

WHITE CLAY POINT TRANSPORTATION IMPACT STUDY

FOR SUBMISSION TO:

New Garden Township, Chester County, PA
& PennDOT District 6-0

Prepared For:

Stonewall Capital LLC

15 West Aylesbury Road
Suite 500
Lutherville, MD 21093

October 20, 2025

TPD # SWCL.00001



Prepared By:

Traffic Planning and Design, Inc.

2500 East High Street, Suite 650
Pottstown, Pennsylvania 19464

Phone: (610) 326-3100

Fax: (610) 326-9410

E-mail: TPD@TrafficPD.com

Website: www.trafficpd.com

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EXECUTIVE SUMMARY

The purpose of this study is to examine the potential traffic impact associated with the proposed White Clay Point development on the roadway network in New Garden Township, Chester County, PA. Based on this evaluation, the following conclusions were reached:

1. The study area intersections included in this evaluation are as follows:

- » Gap-Newport Pike (Route 41, SR 0041) North On/Off Ramps and Limestone Road (SR 3013)
- » Route 41 South On/Off Ramps and Limestone Road (SR 3013)
- » Route 41 and Sharp Road/Sheehan Road
- » Route 41 and Sunny Dell Road (SR 3024)
- » Egypt Run Road and Sunny Dell Road
- » Reynolds Road and Sunny Dell Road
- » Sunny Dell Road and Church Driveway
- » Route 41 and Starr Road/Brittany Hills Drive
- » Limestone Road and Kaolin Road/Ewart Road
- » Route 41 & Route 41 EB On Ramp
- » Route 41 & Route 41 WB On Ramp

2. The project site is located on the north and south sides of Route 41, east of Sharp Road and Sunny Dell Road. The proposed site will consist of the following:

North of Route 41

- » 185 townhomes
- » 6,557 s.f. Convenience Market/Gas Station (16 vehicle fueling positions)
- » 2.12-acres proposed to be provided to the Township for their use as a future Farmer's Market. This farmers market is not proposed to be developed under this application, but traffic related to this use was considered in this study.

South of Route 41

- » 168 semi-detached townhomes
- » 269 single family homes
- » 115,000 s.f. of retail with grocery store
- » 85,000 s.f. medical office building

The subject site previously obtained PennDOT approval under Permit Number 06071460, which included roadway improvements along Route 41, Sunny Dell Road and Limestone Road. The former development included a 489,274 s.f. Shopping Center, a Town Center with 80 townhomes and 250,000 s.f. of retail space, 83 single-family homes, and convenience market with 12 vehicle fueling positions.

3. The proposed development will be served by the following driveway locations:

- » One full access signalized driveway to Route 41 serving development on the north and south sides of Route 41;
 - In conjunction with the proposed development, it is proposed to realign/extend Sharp Road eastward and then southward to intersect Route 41 opposite the proposed site driveway on the south side of Route 41, thus resulting in a reconfiguration of the existing full-movement intersection to permit only southbound right turns from Sharp Road onto westbound Route 41.

- » One right-in/right-out unsignalized driveway to Route 41 primarily serving the 168 semi-detached townhomes on the south side of Route 41;
 - » Three right-in/right-out driveways to Route 41 serving the southern residential development and the commercial development;
 - » One full-access unsignalized driveway and one right-out only driveway to Sheehan Road serving the proposed Convenience Market/Gas Station on the north side of Route 41;
 - » One right-in/right-out driveway to Route 41 serving the proposed Convenience Market/Gas Station on the north side of Route 41;
 - » One full-access unsignalized driveway to Sunny Dell Road, south of Route 41;
 - » Two full-access unsignalized driveway to Reynolds Road, east of Sunny Dell Road;
 - » Two full-access unsignalized driveways to Sharp Road serving the northern residential development;
 - » One potential future unsignalized driveway to the northern leg of the main signalized access for the future Township farmers market. This access is not part of this application.
4. All proposed driveway location sight distances will exceed PennDOT's Safe Stopping Sight Distance (SSSD) criteria based on the posted speed limits.
 5. The proposed development (without the Township's future farmers market) is anticipated to generate approximately 977 new trips during the weekday A.M. peak hour, 1,124 new trips during the weekday P.M. peak hour, and 1,098 new trips during the Saturday midday peak hour. The current plan is anticipated to generate less new peak hour trips during the weekday A.M., weekday P.M. and Saturday midday peak hours, or approximately 33% less on average during the peak hours, than the previously-approved plan for the site.
 6. Under 2035 projected conditions, with implementation of the site-related recommendations, the study area intersections will comply with the requirement outlined in PennDOT's TIS Guidelines.
 7. Traffic Planning and Design Inc. (TPD) recommends the following roadway improvements as outlined at the study area intersections:

TABLE I
IMPROVEMENTS SUMMARY

Intersection		Improvement
Site Access Intersections	Route 41 & Main Access	- Signalize - Construct EB and WB Route 41 left and right turn lanes - Provide SB dual left turn lanes and a shared thru/right lane - Provide separate NB left, thru and right turn lanes
	Route 41 & Western Commercial/Residential RIRO Driveway	-Restrict entering and exiting left turn movements
	Route 41 & Center Commercial RIRO Driveway	-Restrict entering and exiting left turn movements -Construct EB Route 41 right turn lane
	Route 41 & Eastern Commercial RIRO Driveway	-Restrict entering and exiting left turn movements -Construct EB Route 41 right turn lane
	Route 41 & Eastern Townhomes RIRO Driveway	-Restrict entering and exiting left turn movements
	Route 41 & Convenience Store with Gas RIRO Driveway	-Restrict entering and exiting left turn movements -Construct WB Route 41 right turn lane
Off-site Intersections	Route 41 Corridor	- Construct an additional EB Route 41 thru lane beginning west of Sunny Dell Road, ending at the off-ramp to Limestone Road - Construct an additional WB Route 41 thru lane beginning at the WB Route 41 On Ramp to allow for free-flow from the ramp onto WB Route 41, and ending east of the Sharp Rd/Route 41 intersection
	Limestone Road & Route 41 Northern On/Off Ramps	- Provide a NB Limestone Road left turn lane
	Limestone Road & Route 41 Southern On/Off Ramps	- Signalize - Provide a NB Limestone Road left turn lane
	Existing Sharp Road/Sheehan Road & Route 41	- Realign Sharp Road to restrict EB Route 41 left turns, WB Route 41 right turns and southbound Sharp Rd lefts turns
	Route 41 & Sunny Dell Road	- Signalize - Construct EB and WB Route 41 left turn lanes - Construct a channelized NB Sunny Dell Road right turn lane - Construct an additional EB Route 41 thru lane

In addition to the above improvements, TPD recommends the following:

- » Coordinate the treatment for the existing Sheehan Road segment immediately west of the on-ramp from Limestone Road with the Township and PennDOT.
- » Coordinate the ADA facilities and related trail with the Township and PennDOT.

8. Levels of Service (LOS) for the study area intersections have been summarized in matrix form. **Tables II and III** detail the overall intersection LOS for each study area intersection.

TABLE II
LEVEL OF SERVICE DELAY (SECONDS) SUMMARY

Intersection	Peak Hour	Existing Condition	2035 Conditions			Meet LOS Requirements?
			Base	Projected	Projected ¹	
Limestone Road & WB Route 41 On/Off Ramps	AM	A (2.5)	A (2.8)	A (6.1)	A (5.3)	Yes
	PM	A (4.2)	A (4.5)	A (6.9)	B (10.4)	
	SAT	A (5.6)	A (6.2)	A (9.9)	B (11.3)	
Limestone Road & EB Route 41 On/Off Ramps	AM	A (4.4)	A (5.2)	C (16.3)	B (10.4)	Yes
	PM	A (3.2)	A (3.3)	C (18.9)	A (9.7)	
	SAT	A (3.7)	A (4.1)	B (12.0)	B (11.3)	
Route 41 & Sharp Road	AM	A (1.5)	A (1.9)	A (0.7)	A (0.7)	Yes
	PM	A (1.5)	A (1.7)	A (0.7)	A (0.7)	
	SAT	A (1.5)	A (2.2)	A (0.4)	A (0.4)	
Route 41 & Sunny Dell Road	AM	A (8.2)	C (15.7)	F (746.8)	B (11.4)	Yes
	PM	A (3.8)	A (4.8)	ERROR	B (19.7)	
	SAT	A (1.9)	A (2.3)	F (569.4)	B (18.5)	
Sunny Dell Road & Egypt Run Road	AM	A (2.5)	A (2.5)	A (3.0)	--	Yes
	PM	A (1.4)	A (1.4)	A (1.5)	--	
	SAT	A (1.2)	A (1.1)	A (1.2)	--	
Sunny Dell Road & Reynolds Road	AM	A (5.4)	A (5.7)	A (6.7)	--	Yes
	PM	A (2.7)	A (2.7)	A (2.8)	--	
	SAT	A (2.3)	A (2.3)	A (2.5)	--	
Route 41 & Starr Road/Brittany Drive	AM	A (5.2)	A (6.1)	B (11.8)	--	Yes
	PM	A (3.6)	A (3.8)	A (4.9)	--	
	SAT	A (2.4)	A (2.5)	A (3.5)	--	
Sunny Dell Road & Church Access	AM	A (0.0)	A (0.0)	A (0.0)	--	Yes
	PM	A (1.7)	A (1.7)	A (1.4)	--	
	SAT	A (1.3)	A (1.3)	A (0.8)	--	
Limestone Road & Kaolin Road/Ewart Road	AM	A (3.0)	A (3.4)	A (5.3)	--	Yes
	PM	A (2.7)	A (2.9)	A (3.6)	--	
	SAT	A (2.0)	A (2.2)	A (1.9)	--	
Route 41 & Route 41 EB On Ramp	AM	A (0.5)	A (0.9)	A (0.8)	--	Yes
	PM	A (0.6)	A (0.6)	A (0.6)	--	
	SAT	A (0.6)	A (0.6)	A (0.6)	--	
Route 41 & Route 41 WB On Ramp	AM	A (2.2)	A (2.6)	D (29.8)	A (0.0)	Yes
	PM	A (9.7)	B (12.6)	F (127.2)	A (0.0)	
	SAT	A (8.2)	B (12.6)	F (116.8)	A (0.0)	

