing trail south of Grove Street.	**$250k to $350k**	**Municipal, Developer, CMAQ**
P-20-M	**Middletown Road Corridor**	**MID**	Provide bike lanes on the Middletown Road Corridor.	**$125K to $175K**	**Municipal, TA-Set-Aside, CMAQ**

Recommended Transportation Improvements (continued)					
Project Number	**Location**	**Time Span**	**Improvements**	**Total Estimated Improvement Cost (2020 Dollars)**	**Anticipated Funding Sources**
Waltonville Road/Bullfrog Valley Road Corridors					
I-7-M	**Intersection 7: Bullfrog Valley Rd & Wood Rd**	**MID**	Widen Bullfrog Valley Road to construct a southbound right turn lane.	**$120K to $180K**	**Municipal, Developer, DCIB, ARLE**
I-8-M	**Intersection 8: Bullfrog Valley Rd & Research Blvd / Life Lion Dr**	**MID**	Widen Life Lion Drive to construct a westbound right turn lane. Implement protected/permitted left turn phasing for all approaches.	**$310K to $460K**	**Developer, ARLE**
I-36-L	**Intersection 36: SR 2005 (Waltonville Rd) & Hershey West End Driveway / Service Rd**	**LONG**	Construct a southbound right slip lane. Additional northbound through lane through roundabout	**Developer Funded**	
P-7-S	**Quarry Road from Division Street to the Route 322 bridge.**	**SHORT**	Construct sidewalk on the west side of Quarry Road from Division Street to the Route 322 bridge. This will likely require grading and walls to make the connection from the existing sidewalk at Division Street to the existing sidewalk across the bridge.	**$400K to $500K**	**DCNR Trail, TA Set-Aside, Municipal, Developer**
P-8-S	**Waltonville Road from Hershey West End Roundabout to the Route 322 bridge.**	**SHORT**	Construct a shared use path on the west side of Waltonville Road from the proposed Hershey West End Roundabout to the bridge over Route 322.	**$50K to $70K**	**Developer**
Hersheypark Drive Corridor					
Long-Term Improvement: Widen to 6 through lanes between Walton Avenue and Laudermilch Rd. Provide designated bike lanes between Walton Avenue and North Lingle Avenue. Coordinate the traffic signals on the Hersheypark Corridor from Walton Avenue / Mae St to N. Lingle Avenue. Adaptive signals should be considered along the corridor and the technology should be monitored as there are improvements in the field to determine its viability.*					**GLG, TIP, TA-Set-Aside, DCIB, Municipal**
Route 322/Route 422/ Hersheypark Drive Interchange		**LONG**	Reconstruct and reconfigure the 422/322 interchange to make Hersheypark Drive the through movement from Route 322 to redirect through traffic away from downtown Hershey and the Village.	**$50M to $60M**	**TIP**
I-9-M	**Intersection 9: Walton Ave & E Main St/Driveway**	**MID**	Widen Walton Ave to the north to provide a second receiving lane for the dual northbound left turn lanes on Hersheypark Drive (two WB lanes at intersection, a left turn lane onto E. Main Street, and a through/right lane). The Bob Evans driveway will be relocated to the north leg of the intersection.	**See Intersection 10**	
I-10-S	**Intersection 10: Route 39 (W Hersheypark Drive) & Walton Ave/ Mae St**	**SHORT**	Adjust the signal timings based on new traffic counts.	**-**	**-**
I-10-M		**MID**	Widen Walton Avenue to the north to provide an additional lane between Hersheypark Drive and Main Street. This will yield a six-lane section; one westbound left turn lane, one westbound shared through-right lane, two eastbound left turn lanes, one eastbound through lane and an eastbound right turn lane.Widen Mae Street to provide dual westbound left turn lanes.Widen Hersheypark Drive in order to provide dual northbound left turn lanes and a northbound right turn lane.	**$3.7M to $5.5M**	**Developer, CFA or PennDOT MTF, DCIB**
I-10-L		**LONG**	Implement southbound right overlap phasing. Widen Hersheypark Drive from 900’ south to 2800’ north to provide an additional northbound and southbound through lane.	**$5.0M to $7.5M**	**TIP**

Recommended Transportation Improvements (continued)					
Project Number	**Location**	**Time Span**	**Improvements**	**Total Estimated Improvement Cost (2020 Dollars)**	**Anticipated Funding Sources**
I-11-M	**Intersection 11: Route 39 (W Hersheypark Drive)/W Hersheypark Drive & Route 39 (Hershey Rd)/Park Blvd**	**MID**	Widen Route 39 (Hershey Rd) to provide dual southbound left turn lanes.	**$600K to $900K**	**Developer, CFA or PennDOT MTF, DCIB, ARLE**
I-11-L		**LONG**	Widen Hersheypark Drive from 2800' west to 1850' east to providing an additional eastbound and westbound through lane; this will provide a six-lane section. Coordinate signal with Hersheypark Drive corridor.	**$7.8M to $11.7M**	**TIP**
I-12-M	**Intersection 12: Hersheypark Drive & Park Ave/Sand Beach Road**	**MID**	Widen Park Ave to provide dual northbound left turn lanes.	**$370K to $1.0M**	**Developer, CFA or PennDOT MTF, DCIB**
			Widen Hersheypark Drive to the south to provide an additional eastbound through lane and a merge lane.	**$2.6M to $4.4M**	**TIP**
I-12-L		**LONG**	Widen Sand Beach Road to provide a southbound right turn lane.	**$144K to $215K**	**Developer**
			Widen Hersheypark Drive from 1600' west to 1500' east to the north to provide an additional westbound through lane; this will provide a total of six through lanes. Coordinate signal with Hersheypark Drive corridor.	**$2.9M to $4.4M**	**TIP, GLG**
I-13-M	**Intersection 13: E Hersheypark Dr & Laudermilch Rd**	**MID**	Widen Hersheypark Drive to the south to provide dual eastbound left turn lanes. Widen Laudermilch Road to provide a merge lane.	**$900K to $1.4M**	**-**
I-13-L		**LONG**	Widen Hersheypark Drive from 2150' west of Laudermilch Road to the intersection to provide a 6-lane section west of the intersection. East of the intersection will still be a 4-lane section on Hersheypark Drive. Coordinate signal with Hersheypark Drive corridor.	**$2.0M to $3.0M**	**TIP**
I-14-L	**Intersection 14: E Hersheypark Dr & N Lingle Ave**	**LONG**	Reconfigure the intersection so the eastbound (Hersheypark Drive) and northbound (N. Lingle Avenue) approaches become the through movement. The southbound approach is re-aligned to make a T-intersection. The existing westbound approach is re-aligned to create a new intersection to the north. Coordinate signal with Hersheypark Drive corridor.	**$3.1M to $4.7M**	**CFA or PennDOT MTF, GLG, Municipal, DCIB**
P-9-S	**Walton Avenue near Allison Drive**	**SHORT**	Construct sidewalk on the north side of Walton Avenue to fill in a 500-foot gap of sidewalk along the roadway.	**$50K to $80K**	**DCNR Trail, TA Set-Aside, Municipal, Developer**
P-10-L	**Route 39 (Hershey Road)**	**LONG**	Install bike lanes on Hershey Road from Hersheypark Drive to the Derry Township line. Widening the existing bridge over Swatara Creek is recommended when the bridge is to be replaced in order to accommodate the bike lanes.	**See Intersection 11**	
P-21-M	**Hersheypark Drive Corridor**	**MID**	Provide bike lanes on the Hersheypark Drive Corridor. Widen Hersheypark Drive at intersections with right turn lanes and rebuild channelizing islands as required to provide sufficient width for the bike lanes.	**$692K to $1.0M**	**Municipal, TA-Set-Aside, CMAQ, HATS RTP**
P-26-S	**Northwest Drive near Hersheypark Drive**	**SHORT**	Construct sidewalk along the west side of Northeast Drive from the shopping plaza driveway to Hersheypark Drive.	**$42K to $64K**	**Municipal, TA-Set-Aside, CMAQ, HATS RTP**
P-28-M	**Hersheypark Drive Corridor**	**MID**	Evaluate roadway lighting along Hersheypark Drive and install light fixtures to bring the roadway, including crosswalks and future bike lanes, up to standards if deficiencies are found.	**$2.5M to $3.8M**	**Municipal, CFA or PenNDOT MTF, TA Set-Aside**

Recommended Transportation Improvements (continued)					
Project Number	**Location**	**Time Span**	**Improvements**	**Total Estimated Improvement Cost (2020 Dollars)**	**Anticipated Funding Sources**
S.R. 743 Corridor					
I-15-M	**Intersection 15: Park Ave & E. Derry Rd**	**MID**	Signalize after diverting Northeast Drive traffic to E. Derry Road by constructing a connector between E. Derry Road and Northeast Drive.	**$360K to $530K**	**Developer, CFA or PennDOT MTF, DCIB**
I-31-S	**Intersection 31: Route 743 (Fishburn Rd) & Cocoa Ave**	**SHORT**	Allow northbound right turns on red.	**$2K to $3K**	**Municipal**
I-31-L		**LONG**	Widen Fishburn Road to provide a northbound right turn lane.	**$300K to $400K**	**Developer, Municipal, DCIB**
P-4-M	**Route 743 near Giant Shopping Center**	**MID**	Provide a pedestrian connection across SR 743 to the Giant shopping center by either making an agreement with the property owner to use the existing driveway bridge or construct a new culvert across the stream. Then install a pedestrian and bike crossing to access the existing sidewalk on the west side of SR 743.	**$270K to $400K**	**DCNR Trail, TA Set-Aside, Municipal, Developer**
P-6-M	**Route 743 & Valley Road**	**MID**	Provide a pedestrian connection between the Village and the existing trail in the Hershey School campus across from Valley Road. Currently, the trail ends at a stream that runs parallel to SR 743. Negotiations with business may be possible to allow a connection using the existing driveway, rather than constructing a new culvert.	**$260K to $390K**	**DCNR Trail, TA Set-Aside, GTRP, Municipal, Developer, CMAQ, HATS RTP**
P-14-S	**Route 743 and Hartley Road**	**SHORT**	Enhance the pedestrian crossing at the intersection with flashing lights or illuminated signs.	**$50K to $80K**	**DCNR Trail, TA Set-Aside, Municipal, CMAQ, HATS RTP**
P-25-M	**Route 743 near Almond Drive**	**MID**	Provide sidewalk from Almond Drive to the existing sidewalk along Santander Bank.	**$20K to $30K**	**TA Set-Aside, Municipal, CMAQ, HATS RTP**
Chocolate Avenue (Route 422) Corridor & Hershey Village					
S-3-L	**Chocolate Avenue Corridor**	**LONG**	Designate Hersheypark Drive and N. Lingle Ave as Route 422 from the interchange in the west to the intersection of N. Lingle and E. Chocolate in the east. West Chocolate Ave to East Chocolate Ave would be designated as “Business 422”. This should coincide with the reconfiguration of the Route 322/Route 422/Hersheypark Drive interchange.	**-**	**-**
S-4-L	**N. Hockersville Road**	**LONG**	Realigning N. Hockersville Road to remove the S-curve near the old sewage treatment plant south of Hersheypark Drive. This would provide a better road that meets design criteria to create a more functional north-south link, particularly with the possible roundabout at the intersection of SR 422 and Old West Chocolate.	**-**	**-**
I-17-M	**Intersection 17: Route 422 (W. Chocolate Ave) & University Ave**	**MID**	Widen University Drive to provide dual northbound left turn lanes and a channelized northbound right turn lane.	**$670K to $1.0M**	**Developer**

Recommended Transportation Improvements (continued)					
Project Number	**Location**	**Time Span**	**Improvements**	**Total Estimated Improvement Cost (2020 Dollars)**	**Anticipated Funding Sources**
I-19-M	**Intersection 19: Route 422 (E. Chocolate Ave) & Homestead Rd**	**MID**	Widen Homestead Rd for a northbound right turn lane with an overlapping right turn signal phase. Alternately, a roundabout could be feasible at this intersection and may be installed at developer/property owner expense. Due to the anticipated funding, the costs included in this table only include traditional widening for the right turn lane and signalized intersection.	**$140K to $210K**	**Developer, CFA or PennDOT MTF, DCIB**
I-22-M	**Intersection 22: Hockersville Road and W Areba Avenue**	**MID**	Construct a traffic signal. Additionally, geometric improvements are necessary to provide sufficient stopping sight distance along the crest vertical curve on Hockersville Rd, north of Areba Avenue.	**$1.2M to $1.8M**	**CFA or PennDOT MTF, DCIB**
I-38-S	**Intersection 38: Route 422 (W. Chocolate Ave) & Old West Chocolate Ave**	**SHORT**	Convert the W. Chocolate Avenue and Old West Chocolate Avenue intersection into a single-lane roundabout.	**$1.5M to 2.5M**	**CFA or PennDOT MTF, GLG, Developer, DCIB**
I-39-M	**Homestead & Areba Ave/Java Ave**	**MID**	Reconfigure the intersection of Java Ave, Areba Ave, & Homestead Road such that Java Ave is not used to access Homestead Road. This can be accomplished by extending Caracas Ave to intersect with Homestead Road. Two alternatives are proposed to improve Java Ave: o Make Java Ave one-way with traffic flowing toward Caracas Ave. o Remove Java Ave and replace with green space, multi-use trail and add parking along Homestead Road.	**$390K to $770K**	**Municipal, CFA or PennDOT MTF**
P-1-S	**Route 422 and Route 743 Intersection**	**SHORT**	Install green backed shared lane markers along each approach.	**$1.0K to $1.5K**	**Municipal, TA Set-Aside**
P-2-S	**Route 422 between Mill Road and Orchard Road**	**SHORT**	Add shared lane markings along SR 422 eastbound to alert motorists of potential cyclists and delineate a path for cyclists through the merge point.	**$1.0K to $1.5K**	**Municipal, TA Set-Aside**
P-3-M	**Route 422 and Lucy Avenue**	**MID**	To increase pedestrian connections across SR 422, remove the concrete islands at intersection of Lucy Ave and SR 422 and install a traffic signal with pedestrian crosswalks. This would allow for a pedestrian route to connect from Mae St and Hummelstown into the south half of Derry Township.	**$370K to $550K**	**Developer, DCIB, CFA or PennDOT MTF, TA Set-Aside, CMAQ, HATS RTP**
P-11-L	**Old West Chocolate Avenue**	**LONG**	Enhance tunnel lighting through the underpass to make the tunnel safer for pedestrians and cyclists. Extend sidewalk to Swatara Avenue.	**$350K to $500K**	**CFA or PennDOT MTF, DCIB**
P-12-M	**Intersection 21: Route 422 (E. Chocolate Ave) & N. Lingle Ave/S. Lingle Ave**	**MID**	Install video or radar stop bar detection at the intersection as the loop detectors do not detect cyclists. This would help prevent cyclists from crossing SR 422 on red due to an inoperable traffic signal that is not detecting them at the stop bar. Install shared lane markings along SR 422 at the intersection. Install an R4-4 “Right Turn Lane Yield to Bikes” sign at the taper of the westbound right turn lane to alert potential motorists of the conflict point.	**$30K to $40K**	**GLG, Municipal**
P-13-S	**Route 422 and Valley Road**	**SHORT**	Enhance the pedestrian crossing at the intersection with flashing lights or illuminated signs.	**$50K to $80K**	**Municipal**
P-15-S	**Areba Ave**	**SHORT**	Establish a bike route on Areba Ave by installing sharrows.	**$1.0K to $1.5K**	**Municipal or TA Set-Aside**
P-16-S	**Elm Ave**	**SHORT**	Add marked crosswalks across Elm Ave. Consider traffic calming measures, such as speed humps, pending a formal traffic calming evaluation.	**$10K to $15K**	**Municipal**

