



CITY OF BETHLEHEM

BUREAU OF PLANNING AND ZONING

10 East Church Street, Bethlehem, Pennsylvania 18018-6025

Phone: 610-865-7094

Fax: 610-865-7330

TDD: 610-865-7086

May 8, 2026

Andrew Bohl, PE



RE: (25-001 SUB) – 25120001 – TOWNSHIP LINE ROAD (between Santee Mill Rd and US Route 22, formerly known as GOLD TRACT, now called Autumn Estates) – MAJOR SUBDIVISION PLAN – Ward 14, Zoned RR, plan dated November 21, 2025, last revised April 1, 2026.

Dear Sir:

The above-referenced plan has been reviewed by the appropriate City offices. We offer the following comments:

PUBLIC WORKS

Stormwater Engineering

1. The connection from INL-OFF-3 to INL-OFF-2 must be 18" Reinforced Concrete Pipe (RCP).
2. There are no existing inlets along the west side of Township Line Road. Revise the plans to account for this stormwater in this location.
3. This project is not subject to Article 925, impervious coverage charge, as runoff will be infiltrated on-site.
4. Provide a copy of the final National Pollutant Discharge and Elimination System (NPDES) Permit upon review by the Pennsylvania Department of Environmental Protection (PaDEP).
5. A copy of the Lehigh Valley Planning Commission (LVPC) review letter shall be submitted to the City with their acceptance of the stormwater management report.

Sanitary Engineering

1. Applicants have acknowledged that Bethlehem Township Municipal Authority (BTMA) will take ownership of the sanitary sewer facilities constructed as part of this project and applicants will provide additional documentation as such when it becomes available.
2. In accordance with No. 4342, at the time of execution of the developer's agreement, a sanitary sewer tapping fee of \$48,013.00 shall be paid. The total amount has been determined based on the sanitary sewer planning module and project narrative submitted by the applicant.
3. The Engineering Bureau cannot provide the required verification of the City's ability to convey the proposed sewer discharge to the wastewater plant due to a downstream facility which has been found to be over capacity. Provided planning module documents cannot be submitted to PaDEP until such a time that this situation is resolved. The Engineering Bureau has been in contact with the applicants' engineer to apprise them of the situation and steps the City is taking to resolve the issue. Please note that building permits cannot be issued until the Planning Module is reviewed and approved by PaDEP.

Miscellaneous Engineering

1. Provide legal descriptions of all proposed lots within the City of Bethlehem. This shall be included under Additional Special Provisions within the Developer's Agreement and recorded prior to the release of final security.
2. The submitted legal description and exhibit for the Township Line Road right-of-way has been submitted to the City Solicitor's office for their review. Applicants shall coordinate with the Solicitor's Office to execute a dedication agreement for the proposed right-of-way. This shall be included under Additional Special Provisions within the Developer's Agreement and recorded prior to the release of final security.
3. The Emergency access drive entrance shall be designed as a City standard driveway apron. A copy of the City standard driveway detail shall be included in the plan set. Contact Adam Herbold at 610.865.7040, or aherbold@bethlehem-pa.gov, for standard details.
4. The ADA-compliant curb ramp design details, including proposed design slopes, shall be included on the plan set.

Traffic

1. A review letter from Benchmark Engineering, the City's Traffic Engineer, dated February 20, 2026, is enclosed for reference.
 - a. Applicants submitted a Transportation Impact Assessment on May 8, 2026; pages 1-8 are attached hereto. The City's response to this submission will be issued under separate cover.

FIRE

1. All 'Fire Lanes' or "Fire Department Access Roads" shall be identified and properly marked (Refer to International Fire Code, 2018 ed., Section 503 and Appendix D for additional information. Locations for signs and markings can be determined as the project progresses).
 - a. Location for fire lane signage cannot be determined until the building height is provided. Provide an elevation plan(s).
 - i. Elevations indicating building height were not provided as required. Provide an elevation plan(s). Provide overall building height, height from grade plane to the highest roof surface (For purposes of this section, the highest roof surface shall be determined by measurement to the eave of a pitched roof, the intersection of the roof to the exterior wall, or the top of parapet walls, whichever is greater).
2. Add a note to the plan, Fire apparatus access roads shall not be obstructed in any manner, including the parking of vehicles. The minimum widths and clearances established in Sections 503.2.1 and 503.2.2 shall be maintained at all times. Indicate the proposed building height.
 - a. This comment has been acknowledged. This comment remains on this letter to address the required note.
3. Add a note to the plan, On street vehicle parking is considered an obstruction. Clear roadway width must be a minimum of 26'. Autumn Ridge Road shall be widened or marked with code compliant fire lane signage as referenced in Fire Comment 1.