Base = No-Build scenario; Projected = Build scenario

¹*Projected conditions with implementation of recommended improvements*

TABLE III
LEVEL OF SERVICE DELAY (SECONDS) SUMMARY
SITE ACCESS INTERSECTIONS

Intersection	Peak Hour	2035 Projected Conditions	2035 Projected Conditions with Improvements	Meet LOS Requirements?
Route 41 & Proposed Main Access	AM	C (32.3)	C (32.2)	Yes
	PM	C (31.9)	C (31.9)	
	SAT	D (35.8)	D (35.8)	
Route 41 & Townhomes RIRO Eastern Driveway	AM	A (0.5)	A (0.2)	Yes
	PM	A (0.1)	A (0.1)	
	SAT	A (0.2)	A (0.1)	
Sharp Road & Northern Site Driveway	AM	A (1.1)	--	Yes
	PM	A (0.7)	--	
	SAT	A (0.8)	--	
Sharp Road & Southern Site Driveway	AM	A (1.3)	--	Yes
	PM	A (0.8)	--	
	SAT	A (0.9)	--	
Sunny Dell Road & Residential Access	AM	A (1.3)	--	Yes
	PM	A (0.8)	--	
	SAT	A (0.9)	--	
Route 41 & Eastern Commercial RIRO	AM	A (0.6)	A (0.3)	Yes
	PM	A (0.9)	A (0.5)	
	SAT	A (1.2)	A (0.5)	
Reynolds Road & Western Site Driveway	AM	A (0.2)	--	Yes
	PM	A (0.1)	--	
	SAT	A (0.3)	--	
Reynolds Road & Estate Homes Driveway	AM	A (0.3)	--	Yes
	PM	A (0.2)	--	
	SAT	A (0.3)	--	
Route 41 & Western RIRO Access	AM	A (1.1)	A (0.3)	Yes
	PM	A (0.2)	A (0.1)	
	SAT	A (0.5)	A (0.2)	
Route 41 & Center RIRO Access	AM	A (0.6)	A (0.3)	Yes
	PM	A (0.8)	A (0.4)	
	SAT	A (1.1)	A (0.5)	
Route 41 & Convenience Stroe with Gas RIRO Access	AM	A (0.4)	A (0.4)	Yes
	PM	A (0.7)	A (0.7)	
	SAT	A (0.5)	A (0.5)	

Base = No-Build scenario; Projected = Build scenario

INTRODUCTION

Traffic Planning and Design, Inc. (TPD) has completed a Transportation Impact Study (TIS) for the proposed White Clay Point development in New Garden Township, Chester County, Pennsylvania. The project site is located along the north and south sides of Gap-Newport Pike (Route 41, SR 0041), east of Sunny Dell Road and Sharp Road as shown in **Figure 1**. As shown in **Figure 2**, the proposed site will consist of the following:

North of Route 41

- » 185 townhomes
- » 6,557 s.f. Convenience Market/Gas Station (16 vehicle fueling positions)
- » 2.12-acres proposed to be provided to the Township for their use as a future Farmer's Market. This farmers market is not proposed to be developed under this application, but traffic related to this use was considered in this study.

South of Route 41

- » 168 semi-detached townhomes
- » 269 single family homes
- » 115,000 s.f. of retail with grocery store
- » 85,000 s.f. medical office building

Please note, the subject site previously obtained PennDOT approval under Permit Number 06071460, which included roadway improvements along Route 41, Sunny Dell Road and Limestone Road. The former development included a 489,274 s.f. Shopping Center, a Town Center with 80 townhomes and 250,000 s.f. of retail space, 83 single-family homes, and convenience market with 12 vehicle fueling positions.

This report has been prepared in accordance with PennDOT's *Policies and Procedures for Transportation Impact Studies*, found in PennDOT's Publication 282, Appendix A, dated June, 2025. All relevant project correspondence is included in **Appendix A**, including plan sheets from Permit Number 06071460.

Site Access Locations

The proposed development will be served by the following driveway locations:

- » One full access signalized driveway to Route 41 serving development on the north and south sides of Route 41;
 - In conjunction with the proposed development, it is proposed to realign/extend Sharp Road eastward and then southward to intersect Route 41 opposite the proposed site driveway on the south side of Route 41, thus resulting in a reconfiguration of the existing full-movement intersection to permit only southbound right turns from Sharp Road onto westbound Route 41.
- » One right-in/right-out unsignalized driveway to Route 41 primarily serving the 168 semi-detached townhomes on the south side of Route 41;
- » Three right-in/right-out driveways to Route 41 serving the southern residential development and the commercial development;
- » One full-access unsignalized driveway and one right-out only driveway to Sheehan Road serving the proposed Convenience Market/Gas Station on the north side of Route 41;
- » One right-in/right-out only driveway to Route 41 serving the proposed Convenience Market/Gas Station on the north side of Route 41;
- » One full-access unsignalized driveway to Sunny Dell Road, south of Route 41;
- » Two full-access unsignalized driveway to Reynolds Road, east of Sunny Dell Road;
- » Two full-access unsignalized driveways to Sharp Road serving the northern residential development;

- » One potential future unsignalized driveway to the northern leg of the main signalized access for the future Township farmers market. This access is not part of this application.

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**. Photographs 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 ¹	Posted Speed Limit
Gap-Newport Pike	State (S.R. 0041)	Principal Arterial	East-West	18,650	45 mph
Sunny Dell Road	State (S.R. 3024)	Urban Collector	North-South	3,027	40 mph
Limestone Road	State (S.R. 3013)	Urban Collector	North-South	13,300 ²	40 mph
Sharp Road	Local Road		North-South	1,050	Not Posted
Sheehan Road	Local Road		East-West	785	35 mph
Starr Road	Local Road		East-West	3,890	35 mph
Brittany Drive	Local Road		North-South	185	25 mph
Ewart Road	Local Road		East-West	585	35 mph
Kaolin Road	Local Road		East-West	2,295	35 mph

1. Per PennDOT TIRe data (accessed July 2025) or calculated based on peak hour volumes and K-factor

2. Limestone Road, south of Route 41.

Land Use Context

In Chapter 4 of the *Smart Transportation Guidebook*, dated March 2008, there is guidance pertaining to defining the land use context(s) for a given area. Based upon review of this information, the land uses surrounding the proposed site best fits the Suburban Neighborhood designation, as described below:

Suburban Neighborhood, "predominately low density residential communities... typically arranged in a curvilinear internal system of streets with limited connections to regional road network or surrounding streets. Neighborhoods can include community facilities such as schools, churches, recreational facilities, and some other stores and offices. When suburban houses line and arterial roadway but have their primary access to frontage roads or rear access roads, it is possible to classify this area as a suburban corridor."

Roadway Type

In Chapter 5 of the *Smart Transportation Guidebook*, there is guidance pertaining to defining the transportation

context(s) for a given area. Comparing the existing condition roadway characteristics to the various options presented in Table 5.1 of the *Smart Transportation Guidebook*, the study area roadways best fit the following categories, as described below:

Regional Arterial, traffic volumes of 10,000 to 40,000 vehicles per day, intersection spacing of 660 to 1,320 feet, a desired operating speed of 30-55 mph, and a description as follows: *"Roadways in this category would be considered "Principal Arterial" in traditional functional classification."*

» Gap-Newport Pike (S.R. 0041)

Community Collector, traffic volumes of 5,000 to 15,000 vehicles per day, intersection spacing of 300 to 660 feet, a desired operating speed of 25-55 mph, and a description as follows: *"often similar in appearance to a community arterial. Typically classified as Major Collector."*

» Sunny Dell Road (S.R. 3024)

» Limestone Road (S.R.3013)

Bicycle and Pedestrian Facilities

Based on observations during field visits at the study area intersections paved shoulders currently accommodate pedestrian and/or bicycle traffic in the vicinity of the proposed development.