Recommended Transportation Improvements (continued)					
Project Number	**Location**	**Time Span**	**Improvements**	**Total Estimated Improvement Cost (2020 Dollars)**	**Anticipated Funding Sources**
P-17-S	**E. Derry Road**	**SHORT**	Construct sidewalk on E. Derry Road from W. Mansion to the existing sidewalk on E. Derry Road. Extend the sidewalk to Northeast Drive (anticipated to be completed through land development and costs for this portion are not included).	**$17K to $27K**	**Developer, TA Set-Aside, CFA or PennDOT MTF, DCNR Trails, DCIB, CMAQ, HATS RTP**
Governor Road Corridor & Hershey Medical Center Area					
Immediate Improvement Need: Widen to 5 lanes and bike lanes from Cherry Drive to Route 743; Long-term Improvement Need: Widen to 5 lanes and bike lanes from University Drive to Homestead Drive. *					
I-23-M	**Intersection 23: Route 322 (W Governor Rd) & University Dr**	**MID**	Construct an eastbound right turn lane and remove the lane drop to provide an additional eastbound through lane. Widen Governor Road 900’ to the east to provide an additional eastbound receiving lane.	**$1.1M to $1.7M**	**TIP, Developer**
I-23-L		**LONG**	Widen Governor Road 500’ to the west to provide an additional westbound through lane. Construct sidewalk on the north side of SR 322.	**$1.7M to $2.6M**	**TIP, Developer**
I-24-M	**Intersection 24: Route 322 (W Governor Rd) & Centerview Dr**	**MID**	Convert NB approach from a shared left/through lane and a right turn lane to a left turn lane and a shared through/right lane.	**$80K to $120K**	**Developer, ARLE**
I-24-L		**LONG**	Widen Governor Road from about 450’ west to 1700’ east (Beech Ave) to provide additional eastbound and westbound through lanes to provide a 5-lane section including a center left turn lane. The center left turn lane is proposed continuously between Centerview Dr and Cherry Dr. Widen the northbound approach of Centerview Drive to provide an exclusive right turn lane. This will result in a four lane section on Centerview Drive (three northbound lanes and one southbound lane). Construct sidewalk on the north side of SR 322.	**$3.7M to $5.6M**	**TIP, Developer** **Sidewalk: DCNR Trail Grant, TA Set-Aside**
I-25-S	**Intersection 25: Route 322 (W Governor Rd) & Cherry Dr**	**SHORT**	Provide a connection between the crosswalk and the existing trail. This would tie in the trail west of Cherry Drive with the trail along Governor Road east of Cherry Drive. Construct sidewalk on the north side of SR 322.	**$3.6M to $5.3M**	**TIP, Developer**
I-25-M		**MID**	Widen Governor Road from about 1700’ west (Beech Ave) to 525’ east to provide additional eastbound and westbound through lanes to provide a 5-lane section including a center left turn lane. The center left turn lane is proposed continuously between Centerview Dr and Cherry Dr.	**$5.0K to $8.0K**	**DCNR Trail Grant, TA Set-Aside**
I-26-M	**Intersection 26: Route 322 (W Governor Rd) & Fishburn Rd/Hockersville Rd**	**MID**	Widen Governor Road from about 450’ west to 1300’ east (Glen Rd) to provide additional eastbound and westbound through lanes to provide a 5-lane section including a center left turn lane. The Brownstone Building on the southeast quadrant of the intersection should be relocated to the rear end of the lot to provide sufficient room for the proposed widening, bicycle lane, and sidewalk.	**$3.1M to $4.6M**	**TIP, Developer**
I-26-L		**LONG**	Widen Hockersville for an exclusive southbound right turn lane. Modify the traffic signal to include right turn overlaps for all right turn lanes.	**$300K to $450K**	**Developer, CFA or PennDOT MTF, DCIB, ARLE**
I-28-M	**Intersection 28: Fishburn Rd & Sand Hill Rd**	**SHORT**	Relocate Sand Hill Road to incorporate Hope Drive Extension. Install exclusive eastbound left and right turn lanes. Widen Fishburn Road to install a northbound left turn lane and a southbound right turn lane. Construct trail along Hope Drive Extension and Fishburn Road.	**$3.3M to $5.0M**	**CFA or PennDOT MTF, Gaming Grant, Developer**
I-29-M	**Intersection 29: Route 322 (W Governor Rd/E Governor Rd) & Route 743 (Cocoa Ave)**	**MID**	Widen Governor Road from 900’ west (Glen Rd) to 1250’ east to provide an additional eastbound & westbound through lane to provide a 5-lane section including a center left turn lane.	**$ 3.5M to $5.2M**	**TIP, Developer**

Recommended Transportation Improvements (continued)					
Project Number	**Location**	**Time Span**	**Improvements**	**Total Estimated Improvement Cost (2020 Dollars)**	**Anticipated Funding Sources**
I-30-M	**Intersection 30: Route 322 (E Governor Rd) & Homestead Rd**	**MID**	Widen Governor Road from 1250' west to 700' east to provide an additional eastbound & westbound through lane to provide a 5-lane section including a center left turn lane.	**$3.1M to $4.7M**	**TIP, Developer**
I-37-M	**Intersection 37: Hope Dr & Cherry Dr**	**MID**	Change eastbound approach from a shared left/through lane and a right turn lane to a left turn lane and a shared through/right lane with protected/permitted phasing.	**See Intersection 28**	
P-5-L	**Fishburn Road between the Giant Shopping Center and Governor Road**	**MID**	Continue the sidewalk along Fishburn Road between the Giant shopping center and Governor Road.	**$300K to $450K**	**DCNR Trail, TA Set-Aside, Developer, CFA or PennDOT MTF, DCIB, Municipal, CMAQ, HATS RTP**
P-22-M	**Governor Road Corridor**	**SHORT**	Provide bike lanes on the Governor Road Corridor.	**$147K to $221K**	**Municipal, TA Set-Aside, CMAQ, HATS RTP**
P-29-M	**Governor Road Corridor**	**MID**	Evaluate roadway lighting along Governor Road and install light fixtures to bring the roadway, including crosswalks and future bike lanes, up to standards if deficiencies are found.	**$1.1M to $1.7M**	**Municipal, CFA or PenNDOT MTF, TA Set-Aside**
Hummelstown (Main Street) Corridor					
I-33-L	**Intersection 33: Main St & Hanover St**	**LONG**	Widen Hanover St two feet and remove the parking lane to provide an exclusive northbound right turn lane.	**$180K to $270K**	**ARLE, DCIB, Municipal**
I-34-M	**Intersection 34: Main St & Quarry Rd**	**MID**	Install a traffic signal.	**$370K to $560K**	**DCIB, Municipal**
P-24-M	**E Main St**	**MID**	Construct sidewalk on the northern side of E. Main St to provide a pedestrian connection between Main St and the shopping center. This would also provide better connectivity with Lower Dauphin Middle School.	**$110K to $175K**	**Municipal**
Londonderry Township					
Capacity analyses indicate the roadways adequately accommodate daily traffic. Improving primary Hershey access routes should deter the use of these roadways for event traffic.					
S-9	**Schoolhouse Road**	**N/A**	None	**-**	**-**
S-10	**Roundtop Road**	**N/A**	None	**-**	**-**
S-11	**Colebrook Road**	**N/A**	None	**-**	**-**
Future Considerations					
Monitor development of key parcels with respect to land use projections within the Study.					
Evaluate legislation or other methods of addressing the re-routing of traffic based on navigation apps.					
For future transportation and maintenance projects, replace non-bicycle safe inlet grates with bicycle safe inlet grates.					
Sidewalk should be added where possible as roadway widening projects are completed to help increase pedestrian connectivity.					
Potential bicycle facilities should be considered during the preliminary stages of the project.					

Recommended Transportation Improvements (continued)					
Project Number	**Location**	**Time Span**	**Improvements**	**Total Estimated Improvement Cost (2020 Dollars)**	**Anticipated Funding Sources**
Green backed bicycle markings are under interim approval by the FHWA. Prior to implementation, verify if they area still under interim approval.					
Consider future north-south roadway and bicycle/pedestrian connections in the region.					

* Cost of corridor widening has been divided halfway between each study intersection.

Legend:

Project No. Codification = Type of Improvement-Number-Term
Type of Improvement - Intersection (I), Segment (S), or Pedestrian/Bike (P)
Term - Short (S), Mid (M), or Long (L) term

Funding Abbreviations:

CFA = Commonwealth Financing Authority, MTF = Multimodal Transportation Fund, DCIB = Dauphin County Infrastructure Bank, GLG = Green Light Go, ARLE = Automated Red Light Enforcement Grant, Municipal = Municipal Funding, GTRP = Greenways, Tails & Recreation Program, TA - Transportation Alternatives; TIP = Transportation Improvement Program; CMAQ = Congestion Mitigatino and Air Quality Improvement Program; HATS RTP = HATS RTP Implementation Program

Note: Due to emerging transportation technologies and unknown long range regional transportation planning, there are several caveats that could affect these recommendations. These include, but are not limited to:

- Evolving navigation applications
- Autonomous vehicles
- Potential I-81 to Route 283 and PA Turnpike connection
- Significant variations for future land use assumptions

INTRODUCTION

The Greater Hershey region is poised to experience significant growth and development in the coming years that will undoubtedly impact regional transportation infrastructure. It is important that stakeholders throughout the Greater Hershey region collectively consider and adequately plan for prospective major developments. In an effort to plan for this future growth, Derry Township in collaboration with Hummelstown Borough and Londonderry Township has led the comprehensive transportation study for the Greater Hershey region through the Tri-County Regional Planning Commission HATS transportation and PennDOT Connects Program.

Throughout the process, meetings were held with major stakeholders within the planning area to identify long-range plans of each stakeholder. The study includes an assessment of these plans and evaluates compatibility and consistency with each other. Additionally, the study identifies necessary transportation improvements in the Greater Hershey region to accommodate projected long-range plans, with consideration to additional development anticipated based on development trends and existing zoning. The goal of this overall planning effort is to help facilitate the implementation of identified improvements in a coordinated, systematic manner and determine improvements to increase transportation connectivity throughout the Greater Hershey region.

The Greater Hershey region study area includes Derry Township, Hummelstown Borough and the northern portion of Londonderry Township. This transportation study considers potential improvements to key regional arterials and collectors as well as multimodal interconnectivity between major transportation corridors and key destinations.

Goals and Objectives

Through the stakeholder process, the following goals and objectives have been identified –

- Develop "complete streets" that facilitate safe and efficient vehicular flow, while also accommodating bicycle and pedestrian needs throughout the study area.
- Maintain acceptable traffic flow and mobility considering significant anticipated development.
- Accommodate pass-through traffic outside of Hershey Village and downtown corridor.
    - Protect the character within Hershey Village.
    - Establish and complement the Hershey downtown corridor.
    - Keep traffic on arterials, not on rural, collector roads that were not designed for heavy through traffic.
    - Mitigate the impact of navigation apps.
- Improve mobility on key corridors – Middletown Road, Hersheypark Drive, Route 322.
- Improve connectivity and north-south mobility.
- Provide safe and efficient integration of the area's comprehensive off-road multi-use trail network with commercial/business destinations, residential neighborhoods and on-road bicycle and pedestrian facilities.
- Improve pedestrian mobility between Hummelstown and Derry Township as development closes the spacing between the two municipalities – Main Street, Waltonville Road and Hanover Street.
- Preserve the safety of pedestrians around school campuses – Lower Dauphin Middle and High Schools, Derry Township School complex, Milton Hershey school.

One of the core study goals includes maintaining and re-establishing the Hershey downtown and protecting the character of the "Village" – the area generally located between Route 322, Route 422 and Homestead Road. For the purposes of this study, the Village includes both the Village of Hershey and the Village of Swatara Station. Varying land uses within the Greater Hershey region [Hersheypark, Giant Center, Hershey Foods production facilities and offices, Penn State Health Milton S. Hershey Medical Center (also known as the Hershey Medical Center), Milton Hershey School, etc.] contribute significant regional economic benefit while introducing daily and event-related traffic challenges. It is imperative to move traffic safely and efficiently along primary arterials to service these facilities, while minimizing impact to the downtown feel and character of the Hershey Village. As such, the recommendations within the study include enhanced mobility for critical corridors with a goal of limiting pass-through traffic within the Hershey downtown and Village areas.

To identify potential traffic flow deficiencies at intersections and roadway segments, the study includes intersection capacity analysis at key intersections in Derry Township and Hummelstown Borough and segment analysis at key segments in Londonderry Township. To account for an anticipated increase in traffic volumes in the study area, traffic forecasting was completed through a three step model: trip generation, trip distribution, and trip assignment. Roadway improvements at the study intersections proposed in this study are based on maintaining acceptable level of service with the forecasted increase in traffic volumes.

While motor vehicles account for most trips in the region, bicycle and pedestrian mobility is paramount to meet the needs of the community and provide a safe and walkable transportation infrastructure. Improved bicycle mobility is a primary goal of this study throughout the Greater Hershey community, and improved pedestrian mobility is of utmost importance with Hummelstown Borough and the Hershey downtown and Village. Accordingly, the study includes an evaluation of the area's pedestrian and bicycle facilities to identify enhancement opportunities. Vehicles, bicycles, pedestrians, and public transportation were all considered to provide a comprehensive analysis for the region.

