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VOLUME 1

TRANSPORTATION IMPACT STUDY

for

MOUNT JOY TOWN CENTER

on

Existing Commercially Zoned Land

in

**Mount Joy Township
Lancaster County, Pennsylvania**

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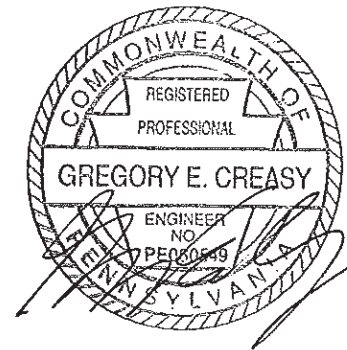


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EXECUTIVE SUMMARY

A retail development, Mount Joy Town Center, is proposed for a tract of land in Mount Joy Township, Lancaster County. The site is located in the northeast corner of the intersection of SR 0230 and Cloverleaf Road (SR 4025). This Transportation Impact Study (TIS) was performed assuming the following land uses:

Convenience Store with Gasoline Pumps
127,000 square feet of general retail space

It is noted that the current plans shows approximately 105,000 square feet of general retail space, so the trip generation projections used in this TIS result in conservative analyses.

Currently proposed access locations are as follows:

- 1) Signalized access onto SR 0230 located approximately 1,050 feet east of Cloverleaf Road via extension of Norlanco Drive
- 2) Right-in only driveway onto Cloverleaf Road on north side of convenience store parcel
- 3) Right-In/Right-Out Driveway onto Cloverleaf Road located 550 feet north of SR 0230
- 4) Right-In Only Driveway onto SR 0230 on the east side of the convenience store lot located approximately 425 feet from the stop bar at the signalized intersection of SR 0230/Cloverleaf Road

This TIS was prepared for a 2024 Opening Year and a 2029 Horizon Year. The following conclusions and recommendations are provided for the study area and the study area intersections:

SR 0230 and SR 0743 (Maytown Road)

- No improvements are necessary to mitigate the impact of traffic from the proposed development.

SR 0230 and Groff Avenue

- Level of service deficiencies exist at this intersection and will continue in the future traffic projections without or with traffic from the proposed development. Many of the residential developments that were included in the background traffic projections will contribute to traffic volumes at this intersection as well.

SR 0230 and Giant Plaza Driveway/Carey Lane

- No improvements are necessary to mitigate the impact of traffic from the proposed development.

SR 0230 and Speedway Driveway/Market Square Driveway

- No improvements are necessary to mitigate the impact of traffic from the proposed development.

SR 0230 and Sheaffer Road

- No improvements are necessary to mitigate the impact of traffic from the proposed development.

SR 0230 and Cloverleaf Road/Colebrook Road

- Minor traffic signal timing adjustments can mitigate impacts of the proposed development traffic.

SR 0230 and Ridge Run Road

- No improvements are necessary to mitigate the impact of traffic from the proposed development.

Colebrook Road and Harrisburg Avenue

- Installation of traffic signal control is required to mitigate the impact of traffic from the proposed development. It is noted that traffic signal installation at this intersection is identified as a future intersection improvement in the Mount Joy Township Capital Improvements Plan.

Cloverleaf Road and Andrew Avenue/Norlanco Drive

- Construction of a 150-foot northbound left turn lane and a 275-foot southbound left turn lane on Cloverleaf Road is necessary to mitigate impacts of the proposed development traffic. It is noted that these left turn lanes are identified as future intersection improvements in the Mount Joy Township Capital Improvements Plan.

Cloverleaf Road and Schwanger Road

- Minor traffic signal timing adjustments can mitigate impacts of the proposed development traffic.

Cloverleaf Road and Merts Drive

- No improvements are necessary to mitigate the impact of traffic from the proposed development.

Cloverleaf Road and PA Route 283 Eastbound Ramps

- Level of service deficiencies exist at this intersection and will continue in the future traffic projections without or with traffic from the proposed development. The Mount Joy Township Capital Improvements Plan identifies improvement options for the PA Route 283/Cloverleaf Road interchange. Completion of those improvements by any individual development is not feasible. Traffic Impact Fees collected by the Township for this project can be applied to those improvement solutions.