Mass Transit Facilities

Public transit is not provided in the vicinity of the proposed development.

Crash Data Investigation

Crash data were obtained from PennDOT for the study area intersections. PennDOT defines a reportable crash as follows, "A reportable (crash) is one in which an injury or fatality occurs or if at least one of the vehicles involved requires towing from the scene." Reportable crashes were tabulated for the five-year time period beginning 1/1/2020 and ending 12/31/2024. For a given intersection, PennDOT considers a crash occurrence of 5 reportable, correctable crashes over a continuous twelve-month period during the past five years to be a threshold value, above which the intersection design should be reviewed to examine if corrective measures can be taken to enhance safety. The number of reportable crashes at the study area intersections is shown in **Table 2**.

TABLE 2
PENNDOT REPORTABLE CRASH DATA

Study Area Intersection	Number of Reportable Crashes				
	2020	2021	2022	2023	2024
Limestone Road & WB Route 41 On/Off Ramps	1	0	2	1	1
Limestone Road & EB Route 41 Ramps	1	6	2	0	3
Route 41 & Sharp Road	1	1	2	0	0
Route 41 & Sunny Dell Road	2	2	0	3	4
Sunny Dell Road & Egypt Run Road	0	0	0	0	0
Sunny Dell Road & Reynolds Road	1	0	0	0	0
Sunny Dell Road & Church Driveway	0	0	0	0	0
Route 41 & Starr Road/Brittany Drive	0	1	0	0	0
Limestone Road & Kaolin Road/Ewart Road	1	1	0	3	1

Based on a review of the crash data, there were three twelve-month periods during the past five years where 5 or more crashes occurred that were deemed correctable at the intersection of Limestone Road and EB Route 41 Ramps. The majority of crashes at this intersection were angle crashes caused by a left-turning vehicle proceeding without clearance. This condition is anticipated to be improved with the proposed signalization of this intersection.

EXISTING TRAFFIC CONDITIONS

Manual traffic counts were conducted on 15-minute intervals during the weekday morning (7:00 to 9:00 A.M.), weekday evening (4:00 to 6:00 P.M.) and Saturday midday (11:00 A.M. to 1:00 P.M.) peak periods. Peak hours and count dates for the study area intersections are identified in **Table 3**.

TABLE 3
MANUAL TRAFFIC COUNT INFORMATION

Intersection	Date of Traffic Counts	Time Period	Intersection Peak Hour ¹
Limestone Road & WB Route 41 On/Off Ramps	Tuesday June 3, 2025	Weekday A.M.	7:15 to 8:15 A.M.
		Weekday P.M.	4:45 to 5:45 P.M.
	Saturday June 28, 2025	Saturday Midday	12:00 P.M. to 1:00 P.M.
Limestone Road & EB Route 41 Ramps	Tuesday June 3, 2025	Weekday A.M.	7:15 to 8:15 A.M.
		Weekday P.M.	4:45 to 5:45 P.M.
	Saturday June 28, 2025	Saturday Midday	12:00 P.M. to 1:00 P.M.
Route 41 & Sharp Road	Tuesday June 3, 2025	Weekday A.M.	7:15 to 8:15 A.M.
		Weekday P.M.	4:45 to 5:45 P.M.
	Saturday June 28, 2025	Saturday Midday	12:00 P.M. to 1:00 P.M.
Route 41 & Sunny Dell Road	Tuesday June 3, 2025	Weekday A.M.	7:15 to 8:15 A.M.
		Weekday P.M.	5:00 to 6:00 P.M.
	Saturday June 28, 2025	Saturday Midday	12:00 P.M. to 1:00 P.M.
Sunny Dell Road & Egypt Run Road	Tuesday June 3, 2025	Weekday A.M.	7:00 to 8:00 A.M.
		Weekday P.M.	5:00 to 6:00 P.M.
	Saturday June 28, 2025	Saturday Midday	11:45 A.M. to 12:45 P.M.
Sunny Dell Road & Reynolds Road	Tuesday June 3, 2025	Weekday A.M.	7:00 to 8:00 A.M.
		Weekday P.M.	5:00 to 6:00 P.M.
	Saturday June 28, 2025	Saturday Midday	11:45 A.M. to 12:45 P.M.
Route 41 & Starr Road/Brittany Drive	Tuesday June 3, 2025	Weekday A.M.	7:15 to 8:15 A.M.
		Weekday P.M.	5:00 to 6:00 P.M.
	Saturday June 28, 2025	Saturday Midday	12:00 P.M. to 1:00 P.M.
Sunny Dell Road & Church Driveway	Tuesday June 3, 2025	Weekday A.M.	7:00 to 8:00 A.M.
		Weekday P.M.	5:00 to 6:00 P.M.
	Saturday June 28, 2025	Saturday Midday	11:45 A.M. to 12:45 P.M.
Limestone Road & Kaolin Road/Ewart Road	Tuesday June 3, 2025	Weekday A.M.	7:15 to 8:15 A.M.
		Weekday P.M.	4:45 to 5:45 P.M.
	Saturday June 28, 2025	Saturday Midday	11:30 A.M. to 12:30 P.M.

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

The existing condition traffic volumes for the weekday A.M., weekday P.M., and Saturday midday peak hours are illustrated in **Figures 3-5**, respectively. Manual 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 0.40% per year in Chester County for urban non-interstate roadways. As such, the background growth factor was applied annually to yield an overall growth percentage of 4.07% (0.40% per year, compounded over 10 years) for the 2035 design year.

Nearby Proposed Developments

Base (no-build) traffic conditions were calculated to include traffic volumes from proposed developments, which, though not operating under existing conditions, may be operating by the design year (2035) of the

proposed development. Based on coordination with Bowman, the Township Traffic Engineer, the following nearby planned developments were specifically included in this study:

New Garden Elementary School is a proposed reconstruction at the site of the existing school designed to accommodate 660 students on the east side of New Garden Road, north of Gap Newport Pike (Route 41). Access to the site will be provided by two existing driveways to New Garden Road. Trip distributions for this development were obtained from a previous 2023 TPD *New Garden Elementary School Transportation Impact Study*, last revised June 2023.

Copperleaf Ridge is proposed to consist of 98 multifamily dwelling units on the northwest quadrant of the east side of Bancroft Road. Access to development will be provided by a proposed full access driveway to Bancroft Road, replacing the existing driveway opposite the existing Modern Mushrooms Farms Access. Trip distributions for this development were obtained from TPD's *Bancroft Residential Development Transportation Impact Study*, last revised October 2021.

163 Sheehan Road is proposed to consist of 45 townhomes located on the southwest corner of the Limestone Road/Kaolin Road/Ewart Road intersection. Trip generation for this development was based on ITE data for land use code #215 (Townhomes). Trips were distributed to the study area consistent with site trip distributions.

Stonebridge at Longwood is proposed to consist of 51 single-family homes on the west side of Thompson Road, north of Hillendale Road. Access to the site is proposed via two full-access driveways to Thompson Road. Trip Distributions for this development were obtained from TPD's *Thompson Residential Development Transportation Impact Study*, last revised August 2020.

Popeyes is a proposed 2,402 s.f. fast food restaurant with a drive through located in the New Garden Shopping Center. Trip generation for this development was based on ITE data for land use code #934 (Fast Food Restaurant with Drive-Thru). Trips were distributed to the study area consistent with site trip distributions.

The additional traffic volumes due to background growth and background developments were added to the existing traffic data to produce 2035 base (no-build) condition traffic volumes. Base condition volumes for the weekday A.M., weekday P.M. and Saturday midday peak hours are illustrated in **Figures 6-8** for the 2035 design year conditions. Trip distributions for the background developments are provided in **Appendix D**.

SCHEDULED ROADWAY IMPROVEMENTS

Based on a review of the DVRPC Transportation Improvement Program (TIP) there are no programmed roadway improvements in the vicinity of the proposed site.

PROPOSED SITE ACCESS

The proposed development will be served by the following driveway locations:

- » One full access signalized driveway to Route 41 serving development on the north and south sides of Route 41;
 - In conjunction with the proposed development, it is proposed to realign/extend Sharp Road eastward and then southward to intersect Route 41 opposite the proposed site driveway on the

- south side of Route 41, thus resulting in a reconfiguration of the existing full-movement intersection to permit only southbound right turns from Sharp Road onto westbound Route 41.
- » One right-in/right-out unsignalized driveway to Route 41 primarily serving the 168 semi-detached townhomes on the south side of Route 41;
 - » Three right-in/right-out driveways to Route 41 serving the southern residential development and the commercial development;
 - » One full-access unsignalized driveway and one right-out only driveway to Sheehan Road serving the proposed Convenience Market/Gas Station on the north side of Route 41;
 - » One right-in/right-out only driveway to Route 41 serving the proposed Convenience Market/Gas Station on the north side of Route 41;
 - » One full-access unsignalized driveway to Sunny Dell Road, south of Route 41;
 - » Two full-access unsignalized driveway to Reynolds Road, east of Sunny Dell Road;
 - » Two full-access unsignalized driveways to Sharp Road serving the northern residential development;
 - » One potential future unsignalized driveway to the northern leg of the main signalized access for the future Township farmers market. This access is not part of this application.