EXISTING CONDITIONS

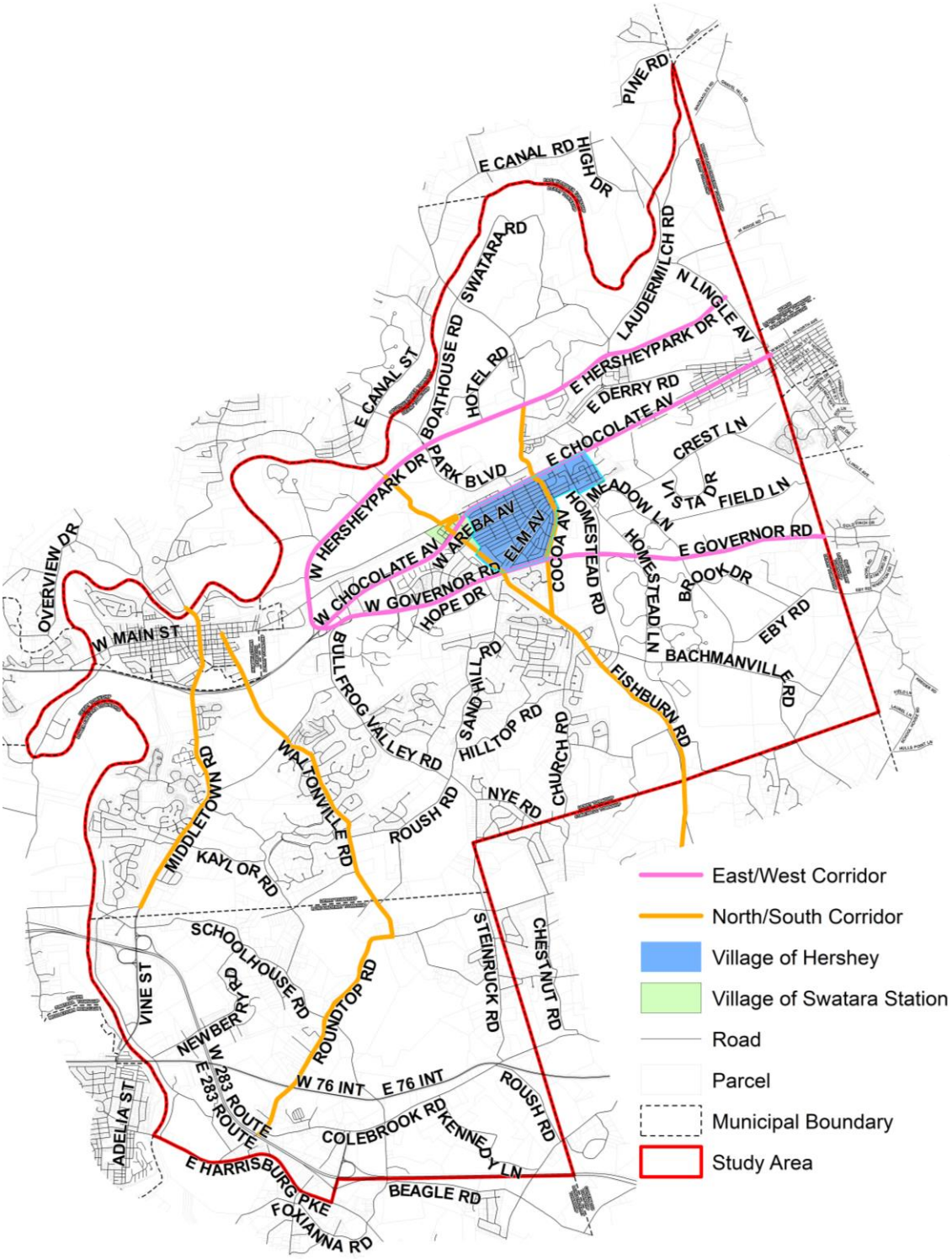
Vehicular Traffic Configuration

Eleven (11) corridors in the region were identified in the scoping process as key corridors to review the characteristics of the roadway, including bicycle and pedestrian facilities, to help identify where facilities are lacking and which roadways are more feasible for improvements. A summary of the existing conditions of these key corridors is provided in Table 1 below:

Table 1. Key Corridors - Existing Conditions

Number	Road Name	Extents	Lane Width	Shoulder Width	ADT (vehicles per day)	Truck %	Speed Limit (mph)	Functional Classification	Sidewalk(s)	On-street Parking
1	**Hanover St (SR 2003)**	**Main St to RT 322**	Main St to Parkside - 11' Parkside to 322 - 12'	Main St to Parkside - None Parkside to RT 322 - Varies 0'-6'	8189	5	25	Minor Arterial	Main St to Parkside Ave	Main St to Poplar
2	**Quarry Rd (SR 2005)**	**Main ST to RT 322**	11'	Main St to Division St - 2' (One Side) Division St to RT 322 - 6'	Main St to Division St - 3440 Division St to RT 322 - 4136	5	RT 322 to Division St (NB) - 30 Division St to Main St (NB) - 25 Poplar to RT 322 (SB) - 30	Urban Collector	Main St to Division St	None
3	**Middletown Rd (SR 2003)**	**RT 322 to Swatara Creek Rd**	11.5'	9' LT | 8' RT	14828	9	RT 322 to Swatara Creek Road - 35 Swatara Creek Road to Swatara Creek - 40	Minor Arterial	Intermittent including adjacent trail	None
4	**Waltonville Rd (SR 2005)**	**RT 322 to Roundtop Rd**	RT 322 to Randall - 10' Randall to Landvater - 10.5' and 21' Landvater to Roundtop - 10.5'	RT 322 to Randall - 5' Randall to Landvater - Varies One Side 0'-10' Landvater to Roundtop - Typically 0'-2'	RT 322 to Wood Rd - 5687 Wood Rd to Roush Rd - 2875 Roush Rd to Roundtop Rd - 1644	5	RT 322 to Deerfield Dr - 35 Deerfield Dr to Roundtop Rd - 40	Urban Collector	Between Quail Hollow and Spring Hill Dr Off Road Trail Adjacent to Waltonville Wood Road to Mid-Block Crossing	Possible Parking South of Randall
5	**RT 422**	**RT 322 to Orchard Rd**	11'-12' Lanes	9.5'	21,500	4	RT 322 to Mill Rd - 50 Mill Rd to Orchard - 35	Principal Arterial	Hillcrest Rd to Orchard Rd	Proposed Hillcrest to Orchard
6	**RT 422**	**Orchard Rd to Township Line**	Orchard to Linden Rd - 15' Linden Rd to Derry Twp Line - 11'-12'	Orchard to E. Mansion Rd. - None E. Mansion Rd. to 1500' East - 3' 1500' East of E. Mansion Rd to E. Derry - 8' E. Derry to Derry Twp Line - None	Orchard to Cocoa Ave - 21,539 Cocoa to E. Derry Rd - 15,312 E. Derry Rd to Derry Township Line - 24,807	4	Orchard to Homestead - 25 Homestead to Township Line - 35	Principal Arterial	Orchard Rd to E. Mansion Rd Wilson Ave to Derry Township line	Orchard Rd to L St Intermittent between L St and SR 743
7	**RT 322 (Governor Road)**	**RT 422 to Township Line**	11'	RT 322 to Centerview - 8' One Side Centerview to Cherry Dr - 8' Cherry Dr to SR 743 - None SR 743 to Derry Twp Line - 8'	RT 422 to Fishburn Rd - 17,291 Fishburn Rd to 743 - 15,266 743 to Derry Twp Line - 13,721	4	RT 422 to SR 743 - 35 743 to Homestead (40 WB & 35 EB) Homestead Rd to Meadow Lane (40 EB & 50 WB) Meadow Lane to Twp Line - 50	Principal Arterial	Adjacent Trail Lucy Ave to Cherry Dr Sidewalk between Hockersville and Cocoa Ave	None
8	**SR 743 (Park Ave / Cocoa Ave)**	**Hersheypark Dr to Fishburn Rd**	11-12'	Hersheypark Dr to N. 3rd St - 3' Shoulder (One Side) No Shoulder South of N 3rd St	Hersheypark Dr to RT 422 - 11,192 RT 422 to RT 322 - 6,885 RT 322 to Fishburn - 7,991	4	Hersheypark Dr to RT 322 - 25 RT 322 to Fishburn Rd - 35	Minor Arterial	Sidewalk between E. Derry St to RT 322 (Except around Zoo) Trail from Rt 322 to Fishburn Rd	Valley Rd to Elm Ave
9	**Schoolhouse Rd (SR 2002)**	**Middletown Rd to Colebrook Rd**	11'	None	789	5	35	Rural Collector	None	None
10	**Roundtop Rd (SR 2005)**	**Colebrook Rd to Steinruck Rd / Sandhill Rd**	11'	Varies 0'-1'	Colebrook to Schoolhouse - 640 Schoolhouse to Steinruck/Sand Hill - 1,829	5	~750 feet N. of Schoolhouse (SB) to Colebrook - 35 Waltonville to ~750 feet N. of Schoolhouse (SB) - 40 Schoolhouse to State Game Lands Driveway (NB) - 35 State Game Lands Driveway to Sand Hill / Steinruck (NB) - 40	Colebrook to I-76 - Urban Collector I-76 to Schoolhouse - Rural Minor Collector Schoolhouse to Waltonville Road - Rural Major Collector	None	None
11	**Colebrook Rd (SR 341)**	**SR 230 to Roush Rd**	11'	2'	SR 230 to Roundtop - 2,113 Roundtop to Toll House - 1,462 Toll House to Schoolhouse - 2,642	6	SR 230 to Tollhouse Rd - 35 Tollhouse Rd to Roush Road - 45	West of Schoolhouse - Urban Collector East of Schoolhouse - Rural Major Collector	None	None
12	**Hersheypark Dr**	**Interchange to N. Lingle Ave**	12’	8’-10’	Interchange to Old W Chocolate - 23,807 Old W Chocolate to Laudermilch- 19,200 Laudermilch to N Lingle Ave – 8,284	8	Interchange to Pennsy Dwy - 35 Pennsy Dwy to Park Blvd – 50 Park Blvd to Lingle Ave - 45	Minor Arterial	None	None
13	**Bullfrog Valley Road**	**Roush Rd to Rt 322**	11’	Varies 1’ to 2.5’	RT 322 to Wood Rd – 8,600 Wood Rd. to Roush Rd - 5,100	2	35	Local	Adjacent trail	None

Figure 1. Study Area



The key corridors in the study area primarily run either east and west or north and south. The east/west arterials include Route 322, Route 422 and Hersheypark Drive. The north/south corridors include Middletown Road/Hanover Street, SR 743, Hockersville Road/Fishburn Road, and Waltonville Road/Quarry Road. These main corridors are highlighted on Figure 1 below. Additionally, the Village of Hershey and the Village of Swatara Station are highlighted in blue and green, respectively.

Influence of Navigation Apps and Real-Time Traffic Updates on Existing Road Network

Transportation agencies across the country are faced with new challenges in recent years as motorists have become more reliant on navigation apps, particularly those that provide real-time traffic conditions. In order to minimize travel time for the user, the navigation apps provide updated route selections in order to avoid congested areas or intersections. While this can be beneficial to the individual user and may reduce overall congestion, there are several negative consequences of this re-routing:

- Impacts in residential neighborhoods – Traffic is frequently routed onto residential streets through neighborhoods resulting in noise and safety concerns;
- Impacts on rural collector / local roads – Increased speeds and traffic volumes on rural collector or local roadways that were not designed to accommodate these increased daily traffic volumes, resulting in pavement deterioration and safety concerns;
- Impacts of re-routed truck traffic – Safety, pavement deterioration and noise concerns associated with truck traffic being diverted through residential streets and local roadways.

Transportation networks have been designed and constructed with the goal of keeping car and truck traffic on higher classification highways (i.e. arterials) for the majority of their travel route, only accessing collector roadway or local roads as they leave or approach their destination. However, the recent increased reliance on navigation apps has compromised this strategy, and is significantly increasing motorist through traffic on collector and local roadways.

Specifically within the Greater Hershey region, several roadways have seen an increase in traffic due to re-routing of traffic, which is exacerbated during Hershey events. It is ideal to keep event traffic on the freeway and arterial network to Hersheypark Drive:

- From the east, along Route 322/422 to Lingle Avenue onto Hersheypark Drive
- From the west, along Route 322 to Hersheypark Drive
- From southwest (eastbound PA 283) – along Middletown Road to Route 322 to Hersheypark Drive
- From southeast (westbound PA 283) – along Route 743 to Hersheypark Drive
- From the north – I-81 to Route 39 or Route 743 to Hersheypark Drive

Unfortunately, as there are frequently long delays along these arterial routes during events, the navigation apps are now re-routing traffic onto less-desirable routes (see Map **10**).

Under current legislation, the only way to counteract the effect of the navigation apps is to either improve the preferred routes to make these routes faster; or add controls (such as truck restrictions, traffic calming and/or street closures) to the non-preferred routes to keep these routes slower. The navigation apps bring a new set of challenges for the transportation community to ensure efficient traffic flow along the arterial routes while preserving the safety and multi-modal accessibility along secondary routes and within residential neighborhoods. Many of the recommendations in this study will improve travel time on the

preferred routes. However, these improvements alone will not solve all of the issues. Therefore, additional controls outside of the scope of the study will need to be considered for event traffic.

Existing Pedestrian and Bike Routes

The Greater Hershey region also has a significant amount of pedestrian and bicycle traffic that uses a combination of sidewalks, on-road bicycle facilities, and shared-use trails. The 13.5 mile Jonathan Eshenour Memorial Trail is a shared use path that connects neighborhoods, parks, and commercial areas throughout Derry Township. The trail provides significant bicycle and pedestrian connectivity to much of Derry Township south of Governor Road with potential to expand to more neighborhoods and commercial areas, particularly north of the Norfolk Southern railroad. Existing on-road bicycle facilities, such as bike lanes and shared lanes provided in Derry Township help expand the reach of the Jonathan Eshenour Memorial Trail where a separate path is not feasible. Shared lanes are delineated with shared lane markings, commonly referred to as sharrows.

Sidewalk encompasses much of Hummelstown and Derry Township, however, some particular areas have a noticeable lack of sidewalk. Sidewalk in Londonderry Township is sparse, as the area is more rural than the generally suburban areas of Hummelstown and Derry Township.

The existing shared use paths, on-road bicycle facilities, and sidewalks are depicted on Map **2**.

Existing Public Transportation

Public transit is limited in the study area to a few bus routes, primarily serving in an east-west direction. Additionally, the existing Intermodal Center is a great resource, though underutilized. Capital Area Transit offers a bus route from Harrisburg through Hummelstown to Derry Township and back, operating from the early morning through the evening on weekdays to provide service for typical weekday commuters. Additionally, Lebanon Transit offers three (3) bus routes that travel through Derry Township. One of the routes is a commuter bus service to connect neighboring Lebanon County with downtown Harrisburg that only has one stop in the study area; the Hershey Medical Center. The Route 8 bus runs from Lebanon to the Hershey Medical Center, Hersheypark, and a few other stops in between from Monday to Saturday. The Route 16 bus route connects Lebanon with Hersheypark via N. Lingle Avenue and Hersheypark Drive, but only in the evenings from Monday to Saturday. The existing bus routes are shown on Map **9**.

LAND USE ASSUMPTIONS

In order to develop future traffic projections for the study area, the growth and development of the study area was projected by determining future land uses. Parcels anticipated to be developed within 20 years were included in the future traffic projections. Land use assumptions were completed with input from each respective municipality. The list of projected developments is provided in Appendix **B** and Map **3** depicts the locations of the parcels projected to be developed. Parcels anticipated to be developed within 20 years were included in the future traffic projections.