Cloverleaf Road and PA Route 283 Westbound Ramps

- No improvements are necessary to mitigate the impact of traffic from the proposed development.

SR 0230 and Right-In Access (near Convenience Store)

- Right turn lane analyses indicate that a 150-foot westbound right turn lane, with a 100-foot taper, is warranted along SR 0230 for traffic entering the proposed Right-In Access using 2029 Horizon Year traffic volumes.

SR 0230 and Norlanco Drive Extension

- Installation of traffic signal control is necessary to provide adequate levels of service at this proposed intersection. A 175-foot westbound right turn lane, with a 100-foot taper, will be constructed to accommodate traffic entering the Norlanco Drive Extension. The existing two-way center left turn only lane will be restriped to show a 250-foot eastbound left turn lane. Two (2) exiting lanes will be provided on the Norlanco Drive Extension.

- Sight distances for traffic entering and exiting the Norlanco Drive Extension are in excess of PennDOT sight distance criteria.

Cloverleaf Road and Right-In Access (near Convenience Store)

- Right turn lane analyses indicate that a 150-foot northbound right turn lane, with a 100-foot taper, is warranted along Cloverleaf Road for traffic entering the proposed Right-In Access using 2029 Horizon Year traffic volumes.

Cloverleaf Road and Eastern Parcels Access

- The Eastern Parcels Access will be designed to permit right-in/right-out movements.

- A raised, mountable-curb pork-chop island will be provided to restrict entering and exiting left turn movements.

- It is recommended that STOP (R1-1, 30"x30") and NO LEFT TURN (R3-2, 30"x30") be provided on the proposed Eastern Parcels Access approach for traffic exiting the development site.

INTRODUCTION

A retail development, Mount Joy Town Center, is proposed for a tract of land in Mount Joy Township, Lancaster County. The site is located in the northeast corner of the intersection of SR 0230 and Cloverleaf Road (SR 4025). This Transportation Impact Study (TIS) was performed assuming the following land uses:

Convenience Store with Gasoline Pumps
127,000 square feet of general retail space

It is noted that the current plans shows approximately 105,000 square feet of general retail space, so the trip generation projections used in this TIS result in conservative analyses.

Currently proposed access locations are as follows:

- 1) Signalized access onto SR 0230 located approximately 1,050 feet east of Cloverleaf Road via extension of Norlanco Drive
- 2) Right-in only driveway onto Cloverleaf Road on north side of convenience store parcel
- 3) Right-In/Right-Out Driveway onto Cloverleaf Road located 550 feet north of SR 0230
- 4) Right-In Only Driveway onto SR 0230 on the east side of the convenience store lot located approximately 425 feet from the stop bar at the signalized intersection of SR 0230/Cloverleaf Road

The following report contains analysis, conclusions, and recommendations for accommodation of traffic volumes anticipated to be generated by the proposed development site.

Grove Miller Engineering, Inc. has been retained by Penmark Management Company, Inc. to conduct a TIS for the development site. The scope of the TIS was confirmed by PennDOT and Mount Joy Township. Study scope documentation and study correspondence are included in Appendix P. The study methodology and traffic analyses documented in this transportation impact study report are in accordance with guidelines in Appendix A - Policies and Procedures for Transportation Impact Studies Related to Highway Occupancy Permits of Publication 282, dated July 2017 and Township SALDO requirements.

Land Use Context

The development site is located in an area defined by PennDOT as an Urban Area. When the existing land use of the proposed development site and the land uses of the properties immediately surrounding the site are considered, the area can be defined as a Suburban Corridor and SR 0230 and Cloverleaf Road (SR 4025) can be considered Community Arterials based upon criteria in Publication 10X (Design Manual Part 1X), Appendix B.