Contact the City of Bethlehem Fire Department office at: 610-865-7143, and request either Fire Marshal Craig Baer (cbaer@bethlehem-pa.gov) or Chief Fire Inspector Lucas Fuller (lfuller@bethlehem-pa.gov) with any questions, referenced Fire Code requirements or to obtain any documents required to complete the submittal for review.

ZONING

1. The comments regarding the Yield Plan remain. The Yield plan is to be based upon the site as it currently exists at time of submission and documents the number of lots possible under current existing conditions.
 - a. The Yield Plan is dated 2007, predates the current Zoning Ordinance by approximately 5 years and the current date by approximately 19 years. The Yield Plan does not appear to

account for parcel M6 4 1A 0204, which is owned by Bethlehem Township Municipal Authority. The yield plan cites some minor dimensional discrepancies with current ordinances.

- b. Zoning Ordinance Section 1309.03(b) requires The Yield Plan shall accurately show the maximum number of dwelling units that would be possible under current City Ordinances if the Open Space Development provisions would not be used, and instead the provisions for conventional development in the Rural Residential (RR) District would be used.
 - c. This comment is carried forward from the previous August 11, 2025 Sketch Plan review and appears to have not been addressed, "The Yield Plan includes two building lots in the location of the currently legally existing Northampton County Parcel M6 4 1A 0204, which is set to host required Water or Sewer infrastructure. As this infrastructure is required regardless of the utilization of provisions contained in Article 1309 of the Zoning Ordinance, this lot area shall be removed from the calculations."
2. It is not readily apparent what entity is proposed to ultimately take ownership of the open space parcels. Dispensation of eventual open space must comply with the requirements of City of Bethlehem Zoning Ordinance Sections 1309.04 and 1309.05.
 - a. This comment shall be carried forward until an acceptable method of preservation is approved by the City Planning Commission.

GENERAL

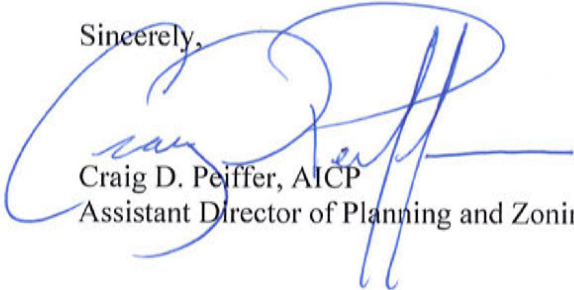
1. Provide an opinion of probable cost estimate in MS Excel Format.
2. A recreation fee calculated using the approved number of dwellings x \$1, 500 shall be required at the time of execution of the developer's agreement.
 - a. Applicant has acknowledged this comment. This comment remains on this letter for inclusion on the developer's agreement; no further response is required.
3. Applicants shall submit a legal description and exhibit for Township Line Road Right-of-Way to be dedicated to the City for review by the city and subsequent recording by the applicants. This shall be included under Additional Special Provisions within the Developer's Agreement and recorded prior to the release of final security; Ref. 1345.02(G).
 - a. Applicant has submitted a legal description and exhibit, which remains under City review. This comment remains on this letter for inclusion on the developer's agreement; no further response is required.
4. Applicants shall submit a legal description and exhibit for the 22' wide access easement for the relocated driveway for the existing dwelling to the City for review by the city and subsequent recording by the applicant. This shall be included under Additional Special Provisions within the Developer's Agreement and recorded prior to the release of final security.
 - a. Applicant has submitted a legal description and exhibit, which remains under City review. This comment remains on this letter for inclusion on the developer's agreement; no further response is required.
5. Add a note to the plan, 1349.04(J) Maintenance of a Non-Public Street. If an association of property owners is to be made responsible, such association must be legally organized according to a timetable approved by the City, and the documents shall be subject to acceptance by the City Solicitor for legal form.
 - a. Applicant has acknowledged this comment. This comment remains on this letter for inclusion on the developer's agreement; no further response is required.
6. Sheet 19 of 30, Lighting and Landscaping Plan, It is recommended that the stormwater basin be designed using native, water-tolerant plantings that promote pollinators and migratory birds and avoid grasses that require weekly mowing of the interior, Ref. 1349.08(C)(3)&(7).
 - a. Applicants' response was to "...look into providing appropriate species in Basin 1..." Upon investigate, applicants shall provide their recommendations to the City for approval.
7. Comments from Bethlehem Township, including, but not limited to, Township Engineer (Pidcock Company), Township Planning Consultant (Thomas Comitta Associates), Township