The developments in the land use assumptions were given IDs (i.e. E-6, C-4, etc.) under the following naming convention: C for commercial developments, R for residential developments, MU for mixed-use developments, and E for developments with existing, submitted plans that have yet to be constructed at the start of this study. The existing developments are identified in Appendix **B**.

Derry Township anticipates significant growth in the future and has the most parcels with projected development of the three municipalities that cover residential, retail, office, warehousing, and other commercial land uses.

Londonderry Township officials have identified several parcels as candidates for development as residential, retail and warehousing uses and have been included in the study. To note, since the onset of the study, four parcels along Route 230 in Londonderry Township have been identified for potential warehouse development. Two of these parcels were anticipated and included in the traffic projections (Lytle Farms and School Heights Village), though two parcels were not anticipated at the onset of the study and therefore are not included (Saturday's Market and Vision Properties warehouses). Given the size and location of these two developments with proximity to the Greater Hershey region, the additional traffic from these two developments is not anticipated to alter the study area recommendations.

As most parcels in Hummelstown are already developed, minimal future development is anticipated in the Borough. A few parcels were identified to be developed or redeveloped within 20 years by Borough officials encompassing residential and commercial land uses for the purposes of this study.

The parcels that are projected to be developed within the next 20 years are depicted on Map **3** and summarized in Table 2 and Table 3 below:

Table 2. Residential Land Uses

Map ID	Type/Size	Municipality	Projected to be Built By
R-9	76 Apartments	Derry Township	2028
R-4	27 Single Family Dwelling Units	Derry Township	2038
R-3	16 Single Family Dwelling Units	Derry Township	2038
R-5	48 Single Family Dwelling Units	Derry Township	2038
R-2	48 Single Family Dwelling Units	Derry Township	2038
R-1	58 Single Family Dwelling Units	Derry Township	2038
R-10	54 Senior Housing Units	Derry Township	2028
R-15	30 Senior Housing Units	Derry Township	2028
R-16	12 Townhomes/Apartments	Derry Township	2028
R-12	200 Single Family Dwelling Units; 100 Townhomes/Apartments; 200 Senior Housing Units	Derry Township	2038
R-14	26 Single Family Dwelling Units	Derry Township	2038
MU-3	36 Single Family Dwelling Units;124 Townhomes/Apartments	Derry Township	37.8% in 2028 and 62.2% in 2038
MU-2	123 Single Family Dwelling Units; 614 Townhomes/Apartments; 88 Senior Housing Units; 100 Assisted Living Units	Derry Township	61.8% in 2028 and 38.2% in 2038
R-17	45 Apartments	Hummelstown Borough	2028
R-18	75 Single Family Homes	Hummelstown Borough	2028

Table 3. Non-Residential Land Uses

Map ID	Type/Size	Municipality	Projected to be Built By
E-12	Hersheypark Expansion	Derry Township	2028
E-15	75,000 SF Retail	Derry Township	2028
MU-1	20,000 SF Retail 5,400 SF Restaurant	Derry Township	2028
MU-5	75,000 SF Office Complex Renovations to provide increase from 1,100 to 1,500 employees	Derry Township	2028
C-9	76-Room Hotel	Derry Township	2038
C-10	120,000 SF Retail	Derry Township	50% in 2028 and 50% in 2038
C-5	10,000 SF Office Building; 90-Room Hotel; Two 5,000 SF Restaurants	Derry Township	2028
C-4	75,000 SF Retail; 90-Room Hotel	Derry Township	2038
C-6	75,000 SF Retail; 140-Room Hotel; Four 5,000 SF Restaurants	Derry Township	2028
C-3	400,000 SF Hospital Expansion; 90,000 SF University Expansion; 350,000 SF Research / Development Center; 140-Room Hotel	Derry Township	50% in 2028 and 50% in 2038
MU-3	157,500 SF Office Complex	Derry Township	37.8% in 2028 and 62.2% in 2038
MU-2	9,025 SF Quality Restaurant; 166,355 SF Retail; 48,410 SF Office Building; 150,000 SF Hospital; Two 12,500 SF Restaurants; 140-Room Hotel	Derry Township	61.8% in 2028 and 38.2% in 2038
C-1	Two 6,150 SF Restaurants	Derry Township	2028
C-2	300,000 SF Retail	Derry Township	50% in 2028 and 50% in 2038
C-7	1,500,000 SF High-Cube Warehousing	Londonderry Township	2028
C-8	550,000 SF Retail	Londonderry Township	2038
C-11	850,000 SF High-Cube Warehousing	Londonderry Township	2028
MU-6	34,000 SF Retail 85,000 SF Office 267 Single-Family Homes 304 Apartments 99 Townhomes 300 Condominiums 103 Senior Housing 400-Unit Continuing Care Retirement Community	Londonderry Township	30% in 2028 and 70% in 2038

Map ID	Type/Size	Municipality	Projected to be Built By
C-12	60-Unit Motel	Hummelstown Borough	2028
C-13	70-Seat Restaurant / Microbrew	Hummelstown Borough	2028
C-14	80-Seat Restaurant	Hummelstown Borough	2028
C-15	Expanded parking for additional 400 parking spaces	Derry Township	2028
C-16	Redevelopment of shopping center; Addition of right-in access from Route 322	Derry Township	2028

All developments labeled with an "E", those with existing, submitted plans that have yet to be constructed at the start of this study, are assumed to be completed by 2028. The rest of the developments were grouped in to 2028 and 2038 opening years per discussions with each municipality. The traffic from the developments that was anticipated to be completed by 2028 were included in the 2028 traffic analysis which determined the midterm improvements. Conversely, the rest of the development traffic is mitigated by the long term improvements as the developments were anticipated to be open by 2038.

Six of the larger developments are anticipated to be built in phases and thus the traffic volumes were proportionally divided into each design year using the percentages provided in Table 2 and Table 3 above.

Note that the Hershey Medical Center has an abundance of open space within its campus that could be developed. The existing campus contains approximately 2.6MSF of medical uses (hospital, offices, research center, etc.). The 20-year land use projections include approximately 950,000 square-feet of additional medical uses on the campus (parcels E-3 and C-3), in addition to related land use projections on surrounding parcels. This equates to approximately 35% increase in the building size of the hospital campus. Due to high-variability of healthcare industry and large availability of land, these projections may be critical to the roadway needs and the actual development patterns should be monitored.

The parcels and land uses identified were used to forecast future traffic conditions within the study area.

TRANSPORTATION NETWORK ASSESSMENT

Traffic Forecasting and Analysis

Based on discussions with each municipality, the study intersections and roadway segments were established and are depicted on Map 4. and
Table 5 below includes a list of all study intersections and study segments:

Table 4. Study Intersections

Intersection		AM Peak Hour	PM Peak Hour	Prior TMC *
Derry Township				
1	Middletown Road and Route 322 EB Off Ramp		X	X
2	Middletown Rd and Wood Rd		X	X
3	Middletown Road and Deer Run Drive / Stoverdale Road		X	X
4	Middletown Road and Locust Lane / Kaylor Rd		X	X

Intersection		AM Peak Hour	PM Peak Hour	Prior TMC *
5	Waltonville Road and Connector Road / Route 322 EB On-Ramp	X	X	X
6	Waltonville Rd and Wood Road		X	X
7	Bullfrog Valley Rd and Wood Road		X	X
8	Bullfrog Valley Road and Research Blvd / Life Lion Drive	X	X	X
9	Walton Avenue and E. Main St		X	
10	W. Hersheypark Dr and Walton Avenue / Mae St		X	
11	Hersheypark Drive and Park Blvd / Hershey Road	X	X	X
12	Hersheypark Drive and Park Avenue / Sand Beach Road	X	X	
13	Hersheypark Drive and Laudermilch Road		X	
14	Hersheypark Dr and N. Lingle Avenue		X	
15	Park Avenue and Derry Road		X	
16	Park Blvd and N Ridge Road		X	
17	W. Chocolate Avenue and University Dr		X	
18	W. Chocolate Avenue and Hockersville Road		X	
19	E. Chocolate Avenue and Homestead Rd	X	X	X
20	E. Chocolate Avenue and E. Derry Rd		X	
21	E. Chocolate Avenue and N. Lingle Avenue / S. Lingle Avenue		X	X
22	Hockersville Road and W Areba Avenue		X	
23	W. Governor Road and University Dr	X	X	X
24	W. Governor Road and Centerview Ln	X	X	X
25	W. Governor Road and Cherry Dr		X	X
26	W. Governor Rd and Fishburn Rd / Hockersville Rd	X	X	X
27	Sand Hill Rd and Cherry Dr		X	X
28	Fishburn Rd and Sand Hill Rd (Hope Drive Extension for future analysis)		X	X
29	W. Governor Road / E. Governor Road and Cocoa Avenue	X	X	X
30	E. Governor Road and Homestead Road	X	X	
31	Fishburn Road and Cocoa Avenue		X	
32	Fishburn Road and Church Rd		X	
Hummelstown Borough				
33	Main St & Hanover St		X	
34	Main St & Quarry Rd		X	

*Turning Movement Count available from prior study

Table 5. Study Segments

Londonderry Township		
1	Route 2002 (Schoolhouse Rd) from Middletown Rd to Colebrook Rd	PM Peak Hour
2	Route 2005 (Roundtop Rd) from Colebrook Rd to Steinruck Road)	PM Peak Hour
3	Route 341 (Colebrook Rd) from Route 230 to Roush Road	PM Peak Hour

Data Collection

Many of the study intersections have been studied in recent years, and thus some Turning Movement Counts (TMC) were readily available. These intersections have been labeled in

Table 4 above.

New TMCs were conducted at each study intersection during the PM peak period (4 PM - 6 PM) where previous data was not available. Additionally TMCs were conducted and collected during the AM Peak period (7 AM to 9 AM) at the intersections denoted in
Table 4. All TMCs conducted and collected for this study are compiled in Appendix **A**.
For any TMCs that were conducted prior to 2018, traffic volumes to and from state routes were grown to account for the general growth of traffic not attributable to any particular development. The traffic projections included a background growth rate of 0.62% to account for growth outside of the study area. This factor was obtained from PennDOT for Dauphin County.

Due to the seasonal operation of Hersheypark, study intersections located in the immediate vicinity of the park have seasonal fluctuations in traffic volumes. Ideally, traffic counts would be conducted during the open season of Hersheypark to be sure park traffic during peak hours is accounted for, however, this was not achievable for every intersection. A few intersections were counted out of season and were adjusted to account for additional trips that typically enter and exit the park during the PM peak period. Traffic volumes during the AM peak period were not adjusted. Traffic counts at the intersection of Hersheypark Drive and the Park Ext/Hotel Road and the intersections of Hersheypark Drive & Park Boulevard / Hershey Road were used to determine the amount of traffic that enters and exits the park during the typical PM peak hour. These trips were then distributed along Hersheypark Drive, Park Boulevard, and Park Ave using the existing distributions. The following intersections were not counted during the park's open season and thus were adjusted:

- Intersection 10. W. Hersheypark Dr and Walton Ave / Mae St
- Intersection 12. Hersheypark Drive and Park Avenue / Sand Beach Road
- Intersection 13. Hersheypark Drive and Laudermilch Road
- Intersection 14. Hersheypark Dr and N. Lingle Ave
- Intersection 15. Park Avenue and Derry Road
- Intersection 16. Park Blvd and N Ridge Road

Analysis of Current Traffic Conditions

The AM and PM peak hours were analyzed at the study area intersections to determine their capacity under existing traffic volume conditions to determine if any of the existing intersections are deficient. The capacities of each intersection in the study area were analyzed using the procedures outlined in the 6th Edition of the *Highway Capacity Manual* as applied by the Synchro software.

The *Highway Capacity Manual (HCM)* defines the Level of Service (LOS) as a function of the delay encountered by motorists, which is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. LOS is a designated letter grade that corresponds to a given average control delay per vehicle. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Unsignalized intersections are analyzed using unsignalized intersection capacity analyses. The LOS of an unsignalized intersection is determined by each vehicle's delay.

For signalized intersections, the LOS measures the average control delay time per vehicle. Also, the volume to capacity ratio, which is a ratio of the peak hour traffic volumes for a facility to the theoretical maximum traffic volume the facility can handle, also relates to the LOS of a facility.

All ten (10) of the intersections that were analyzed for the AM peak period were found to operate at acceptable levels of service under existing conditions. Two (2) of the existing intersections analyzed during the PM peak period were determined to operate at unacceptable levels of service under existing conditions:

2. Middletown Road & Wood Road
10. Hersheypark Drive & Walton Avenue / Mae St

Improvements at these two intersections should be prioritized to address these existing deficiencies.

Traffic Forecasting

Traffic volumes were forecasted to 2028 (midterm) and 2038 (long term) by both growing the existing traffic volumes and adding traffic caused by projected developments in the study area. Traffic volumes to and from State Routes were grown by PennDOT's growth rate to account for the general growth of traffic not attributable to any particular development. The PennDOT traffic growth rate for Dauphin County that was used is 0.62% for exponential growth. Existing traffic volumes to/from township roads or private developments were not grown as any additional trips within the study area will be accounted for in future development trips.

Future traffic volumes from new developments in the study area were accounted for using a three step traffic model: Trip Generation, Trip Distribution, and Trip Assignment.

Generation

To forecast the increase in traffic due to the future developments, HRG calculated trip generation using the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*, 10th Edition for the parcels indicated in the Land Use Assumptions section of this report. For proposed future developments that already have a Traffic Impact Studies, the trip generation for the development was taken directly from the study.

Primary trips and pass-by trips both were calculated for developments as applicable. A primary trip is defined as a trip from an origin, to a destination, and back to the origin. Pass-by trips are defined as trips made by users that make a trip to the development while en route to their destination. Thus, pass-by trips do not add to the overall traffic in the study area, but merely redirect a portion of the existing traffic volume into development driveways. Pass-by trip reductions were applied to future developments if pass-by rates were provided in the ITE's *Trip Generation Handbook*, 3rd Edition. Pass-by trips are typical for restaurants, coffee shops, banks, etc. Land uses that do not have pass-by trips include residential land uses, office buildings, warehouse, etc.

Distribution and Assignment

Traffic volumes from the proposed future developments were distributed throughout the roadway network using a model based on the existing traffic volumes. Traffic volumes were distributed through intersections such that the proposed development volumes would have the same directional distribution as the existing turning movement's proportions at the intersections to determine all possible paths from the development to the rest of the study area. The model was developed in the programming language Python.