Study Area Transportation Facilities

Based on the scoping process, the study area consists of the following intersections:

- SR 0230 and SR 0743 (Maytown Road)
- SR 0230 and Groff Avenue
- SR 0230 and Giant Plaza Driveway/Carey Lane
- SR 0230 and Speedway Driveway/Market Square Driveway
- SR 0230 and Sheaffer Road
- SR 0230 and Cloverleaf Road/Colebrook Road
- SR 0230 and Ridge Run Road
- Colebrook Road and Harrisburg Avenue
- Cloverleaf Road and Andrew Avenue/Norlanco Drive
- Cloverleaf Road and Schwanger Road

- Cloverleaf Road and Merts Drive
- Cloverleaf Road and PA 283 Eastbound Ramps
- Cloverleaf Road and PA 283 Westbound Ramps
- SR 0230 and Right-In Access (near Convenience Store)
- SR 0230 and Norlanco Drive Extension
- Cloverleaf Road and Right-In Access (near Convenience Store)
- Cloverleaf Road and Eastern Parcels Access

Photographs of the study area intersections are provided in Appendix F, while documentation of existing roadway conditions and transportation facilities are included in Appendix E.

There are no existing sidewalks along SR 0230 or Cloverleaf Road in the area of the development site. Pedestrian accommodations are provided at the signalized intersection of SR 0230 and Cloverleaf Road. Bicycles share the roadway with passenger vehicles, trucks, and busses.

Study Area Map

A map showing the study area and the proposed site location is provided in Appendix B, Figure 1.

Site Plan

The site plan depicts the current development proposal of a convenience store with gasoline pumps and general retail space. It is noted that the current plans shows approximately 105,000 square feet of general retail space, so the trip generation projections used in this TIS result in conservative analyses.

Currently proposed access locations are as follows:

- 1) Signalized access onto SR 0230 located approximately 1,050 feet east of Cloverleaf Road via extension of Norlanco Drive
- 2) Right-in only driveway onto Cloverleaf Road on north side of convenience store parcel
- 3) Right-In/Right-Out Driveway onto Cloverleaf Road located 550 feet north of SR 0230
- 4) Right-In Only Driveway onto SR 0230 on the east side of the convenience store lot located approximately 425 feet from the stop bar at the signalized intersection of SR 0230/Cloverleaf Road

This TIS was prepared for a 2024 Opening Year and a 2029 Horizon Year.

DATA COLLECTION

Manual turning movement counts (TMC) were conducted at the following study area intersections:

- SR 0230 and SR 0743 (Maytown Road)
- SR 0230 and Groff Avenue
- SR 0230 and Giant Plaza Driveway/Carey Lane
- SR 0230 and Speedway Driveway/Market Square Driveway
- SR 0230 and Sheaffer Road
- SR 0230 and Cloverleaf Road/Colebrook Road
- SR 0230 and Ridge Run Road
- Colebrook Road and Harrisburg Avenue
- Cloverleaf Road and Andrew Avenue/Norlanco Drive
- Cloverleaf Road and Schwanger Road
- Cloverleaf Road and Merts Drive
- Cloverleaf Road and PA 283 Eastbound Ramps
- Cloverleaf Road and PA 283 Westbound Ramps

The TMC were conducted during the weekday morning (6:00 AM to 9:00 AM), weekday afternoon (3:00 PM to 6:00 PM), and Saturday (11:00 AM to 2:00 PM) peak periods. The TMC traffic counts were conducted in March 2022. No seasonal adjustments were applied to the raw count data.

Automatic traffic recorder (ATR) counts were conducted along SR 0230, Cloverleaf Road, and Ridge Run Road in the area of the development site. The TMC and ATR data sheets are provided in Appendix H.

EXISTING STUDY AREA CONDITIONS

The area around the proposed development is within an urban boundary but is more characteristic of a suburban corridor. SR 0230 and Cloverleaf Road (SR 4025) are the major roadways providing access to the development site.