Mechanical/Electrical Engineers (Snyder Hoffman Associates) Township Fire Marshall, Zoning Officer and Public Works Director will be issued under separate cover.

When these comments are addressed, please submit two (2) full sets of revised plans, one (1) partial sets of revised plans for Fire, an electronic plan, and a comment/response letter for further review.

This plan will be placed on the May 14, 2026, Planning Commission Agenda.

Sincerely,



Craig D. Peiffer, AICP
Assistant Director of Planning and Zoning

C.	Geoffrey Karanaja	Olivia Teel	Mike Halbfoerster
	Cathy Fletcher	Craig Baer	Gregory Cryder
	Adam Herbold	Ryan Knause	Robert Taylor
	David Taylor		

Enc.



1727 Jonathan Street • Allentown, PA 18104
Phone: (610) 776-6700 • Fax: (610) 776-1190 • www.bencivil.com

February 20, 2026

Craig Peiffer
Stephany Sebesta
City of Bethlehem
10 E. Church Street
Bethlehem, PA 18018
cpeiffer@bethlehem-pa.gov
Ssebesta@bethlehem-pa.gov

RE: Traffic Review #1
Autumn Estates Development
Review of Trip Generation and Site Plan
City of Bethlehem
Benchmark Project No. 038100

Dear Craig and Stephany:

Benchmark Civil Engineering Services, Inc. has reviewed the Trip Generation Assessment for the Gold Property - 65 Unit Single Family Residential Development letter dated September 16, 2025 and the Overall Layout Plan Autumn Estates Development Plan Prepared dated 11/21/25 prepared by Hanover Engineering with respect to City of Bethlehem Ordinance No. 2025-39.

We offer the following comments.

1. The Trip Generation Assessment utilizes the 11th Ed. of the ITE Trip Generation Manual. The current editions is the 12th Edition. Utilizing the 12th Ed. the projected trip generation from the proposed 65 lot single family residential development (19 lots in the city of Bethlehem and 46 lots in Bethlehem Township) generates a volume of traffic which requires a limited transportation impact study to address pedestrian safety concerns.
2. The Transportation Impact Study should describe the site's trip generation, the available sight distance for pedestrians at the intersection with Township Line Road and the potential connections and limitations to connections to adjacent properties.

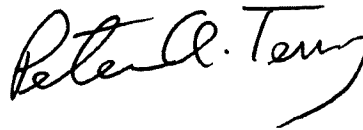
Craig Peiffer
Stephany Sebesta
City of Bethlehem
Traffic Review #1, Autumn Estates Development
Benchmark Project No. 038100

February 20, 2026

3. The Transportation Impact Study should also identify the trip distribution anticipated for the proposed development. We suggest that a traffic count be performed during the weekday AM (7-9) and PM (4-6) peak periods at the intersection of Township Line Road and Cottage Drive to identify the distribution of both vehicular and pedestrian traffic from that adjacent development.

If you have any questions please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink that reads "Peter A. Terry". The signature is written in a cursive, flowing style.