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 Guidelines 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

Tables 4-7 show the measured, desirable, acceptable (SSSD), and required sight distances at the site driveways for vehicles entering and exiting the site.

TABLE 4
SIGHT DISTANCE ANALYSIS – ROUTE 41

Direction		Posted Speed	Grade¹	Sight Distances (feet)		
				DES	SSSD	EXIST
Signalized Driveway to Route 41 (SR 0041) Northern leg						
Exiting Movements	To the left	45 mph	-1%	635	398	800' +
	To the right	45 mph	2%	570	370	800' +
Entering Left Turns	Approaching same direction	45 mph	2%	445	370	800' +
	Approaching opposite direction	45 mph	-1%	445	398	800' +
Signalized Driveway to Route 41 (SR 0041) Southern leg						
Exiting Movements	To the left	45 mph	-1%	635	398	800' +
	To the right	45 mph	2%	570	370	800' +
Entering Left Turns	Approaching same direction	45 mph	2%	445	370	800' +
	Approaching opposite direction	45 mph	-1%	445	398	800' +
RIRO Residential Access (East of Main Signalized Access)						
Exiting Movements	To the left	45 mph	-2%	635	398	750' +
Western RIRO Residential/Commercial Access						
Exiting Movements	To the left	45 mph	-1%	635	398	650' +
Center RIRO Residential/Commercial Access						
Exiting Movements	To the left	45 mph	-1%	635	398	650' +
Eastern RIRO Residential/Commercial Access						
Exiting Movements	To the left	45 mph	-1%	635	398	650' +

DES = PennDOT Desirable Sight Distance

¹ = Roadway Grade Approaching Driveway

SSSD = PennDOT Acceptable Sight Distance

EXIST = Existing (measured) Sight Distance

TABLE 5
SIGHT DISTANCE ANALYSIS – SHEEHAN ROAD

Direction		Posted Speed	Grade ¹	Sight Distances (feet)		
				DES	SSSD	EXIST
Convenience Store with Gas Western Access						
Exiting Movements	To the left	35 mph	-2%	440	256	600'+
	To the right	35 mph	1%	350	245	600'+
Entering Left Turns	Approaching same direction	35 mph	1%	300	245	600'+
	Approaching opposite direction	35 mph	-2%	300	256	635'
Convenience Store with Gas Eastern Access						
Exiting Movements	To the left	35 mph	0%	440	249	650'+
	To the right	35 mph	0%	350	249	315'
Entering Left Turns	Approaching same direction	35 mph	0%	300	249	270'
	Approaching opposite direction	35 mph	0%	300	249	650'+

DES = PennDOT Desirable Sight Distance

¹ = Roadway Grade Approaching Driveway

SSSD = PennDOT Acceptable Sight Distance

EXIST = Existing (measured) Sight Distance

TABLE 6
SIGHT DISTANCE ANALYSIS – SUNNY DELL ROAD

Direction		Posted Speed	Grade ¹	Sight Distances (feet)		
				DES	SSSD	EXIST
Sunny Dell Road Access						
Exiting Movements	To the left	40 mph	-1%	538	319	550'
	To the right	40 mph	-1%	460	319	665'
Entering Left Turns	Approaching same direction	40 mph	-1%	373	319	620'
	Approaching opposite direction	40 mph	-1%	373	319	585'

DES = PennDOT Desirable Sight Distance

1 = Roadway Grade Approaching Driveway

SSSD = PennDOT Acceptable Sight Distance

EXIST = Existing (measured) Sight Distance

TABLE 7
SIGHT DISTANCE ANALYSIS – SHARP ROAD

Direction		Posted Speed	Grade¹	Sight Distances (feet)		
				DES	SSSD	EXIST
Northern Residential Access to Sharp Road						
Exiting Movements	To the left	35mph	-1%	440	252	650'
	To the right	35mph	2%	350	242	600'
Entering Left Turns	Approaching same direction	35mph	2%	300	242	615'
	Approaching opposite direction	35mph	-1%	300	252	650'
Northern Residential Access to Sharp Road						
Exiting Movements	To the left	35mph	-1%	440	252	450'
	To the right	35mph	1%	350	245	700'+
Entering Left Turns	Approaching same direction	35mph	1%	300	245	700'+
	Approaching opposite direction	35mph	-1%	300	252	485'

DES = PennDOT Desirable Sight Distance

1 = Roadway Grade Approaching Driveway

SSSD = PennDOT Acceptable Sight Distance

EXIST = Existing (measured) Sight Distance

TABLE 8
SIGHT DISTANCE ANALYSIS – REYNOLDS ROAD

Direction		Posted Speed	Grade¹	Sight Distances (feet)		
				DES	SSSD	EXIST
Single-Family Homes Access to Reynolds Road						
Exiting Movements	To the left	35mph	3%	440	239	430'
	To the right	35mph	-7%	350	280	450'
Entering Left Turns	Approaching same direction	35mph	-7%	300	280	405'
	Approaching opposite direction	35mph	3%	300	239	465'
Eastern Estates Access to Reynolds Road						
Exiting Movements	To the left	35mph	0%	440	249	300'
	To the right	35mph	0%	350	249	250'
Entering Left Turns	Approaching same direction	35mph	0%	300	249	205'
	Approaching opposite direction	35mph	0%	300	249	335'

DES = PennDOT Desirable Sight Distance

SSSD = PennDOT Acceptable Sight Distance

EXIST = Existing (measured) Sight Distance

¹ = Roadway Grade Approaching Driveway

As shown in **Tables 4-8** above, the measured sight distances at the site driveways exceed PennDOT's acceptable sight distance requirements.

SHARP ROAD RE-ALIGNMENT

As part of this project, it is proposed to realign/extend Sharp Road eastward and then southward to intersect Route 41 opposite the signalized driveway on the south side of Route 41. In conjunction with this improvement, it is proposed modify the Sharp Road/Rt 41 intersection such that the only permitted movement is southbound Sharp Road right turns onto westbound Route 41. The redistribution due to the Sharp Road re-alignment for the weekday A.M., weekday P.M., and Saturday midday peak hours are shown in **Figures 12-14**, respectively.

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. For the proposed development, Land Use Codes 210 (Single Family Detached Housing), 215 (Single Family Attached Housing), 821 (Retail), 945 (Convenience Market/Gas Station), and 720 (Medical/Dental Office Building) 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; (3) weekday P.M. peak hour; and (4) Saturday midday peak hour. In addition, although not proposed to be developed as part of this application, trips associated with the future Township farmers market were also generated using ITE Land Use Code 858 (Farmer's Market). **Table 9** shows the rates/equations and directional percentages for the analyzed time periods.

TABLE 9
ITE TRIP GENERATION DATA

Land Use	Subcategory	ITE #	Peak Hour	Rate/Equation	Enter %	PB %
Single Family Attached Homes	NA	215	Weekday AM	T = 0.59(X) - 15.25	25%	--
			Weekday PM	T = 0.57(X) - 7.84	57%	--
			Saturday MIDDAY	T = 0.47(X)	48%	--
			Average Weekday	T = 6.57(X)	50%	--
Single Family Detached Homes	NA	210	Weekday AM	T = 0.70(X)	27%	--
			Weekday PM	T = 0.93(X)	62%	--
			Saturday MIDDAY	T = 1.00(X)	53%	--
			Average Weekday	T = 9.0 (X)	50%	--
Convenience Store/Gas Station ²	VFP (16-24)	945	Weekday AM	T = 64.97*(X)	50%	76%
	GFA (5.5-10k)		Weekday PM	T = 61.09(X)	50%	75%
			Saturday MIDDAY	T = 25.67(X)	51%	65% ¹
	VFP (16-24)		Average Weekday	T = 642.41(X)	50%	--
Farmer's Market	NA	858	Weekday AM	T = 174.9(X)	50%	--
			Weekday PM	T = 174.84(X)	48%	--
			Saturday MIDDAY	T = 174.84(X) ³	48%	--
			Average Weekday	NA ⁵		
Retail	With Grocery Store	822	Weekday AM	T = 3.89(X) - 27.4	60%	30% ¹
			Weekday PM	T = 9.34(X) - 66.48	49%	40%
			Saturday MIDDAY	T = 7.67(X)	49%	31%
			Average Weekday	T = 136.41(X) - 2680.46	50%	--
Medical/Dental Office Building	Standalone	720	Weekday AM	T = 3.21*(X)	78%	--
			Weekday PM	T = 3.70*(X) - 5.75	30%	--
			Saturday MIDDAY	T = 1.03*(X)	55%	--
			Average Weekday	T = 40.60*(X) - 75.15	50%	--

T = number of site-generated vehicular trips

X = independent variable

1 = No ITE data available for peak hour; used 10% less than PM peak hour

2 = Calculated using VFP and GFA, the higher generator was used

3 = Saturday data not provided, utilized PM peak hour data

*5 = Average weekday data not provided, utilized the (AM + PM) *5*

Internal Trips

For mixed-use developments, the *Trip Generation* manual recommends applying an interaction factor to the site trip generation to determine the quantity of “external trips” (trips from external roadways) and “internal capture trips” (trips between the various uses onsite that do not utilize the external roadways, in this case between the commercial development and the residential development on the southern side of Route 41. Internal capture for the proposed development was calculated in accordance with current ITE recommendations for the weekday A.M. and P.M. peak hours. For the Saturday midday peak hour and weekday interaction, an average of the weekday A.M. and P.M. peak hour interaction rates was utilized. Internal capture worksheets are provided in **Appendix D**.