Roadway Network

The study area includes the following roadways:

SR 0230. SR 0230 is a three-lane roadway (one lane in each direction and a center left-turn only lane) running in an east/west direction south of and adjacent to the development site. The roadway is classified as a Community Arterial using Publication 10X (Design Manual 1X), Appendix B. The current average daily traffic (ADT) volume on SR 0230 is approximately 10,000 vehicles per day in the vicinity of the proposed development site. Pavement markings consist of a yellow center left-turn only pattern and white edge lines. The posted speed limit along SR 0230 is 45 miles per hour (mph) along the western development frontage (west of Cloverleaf Road) and for approximately 1,500 feet east of Cloverleaf Road. The posted speed limit to the east of that location (along the eastern development frontage) is 55 mph..

Cloverleaf Road (SR 4025). Cloverleaf Road is a two-lane roadway running in a north/south direction adjacent to the development site. Cloverleaf Road is designated as SR 4025 through the study area. The roadway is classified as a Community Arterial using Publication 10X (Design Manual 1X), Appendix B. The current ADT volume on Cloverleaf Road is approximately 16,000 vehicles per day in the vicinity of the proposed development site. Pavement markings consist of a double yellow center line and white edge lines. The posted speed limit along Cloverleaf Road is 40 mph in the area of the development site.

Ridge Run Road (T-327). Ridge Run Road is a two-lane roadway running in a north/south direction east of and adjacent to the development site. Ridge Run Road is designated as T-327. The roadway is classified as a Local Road using Publication 10X (Design Manual 1X), Appendix B. The current ADT volume on Ridge Run Road is approximately 775 vehicles per day in the vicinity of the proposed development site. Pavement markings consist of a double yellow center line. The posted speed limit along Ridge Run Road is 35 mph in the area of the development site.

Maytown Road (SR 0743). Maytown Road is a two-lane roadway running in a north/south direction west of the development site. Maytown Road is designated as SR 0743 through the study area. Pavement markings consist of a double yellow center line and white edge lines. The posted speed limit along Maytown Road is 35 mph in the area of SR 0230.

Groff Avenue. Groff Avenue is a two-lane roadway running in a north/south direction west of the development site. Groff Avenue is a Borough street. Pavement markings consist of a double yellow center line. The posted speed limit along Groff Avenue is 35 mph in the area of SR 0230.

Sheaffer Road (T-888). Sheaffer Road is a two-lane roadway running in a north/south direction west of the development site. Sheaffer Road is designated as T-888 in the study area. Pavement markings consist of a double yellow center line. The posted speed limit along Sheaffer Road is 35 mph in the area of SR 0230.

Harrisburg Avenue (SR 4018). Harrisburg Avenue is a two-lane roadway running in an east/west direction south of the development site. Harrisburg Avenue is designated as SR 4018 through the study area. Pavement markings consist of a double yellow center line and white edge lines. The posted speed limit along Harrisburg Avenue is 35 mph in the area of Cloverleaf Road.

Andrew Avenue. Andrew Avenue is a two-lane roadway running in an east/west direction west of the development site. Andrew Avenue is designated as T-351 through the study area. Pavement markings consist of a double yellow center line in the area of Cloverleaf Road. The posted speed limit along Andrew Avenue is 25 mph in the area of Cloverleaf Road.

Norlanco Drive. Norlanco Drive is a two-lane roadway running in an east/west direction north of the development site. Norlanco Drive is designated as T-351 through the study area. Pavement markings consist of a double yellow center and white edge lines. The posted speed limit along Norlanco Drive is 25 mph in the area of Cloverleaf Road.

Schwanger Road. Schwanger Road is a two-lane roadway running in an east/west direction north of the development site. Schwanger Road is designated as T-843 through the study area. Pavement markings consist of a double yellow center line and white edge lines. The posted speed limit along Schwanger Road is 35 mph in the area of SR Cloverleaf Road.

Merts Drive. Merts Drive is a two-lane roadway running in an east/west direction north of the development site. Merts Drive is designated as T-833 through the study area. Pavement markings consist of a double yellow center line and white edge lines. The posted speed limit along Merts Drive is 25 mph in the area of Cloverleaf Road.

Existing traffic signal permit plans are provided in Appendix B, Figure 3d.