Peter A. Terry, P.E., PTOE, PMP, RSP2I

PAT/slc



May 8, 2026
TPD# HVHL.00001

Autumn Estates

Transportation Impact Assessment

City of Bethlehem,

Northampton County, PA

For Submission To:

City of Bethlehem

AUTUMN ESTATES TRANSPORTATION IMPACT ASSESSMENT

FOR SUBMISSION TO:

City of Bethlehem, Northampton County, PA

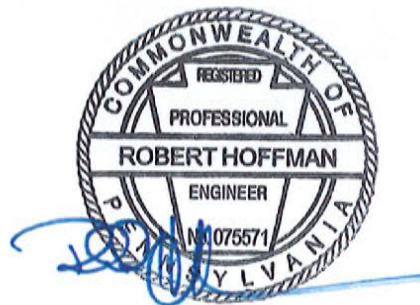
Prepared For:
Highview Homes, LLC
Dave Gunia
106 Route 71, Suite 3
Spring Lake, NJ 07762

May 8, 2026
TPD # HVHL.00001



Prepared By:
TPD
1720 Spillman Drive, Suite 260
Bethlehem, Pennsylvania 18015

Phone: (610) 326-3100
Fax: (610) 326- 9410
E-mail: TPD@TPDinc.com
Website: www.TPDinc.com



Robert Hoffman, P.E., PTOE
Regional Manager
Pennsylvania License Number 075571

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TECHNICAL APPENDICES

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Appendix B:	Study Area Photographs
Appendix C:	Intersection Traffic Count Printouts
Appendix D:	Traffic Volume Development Worksheets
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Appendix F:	Auxiliary Turn Lane Warrant Analyses

EXECUTIVE SUMMARY

The purpose of this traffic assessment is to examine the potential traffic impact associated with the proposed Autumn Estates residential development on the roadway network in the City of Bethlehem, Northampton County, PA. Based on this evaluation, the following conclusions were reached:

- » The study area intersections included in this TIA are as follows:
 - » Township Line Road & Cottage Drive;
 - » Township Line Road & Altonah Road/Santee Mill Road.
- » The project site is located on the eastern side of Township Line Road, south of S.R. 0022.
- » Access to the site is proposed via one full-access driveway to Township Line Road which will form the fourth leg of the intersection with Cottage Drive. Additionally, an emergency access will be provided to Township Line Road.
- » All proposed driveway location sight distances will exceed Safe Stopping Sight Distance criteria.
- » The proposed site will consist of 65 single family homes.
- » Upon full build-out, the proposed development is expected to generate 49 new vehicle-trips during the weekday A.M. peak hour and 65 new vehicle-trips during the weekday P.M. peak hour.
- » Under the 2029 projected conditions, all approaches and turning movements at the site driveway intersection with the external roadway network will operate at LOS B or better during weekday A.M. and weekday P.M. peak hours.
- » All overall intersection levels of service (ILOS) at the offsite study area intersection will operate at an ILOS A during the 2029 projected condition scenarios.
- » Levels of Service (LOS) for the study area intersections have been summarized in matrix form. **Table I** details the LOS for each study area intersection.

TABLE I
LEVEL OF SERVICE DELAY (SECONDS) SUMMARY

Intersection	Movement	Weekday A.M. Peak Hour			Weekday P.M. Peak Hour		
		Existing Condition	Opening Year 2029		Existing Condition	Opening Year 2029	
			Base	Projected		Base	Projected
Township Line Road & Cottage Drive / Proposed Site Driveway	EB LTR	A	A	A	A	A	B
	WB LTR	--	--	B	--	--	B
	NB LTR	A	A	A	A	A	A
	SB LTR	A	A	A	A	A	A
	ILOS	A (0.2)	A (0.2)	A (1.4)	A (0.3)	A (0.3)	A (1.3)
Township Line Road / Altonah Road & Santee Mill Road	WB LR	A	A	A	A	A	A
	NB TR	A	A	A	A	A	A
	SB LT	A	A	A	A	A	A
	ILOS	A (3.2)	A (3.0)	A (3.2)	A (5.1)	A (5.1)	A (5.3)

Base = No-Build scenario / Projected = Build scenario

ILOS = Overall Intersection Level of Service; Unsignalized ILOS calculated in accordance with Figure 5 of Policies and Procedures for Transportation Impact Studies.