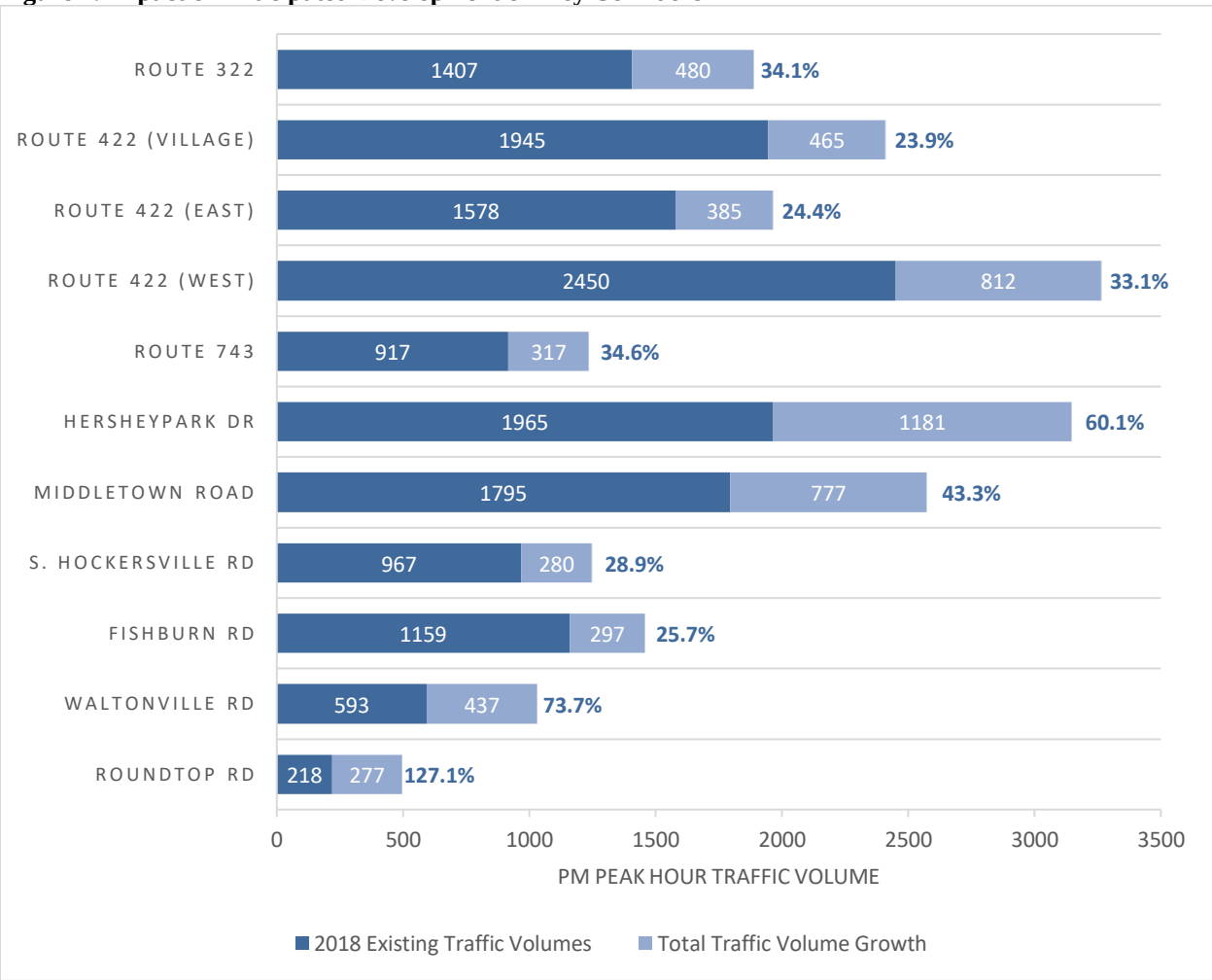
For example, if ten (10) vehicles from a particular development were heading northbound toward an intersection, the existing directional distribution between the northbound left, northbound through, and northbound right turns was first calculated. If that distribution ended up being 20% left turning vehicles, 70% through vehicles, and 10% right turning vehicles, then resulting traffic volumes would be two (2) left turning vehicles, seven (7) through vehicles, and one (1) right turning vehicles. Then the traffic volumes would be carried on to the next intersection in the network and would again be distributed in the same fashion based on the directional distribution of the intersection approach. This would continue until either the path reached an end point, the path left the study area, or the distribution percentage hit 0.1% of the trip generation of the development. Thus all reasonable traffic paths to and from a development were determined through the model. Paths that have a higher percentage of existing traffic are anticipated to have more development traffic.

The roadway network was setup graphically in Synchro Version 10 and processed by the model that was developed. The roadway network used for the model included all arterials and collector roadways in the study area, as well as some of the key local roads and proposed roadways. Local roads within residential neighborhoods were not included in the roadway network for the model, however, roadway links to large residential areas and other large existing traffic generators were added to the model. This would draw some of the development traffic to existing land uses in the study area to simulate trips to a commercial development that would originate in an existing residential area.

The traffic modelling process was iterative as corrections were made to the model to ensure logical traffic routing, properly model cut through traffic, and confirmed that resulting traffic distributions matched engineering judgement.

The resulting trip assignment to the study intersections is summarized in Appendix **F**. The increase in traffic due to the anticipated developments on key corridors is shown in Figure 2 below:

Figure 2. Impact of Anticipated Development on Key Corridors



Most development is anticipated to use Hersheypark Drive and Middletown Road, while Route 422 (Chocolate Avenue) has only a relatively minor increase in projected traffic. Note that these traffic volumes depict projected PM Peak traffic volumes only and other peak periods, particularly for event traffic, may vary.

2028 and 2038 Projected Traffic Volumes

The traffic volumes for 2028 & 2038 included growth of the 2018 existing traffic volumes as described above and the projected development volumes (from the traffic model above) that are anticipated to be constructed and operational by 2028 and 2038, respectively, based on the land use assumptions.

The anticipated development opening years are listed in Table 2 and Table 3 in the Land Use Assumptions section of this report.

Since new road segments are proposed to increase the connectivity, some existing traffic volumes were diverted onto the new road segment to bypass the existing roads. The traffic volumes summarized above include adjustments to compensate for changes to the roadway network:

- Traffic was adjusted at the intersection of Wood Road and Waltonville Road to divert traffic from Wood Road onto the new connector.

- Traffic volumes were diverted from Route 422 (through downtown Hershey) to N. Lingle Avenue and Hersheypark Drive. For the purposes of this study, the through traffic assumed to be diverted is 20% of the through movements at the intersection of Route 422 & Lingle Avenue. This traffic volume was removed from the through movements along Route 422 and rerouted through Hersheypark Drive.

The total traffic volumes for the 2028 and 2038 analysis years can be found in Appendix **F**.

Future Roadway Network

- Through this comprehensive planning study, new roadway connections have been proposed as either strategic improvements to mitigate traffic concerns or as safety improvements. The strategic improvements that were incorporated into the traffic model are as follows: Per their Official Map, Derry Township envisions a new Connector Road parallel to Wood Road from the intersection of Middletown Road and Gramercy Place (southern intersection) to Waltonville Road to the east. The intersection of Middletown Road and Wood Road would be modified to right-in/right-out access only due to intersection constraints. This new roadway would provide access to Middletown Road from the east at a suitable location with the expectation that the new intersection of Middletown Road & Gramercy Place/Connector Road would be signalized. This would also alleviate some of the cut through traffic from motorists using the Sheetz development's access road to use the signal at the Stoverdale intersection.
- The Hope Drive Extension is proposed to provide direct access between the Hershey Medical Center entrance on Cherry Drive and Fishburn Road. As such, Sand Hill Road would terminate at either Hope Drive Extension or in a cul-de-sac.
- Northeast Drive connector road to connect Northeast Drive directly to E. Derry Road. Several alternative locations have been reviewed, but the prevailing location is from Derry Rd & N St intersection through the development approximately 775' feet east of Park Avenue on Northeast Drive.
- Designate Hersheypark Drive as Route 422 and reconfigure the interchange to make Hersheypark Drive the through movement from Route 322 to redirect through traffic away from downtown Hershey and the Village. The reconfigured interchange should also provide multimodal connectivity between Route 422 and Hersheypark Drive, through either off-road facilities or a signalized crossing at Route 422/Sipe Avenue/Mae St or Route 422/Lucy Avenue.

To improve the safety of roadways for vehicles, pedestrian, and bicycles the following is recommended:

- Realigning N. Hockersville Road to remove the S-curve near the old sewage treatment plant south of Hersheypark Drive. This would provide a better road that meets design criteria to create a more function north-south link, particularly with the possible roundabout at the intersection of Route 422 and Old West Chocolate.
- Reconfigure the intersection of Java Avenue, Areba Avenue, & Homestead Road such that Java Ave is not used to access Homestead Road. This can be accomplished by extending Caracas Avenue to intersect with Homestead Road. Two alternatives are proposed to improve Java Avenue:
    - Make Java Avenue one-way with traffic flowing toward Caracas Avenue.
    - Remove Java Avenue and replace with green space, multi-use trail and add parking along Homestead Road.

The proposed connector roads and realignments are sketched in the Appendix **N**. For additional context of the location of the proposed roadways within the roadway network, the proposed roadways are depicted on Map **6** with dashed red lines.

These new roadways modify existing intersections and add new intersections. The following existing intersections were modified:

Intersection 5: Waltonville Road & Route 322 On Ramps / Service Road - With the Service Road relocation and the elimination of left turns onto the Route 322 On Ramp proposed as part of the Hershey West End project, the intersection would not have any conflicting movements. Thus under this operation, a capacity analysis is not applicable.

Intersection 28: Fishburn Road & Sand Hill Road – Since Sand Hill Road is proposed to terminate at the proposed Hope Drive Extension, Sand Hill Road will not intersect with Fishburn Road. Thus for the analysis years of 2028 and 2038, intersection 28 is the intersection of Fishburn Road and Hope Drive Extension.

The following proposed intersections were included in the capacity analysis for the 2028 and 2038 analysis years:

Intersection 35: Waltonville Road and Connector Road / Hershey West End Driveway
Intersection 36: Route 2003 (Middletown Rd) & Proposed Connector
Intersection 37: Hope Drive & Cherry Drive

Analysis of Future Traffic Conditions

Once traffic volumes for the 2028 and 2038 analysis years was established, intersection capacity and segment capacity analyses were completed for the study intersections and segments. The intersection capacity analysis was completed using the procedures outlined in the 6th Edition of the *Highway Capacity Manual* as applied by Synchro. A description of Level of Service (LOS) is provided in the Section on Analysis of Current Traffic Conditions

The LOS at each intersection was examined to determine if there were any deficiencies in the 2028 or 2038 analysis years. Based on discussions with the municipalities and the stakeholder and steering committees, acceptable levels of service were established for the study area. If an intersection does not meet the following criteria, the intersection for study purposed is deemed deficient:

- An overall LOS C is to be maintained for Middletown Road, Hersheypark Drive, Main Street, Waltonville Road, and the intersections around the Hershey Medical Center on Bullfrog Valley Road, Route 322, Fishburn Road, and Sandhill Road.
- Approaches to intersections must be not be failing (LOS F or a volume to capacity (V/C) ratio greater than 1).
- Otherwise an overall LOS D is to be maintained.

The following intersections are projected to be deficient by 2028:

Intersection 1: Route 2003 (Middletown Road) & Route 322 EB Off Ramp/Service Road
Intersection 2: Route 2003 (Middletown Road) & Wood Road
Intersection 7: Bullfrog Valley Road & Wood Road
Intersection 8: Bullfrog Valley Road & Research Boulevard / Life Lion Drive
Intersection 10: Route 39 (W Hersheypark Drive) & Walton Avenue/Mae Street

Intersection 11: Route 39 (W Hersheypark Drive)/W Hersheypark Drive & Route 39 (Hershey Road)/Park Boulevard
Intersection 12: Hersheypark Drive & Park Avenue/Sand Beach Road
Intersection 15: Park Avenue & E. Derry Road
Intersection 17: Route 422 (W. Chocolate Avenue) & University Avenue
Intersection 19: Route 422 (E. Chocolate Avenue) & Homestead Road
Intersection 22: Hockersville Road and W Areba Avenue
Intersection 23: Route 322 (W Governor Road) & University Drive
Intersection 24: Route 322 (W Governor Road) & Centerview Drive
Intersection 25: Route 322 (W Governor Road) & Cherry Drive
Intersection 26: Route 322 (W Governor Road) & Fishburn Rd/Hockersville Road
Intersection 29: Route 322 (W Governor Road /E Governor Road) & Route 743 (Cocoa Avenue)
Intersection 30: Route 322 (E Governor Road) & Homestead Road
Intersection 34: Main Street & Quarry Road

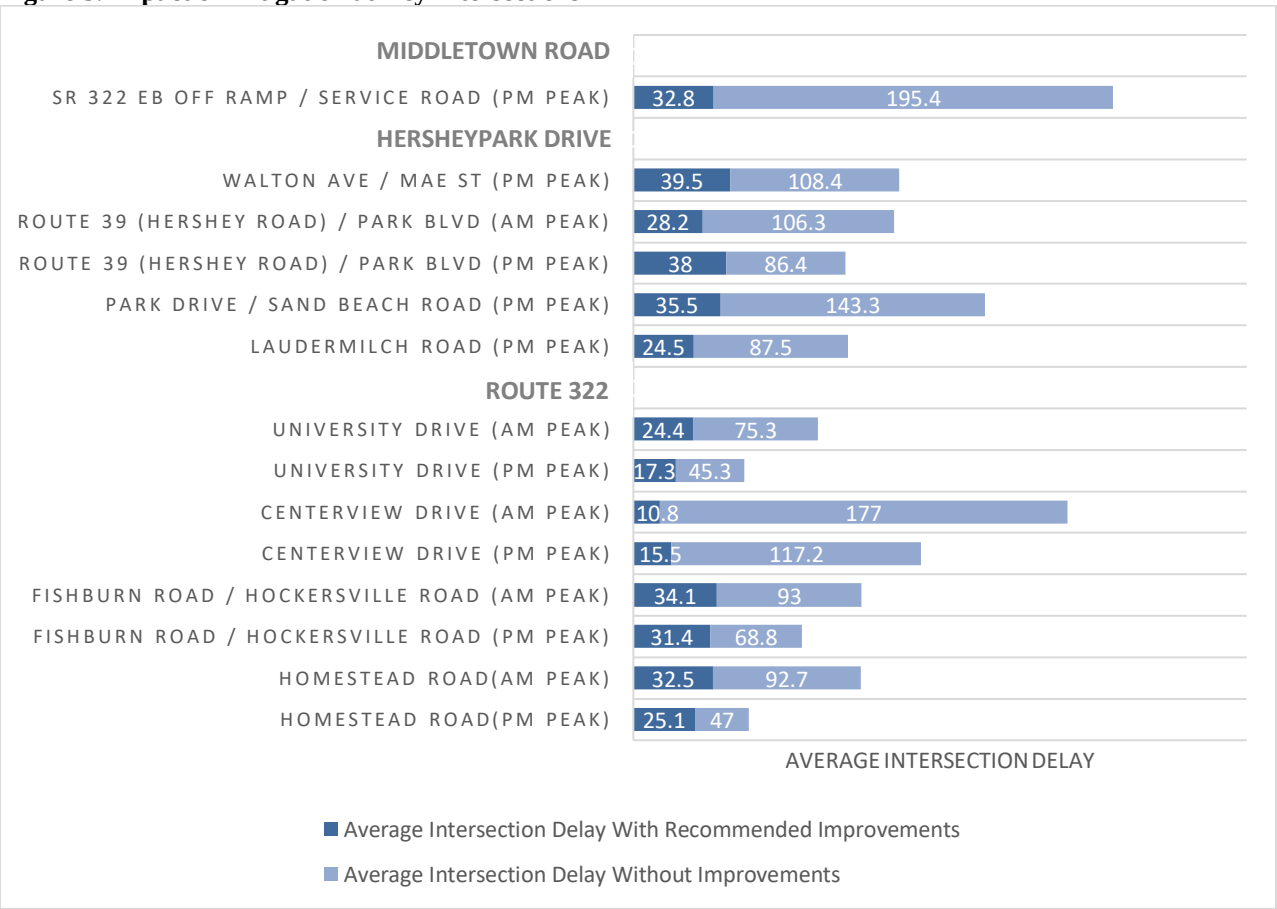
The following intersections are projected to be deficient by 2038:

Intersection 11: Route 39 (W Hersheypark Drive)/W Hersheypark Drive & Route 39 (Hershey Road)/Park Boulevard
Intersection 12: Hersheypark Drive & Park Avenue/Sand Beach Road
Intersection 13: E Hersheypark Drive & Laudermilch Road
Intersection 23: Route 322 (W Governor Road) & University Drive
Intersection 24: Route 322 (W Governor Road) & Centerview Drive
Intersection 26: Route 322 (W Governor Road) & Fishburn Rd/Hockersville Rd
Intersection 31: Route 743 (Fishburn Road) & Cocoa Avenue
Intersection 33: Main Street & Hanover Street

The capacity analysis for the 2028 AM, 2028 PM, 2038 AM, and 2038 PM scenarios can be found in Appendix **G**, Appendix **H**, Appendix **I**, and Appendix **J**, respectively.