Volumes and Capacity

Capacity and queue analyses were completed using Synchro Software, Version 11.1, Build 2, Revision 9. The existing coordination or MAX signal times were utilized for existing conditions. Capacity analyses for existing conditions at study area intersections are summarized in Appendix A, Table 1. Existing traffic volumes and levels of service at study area intersections are shown in Appendix B, Figures 3a through 3c. The capacity analyses worksheets are provided in Appendix L.

Pedestrian/Bicycle Facilities

There are no existing sidewalks along SR 0230 or Cloverleaf Road in the area of the development site. Pedestrian accommodations are provided at the signalized intersection of SR 0230 and Cloverleaf Road. Bicycles share the roadway with passenger vehicles, trucks, and busses.

Transit Facilities

Red Rose Transit Route 18 currently provides service to the study area, including a stop at the intersection of SR 0230 and Cloverleaf Road (SR 4025). The applicant is working with the transit service about providing a bus stop along the SR 0230 site frontage.

OPENING YEAR CONDITIONS WITHOUT DEVELOPMENT

Traffic analyses conducted for conditions without the development are documented in this report section. The 2024 Opening Year was analyzed.

Background Growth Factors

Traffic projections were made in order to account for growth in background traffic volumes which may result from other future, potential development in the region. The 2022 traffic count volumes were projected to the 2024 Opening Year using a 0.60 percent annual traffic growth rate. The traffic growth rate was referenced from growth factor data provided by the PennDOT Bureau of Planning and Research and is documented in Appendix I. Opening Year traffic volumes are shown in Appendix C, Figure 5a. Traffic volume projections are documented in spreadsheet format in Appendix K.

Adjacent Development Traffic

The Township provided information regarding six (6) other development projects in the area. The developments are: Featherton 5, 1376 Campus Road, 1925 Sheaffer Road, Westbrooke IV, Raffensperger, and Westmount. Traffic for these developments was included in the traffic projections where appropriate (TIS submitted to the Township prior to the TIS submission for this development).

Capacity Analysis

Capacity and queue analyses were completed using Synchro Software, Version 11.1, Build 2, Revision 9. Traffic signal timings were optimized for No Build conditions. Capacity analyses for the Opening Year without development conditions at study area intersections are summarized in Appendix A, Table 1. The capacity and queue analyses worksheets are provided in Appendix L.

HORIZON YEAR CONDITIONS WITHOUT DEVELOPMENT

Traffic analyses conducted for conditions without the development are documented in this report section. The 2029 Horizon Year was analyzed.

Background Growth Factors

Traffic projections were made for the Horizon Years in a similar manner as the projections for the Opening Years as defined in the previous report section. Horizon Year traffic volumes are shown in Appendix D, Figure 6a.

Adjacent Development Traffic

Adjacent developments, as defined in the previous report sections, were included in the traffic projections.

Capacity Analysis

Capacity and queue analyses were completed using Synchro Software, Version 11.1, Build 2, Revision 9. Traffic signal timings were optimized for No Build conditions. Capacity analyses for Horizon Year conditions at study area intersections are summarized in Appendix A, Table 1. The capacity and queue analyses worksheets are provided in Appendix L.

DEVELOPMENT DESCRIPTION

Site Narrative

A retail development, Mount Joy Town Center, is proposed for a tract of land in Mount Joy Township, Lancaster County. The site is located in the northeast corner of the intersection of SR 0230 and Cloverleaf Road (SR 4025). This Transportation Impact Study (TIS) was performed assuming the following land uses:

Convenience Store with Gasoline Pumps
127,000 square feet of general retail space

It is noted that the current plans shows approximately 105,000 square feet of general retail space, so the trip generation projections used in this TIS result in conservative analyses.

Currently proposed access locations are as follows:

- 1) Signalized access onto SR 0230 located approximately 1,050 feet east of Cloverleaf Road via extension of Norlanco Drive
- 2) Right-in only driveway onto Cloverleaf Road on north side of convenience store parcel
- 3) Right-In/Right-Out Driveway onto Cloverleaf Road located 550 feet north of SR 0230
- 4) Right-In Only Driveway onto SR 0230 on the east side of the convenience store lot located approximately 425 feet from the stop bar at the signalized intersection of SR 0230/Cloverleaf Road

The land use at and surrounding the site is suburban based on the criteria discussed in Publication 10X (Design Manual 1X), Appendix B and will not change as a result of the proposed development.