INTRODUCTION

Traffic Planning and Design, Inc. (TPD) has completed a Transportation Impact Assessment (TIA) for the proposed Autumn Estates residential development in the City of Bethlehem, Northampton County, Pennsylvania. The project site is located on the eastern side of Township Line Road, as shown in **Figure 1**. The proposed site will be served by one full-access driveway to Township Line Road, which will form the fourth leg of the intersection with Cottage Drive, as shown in **Figure 2**. The land use context of the site and surrounding area is defined as Suburban Neighborhood in the Smart Transportation Guidebook, dated March 2008. All relevant correspondence pertaining to this project has been included in **Appendix A**.

Existing Roadway Network

A field review of the existing roadway system in the study area was conducted. The existing roadway characteristics within the study area are summarized in **Table 1**. The existing lane configuration and intersection controls for the study area intersections are shown in **Figure 3**. Photographs and sketches of the study area intersections are included in **Appendix B**.

TABLE 1
ROADWAY CHARACTERISTICS WITHIN STUDY AREA

Roadway	Ownership	Functional Classification/ Roadway Type	Predominant Directional Orientation	Average Daily Traffic	Posted Speed Limit
Township Line Road	Local	Local	North/South	3,053	40 mph
Cottage Drive	Local	Local	East/West	N/A	Not Posted
Altonah Road	Local	Local	North/South	N/A	25 mph
Santee Mill Road	Local	Local	East/West	N/A	25 mph

Bicycle and Pedestrian Facilities

Based on field observations at the study area intersections, sidewalks, and/or travel lanes currently accommodate pedestrian and bicycle traffic in the vicinity of the proposed development.

Mass Transit Facilities

Northampton County is provided with public transportation by LANTA. Public transportation is not available in the vicinity of the proposed site.

EXISTING TRAFFIC CONDITIONS

Intersection Turning Movement Counts

Intersection traffic counts were conducted on 15-minute intervals during the weekday morning (6:00 to 9:00 A.M.) and weekday evening (3:00 to 6:00 P.M.) peak periods. Data pertaining to heavy vehicles and pedestrians were observed during the turning movement counts. Peak hours and count dates for the study area intersections are identified in **Table 2**.

TABLE 2
TRAFFIC COUNT INFORMATION

Intersection	Date of Traffic Counts	Time Period	Intersection Peak Hour ¹
Township Line Road & Cottage Drive	Tuesday, April 21, 2026	Weekday A.M.	7:30 – 8:30 A.M.
		Weekday P.M.	3:15 – 4:15 P.M.
Township Line Road / Altonah Road & Santee Mill Road	Tuesday, April 21, 2026	Weekday A.M.	7:30 – 8:30 A.M.
		Weekday P.M.	3:30 – 4:30 P.M.

¹ = Peak Hour consists of the four consecutive 15-minute intervals where the highest traffic volumes occur.

Existing condition traffic volumes for the weekday A.M. and weekday P.M. peak hours are illustrated in **Figure 4**. Intersection traffic count data sheets are provided in **Appendix C**.

BASE (NO-BUILD) CONDITIONS

Annual Background Growth

A background growth factor for the roadways in the study area was developed based on growth factors for August 2025 to July 2026 obtained from the PennDOT Bureau of Planning and Research (BPR). The PennDOT BPR suggests using a background growth trend factor of 0.37% per year in Northampton County for urban non-interstate roadways. As such, the background growth factor was applied annually to yield overall growth percentages of 1.11% (0.37% per year, compounded over 3 years) for the 2029 opening year.

The additional traffic volumes due to background growth were added to the existing traffic data to produce 2029 base (no-build) condition traffic volumes. Base condition volumes for the weekday A.M. and weekday P.M. peak hours are illustrated in **Figure 5** for the 2029 opening year conditions.

SCHEDULED ROADWAY IMPROVEMENTS

Programmed Improvements

It is TPD's understanding that there are no planned roadway improvements in the vicinity of the proposed site.