An abbreviated summary of the overall intersection delay at key intersections from the capacity analysis the 2038 Future Traffic Volumes scenarios, both with and without the proposed mitigation, is summarized in Figure 3 below:

Figure 3. Impact of Mitigation at Key Intersections



Many study intersections are projected to see excessive delays as the Greater Hershey Area continues to develop. Mitigation measures such as constructing turn lanes, widening for additional through lanes, and signal modifications, to name a few, are required to reduce they excessive delay at these intersections to maintain sufficicient traffic flow throughout the study area. The recommended mitigation for the deficiencies at each intersection are decribed in the Conclusions and Recommendations section of this report.

A table summary of results of the capacity analysis depicting the overall delay and LOS of each study intersection is provided in Appendix L. The analysis year the study intersections and segments are anticipated to be deficient is identified in Map 5.

All three of the Londonderry Township roadway segments are projected to have a LOS A for both the 2028 and 2038 projected traffic volumes. The segment analysis is provided in Appendix **K**.

Bicycle and Pedestrian Transportation Assessment

While motor vehicles account for most trips in the region, there is significant bicycle and pedestrian usage that must be considered to properly address the transportation needs of the area. Vehicles, bicycles, pedestrians, and mass transit were assessed to provide a comprehensive analysis for the region. Input from constituents was considered and evaluated for feasibility and applicability based on bserved field conditions and traffic engineering standards. Sources of input include the Derry Township Bike and Pedestrian Alliance Survey, municipal input, stakeholder feedback, and Lebanon Valley Bicycle Coalition input.

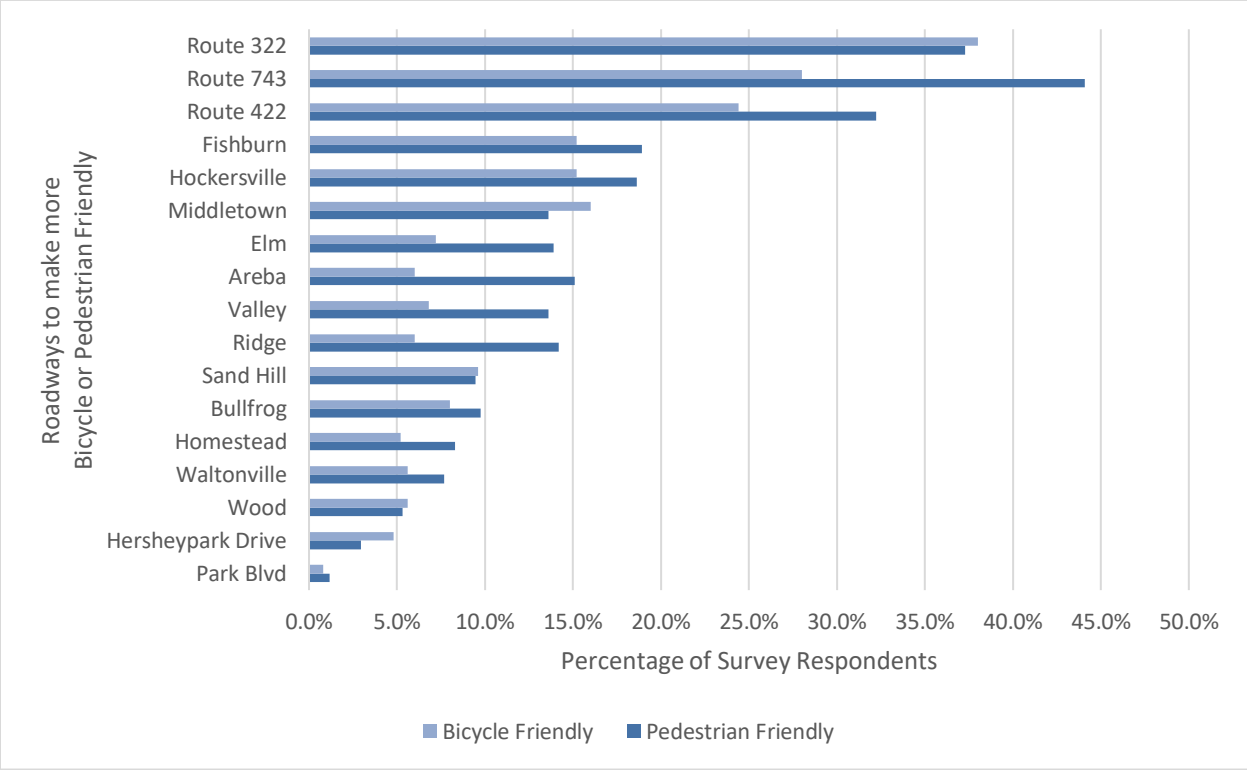
Additionally the existing sidewalk and bicycle facility networks were reviewed and field observations were conducted to determine locations where facilities could be proposed to increase connectivity. While bicyclists and pedestrians were included in the intersection TMCs, no separate pedestrian or bicycle counts were completed for pedestrian and bicycle facilities, such as shared use paths.

Derry Township Bike and Pedestrian Alliance Survey

The Derry Township Bike and Pedestrian Alliance conducted a survey to help determine the bike and pedestrian needs of the region through community input The survey had been advertised on the Derry Township webpage, Derry Township's Facebook page, and circulated through bike-pedestrian advocacy groups generally. A total of 452 people participated in the survey.

Through the responses in the study, specific roads were mentioned more than others, indicating the desirability to make certain roads more pedestrian or bicycle friendly. Figure 4 below depicts the percentage of survey respondents that mentioned they want to see more pedestrian or bicycle facilities on a particular roadway.

Figure 4. Corridors to Improve Bicycle and Pedestrian Facilities



The three (3) roads that were mentioned the most to make more pedestrian friendly and more bicycle friendly include Route 743, Route 322, and Route 422. A total of 338 people answered the question about pedestrian facilities and 250 people answered the question about bicycle facilities. Aside from the key corridors already highlighted in this study, other roads that participants would like to be more pedestrian and bicycle friendly include: Elm Avenue, Ridge Road, and Valley Road. The results of the study are provided in Appendix **P**.

Some specific areas of concern that were discussed in the survey include:

1. Route 322/422/Hersheypark Drive interchange lacks pedestrian and bicycle facilities. This either creates a barrier for cyclists and pedestrians or the underpass is used despite the lack of safety.
2. There is a lack of sidewalk and bike lanes on Park Boulevard to help pedestrians and cyclists entering Hersheypark from Hersheypark Drive. Often for events at the Hersheypark Stadium and Star Pavilion, people will park in the fields on the north side of Hersheypark Drive and walk the rest of the way to the Giant Center. There are pedestrian crossings at the intersection of Hersheypark Drive and Park Boulevard, but the crossings don't lead to a pedestrian facility on Park Boulevard or Hersheypark Drive.
3. Route 39 bridge into South Hanover Township has narrow shoulders that are not suitable for cyclists or pedestrians.
4. Pedestrians and cyclists do not have a safe route between the Village and N. Hockersville Road to get to Hersheypark Drive.
    a. The intersection of Route 422 & Old West Chocolate does not have pedestrian crossings.
    b. The underpass of the railroad on Old West Chocolate Avenue is too narrow to safely allow pedestrians.
5. A lack of safe pedestrian crossings across Route 422. One specific area where additional safety enhancements may be appropriate is Valley Road.
6. The existing trail along Cocoa Avenue does not provide a connection to cross Cocoa Avenue to access the Giant Shopping Center.
7. Better identified crosswalks across Elm Avenue and speed control along Elm Avenue.
8. At the intersection of Fishburn Road & Hartley Road, survey participants found it difficult to cross Fishburn Road for pedestrians and cyclists. The crossing is marked and provides access to the residential neighborhood from the Jonathan Eshenour Memorial Trail.

The results of the survey are provided in Appendix **P**.

Lebanon Valley Bicycle Coalition Recommendations

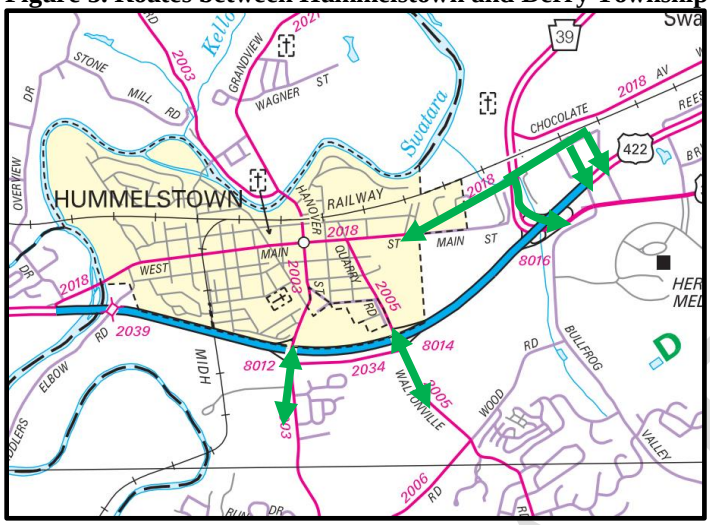
Over the years, the Lebanon Valley Bicycle Coalition (LVBC) has made recommendations to municipalities to add more bicycle facilities. The recommendations in this report have taken past LVBC recommendations into consideration. Several documents of the LVBC's recommendations are provided in Appendix **Q**.

Other Areas of Concern for Pedestrians and Bicyclists

The sidewalk and bicycle facilities were reviewed in the region to determine if improvements could be made to increase connectivity. Pedestrian and bicycle routes between the municipalities, between residential areas, and between residential and commercial developments have been examined to find areas of potential improvements.

Pedestrian and bicycle routes between Hummelstown and Derry Township are already limited to two (2) overpasses over Route 322 (Hanover St / Middletown Road and Quarry Road / Waltonville Road), and crossing at the Hersheypark Drive and Walton Avenue / Mae Street intersection. These routes are highlighted in green on Figure 5 below:

Figure 5. Routes between Hummelstown and Derry Township

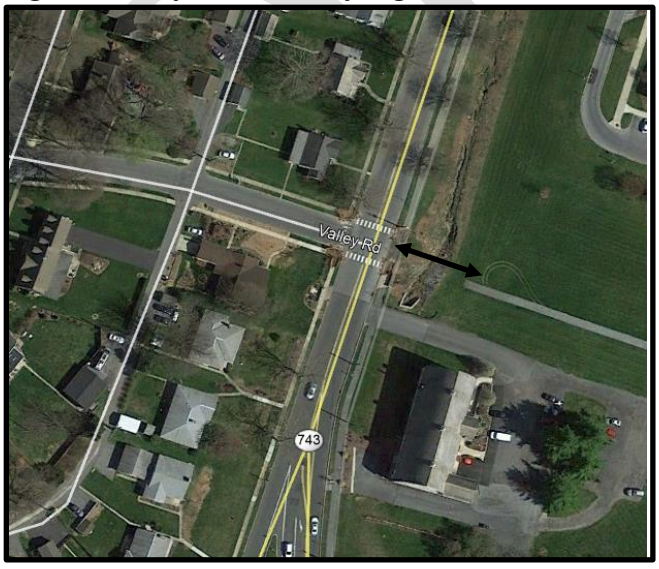


Between downtown Hummelstown and Hersheypark Drive, there are gaps in the sidewalk which present a problem as pedestrians have to walk on the shoulder to get to and from destinations. Route 422 presents a problem as well as there are concrete islands blocking both vehicles and pedestrians from crossing Route 422 at Lucy Avenue and Sipe Avenue.

Additionally there are gaps in sidewalks on Hanover Street and Waltonville Road. The bridge over Route 322 does have sidewalk on the western side of the road, but sidewalk has yet to be constructed to the north and south to connect developed areas. With more development anticipated adjacent to Waltonville Road, more pedestrian trips would be anticipated supporting proper access.

Across from Valley Road there is an existing shared use path that connects to the Hershey High School campus. This path suddenly terminates prior to the intersection of Route 743 and Valley Road because of a stream that runs parallel to Route 743. The gap in the path is shown in Figure 6 below. The path should be extended over the stream to the intersection, the path would provide a good pedestrian and bicycle connection between the Village and the Hershey High School campus.

Figure 6. Valley Road to Derry High School Connection



Another issue for pedestrians are the crosswalks across Hersheypark Drive during events at Hersheypark Stadium and Star Pavilion. Currently, a significant amount of event traffic parks on the north side of Hersheypark Drive in the old airfield on either side of Hotel Road and walk across the road to enter the park. Derry Township Police Department stops traffic at the intersection of Hersheypark Drive and Hotel Road / Park Exit completely to make the crossing safer. Vehicular traffic may be stopped for up to 45 minutes to allow pedestrians to cross. At the time of this study Hersheypark is working with the engineering firm HDR to evaluate possible improvements.