Pass-By Trips

According to the *Trip Generation* manual, not all of the trips generated by the proposed development will be new to the surrounding area. A distinction was made between “new” trips, which are trips made to/from the study area for the express purpose of visiting the site, “pass-by” trips, which are trips made to the site by traffic passing the retail center on the adjacent roadways en route to another destination. The pass-by trips do not add any additional traffic to the study area intersections but will result in shifts in turning movement at the site driveway intersections.

The calculated trip generation for the proposed development (plus the Township’s future Farmers Market) is shown in **Table 10**.

TABLE 10
TRIP GENERATION SUMMARY

Time Period	Land Use	Total Trips			Internal Trips		External Trips			Pass-By Trips			New Trips		
		Total	Enter	Exit	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
Weekday AM Peak Hour	North of Route 41														
	Townhomes	94	23	71	--	--	94	23	71	0	0	0	94	23	71
	Farmer's Market	371	185	186	--	--	371	185	186	0	0	0	371	185	186
	Convenience/Gas	426	217	209	--	--	426	217	209	324	162	162	102	55	47
	South of Route 41														
	Single Family	188	51	137	1	4	183	50	133	0	0	0	183	50	133
	Townhomes	84	21	63	0	2	82	21	61	0	0	0	82	21	61
	Retail	420	252	168	20	10	390	232	158	117	59	58	273	173	100
	MOB	273	213	60	13	17	243	200	43	0	0	0	243	200	43
	Grand Total	1856	962	894	34	33	1789	928	861	441	221	220	1348	707	641
Weekday PM Peak Hour	North of Route 41														
	Townhomes	98	56	42	--	--	98	56	42	0	0	0	98	56	42
	Farmer's Market	381	183	198	--	--	381	183	198	0	0	0	381	183	198
	Convenience/Gas	401	200	201	--	--	401	200	201	301	151	150	100	49	51
	South of Route 41														
	Single Family	250	155	95	74	39	137	81	56	0	0	0	137	81	56
	Townhomes	88	50	38	24	16	48	26	22	0	0	0	48	26	22
	Retail	1008	494	514	89	103	816	405	411	326	163	163	490	242	248
	MOB	309	93	216	15	43	251	78	173	0	0	0	251	78	173
	Grand Total	2535	1231	1304	202	201	2132	1029	1103	627	314	313	1505	715	790

TABLE 10 (CONTINUED)
TRIP GENERATION SUMMARY

Time Period	Land Use	Total Trips			Internal Trips		External Trips			Pass-By Trips			New Trips		
		Total	Enter	Exit	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
Saturday Midday Peak Hour	North of Route 41														
	Townhomes	87	42	45	--	--	87	42	45	0	0	0	87	42	45
	Farmer's Market	381	183	198	--	--	381	183	198	0	0	0	381	183	198
	Convenience/Gas	411	209	202	--	--	411	209	202	267	134	133	144	75	69
	South of Route 41														
	Single Family	269	143	126	36	28	205	107	98	0	0	0	205	107	98
	Townhomes	79	38	41	10	9	60	28	32	0	0	0	60	28	32
	Retail	882	432	450	56	59	767	376	391	238	119	119	529	257	272
	MOB	88	48	40	5	10	73	43	30	0	0	0	73	43	30
	Grand Total	2197	1095	1102	107	106	1984	988	996	505	253	252	1479	735	744
Average Weekday	North of Route 41														
	Townhomes	3533	1767	1766	--	--	3533	1767	1766	--	--	--	--	--	--
	Farmer's Market	3760	1880	1880	--	--	3760	1880	1880	--	--	--	--	--	--
	Convenience/Gas	4212	2107	2107	--	--	4212	2107	2107	--	--	--	--	--	--
	South of Route 41														
	Single Family	2445	1223	1222	306	269	1870	917	953	--	--	--	--	--	--
	Townhomes	1104	552	552	138	121	845	414	431	--	--	--	--	--	--
	Retail	13007	6503	6504	845	846	11316	5658	5658	--	--	--	--	--	--
	MOB	3376	1688	1688	186	405	2785	1502	1283	--	--	--	--	--	--
	Grand Total	31437	15720	15719	1475	1641	28321	14245	14078	--	--	--	--	--	--

The external and pass-by trip generation for the proposed development (plus the Township's future Farmers Market) is summarized in **Table 11**.

TABLE 11
TRIP GENERATION SUMMARY

Time Period	External Trips			Pass By Trips			New Trips		
	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
Weekday A.M. Peak Hour	1789	928	861	441	221	220	1348	707	641
Weekday P.M. Peak Hour	2132	1029	1103	627	314	313	1505	715	790
Saturday Midday Peak Hour	1984	988	996	505	253	252	1479	735	744
Weekday	28321	14245	14078	--	--	--	--	--	--

Based on the trip generation analysis summarized in **Table 11**, the proposed development (plus the Township's future Farmers Market) will generate approximately 1,348 new trips during the weekday A.M. peak hour, 1,505 new trips during the weekday P.M. peak hour, and 1,479 new trips during the Saturday midday peak hour. Excluding the Township's future Farmers Market, the proposed development is anticipated to generate approximately 977 new trips during the weekday A.M. peak hour, 1,124 new trips during the weekday P.M. peak hour, and 1,098 new trips during the Saturday midday peak hour.

Table 12 compares the new trips under the previously-approved plan and the new trips under the proposed plan.

TABLE 12
TRIP GENERATION COMPARISON

Peak Hour	White Clay Pointe – Total New Trips		
	Previously Approved Plan	Current Application/Plan	Difference
Weekday A.M. Peak Hour	986	977	-9
Weekday P.M. Peak Hour	1,828	1,124	-704
Saturday Midday Peak Hour	2,881	1,098	-1,783

As shown in **Table 12**, the current plan is anticipated to generate less new peak hour trips during the weekday A.M., weekday P.M. and Saturday midday peak hours, or approximately 33% less on average during the peak hours, than the previously approved plan for the site.

TRIP DISTRIBUTION

The distribution of trips generated by the proposed development was based on the local road network, the existing traffic patterns, a gravity model consistent with the previously approved TIS for the site, the proposed use of the site, and the site driveway locations. The new trips for the proposed development were distributed to the local roadway network based on the percentages shown in **Table 13**. The pass-by trips for the proposed development were distributed to the local road network based on the existing traffic volumes passing the proposed site driveways.

TABLE 13
TRIP DISTRIBUTION PERCENTAGES – NEW TRIPS

Direction - To/From	Assignment To/From	Distribution %
East	via Route 41	13%
	via Reynolds Road	2%
West	via Route 41	30%
	via Egypt Run Road	2%
North	via Sharp Road	3%
	via Kaolin Road	16%
South	via Sunny Dell Road	4%
	via Limestone Road	30%

Pass-By Trips

Pass-by trips were established based on the existing traffic patterns in the vicinity of the site and the location and configuration of the site driveways. The percentages used for the distribution of pass-by trips to the project site are shown below in **Table 14**.

TABLE 14
TRIP DISTRIBUTION PERCENTAGES – PASS-BY TRIPS

Direction - From	Pass-by Trip Distribution Percentages		
	Weekday A.M.	Weekday P.M.	Saturday Midday
East via Route 41	61%	42%	49%
West via Route 41	39%	58%	51%

The assignment of site-generated trips for the proposed development during the weekday A.M., P.M., and Saturday midday peak hours are shown in **Figures 9-11**, respectively. Please note, for the purpose of this study, the two (2) convenience store with gas driveways to Sheehan Road were evaluated as one driveway.

PROJECTED (BUILD) CONDITION TRAFFIC VOLUMES

The redistribution of traffic due to the Sharp Road realignment and the site-generated trips were added to the base condition traffic volumes to develop projected condition traffic volumes for the weekday A.M., weekday P.M., and Saturday midday peak hours. Projected condition traffic volumes are shown in **Figures 15-17** for the 2033 design years for the weekday A.M., P.M. and Saturday midday peak hours. Traffic volume development worksheets are contained in **Appendix D**.

DRIVEWAY CLASSIFICATION

Driveways intersecting state roads are classified in the Pennsylvania Code, Title 67, Chapter 441. Low volume driveways are used by 25 to 750 vehicles per day. A medium volume driveway is used by 750 to 1500 vehicles per day. High volume driveways are used by more than 1500 vehicles per day. Based on the anticipated site trip generation and the assignment of site traffic, the classifications of the site driveways intersecting state roads (Route 41 and Sunny Dell Road) are listed in **Table 15**.