PROPOSED SITE ACCESS

The proposed site will be served by one full-access driveway to Township Line Road, which will form the fourth leg of the intersection with Cottage Drive. Additionally, an emergency access will be provided to Township Line Road.

Sight Distance Analysis

A sight distance analysis was prepared for the proposed site driveways. In general, recommended safe sight distances depend upon the posted speed limit and roadway grades. The existing sight distances at the proposed driveways were measured in accordance with PennDOT Publication 282 Highway Occupancy Permit Operations Manual and compared to PennDOT's desirable sight distance standard, which is identified in 67 PA Code Chapter 441.8(h), "Access to and Occupancy of Highways by Driveways and Local Roads." In addition, measured sight distances at the proposed driveways were compared to PennDOT's safe stopping sight distance standard, which is calculated by the following equation:

$$SSSD = 1.47VT + V^2/[30(f \pm g)]$$

SSSD = safe stopping sight distance (acceptable sight distance)

V = Vehicle Speed

T = Perception Reaction Time of Driver (2.5 seconds)

f = Coefficient of Friction for Wet Pavements

g = Percent of Roadway Grade Divided by 100

Table 3 shows the measured, desirable, and acceptable (SSSD) sight distances at the site driveway for vehicles entering and exiting the site.

TABLE 3
SIGHT DISTANCE ANALYSIS
SITE DRIVEWAY TO TOWNSHIP LINE ROAD

	Direction	Speed	Grade ¹	Sight Distances (feet)		
				DES	SSSD	EXIST
Exiting Movements	To the left	40 mph	+1%	538'	309'	505'
	To the right	40 mph	-3%	460'	331'	650'+
Entering Left Turns	Approaching same direction	40 mph	-3%	373'	331'	650'+
	Approaching opposite direction	40 mph	+1%	--	309'	475'

DES = Desirable Sight Distance

1 = Roadway Grade Approaching Driveway

EXIST = Existing (measured) Sight Distance

As shown in **Table 3** above, the measured sight distances at the site driveway exceeds PennDOT's safe stopping sight distance requirements.

TRIP GENERATION

The trip generation rates for the proposed development were obtained from the *Trip Generation Manual*, Twelfth Edition, 2025, an Institute of Transportation Engineers (ITE) Informational Report. The data are categorized by Land Use Codes, with total vehicular trips for a given land use estimated using an independent variable and statistically generated rates or equations.

For the proposed development, Land Use Code 210 (Single Family Detached Housing) from *Trip Generation* was used to calculate the number of vehicular trips the development will generate during the following time periods: (1) average weekday; (2) weekday A.M. peak hour; and (3) weekday P.M. peak hour. **Table 4** shows the rates/equations and directional percentages for the analyzed time periods.

TABLE 4
ITE TRIP GENERATION DATA

Land Use	ITE #	Time Period	Equations/Rates	Entering %	Exiting %
Single Family Detached Housing	210	Weekday	$T = 8.07(X) + 265.45$	50%	50%
		Weekday A.M. Peak Hour	$T = 0.67(X) + 5.59$	27%	73%
		Weekday P.M. Peak Hour	$\ln(T) = 0.92 \ln(X) + 0.33$	62%	38%

T = number of site-generated vehicular trips

X = independent variable (dwelling units)

TABLE 5
TRIP GENERATION SUMMARY

Time Period	Independent Variable (X)	Autumn Estates		
		Total	Enter	Exit
Weekday	65 Dwelling Units	790	395	395
Weekday A.M. Peak Hour		49	13	36
Weekday P.M. Peak Hour		65	40	25

Based on the trip generation analysis summarized in **Table 5**, the Autumn Estates residential development will generate approximately 49 new trips during the weekday A.M. peak hour and 65 new trips during the weekday P.M. peak hour at full build out.

TRIP DISTRIBUTION

The distribution of trips generated by the proposed development was based on the existing traffic patterns at Cottage Drive in conjunction with the proposed use of the site and the site driveway location. The new trips for the proposed development were distributed to the local roadway network based on the percentages shown in **Table 6**.