Most signalized intersections throughout the study area have normal pedestrian intervals that start when the green interval for the adjacent through lane begins. While this is fairly typical, leading pedestrian intervals should be evaluated as signal timings are updated throughout the study area, particularly in high pedestrian areas. A leading pedestrian interval starts the walk interval before the vehicular traffic so a pedestrian has time to get into the intersection before the vehicle, making the movement safer, but will negatively impact intersection capacity as the clearance times for vehicular movements would be extended

Public Transportation

Public transit can reduce the impact that passenger vehicles have on the existing roadway network and provide a greener transportation option to residents of the region. There is currently one Capital Area Transit (CAT) bus line that provides service in Derry Township and Hummelstown. Additioally, the existing Intermodal Center is a great resource that is underutilized. Younger generations are typically more enthusiastic about public transportation and would more likely take advantage of options if present. As the region continues to grow and demographics change, public opinion should be monitored to determine if additional mass transit would be successfully utilized by the public. Considering the land uses and demographics in the Greater Hershey region, improved public transportation options should be evaluated. Due to the evolving landscape of transit service and demands, transit agencies should monitor needs in the Greater Hershey region on an ongoing basis and identify opportunities for improvement.

FUNDING

Funding strategies will be critical to the successful implementation of the identified improvements. This will require collaboration between the three (3) municipalities, Dauphin County, Tri-County Regional Planning Commission, PennDOT, and the developer community. The funding strategies should include the following potential Funding Programs:

- Federal Funding
  - TIP Funding
  - HATS Multimodal Funding
  - Other future grant programs (ie, TIGER Grant successor)
- State Funding
  - Transportation Alternatives (TA) Set-Aside Program – For shared use paths, sidewalks, and bicycle facilities
  - DCNR Trail Grants – For shared use paths, sidewalks, and bicycle facilities
  - Greenways, Trail & Recreation Program (GTRP) – For recreational trails
  - Green Light Go – For traffic signal enhancements and improved coordination
  - Automated Red Light Enforcement (ARLE) Grant – Low cost improvements at signalized intersections
  - PennDOT Multimodal Transportation Fund – See below information
  - Commonwealth Financing Authority (CFA) Multimodal Transportation Fund – See below information
  - Redevelopment Assistance Capital Program – See below information
- County Funding
  - Dauphin County Infrastructure Bank
  - Local Share Gaming Grants
- Other Funding
  - New land development may trigger the need for roadway improvements to mitigate site traffic as determined by a Transportation Impact Study. Typically, these improvements would be the responsibility of the developer.
  - Greater Hershey region stakeholders collaborate to identify supplemental funding sources.

FEDERAL FUNDING PROGRAMS

Federal Funding for Transportation Projects

Harrisburg Area Transportation Study (HATS) was created as a result of the Federal-Aid Highway Act of 1962, which mandated regional planning as a condition of receiving federal funds for transportation projects. To this day, the planning must be supported through a continuing, comprehensive, coordinated (3C) process.

HATS is a designated Metropolitan Planning Organization (MPO), an organization of federal, state and local agencies, as well as officials from Cumberland, Dauphin and Perry Counties, the City of Harrisburg and Capital Area Transit, all of whom are accountable for the 3C process. Tri-County Regional Planning Commission (TCRPC) serves as the lead staff agency for the Harrisburg Area Transportation Study.

In this role, HATS develops a Regional Transportation Plan (RTP), which documents the current status of transportation projects and programs, identifies long-term needs and recommends projects to meet those needs. The long-range RTP sets a framework and priorities for the expenditure of federal transportation funds over a 25-year period.

The RTP is updated by HATS staff through identification of specific need via submission of an HATS Transportation Need Form. Once a Need Form is received, HATS staff discusses the issue with both the sponsor and the municipality to gather additional information and determine possible funding options. The municipality's presence is essential in these discussions since most federal funding sources require a local match.

The Transportation Improvement Program (TIP) is a comprehensive listing of all federal and state-funded transportation improvement projects in the HATS area over the next four years. HATS develops and updates the TIP every two years with projects derived from the RTP.

Total Funds Available for Award:
- Undetermined (2019-2022 $59 million Dauphin County)

Eligible Applicants:
- Transportation Agencies and Municipalities

Eligible Uses:
- Surface Transportation Infrastructure

HATS RTP Implementation Program

Grant Amount:
- Local match of 20% of total project cost

Eligible Applicants:
- Municipalities within HATS region
- Transportation Service Provider within HATS region

Total Funds Available for Award:
$1,000,000 Federal Funds per year for Dauphin County

Eligible Uses:
- Feasibility or planning studies
- Non-motorized trail expansion or enhancements
- Improved transit
- Streetscape projects with traffic calming
- Improved roadway connections
- Redevelopment of existing streets into neighborhood streets
- Improvements to non-motorized mobility
- Low-cost safety or congestion improvements
- Roundabouts
- Safety Improvements

STATE FUNDING PROGRAMS

Transportation Alternatives (TA) Set-Aside Program

Funding Amount:

- $50,000 to $1,000,000
- Applicant pays 100% of pre-construction costs
- Projects are funded at 100% of construction cost (including construction inspection)

Eligible Applicants:

- Municipalities and transportation authorities
- Transit agencies
- School district
- Natural resource or public land agency
- Non-profit organizations that oversee the administration of local transportation safety programs

Eligible Uses:

- On-road and off-road sidewalk or trail facilities
- Traffic calming, lighting, other safety-related improvements
- ADA compliance

Total Funds Available for Award:

- $850 million nationwide

DCNR Trail Grants

Grant Amount:

- Total project cost; varies depending on project type and funding source
- Local match required; varies depending on project type and funding source

Eligible Applicants:

- Municipalities
- Non-Profit Organizations
- For-Profit Organizations

Eligible Uses:

For the development of recreational trails to close priority trail gaps or rehabilitate/upgrade existing trails for use by the public:

- Land Acquisition
- Planning
- Construction, rehabilitation, maintenance
- Development and operation of trail educational programs

Application Deadline:

- Pre-application Conference required
- April 22, 2020 / Spring of each year

Planned Award Announcement Date:

- Fall of each year

Commonwealth Financing Authority – Greenways, Trails and Recreation Program (GTRP)

Grant Amount:

- Up to $250,000
- Need 15% match of the total project cost

Eligible Applicants:

- Municipalities
- Councils of Government
- Authorized Organizations (not-for-profit)
- Institutions of Higher Learning
- Watershed Organizations
- For-Profit Businesses (other than "producers" of natural gas)

Total Funds Available for Award:

- Varies. (In 2019, $20.8 million total amount for all 7 programs under Act 13 funding)

Eligible Uses:

Funds may be used for the development, rehabilitation, and improvement for public park and recreation areas; greenways and trails; and rivers conservation projects.

Application Deadline:

- May 31 of each year

Planned Board Approval Date:

- September of each year

Application Fee:

- $100 non-fundable application fee

PennDOT Multimodal Transportation Fund (MTF)

Grant Amount:

- Minimum project cost of $100,000
- Maximum grant award of $3,000,000
- Local match required – at least 30% of the award amount
- Approximately $40,000,000 total funds available annually

Eligible Applicants:

- Municipalities
- Councils of Government
- Businesses
- Economic Development Organizations
- School Districts
- Non-Profits
- Public Transportation Agency
- Ports

Eligible Uses:

Funds may be used to coordinate local land use with transportation assets to enhance existing communities; related streetscapes, lighting, sidewalk enhancement, and pedestrian safety; improve connectivity or utilization of transportation assets; and related to transit-oriented development.

Application Deadline:

- Fall/Winter of each year

Planned Award Announcement Date:

- Spring/Summer of each year

Commonwealth Financing Authority - Multimodal Transportation Fund (MTF)

Grant Amount:

- Total project cost of $100,000 - $3,000,000
- Need 30% match of non-federal share of the total project cost

Eligible Applicants:

- Municipalities
- Councils of Government
- Businesses
- Economic Development Organizations
- Public Transportation Agency
- Ports – Rail/Freight

Total Funds Available for award:

Varies ($79 million awarded in 2019)

Eligible Uses:

Funds may be used to coordinate local land use with transportation assets to enhance existing communities; related streetscapes, lighting, sidewalk enhancement, and pedestrian safety; improve connectivity or utilization of transportation assets; and related to transit-oriented development.

Application Deadline:

- July 31 of each year
- $100 non-refundable application fee

Planned Board Approval Date:

- September of each year

PennDOT Automated Red Light Enforcement (ARLE) Grant Program

Grant Amount:

- No funding limits, but should be "relatively low-cost"
- No local match is required, but cost sharing is encouraged

Eligible Applicants:

- Municipalities
- Counties
- Metropolitan Planning Organizations (MPOs)
- Rural Planning Organizations (RPOs)
- County Planning Organizations
- Commonwealth Agencies

Total Funds Available for award:

- Varies ($13.1 million in 2019)

Eligible Projects:

- Traffic Control Signal Improvements
- Roadway Capacity, Mobility & Safety Upgrades
- Bicycle & Pedestrian Improvements
- Local Technical Assistance Program Projects

Application Period:

- June 1 through June 30 each year

Award Date:

- December of each year

PennDOT Green Light-Go: Pennsylvania's Municipal Signal Partnership Program

Grant Amount:

- Need 20% match of the total project cost

Municipal and Private Match Options:

- Municipal general funds
- Liquid fuels funds
- Pennsylvania Infrastructure Bank (PIB) loans
- Municipal private loans
- Developer contributions
- Act 209 (Transportation Impact fees)
- In-Kind services
- Act 89 funding (Title 75, County $5 Fee)

Eligible Applicants:

- Municipalities
- Planning Organizations

Total Funds Available for award:

- Varies ($5 million in 2019)

Eligible Projects:

- LED Replacement
- Traffic Signal Retiming
- Study and Removal of Unwarranted Traffic Control Signals
- Real-Time and/or Historic Performance Monitoring
- Innovative Technologies
- Communications/Connections Back to Traffic Management Center
- Detection and/or Controller Upgrades
- Modernization Upgrades
- Intelligent Transportation System Applications

Application Period:

- Fall/Winter of each year

Redevelopment Assistance Capital Program (RACP)

Grant / Project Amount:

- Grant amount varies based on available funding for the Capital Project Itemization Bill line item
- Minimum $1,000,000 total project costs
- Minimum 50% match of total project costs

Eligible Applicants:

- Redevelopment Authorities
- Industrial Development Authorities
- General Purpose Unit of Local Government
- Local Development District
- Public Authority
- Industrial Development Authority

Total Funds Available for award:

Based on available funding for the Capital Project Itemization Bill line item.

Eligible Uses:

Funds may be used for economic development project that is further defined by the Capital Project Itemization Bill line item

Application Deadline:

- Annual deadline varies

Planned Board Approval Date:

- Award announcement varies

Application Fee:

- $500 non-fundable application fee

COUNTY FUNDING

Dauphin County Infrastructure Bank

Grant Amount:

- Unlimited funding request
- Low-interest loan

Eligible Applicants:

- Dauphin County
- Municipalities within Dauphin County
- Municipal and redevelopment authorities within Dauphin County
- Private entities (including non-profit organizations) with eligible projects located in Dauphin County
- School districts

Eligible Uses:

Projects that will improve the safety and mobility of local surface transportation, are publicly owned and are Liquid Fuels Tax eligible

Local Share Gaming Funds

Grant Amount:

- No set amount. (In 2020, awards ranged from $2,500 to $745,000.)

Eligible Applicants:

- East Hanover Township
- Municipalities contiguous with East Hanover Township and located within Dauphin County (Derry, Middle Paxton, Rush, South Hanover, and West Hanover Townships)
- Dauphin County
- Non-contiguous municipalities within Dauphin County may be eligible if sponsored by an eligible local municipality or Dauphin County
- Non-municipal entities may apply if sponsored by an eligible local municipality or Dauphin County

Total Funds Available for award:

- Amount varies and based on gaming revenues. (In 2020, total $6.3 million was awarded.)

Eligible Uses:

Funds may be used for 1) Human Service costs, infrastructure improvements, facilities, emergency services, and health and public safety expenses related to the licensed gaming facility and 2) health, safety, transportation, and public interest/quality of life projects for the residents and communities.

Application Deadline:

- Early August of each year – Pre-application Conference required
- Early September of each year – Applications due

Planned Board Approval Date:

- Early March of each year

Application Fee:

- None

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings outlined in the report for the vehicular traffic analysis and pedestrian and bicycle assessment, improvements have been recommended to satisfy the goals and objectives of this study. In summary of the key corridors of this study, the following key strategies are recommended to move traffic safely and efficiently along primary arterials, minimize impact to the downtown feel and character of the Hershey Village, and enhance pedestrian and bicycle mobility:

Middletown Road Corridor

- Average Daily Traffic (ADT) projected to increase from approximately 15,000 to 22,000 vehicles per day.
- Roadway is transforming in character and purpose from a minor arterial to a principal arterial (Suburban Neighborhood Corridor Arterial), resulting in more consideration to more emphasis on traffic mobility and intracommunity continuity, with less emphasis on land access.
- New access points should be limited to right-in / right-out unless signalized.
- New signals should be strategically placed to maximize access from both sides of road.
- Corridor widening for additional through lanes, shoulders and a center left turn lane from PA 283 to Route 322 to improve capacity and safety.
- Provide bicycle and pedestrian interconnectivity between the residential areas along the west side with the Jonathan Eshenour Memorial Trail and the Hershey Medical Center.

Waltonville Road / Bullfrog Valley Road Corridors

- ADT projected to increase from approximately 5,700 to 10,000 vehicles per day along Waltonville Road.
- Minor intersection improvements to improve capacity.
- Construct new east-west collector roadway to connect between Hershey Medical Center and Middletown Road.
- Improve north/south pedestrian interconnection into Hummelstown.

Hersheypark Drive

- ADT projected to increase from approximately 20,000 to 32,000 vehicles per day.
- Emphasis on the movement of through vehicles and event traffic. Consider re-designating roadway as "Route 422".
- Reconfigure Route 322/422 interchange to maintain Hersheypark Drive as the through movement to/from Route 322.
- Consider adaptive traffic signals to move traffic more efficiently.
- Delineate bike lanes on both sides of roadway.
- Install continuous sidewalk along north side of Main Street and Walton Avenue into Hummelstown.
- Considerations to grade-separated pedestrian facilities to reduce conflicts and improve traffic flow during events via private investment by others.

Route 743 (Cocoa Avenue / Park Avenue)

- ADT projected to increase from approximately 8,000 to 11,000 vehicles per day.

- Isolated capacity-adding intersection improvements.
- Emphasis on bicycle and pedestrian crossings and connections between residential areas and the Jonathan Eshenour Memorial Trail / commercial areas.