TABLE 15
DRIVEWAY CLASSIFICATIONS

State Road	Driveway/Intersection		Weekday Trips	Weekday Vehicles	Driveway Type
Route 41	Main Access	North (Sharp Rd)	9303	4652	High Volume
		South	9903	4951	High Volume
	Convenience Market/Gas Station Driveway		2889	1445	Medium Volume
	Western RIRO Driveway		607	303	Low Volume
	Center RIRO Driveway		1676	838	Low Volume
	Eastern RIRO Driveway		1705	852	Low Volume
	Townhomes RIRO Driveway		412	206	Low Volume
Sunny Dell Road	Site Driveway		968	484	Low Volume

Note: A "trip" equals an entering or an exiting vehicle. Therefore, weekday vehicles = weekday trips/2.

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 16**. 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 16
LEVEL OF SERVICE CRITERIA
UNSIGNALIZED AND SIGNALIZED INTERSECTIONS¹

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 18-4 and 19-1 of the Transportation Research Board's Highway Capacity Manual 2010

CAPACITY ANALYSIS METHODOLOGY

Capacity analyses were conducted for the weekday A.M., weekday P.M., and Saturday midday peak hours at the study area intersections. These analyses were conducted according to the methodologies contained in the 6th Edition *Highway Capacity Manual* (HCM) using *Synchro 12* software, a Trafficware product.

The following conditions were analyzed, as applicable:

- » Existing conditions;
- » 2035 Base conditions (Design year without development);
- » 2035 Projected conditions (Design year with development);

It should be noted that based on methodologies contained in Chapter 10 of PennDOT's Publication 46, TPD adjusted the following HCM default values in the *Synchro 12* capacity analysis. These adjustments were made at the signalized intersections within the study area for all time periods based on the study area location being classified as Suburban:

- » Base saturation flow rates for signalized intersections. The saturation flow rate was changed from the default value of 1900 to 1800 based on Exhibit 10-9.
- » Start-up lost time and extension of effective green time for signalized intersections. The startup lost time was changed from the default value of 2.0 seconds to 2.5 seconds. Based on the total clearance time (yellow plus all-red time) being greater than 5 seconds, the extension of green time was changed from the default value of 2 seconds to 3.5 seconds. These adjusted values were based on Exhibit 10-10.

In addition, capacity analyses were conducted at the proposed site driveway intersections under the 2035 projected conditions. The capacity analysis worksheets are included in **Appendix E**.

PennDOT's Transportation Impact Study Guidelines outlined in PennDOT's *Policies and Procedures for Transportation Impact Studies*, found in PennDOT's Publication 282, Appendix A, dated June, 2025 contain the following criteria regarding levels of service:

- » *If evaluation of the With Development Horizon Year Scenario to the Without Development Horizon Year Scenario indicates that the overall intersection level of service has dropped, the applicant will be required to mitigate the level of service if the increase in overall intersection delay is greater than 10-seconds. If the overall intersection delay increase is less than or equal to 10-seconds, mitigation of the intersection will not be required.*
- » *For mitigation scenarios, applicants are expected to mitigate the overall intersection LOS to the original Without Development LOS; the 10-second delay variance is not applied to mitigation scenarios. Applicants may be required to address available storage and queue lengths at critical movements or approaches even if the overall LOS requirements are met.*
- » *If signalization is the preferred alternative for mitigation, overall intersection LOS C in rural areas and LOS D in urban areas is acceptable.*
- » *New signalized or unsignalized intersection established to serve as access to the development shall be designed to operate at minimum LOS C for rural areas, and minimum LOS D for urban areas.*

LEVELS OF SERVICE IN THE STUDY AREA

Level of service (LOS) matrices for the study area intersections are shown in **Tables 17-20** for the weekday A.M., weekday P.M., and Saturday midday peak hours.

TABLE 17
LEVEL OF SERVICE DELAY (SECONDS) SUMMARY

Intersection	Movement	Weekday A.M. Peak Hour			
		Existing Condition	2035 Design Year		
			Base	Projected	Projected ¹
Limestone Road & Route 41 North On/Off Ramps	WB L	E	E	F (422.4)	F (129.6)
	WB R	B	B	B	B
	NB L	B	B	C	C
	ILOS	A (2.5)	A (2.8)	A (6.1)	A (5.3)
Limestone Road & Route 41 South On/Off Ramps	EB L	C	C	F (77.7)	D
	EB R	C	C	E	A
	NB L	A	A	A	A
	NB T				A
	SB TR	--	--	--	A
	ILOS	A (4.4)	A (5.2)	C (16.3)	B (10.4)
Route 41 & Sharp Road	EB L	B	B	--	--
	SB LR	C	D	C	C
	ILOS	A (1.5)	A (1.9)	A (0.7)	A (0.7)
Route 41 & Sunny Dell Road	EB T	B	B	B	B
	EB TR				A
	WB L	B	C	C	C
	WB TR				B
	NB LT	F (77.6)	F (162.9)	F (6647.6)	C
	NB R				A
	SB LTR	C	D	ERROR	C
	ILOS	A (8.2)	C (15.7)	F (746.8)	B (11.4)
Sunny Dell Road & Egypt Run Road	EB LR	B	B	C	--
	NB L	A	A	A	--
	ILOS	A (2.5)	A (2.5)	A (3.0)	--
Sunny Dell Road & Reynolds Road	EB LT	B	C	C	--
	EB R	A	A	A	--
	WB LTR	B	B	B	--
	NB L	A	A	A	--
	SB L	A	A	A	--
	ILOS	A (5.4)	A (5.7)	A (6.7)	--

Base = No-Build scenario; Projected = Build scenario

¹ = Projected conditions with implementation of recommended improvements

TABLE 17 (CONTINUED)
LEVEL OF SERVICE DELAY (SECONDS) SUMMARY

Intersection	Movement	Weekday A.M. Peak Hour			
		Existing Condition	2035 Design Year		
			Base	Projected	Projected ¹
Route 41 & Starr Road/Brittany Drive	EB L	A	A	B	--
	WB L	B	B	B	--
	NB LT	D	E	F (70.5)	--
	NB R	C	D	F (57.1)	--
	SB L	F (75.6)	F (117.1)	F (941.9)	--
	SB TR	B	B	C	--
	ILOS	A (5.2)	A (6.1)	B (11.8)	--
Sunny Dell Road & Church Driveway	EB LR	A	A	A	--
	NB LR	A	A	A	--
	ILOS	A (0.0)	A (0.0)	A (0.0)	--
Limestone Road & Kaolin Road/Ewart Road	EB LTR	B	C	D	--
	WB LTR	C	C	D	--
	NB L	A	A	A	--
	SB L	A	A	A	--
	ILOS	A (3.0)	A (3.4)	A (5.3)	--
EB Rt 41 & EB Rt 41 On-Ramp	NB R	B	C	C	--
	ILOS	A (0.5)	A (0.9)	A (0.8)	--
WB Rt 41 On Ramp & WB Rt 41	SB R	B	C	F (123.6)	A
	ILOS	A (2.2)	A (2.6)	D (29.8)	A (0.0)

Base = No-Build scenario; Projected = Build scenario

¹ = Projected conditions with implementation of recommended improvements

TABLE 18
LEVEL OF SERVICE DELAY (SECONDS) SUMMARY

Intersection	Movement	Weekday P.M. Peak Hour			
		Existing Condition	2035 Design Year		
			Base	Projected	Projected ¹
Limestone Road & Route 41 North On/Off Ramps	WB L	F (68.2)	F (83.2)	F (ERROR)	F (425.9)
	WB R	B	B	B	B
	NB L	B	B	C	C
	ILOS	A (4.2)	A (4.5)	A (6.9)	B (10.4)
Limestone Road & Route 41 South On/Off Ramps	EB L	C	C	F (118.6)	C
	EB R	C	C	E	A
	NB L	A	A	A	A
	NB T				A
	SB TR	--	--	--	A
	ILOS	A (3.2)	A (3.3)	C (18.9)	A (9.7)
Route 41 & Sharp Road	EB L	B	B	--	--
	SB LR	D	D	D	D
	ILOS	A (1.5)	A (1.7)	A (0.7)	A (0.7)
Route 41 & Sunny Dell Road	EB T	B	B	B	D
	EB TR				A
	WB L	B	B	C	C
	WB TR				C
	NB LT	F (51.2)	F (70.9)	F (ERROR)	C
	NB R				D
	SB LTR	F (113.8)	F (147.2)	F (ERROR)	C
	ILOS	A (3.8)	A (4.8)	ERROR	B (19.7)
Sunny Dell Road & Egypt Run Road	EB LR	A	A	B	--
	NB L	A	A	A	--
	ILOS	A (1.4)	A (1.4)	A (1.5)	--
Sunny Dell Road & Reynolds Road	EB LT	B	B	B	--
	EB R	A	A	A	--
	WB LTR	A	A	A	--
	NB L	A	A	A	--
	SB L	A	A	A	--
	ILOS	A (2.7)	A (2.7)	A (2.8)	--