TABLE 6
TRIP DISTRIBUTION PERCENTAGES

Direction - To/From	Assignment - To/From	Distribution Percentage
North	via Township Line Road / Altonah Road	60%
South		20%
West	via Santee Mill Road	20%

The assignment of site-generated trips for the proposed development during the weekday A.M. and weekday P.M. peak hours are shown in **Figure 6**. The trip distribution and assignment percentage information is included in **Appendix E**.

PROJECTED (BUILD) CONDITION TRAFFIC VOLUMES

The site-generated trips for the proposed development were added to the 2029 base (no-build) condition traffic volumes to develop 2029 projected (build) condition traffic volumes.

Projected condition traffic volumes for the opening year of 2029 for the weekday A.M. and weekday P.M. peak hours are shown in **Figure 7**. Traffic volume development worksheets are contained in **Appendix E**.

LEVELS OF SERVICE FOR AN INTERSECTION

For analysis of intersections, level of service is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. LOS criteria is stated in terms of control delay per vehicle for a one-hour analysis period. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The criteria are shown in **Table 7**. Delay, as it relates to level of service, is a complex measure and is dependent upon a number of variables. For signalized intersections, these variables include the quality of vehicle progression, the cycle length, the green time ratio, and the volume/capacity ratio for the lane group in question. For unsignalized intersections, delay is related to the availability of gaps in the flow of traffic on the major street and the driver's discretion in selecting an appropriate gap for a particular movement from the minor street (straight across, left or right turn).

TABLE 7
LEVEL OF SERVICE CRITERIA
UNSIGNALIZED AND SIGNALIZED INTERSECTIONS ¹

Level of Service	Control Delay Per Vehicle (Seconds)	
	Signalized	Unsignalized
A	< 10	< 10
B	> 10 and < 20	> 10 and < 15
C	> 20 and < 35	> 15 and < 25
D	> 35 and < 55	> 25 and < 35
E	> 55 and < 80	> 35 and < 50
F	> 80 or v/c > 1.0	> 50 or v/c > 1.0

¹ Obtained from Exhibits 19-8 and 20-2 of the Transportation Research Board's *Highway Capacity Manual 7th Edition*

CAPACITY ANALYSIS METHODOLOGY

Capacity analyses were conducted for the weekday A.M. and weekday P.M. peak hours at the study area intersections. These analyses were conducted according to the methodologies contained in the *Highway Capacity Manual 7th Edition* (HCM) using *Synchro 12* software, a Trafficware product.

The following conditions were analyzed, as applicable:

- » 2026 Existing conditions;
- » 2029 Base conditions (Opening year without development);
- » 2029 Projected conditions (Opening year with development).

The capacity analysis worksheets are included in **Appendix E**.

The following items should be noted with respect to the capacity analyses:

- » The Pennsylvania default values for two-way stop controlled intersections in a suburban land use context contained in Chapter 10 of PennDOT's *Publication 46* were utilized for the base critical headway and base follow-up headways. Worksheets related to the calculated critical and follow-up headways are included at the beginning of **Appendix E**.
- » A minimum heavy vehicle percentage of 2% was utilized for all movements at the proposed site driveway.

- » SimTraffic methodology was utilized for the intersection of Township Line Road / Altonah Road & Santee Mill due to limitations in the HCM 7th Edition and Synchro's percentile methodologies for the existing intersection control configuration.

LEVELS OF SERVICE IN THE STUDY AREA

Level of service (LOS) matrices for the study area intersections for the weekday A.M. and weekday P.M. peak hours are shown in **Table 8** for existing conditions, 2029 base conditions, and 2029 projected conditions.