This TIS was prepared for a 2024 Opening Year and a 2029 Horizon Year.

Sight Distance Analysis

Sight distances were evaluated at the proposed site access locations onto SR 0230 and Cloverleaf Road to determine if available lines of sight meet PennDOT sight distance criteria. Sight distances were measured and compared with the published safe sight distance criteria in AASHTO or PennDOT Regulations Chapter 441 as necessary. A summary of sight distance criteria and measurements for the intersections can be found in Tables 3 and 4.

Table 3. Sight Distance Evaluation Summary:
 SR 0230 and Norlanco Drive Extension

Location	Direction	Observed Sight Distance (ft)	Required Sight Distance (ft)	Acceptable
Norlanco Drive Extension @ SR 0230	Left (east)	1,000+	430 ⁽¹⁾	YES
	Right (west)	1,000+	500 ⁽²⁾	YES
vehicle approaching from rear on major street	EB	1,000+	376 ⁽³⁾	YES
left turn from major street	EB left	960	365 ⁽⁴⁾	YES

(1) AASHTO, Table 9-8

(2) AASHTO, Table 9-6

(3) Minimum safe stopping sight distance

(4) AASHTO, Table 9-14

Table 4. Sight Distance Evaluation Summary:
 Cloverleaf Road and Eastern Parcels Access

Location	Direction	Observed Sight Distance (ft)	Required Sight Distance (ft)	Acceptable
Eastern Parcels Access @ Cloverleaf Road	Left (south)	500	540 ⁽¹⁾ 304 ⁽²⁾	YES
	Right (north)	N/A	N/A	YES
vehicle approaching from rear on major street	SB	497	325 ⁽²⁾	YES
left turn from major street	SB left	472	375 ⁽³⁾	YES

(1) Ch 441, Table 1

(2) Minimum safe stopping sight distance

(3) Ch 441, Table 5

The sight distance evaluations indicate that the lines of sight at the proposed site access locations are acceptable and provide for safe traffic movements.

Documentation of sight distance evaluations is provided in Appendix N.

Trip Generation

The Institute of Transportation Engineers (ITE), Trip Generation Manual, 11th Edition (2021) was used to estimate the number of trips which could be generated by the Mount Joy Town Center site. Table 5 summarizes the trip generation projections for the site, and trip generation calculation worksheets are provided in Appendix J.

Table 5. Proposed Land Use and Trip Generation Summary

Land Use (Code)	Daily Trips	Peak Hour Trips					
		AM Enter	AM Exit	PM Enter	PM Exit	SAT Enter	SAT Exit
Retail (821)	11,213	279	171	526	570	557	536
Pass-By Trips	–	0	0	210	228	173	166
New Trips	–	279	171	316	342	384	370
Conv. Store (945)	3,690	189	190	161	162	175	182
Pass-By Trips	–	144	144	121	121	114	118
New Trips	–	45	46	40	41	61	64
Total Site Trips	14,903	468	361	687	732	732	718
Total Pass-By Trips	–	144	144	331	349	287	284
Total New Trips	–	324	217	356	383	445	434

For the Convenience Store land use, trip generation calculations were performed using the number of vehicle fueling positions category with the building square footage as the secondary variable, and then with the building square footage category with the number of fueling positions as the secondary variable to determine the most conservative estimates. The most conservative estimate was used in the trip generation projections.

Pass-By Trips

Pass-By Trips are applicable to land uses associated with this development and were applied based on the following percentages:

- Shopping Plaza (40,000-150,000 sq. ft.) - 40% PM, 31% SAT
- Convenience Store - 76% AM, 75% PM, 65% SAT (assume 10% less than PM)

Documentation is provided in Appendix J.

Internal Capture Trips

Internal capture trips are applicable to the proposed land uses.