Base = No-Build scenario; Projected = Build scenario

¹ = *Projected conditions with implementation of recommended improvements*

TABLE 18 (CONTINUED)
LEVEL OF SERVICE DELAY (SECONDS) SUMMARY

Intersection	Movement	Weekday P.M. Peak Hour			
		Existing Condition	2035 Design Year		
			Base	Projected	Projected ¹
Route 41 & Starr Road/Brittany Drive	EB L	B	B	B	--
	WB L	B	B	C	--
	NB LT	A	A	A	--
	NB R	C	C	D	--
	SB L	F (133.9)	F (161.5)	F (599.2)	--
	SB TR	B	B	C	--
	ILOS	A (3.6)	A (3.8)	A (4.9)	--
Sunny Dell Road & Church Driveway	EB LR	A	A	B	--
	NB LR	A	A	A	--
	ILOS	A (1.7)	A (1.7)	A (1.4)	--
Limestone Road & Kaolin Road/Ewart Road	EB LTR	B	B	C	--
	WB LTR	D	D	E	--
	NB L	B	B	B	--
	SB L	A	A	A	--
	ILOS	A (2.7)	A (2.9)	A (3.6)	--
EB Rt 41 & EB Rt 41 On-Ramp	NB R	B	B	B	--
	ILOS	A (0.6)	A (0.6)	A (0.6)	--
WB Rt 41 On Ramp & WB Rt 41	SB R	E	F (62.1)	F (496.3)	A
	ILOS	A (9.7)	B (12.6)	F (127.2)	A (0.0)

Base = No-Build scenario; Projected = Build scenario

¹ = Projected conditions with implementation of recommended improvements

TABLE 19
LEVEL OF SERVICE DELAY (SECONDS) SUMMARY

Intersection	Movement	Saturday Midday Peak Hour			
		Existing Condition	2035 Design Year		
			Base	Projected	Projected ¹
Limestone Road & Route 41 North On/Off Ramps	WB L	F (55.1)	F (77.1)	F (ERROR)	F (313.9)
	WB R	A	B	B	B
	NB L	B	B	C	C
	ILOS	A (5.6)	A (6.2)	A (9.9)	B (11.3)
Limestone Road & Route 41 South On/Off Ramps	EB L	C	C	F (65.7)	D
	EB R	B	B	C	A
	NB L	A	A	A	A
	NB T				B
	SB TR	--	--	--	A
	ILOS	A (3.7)	A (4.1)	B (12.0)	B (11.3)
Route 41 & Sharp Road	EB L	B	B	--	--
	SB LR	E	F (63.2)	D	D
	ILOS	A (1.5)	A (2.2)	A (0.4)	A (0.4)
Route 41 & Sunny Dell Road	EB T	B	B	B	D
	EB TR				A
	WB L	B	B	C	B
	WB TR				C
	NB LT	D	E	F (8921.1)	C
	NB R				A
	SB LTR	C	C	C	C
	ILOS	A (1.9)	A (2.3)	F (569.4)	B (18.5)
Sunny Dell Road & Egypt Run Road	EB LR	A	A	A	--
	NB L	A	A	A	--
	ILOS	A (1.2)	A (1.1)	A (1.2)	--
Sunny Dell Road & Reynolds Road	EB LT	B	B	B	--
	EB R	A	A	A	--
	WB LTR	A	A	A	--
	NB L	A	A	A	--
	SB L	A	A	A	--
	ILOS	A (2.3)	A (2.3)	A (2.5)	--

Base = No-Build scenario; Projected = Build scenario

¹ = *Projected conditions with implementation of recommended improvements*

TABLE 19 (CONTINUED)
LEVEL OF SERVICE DELAY (SECONDS) SUMMARY

Intersection	Movement	Saturday Midday Peak Hour			
		Existing Condition	2035 Design Year		
			Base	Projected	Projected ¹
Route 41 & Starr Road/Brittany Drive	EB L	B	B	B	--
	WB L	B	B	B	--
	NB LT	F (55.1)	F (69.5)	F (155.1)	--
	NB R	C	C	D	--
	SB L	F (81.9)	F (111.2)	F (364.6)	--
	SB TR	C	D	E	--
	ILOS	A (2.4)	A (2.5)	A (3.5)	--
Sunny Dell Road & Church Driveway	EB LR	A	A	B	--
	NB LR	A	A	A	--
	ILOS	A (1.3)	A (1.3)	A (0.8)	--
Limestone Road & Kaolin Road/Ewart Road	EB LTR	A	A	B	--
	WB LTR	C	C	C	--
	NB L	A	A	A	--
	SB L	A	A	A	--
	ILOS	A (2.0)	A (2.2)	A (1.9)	--
EB Rt 41 & EB Rt 41 On-Ramp	NB R	B	B	B	--
	ILOS	A (0.6)	A (0.6)	A (0.6)	--
WB Rt 41 On Ramp & WB Rt 41	SB R	D	E	F (393.6)	A
	ILOS	A (8.2)	B (12.6)	F (116.8)	A (0.0)

Base = No-Build scenario; Projected = Build scenario

¹ = Projected conditions with implementation of recommended improvements

TABLE 20
LEVEL OF SERVICE DELAY (SECONDS) SUMMARY – SITE DRIVEWAYS

Intersection	Movement	2035 Design Year					
		Weekday A.M. Peak Hour		Weekday P.M. Peak Hour		Saturday Midday Peak Hour	
		Projected	Projected ¹	Projected	Projected ¹	Projected	Projected ¹
Route 41 & Main Signalized Access	EB L	B	B	C	C	C	C
	EB T	C	C	C	C	D	D
	EB R	C	C	C	C	C	C
	WB L	D	D	C	C	D	D
	WB T	C	C	C	C	C	C
	WB R	C	C	C	C	C	C
	NB L	D	D	D	D	C	C
	NB T	D	D	D	D	D	D
	NB R	C	C	C	C	C	C
	SB L	D	D	D	D	D	D
	SB TR	D	D	D	D	D	D
Route 41 & Townhomes RIRO Eastern	ILOS	C (32.3)	C (32.2)	C (31.9)	C (31.9)	D (35.8)	D (35.8)
	NB R	E	C	C	B	D	B
Sharp Rd & Northern Residential Access	ILOS	A (0.5)	A (0.2)	A (0.1)	A (0.1)	A (0.2)	A (0.1)
	WB LR	A	--	A	--	A	--
	SB L	A	--	A	--	A	--
Sharp Rd & Southern Residential Access	ILOS	A (1.1)	--	A (0.7)	--	A (0.8)	--
	WB LR	A	--	A	--	A	--
	SB L	A	--	A	--	A	--
Sunny Dell Rd & Residential Access	ILOS	A (1.3)	--	A (0.8)	--	A (0.9)	--
	WB LR	B	--	A	--	A	--
	SB L	A	--	A	--	A	--
Route 41 & Commercial RIRO Eastern	ILOS	A (1.3)	--	A (1.0)	--	A (2.1)	--
	NB R	E	C	D	B	E	C
	ILOS	A (0.6)	A (0.3)	A (0.9)	A (0.5)	A (1.2)	A (0.5)
Reynolds Rd & Residential Access	EB L	A	--	A	--	A	--
	SB LR	A	--	A	--	A	--
	ILOS	A (0.2)	--	A (0.1)	--	A (0.3)	--
Reynolds Rd & Estate Homes Access	EB L	A	--	A	--	A	--
	SB LR	A	--	A	--	A	--
	ILOS	A (0.3)	--	A (0.2)	--	A (0.3)	--
Route 41 & Western RIRO Access	NB R	E	C	C	B	D	B
	ILOS	A (1.1)	A (0.3)	A (0.2)	A (0.1)	A (0.5)	A (0.2)
Route 41 & Center RIRO Access	NB R	E	C	C	B	D	C
	ILOS	A (0.6)	A (0.3)	A (0.8)	A (0.4)	A (1.1)	A (0.5)
Route 41 & Convenience Stroe with Gas RIRO Access	SB R	B	B	C	C	B	B
	ILOS	A (0.4)	A (0.4)	A (0.7)	A (0.7)	A (0.5)	A (0.5)

Projected = Build scenario

¹ = Projected conditions with implementation of recommended improvements

As shown in **Tables 17-20**, under 2035 projected conditions with the development of the proposed site and with the proposed improvements identified in the executive summary, the study area intersections will comply with the requirement outlined in PennDOT's TIS Guidelines. The proposed improvements are illustrated on the Conceptual Roadway Improvement Plan included in **Appendix H**.

RAMP JUNCTION ANALYSIS

TPD evaluated the eastbound Route 41 off-ramp diverge onto Limestone Road utilizing HCS software. The 2035 projected condition results are summarized in **Table 21** below. Please note, the Route 41 EB on-ramp intersection with Route 41 analysis is summarized in **Tables 17-20**. In addition, the existing merge onto Route 41 westbound from Limestone Road is proposed to be a free-flow movement with the proposed improvements. As such, this intersection was not evaluated. The HCS printouts are included in **Appendix E**.