TABLE 8
LEVEL OF SERVICE DELAY (SECONDS) SUMMARY

Intersection	Movement	Weekday A.M. Peak Hour			Weekday P.M. Peak Hour		
		Existing Condition	Opening Year 2029		Existing Condition	Opening Year 2029	
			Base	Projected		Base	Projected
Township Line Road & Cottage Drive / Proposed Site Driveway	EB LTR	A	A	A	A	A	B
	WB LTR	--	--	B	--	--	B
	NB LTR	A	A	A	A	A	A
	SB LTR	A	A	A	A	A	A
	ILOS	A (0.2)	A (0.2)	A (1.4)	A (0.3)	A (0.3)	A (1.3)
Township Line Road / Altonah Road & Santee Mill Road	WB LR	A	A	A	A	A	A
	NB TR	A	A	A	A	A	A
	SB LT	A	A	A	A	A	A
	ILOS	A (3.2)	A (3.0)	A (3.2)	A (5.1)	A (5.1)	A (5.3)

Base = No-Build scenario / Projected = Build scenario

ILOS = Overall Intersection Level of Service; Unsignalized ILOS calculated in accordance with Figure 5 of Policies and Procedures for Transportation Impact Studies.

As shown in **Table 8** above, under 2029 projected conditions with the development of the proposed site, the study area intersections will operate at the same overall intersection level of service (ILOS) as under 2029 base conditions during the weekday A.M. and weekday P.M. peak hours.

95TH PERCENTILE QUEUE ANALYSIS

Queue analyses were conducted at the study area intersections using *Synchro 12* software. The queue analysis results are summarized in **Table 9** for the analyzed peak hours.

TABLE 9
95TH PERCENTILE QUEUE ANALYSIS

Intersection	Movement	Existing / Proposed Storage	Opening Year 2029			
			Weekday A.M. Peak Hour		Weekday P.M. Peak Hour	
			Base	Projected	Base	Projected
Township Line Road & Cottage Drive / Proposed Site Driveway	EB LTR	-	<25	<25	<25	<25
	WB LTR	-	<25	<25	<25	<25
	NB LTR	-	<25	<25	<25	<25
	SB LTR	-	<25	<25	<25	<25
Township Line Road / Altonah Road & Santee Mill Road	WB LR	-	48	48	47	49
	NB TR	-	<25	<25	<25	<25
	SB LT	-	48	48	67	68

Base = No-Build scenario / Projected = Build scenario

Queue analysis worksheets are included with the capacity analysis worksheets provided in **Appendix F**.

AUXILIARY TURN LANE ANALYSIS

Methodology

TPD evaluated auxiliary turn lane warrants at the site access intersections. The warrant analysis methodology contained within Chapter 11 of PennDOT's *Publication 46*, Section 11.17 and Strike-Off Letter 470-08-07 was utilized for this evaluation.

Findings

Table 10 summarizes the results of the auxiliary turn lane analysis at the site access intersections.

TABLE 10
AUXILIARY TURN LANE ANALYSIS SUMMARY

Intersection	Approach	Auxiliary Lane	Warrant Satisfied?	Required Lane Length	Proposed Lane Length
Township Line Road & Cottage Drive / Proposed Site Driveway	Southbound	Left-turn Lane	No	--	--
	Northbound	Right-turn Lane	No	--	--

Based on the analysis summarized above, under 2029 projected conditions, auxiliary turn lanes are not warranted at the proposed site driveway. The calculations for the auxiliary turn lane warrants are included in **Appendix G**.

CONCLUSIONS

Based on the results of the transportation impact study, TPD offers the following conclusions:

- » The project site is located on the eastern side of Township Line Road south of S.R. 0022.
- » Access to the site is proposed via one full-access driveway to Township Line Road which will form the fourth leg of the intersection with Cottage Drive. Additionally, an emergency access will be provided to Township Line Road.
- » All proposed driveway location sight distances will exceed Safe Stopping Sight Distance criteria.
- » The proposed site will consist of 65 single family homes.
- » Upon full build-out, the proposed development is expected to generate 49 new vehicle-trips during the weekday A.M. peak hour and 65 new vehicle-trips during the weekday P.M. peak hour.
- » Under the 2029 projected conditions, all approaches and turning movements at the site driveway intersection with the external roadway network will operate at LOS B or better during weekday A.M. and weekday P.M. peak hours.
- » All overall intersection levels of service (ILOS) at the offsite study area intersection will operate at an ILOS A during the 2029 projected condition scenarios.
- » It is TPD's opinion that the construction of the proposed development will not adversely affect the health, safety, and welfare of the community from a traffic engineering perspective.