Trip Distribution/Assignment

New and pass-by trips generated by the proposed development were distributed onto the surrounding roadway network based on gravity models as approved during the TIS Scoping Application process. The trip distributions for the peak hours are shown in Appendix B, Figures 4a and 4b. Additional trip distribution documentation is provided in Appendix K.

OPENING YEAR CONDITIONS WITH DEVELOPMENT

Traffic analyses conducted for conditions with the development are documented in this report section. The 2024 Opening Year was analyzed.

Volumes and Capacity Analysis

Capacity and queue analyses were completed using Synchro Software, Version 11.1, Build 2, Revision 9. The traffic signal timings that were optimized for No Build conditions were utilized for Build conditions. Capacity analyses for Opening Year traffic conditions with development at study area intersections are summarized in Appendix A, Tables 1, 3, and 5. Projected traffic volumes at study area intersections are shown in Appendix C, Figure 5b for the Opening Year. The capacity analyses worksheets are provided in Appendix L.

HORIZON YEAR CONDITIONS WITH DEVELOPMENT

Traffic analyses conducted for conditions with the development are documented in this report section. The 2029 Horizon Year was analyzed.

Volumes and Capacity Analysis

Capacity and queue analyses were completed using Synchro Software, Version 11.1, Build 2, Revision 9. The traffic signal timings that were optimized for No Build conditions were utilized for Build conditions. Capacity analyses for Horizon Year traffic conditions with development at study area intersections are summarized in Appendix A, Table 1. Projected traffic volumes at study area intersections are shown in Appendix D, Figure 6b for the Horizon Year. The capacity analyses worksheets are provided in Appendix L.

Traffic Signal Warrant Analyses

Traffic signal warrant analyses were performed for the intersection of SR 0230/ Norlanco Drive Extension. The analyses indicate that the peak hour volume warrant is justified during the 2024 Opening Year with the proposed development traffic. The analyses are provided in Appendix O.

Queue Analysis

Queue analyses were performed for the study intersections using the traffic volumes for the 2029 Horizon Year. The analyses provided recommendations for proposed turning lanes and assessed whether existing storage lanes for turning movements are adequate to accommodate the additional traffic generated by the proposed development. The results of the queue analyses are presented in Appendix A, Table 2. Queue analyses worksheets are provided with the capacity analyses worksheets in Appendix L.

Left Turn Lane Analyses

The 2029 Horizon Year traffic volumes were analyzed to determine whether PennDOT guidelines for left turn lanes may be satisfied along SR 0230 and Cloverleaf Road at the proposed site access locations. The analyses indicated the following:

SR 0230/Norlanco Drive Extension: 250-foot eastbound left turn lane is warranted

Cloverleaf Rd/Andrew Avenue: 150-foot northbound left turn lane is warranted

Cloverleaf Rd/Andrew Avenue: 275-foot southbound left turn lane is warranted

The figures used in the left turn lane analyses are included in Appendix M.

Right Turn Lane Analyses

The 2029 Horizon Year traffic volumes were analyzed to determine whether PennDOT guidelines for right turn lanes may be satisfied along SR 0230 and Cloverleaf Road at the proposed site access locations. The analyses indicated the following:

SR 0230/Right-In Access: 150-foot westbound right turn lane is warranted

SR 0230/Norlanco Drive Extension: 175-foot westbound right turn lane is warranted

Cloverleaf Rd/Right-In Access: 150-foot northbound right turn lane is warranted

Cloverleaf Rd/Eastern Parcels Access: 150-foot northbound right turn lane is warranted

The figures used in the right turn lane analyses are included in Appendix M.

MITIGATION IDENTIFICATION AND RECOMMENDATIONS

The recommended improvements for off-site intersections are documented in this report section.

SR 0230/Cloverleaf Road - traffic signal timing adjustments in PM peak hour

Colebrook Road/Harrisburg Avenue - traffic signal installation

Colebrook Road/Andrew Avenue - northbound and southbound left turn lanes

Cloverleaf Road/Schwanger Road - traffic signal timing adjustments in PM peak hour

Alternative Transportation Plan

No Alternative Transportation Plan is proposed.

CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations are documented in the Executive Summary of the study report.