Route 422 (Chocolate Avenue)

- ADT projected to increase from approximately 21,000 to 27,000 vehicles per day.
- Minimal capacity-adding improvements.
- Emphasis on bicycle and pedestrian mobility and connectivity.
- Improve north/south connectivity west of Orchard for vehicular and bicycle/pedestrian traffic (Old West Chocolate; University Drive; Mae Street/Lucy Avenue).
- Reinforce and enhance the downtown character and deter pass-through traffic. Consider designating Chocolate Avenue as "Business Route 422" from Route 322 interchange to Lingle Avenue.
- Reconfigure Route 322/422 interchange to maintain Hersheypark Drive as the through movement to/from Route 322 to better deter through traffic.

Route 322 (Governor Road)

- ADT projected to increase from approximately 15,000 to 20,000 vehicles per day.
- Emphasis on improved vehicular mobility. Immediate need for additional capacity.
- Corridor widening for additional through lanes and center left turn lane from Route 322/Route 422 interchange through the intersection with Homestead Road.
- Additional isolated intersection improvements.
- Provide bike lanes where off-road trail is not available.
- Ensure pedestrian connectivity along the corridor.

Fishburn Road/Hockersville Road

- Establish the north/south connection from N. Hockersville Road to S. Hockersville Road by constructing a roundabout at the intersection of Chocolate Avenue and Old West Chocolate.
- Remove the S-curve on N. Hockersville Road to increase safety and make the road more viable to vehicular traffic.

The improvement strategies outlined above have been utilized to develop a specific list of improvements to develop complete streets, maintain acceptable traffic flow, and improve connectivity throughout the region for vehicles, pedestrians, and bicyclists. The improvement list is detailed in the "Recommended Transportation Improvements" table in the Executive Summary.

Limited Access Connection Considerations

As a part of other transportation planning efforts in the Harrisburg region, a new limited access freeway could be considered from Route 283 to I-81 with an interchange on the PA Turnpike I-76. This new freeway connection would provide more direct access for Hershey event and seasonal traffic and reduce traffic volumes along other north/south routes in the study area. This connection would also improve overall regional connectivity.

This freeway could possibly be located near the Dauphin and Lebanon County boundary. While the impacts of this connection are outside the scope of this study, a new freeway would have inter-regional effects on traffic. The roadway recommendations in this study may need to be reevaluated if a new limited access roadway gains traction.

Traditionally, an investment of this magnitude would involve the Long Range Planning process through HATS. However, other planned freeway improvements already underway (I-81 widening) will likely preclude federal funding for this concept for an extended time. However, this concept could be advanced through a Public-Private Partnership (P3) initiative.

Implementation Strategy

The need for several capacity-adding improvements (ie, signalization, turn lanes and through-lane widening) will largely be driven by growth within the region, making it difficult to project a specific build schedule. Table 6 includes a suggested implementation timeframe, including "Short-Term" (within next 5 years), "Mid-Term" (within 5-10 years) and "Long-Term" (within 10-20 years). The rankings should be used as a guide when determining the sequencing of the improvements; implementation should be refined based on actual development patterns and evolving transportation needs. However, several identified short-term improvements should be pursued in the near future. Additionally, active planning efforts for the more substantial long-term improvement project could begin now. Specifically, the following action items should be advanced:

- Route 322 corridor widening for a five-lane cross section from the Route 322/Route 422 Interchange to Homestead Road; includes planning and lobbying efforts and short-term implementation
- Planning and lobbying efforts for long-range improvements
    - Route 322/Route 422 Interchange reconfiguration; associated establishment of "Business Route 422"
    - Roundabout at Route 422 and Old West Chocolate Avenue
    - New Connector Road from Middletown Road to Waltonville Road
    - Middletown Road corridor widening
    - Hersheypark Drive corridor widening
    - New Connector Road from Northeast
    - New north/south connection (University or Mae/Lucy extensions)
    - Java / Caracas improvements
- Develop implementation strategy for missing sidewalk connections or extensions
- Develop implementation strategy for low-cost bicycle improvements (bike lanes, markings and signing improvements)

APPENDIX L
INTERSECTION CAPACITY ANALYSIS SUMMARY

UNSIGNALIZED INTERSECTIONS – LOS CRITERIA		
LEVEL OF SERVICE	**AVERAGE CONTROL DELAY (SEC/VEH)**	**EXPECTED DELAY CHARACTERISTICS**
A	≤ 10	Little or no delay
B	> 10 and ≤ 15	Short traffic delays
C	> 15 and ≤ 25	Average traffic delays
D	> 25 and ≤ 35	Long traffic delays
E	> 35 and ≤ 50	Very long delays
F	> 50	Volume exceeds capacity

SIGNALIZED INTERSECTIONS – LOS CRITERIA		
LEVEL OF SERVICE	**AVERAGE CONTROL DELAY (SEC/VEH)**	**EXPECTED DELAY CHARACTERISTICS**
A	≤ 10	Occurs when the volume-to-capacity ratio is low and either progression is exceptionally favorable (most vehicles arrive during the green indication and travel through the intersection without stopping) or the cycle length is very short.
B	> 10 and ≤ 20	Occurs when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.
C	> 20 and ≤ 35	Occurs when progression is favorable or the cycle length is moderate. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.
D	> 35 and ≤ 55	Occurs when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.
E	> 55 and ≤ 80	Occurs when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.
F	> 80	Occurs when the volume-to-capacity ratio is very high or greater than 1.0, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

Table 1: Level of Service Summary									
		AM Peak Hour				PM Peak Hour			
Road	Movement	2018 Existing Conditions	2028 Forecasted Traffic with New Links and Mitigation	2038 Forecasted Traffic with New Links	2038 Forecasted Traffic with New Links and Mitigation	2018 Existing Conditions	2028 Forecasted Traffic with New Links and Mitigation	2038 Forecasted Traffic with New Links	2038 Forecasted Traffic with New Links and Mitigation
Intersection 1: SR 2003 (Middletown Rd) & SR 322 EB Off Ramp/Service Rd									
Overall		N/A	N/A	N/A	N/A	**C (32.8)**	**C (20.3)**	**F (195.4)**	**C (32.8)**
Intersection 2: SR 2003 (Middletown Rd) & Wood Rd									
Overall		N/A	N/A	N/A	N/A	**E (38.4)**	**A (0.1)**	**A (0.1)**	**A (0.1)**
Intersection 3: SR 2003 (Middletown Rd) & Deer Run Dr/Stoverdale Rd									
Overall		N/A	N/A	N/A	N/A	**B (14.2)**	**B (13.6)**	**C (32.6)**	**C (31.1)**
Intersection 4: SR 2003 (Middletown Rd) & Locust Ln/Kaylor Rd									
Overall		N/A	N/A	N/A	N/A	**B (11.4)**	**B (18.5)**	**C (31.0)**	**B (11.1)**
Intersection 5: SR 2005 (Waltonville Rd/Quarry Rd) & Service Rd/SR 322 EB On Ramp									
Overall		**B (13.6)**	**See Intersection 36**			**B (17.6)**	**See Intersection 36**		
Intersection 6: SR 2005 (Waltonville Rd) & Wood Rd									
Overall		N/A	N/A	N/A	N/A	**C (15.6)**	**D (28.3)**	**F (66.0)**	**A (0.1)**
Intersection 7: Bullfrog Valley Rd & Wood Rd									
Overall		N/A	N/A	N/A	N/A	**C (17.0)**	**B (12.2)**	**F (66.9)**	**C (15.7)**
Intersection 8: Bullfrog Valley Rd & Research Blvd / Life Lion Dr									
Overall		**B (11.9)**	**C (22.8)**	**E (74.0)**	**C (34.6)**	**B (10.7)**	**B (18.5)**	**B (17.7)**	**C (22.5)**
Intersection 9: Walton Ave & E Main St/Driveway									
Overall		N/A	N/A	N/A	N/A	**A (8.4)**	**B (12.8)**	**B (12.3)**	**B (14.9)**
Intersection 10: Route 39 (W Hersheypark Drive) & Walton Ave/Mae St									
Overall		N/A	N/A	N/A	N/A	**F (83.9)**	**C (34.4)**	**F (108.4)**	**D (39.5)**
Intersection 11: Route 39 (W Hersheypark Drive)/W Hersheypark Drive & Route 39 (Hershey Rd)/Park Blvd									
Overall		**C (34.9)**	**C (29.2)**	**F (106.3)**	**C (28.2)**	**D (39.5)**	**C (34.9)**	**F (86.4)**	**D (38.0)**
Intersection 12: W Hersheypark Drive/E Hersheypark Dr & Park Drive/Sand Beach Road									
Overall		**B (19.9)**	**C (31.6)**	**D (51.9)**	**C (27.9)**	**C (29.1)**	**C (33.3)**	**F (143.3)**	**D (35.5)**

Road	Movement	AM Peak Hour				PM Peak Hour			
		2018 Existing Conditions	2028 Forecasted Traffic with New Links and Mitigation	2038 Forecasted Traffic with New Links	2038 Forecasted Traffic with New Links and Mitigation	2018 Existing Conditions	2028 Forecasted Traffic with New Links and Mitigation	2038 Forecasted Traffic with New Links	2038 Forecasted Traffic with New Links and Mitigation
Intersection 13: E Hersheypark Dr & Laudermilch Rd									
Overall		N/A	N/A	N/A	N/A	**B (18.3)**	**C (29.2)**	**F (87.5)**	**C (24.5)**
Intersection 14: E Hersheypark Dr & N Lingle Ave									
Overall		N/A	N/A	N/A	N/A	**B (12.2)**	**C (20.0)**	**C (30.2)**	**C (28.9)**
Intersection 15: Park Ave & E. Derry Rd									
Overall		N/A	N/A	N/A	N/A	**C (16.9)**	**A (4.9)**	**F (59.7)**	**A (5.0)**
Intersection 16: Park Blvd & Ridge Rd									
Overall		N/A	N/A	N/A	N/A	**A (9.2)**	**B (10.1)**	**B (10.7)**	**B (10.7)**
Intersection 17: SR 422 (W. Chocolate Ave) & University Ave									
Overall		N/A	N/A	N/A	N/A	**C (24.4)**	**C (30.2)**	**E (65.5)**	**C (34.5)**
Intersection 18: SR 422 (W. Chocolate Ave) & Hockersville Rd									
Overall		N/A	N/A	N/A	N/A	**C (24.1)**	**C (29.7)**	**D (42.5)**	**D (42.6)**
Intersection 19: SR 422 (E. Chocolate Ave) & Homestead Rd									
Overall		**C (22.1)**	**D (29.1)**	**E (43.2)**	**E (43.2)**	**C (28.8)**	**C (23.7)**	**D (34.3)**	**C (21.3)**
Intersection 20: SR 422 (E. Chocolate Ave) & E. Derry Rd									
Overall		N/A	N/A	N/A	N/A	**A (9.4)**	**B (13.5)**	**C (22.7)**	**B (11.8)**
Intersection 21: SR 422 (E. Chocolate Ave) & N. Lingle Ave/S. Lingle Ave									
Overall		N/A	N/A	N/A	N/A	**C (24.0)**	**C (27.7)**	**C (34.0)**	**C (33.7)**
Intersection 22: Hockersville Road and W Areba Avenue									
Overall		N/A	N/A	N/A	N/A	**C (18.7)**	**A (7.4)**	**F (63.8)**	**A (7.9)**
Intersection 23: SR 322 (W Governor Dr) & University Dr									
Overall		**B (19.9)**	**C (22.4)**	**E (75.3)**	**C (24.4)**	**B (15.3)**	**C (20.9)**	**D (45.3)**	**B (17.3)**
Intersection 24: SR 322 (W Governor Dr) & Centerview Dr									
Overall		**C (22.4)**	**B (11.9)**	**F (177.0)**	**B (10.8)**	**D (46.8)**	**C (23.3)**	**F (117.2)**	**B (15.5)**
Intersection 25: SR 322 (W Governor Dr) & Cherry Dr									
Overall		N/A	N/A	N/A	N/A	**C (23.8)**	**C (26.2)**	**C (29.8)**	**C (21.3)**

Road	Movement	AM Peak Hour				PM Peak Hour			
		2018 Existing Conditions	2028 Forecasted Traffic with New Links and Mitigation	2038 Forecasted Traffic with New Links	2038 Forecasted Traffic with New Links and Mitigation	2018 Existing Conditions	2028 Forecasted Traffic with New Links and Mitigation	2038 Forecasted Traffic with New Links	2038 Forecasted Traffic with New Links and Mitigation
Intersection 26: SR 322 (W Governor Dr) & Fishburn Rd/Hockersville Rd									
Overall		**D (43.5)**	**C (34.2)**	**F (93.0)**	**C (34.1)**	**D (46.3)**	**C (29.0)**	**E (68.8)**	**C (31.4)**
Intersection 27: Cherry Dr & Sand Hill Drive									
Overall		N/A	N/A	N/A	N/A	**B (14.4)**	**A (9.0)**	**A (9.7)**	**A (9.7)**
Intersection 28: SR 743 (Fishburn Rd) & Sand Hill Rd									
Overall		N/A	N/A	N/A	N/A	**A (9.4)**	**B (19.2)**	**E (37.2)**	**C (20.0)**
Intersection 29: SR 322 (W Governor Dr/E Governor Dr) & Cocoa Ave									
Overall		**B (19.1)**	**B (18.1)**	**D (45.1)**	**B (19.3)**	**C (26.6)**	**C (26.6)**	**E (69.3)**	**C (29.8)**
Intersection 30: SR 322 (E Governor Dr) & Homestead Rd									
Overall		**C (32.8)**	**C (30.8)**	**F (92.7)**	**C (32.5)**	**B (19.3)**	**C (24.6)**	**D (47.0)**	**C (25.1)**
Intersection 31: SR 743 (Fishburn Rd) & Cocoa Ave									
Overall		N/A	N/A	N/A	N/A	**C (20.1)**	**C (28.0)**	**D (37.9)**	**C (22.4)**
Intersection 31: SR 743 (Fishburn Rd) & Church Rd									
Overall		N/A	N/A	N/A	N/A	**A (1.3)**	**A (1.7)**	**A (2.0)**	**A (2.0)**
Intersection 33: Main St & Hanover St									
Overall		N/A	N/A	N/A	N/A	**C (20.6)**	**C (32.0)**	**D (47.7)**	**C (33.8)**
Intersection 34: Main St & Quarry Rd									
Overall		N/A	N/A	N/A	N/A	**A (3.4)**	**A (7.5)**	**F (50.8)**	**B (13.4)**
Intersection 35: SR 2003 (Middletown Rd) & Proposed Connector Rd									
Overall		N/A	N/A	N/A	N/A	N/A	N/A	**F (280.0)**	**D (39.8)**
Intersection 36: SR 2005 (Waltonville Rd) & Hershey West End Driveway / Service Rd									
Overall		N/A	N/A	N/A	N/A	N/A	N/A	**E (39.4)**	**D (25.5)**
Intersection 37: Hope Dr & Cherry Dr									
Overall		N/A	N/A	N/A	N/A	N/A	N/A	N/A	**C (26.2)**