TABLE 21
LEVEL OF SERVICE DELAY (SECONDS) SUMMARY – DIVERGE ANALYSIS

Intersection	2035 Projected Conditions		
	AM Peak Hour	PM Peak Hour	Saturday Peak Hour
Route 41 & EB Off-Ramp to Limestone Road	B	B	B

However, although the diverge analysis indicates LOS B operations with the existing Route 41 configuration at the off-ramp to Limestone Road, an additional eastbound Route 41 thru lane is proposed along the site frontage, which will drop into a dedicated lane onto the off-ramp for Limestone Road.

95TH PERCENTILE QUEUE ANALYSIS

Queue analyses were conducted at the signalized study area intersections using *Synchro 12* software. For this analysis, the 95th percentile queue is defined as the queue length that is exceeded in 5% of the signal cycles. As an example, for a signal with a 90-second cycle, this means that the 95th percentile queue length will be exceeded during 2 of the 40 signal cycles that occur during the peak hour. The queue analysis results are summarized in **Table 22** for the analyzed peak hours.

TABLE 22
95TH PERCENTILE QUEUE (FEET) ANALYSIS

Intersection	Movement	Existing [Proposed] Storage	2035 Design Year								
			Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Midday Peak Hour		
			Base	Projected	Projected ¹	Base	Projected	Projected ¹	Base	Projected	Projected ¹
Limestone Road & Route 41 North On/Off Ramps	WB L	100+	3	23	10	18	0	48	8	0	23
	WB R	100+	3	5	5	5	8	8	3	3	3
	NB L	285	33	93	93	55	158	158	78	193	193
Limestone Road & Route 41 South On/Off Ramps	EB L	200+	15	138	123	5	170	110	3	115	105
	EB R	145	95	278	0	68	283	0	73	210	0
	NB L	100+ [100]	0	0	3	0	0	3	3	3	3
	NB T	300+			205			185			215
	SB TR	285	--	--	43	--	--	53	--	--	25
Route 41 & Sharp Road	EB L	100+	13	--	--	10	--	--	10	--	--
	SB LR	100+	48	28	28	43	30	30	58	18	18
Route 41 & Sunny Dell Road	EB L	[75]	0	0	5	0	0	3	0	0	0
	EB TR	300+			215			178			185
	WB L	[250]	28	58	153	30	68	185	15	38	88
	WB TR	800+			328			665			695
	NB LT	100+	245	945	50	88	0	23	58	578	33
	NB R	[200]			0			135			0
	SB LTR	50+			10			8			10
Sunny Dell Road & Egypt Run Road	EB LR	50+	15	30	--	3	5	--	3	3	--
	NB L	100+	8	8	--	3	3	--	0	0	--
Sunny Dell Road & Reynolds Road	EB LT	100+	48	70	--	0	0	--	0	0	--
	EB R	100+	5	5	--	0	0	--	0	0	--
	WB LTR	100+	15	20	--	3	5	--	3	3	--
	NB L	100+	5	5	--	0	0	--	0	0	--
	SB L	100+	0	3	--	3	5	--	3	3	--
Route 41 & Starr Road/Brittany Drive	EB L	70	0	0	--	0	0	--	0	3	--
	WB L	170	15	20	--	43	58	--	18	23	--
	NB LT	100+	0	3	--	0	0	--	5	13	--
	NB R	175	120	210	--	48	75	--	35	53	--
	SB L	60	13	38	--	13	25	--	13	28	--
Sunny Dell Road & Church Driveway	SB TR	100+	3	3	--	3	3	--	3	3	--
	EB LR	50+	0	0	--	8	8	--	3	3	--
Limestone Road & Kaolin Road/Ewart Road	NB LR	100+	0	0	--	3	3	--	0	0	--
	EB LTR	100+	40	93	--	20	43	--	8	13	--
WB Rt 41 On Ramp & WB Rt 41	WB LTR	100+	10	18	--	15	23	--	3	5	--
	NB L	100+	3	3	--	10	10	--	5	5	--
	SB L	100+	0	0	--	0	0	--	0	0	--
EB Rt 41 & EB Rt 41 On-Ramp	NB R	350	15	18	--	10	13	--	10	10	--
WB Rt 41 On Ramp & WB Rt 41	SB R	430	68	593	0	275	1343	0	295	1413	0

Base = No-Build scenario; Projected = Build scenario

¹ = Projected conditions with implementation of recommended improvements

TABLE 23
95TH PERCENTILE QUEUE (FEET) ANALYSIS – SITE DRIVEWAYS

Intersection	Movement	Proposed Storage	2035 Design Year					
			Weekday A.M. Peak Hour		Weekday P.M. Peak Hour		Saturday Midday Peak Hour	
			Projected	Projected ¹	Projected	Projected ¹	Projected	Projected ¹
Route 41 & Main Signalized Access	EB L	275	195	195	165	165	185	185
	EB T	550+	503	503	348	348	475	475
	EB R	175	83	83	43	43	33	33
	WB L	325	248	248	235	235	283	283
	WB T	500+	295	295	388	388	385	385
	WB R	225	118	118	123	123	125	125
	NB L	250	125	125	115	115	193	193
	NB T	50+	13	13	15	15	13	13
	NB R	250	68	68	158	158	73	73
	SB L	200 ²	200	200	145	145	165	165
	SB TR	200 ²	175	175	165	165	143	143
Route 41 & Townhomes RIRO Eastern	NB R	50+	25	10	5	3	10	5
Sharp Rd & Northern Residential Access	WB LR	50+	3	--	3	--	3	--
	SB L	50+	0	--	0	--	0	--
Sharp Rd & Southern Residential Access	WB LR	50+	5	--	3	--	3	--
	SB L	50+	0	--	0	--	0	--
Sunny Dell Rd & Residential Access	WB LR	50+	8	--	3	--	5	--
	SB L	50+	3	--	3	--	3	--
Route 41 & Commercial RIRO Eastern	NB R	50+	25	10	38	18	50	20
Reynolds Rd & Residential Access	EB L	50+	0	--	0	--	0	--
	SB LR	50+	0	--	0	--	0	--
Reynolds Rd & Estate Homes Access	EB L	50+	0	--	0	--	0	--
	SB LR	50+	0	--	0	--	0	--
Route 41 & Western RIRO Access	NB R	50+	45	15	8	5	20	10
Route 41 & Center RIRO Access	NB R	50+	25	10	35	15	48	18
Route 41 & Convenience Store with Gas RIRO Access	SB R	50+	13	13	25	25	20	20

Base = No-Build scenario; Projected = Build scenario

¹= Projected conditions with implementation of recommended improvements

²Distance to Sheehan Road

As shown in **Tables 22-23**, adequate queue storage will be provided for the turn lanes in 2035 with construction and full build-out of the proposed development. Queue analysis worksheets are included with the capacity analysis worksheets provided in **Appendix E**.

AUXILIARY TURN LANE ANALYSIS

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. **Table 24** summarizes the results of the auxiliary turn lane analysis at the site access intersections. The calculations for the auxiliary turn lane warrants are included in **Appendix F**.

TABLE 24
AUXILIARY TURN LANE ANALYSIS SUMMARY

Intersection	Auxiliary Lane	Warrant Satisfied?	Required Length		Maximum 95th Percentile Queue (feet)	Proposed Length (feet)
			1 Lane Approach	2 Lane Approach		
Route 41 & Main Signalized Access	EB Left Turn Lane	Yes	--	275	195	275
	EB Right Turn Lane	Yes	--	175	83	175
	WB Left Turn Lane	Yes	--	325	283	325
	WB Right Turn Lane	Yes	--	225	125	225
Route 41 & Sunny Dell Rd (Signalized)	EB Left Turn Lane	No	150	--	5	75
	EB Right Turn Lane	Yes	225	225	--	--
	WB Left Turn Lane	Yes	250	250	185	250
	WB Right Turn Lane	No	--	--	--	None
Route 41 & Townhomes RIRO Eastern	EB Right Turn Lane	No	--	--	--	--
Route 41 & Commercial RIRO Eastern	EB Right Turn Lane	Yes	125	125	--	125
Route 41 & Western RIRO Access	EB Right Turn Lane	No	--	--	--	--
Route 41 & Center RIRO Access	EB Right Turn Lane	Yes	125	125	--	125
Route 41 & Convenience Store with Gas RIRO Access	WB Right Turn Lane	Yes	--	225*	--	185 ¹
Sharp Road & Residential Driveway (Northern)	SB Left Turn Lane	No	--	--	--	--
	NB Right Turn Lane	No	--	--	--	--
Sharp Road & Residential Driveway (Southern)	SB Left Turn Lane	No	--	--	--	--
	NB Right Turn Lane	No	--	--	--	--
Sunny Dell Road & Site Driveway	SB Left Turn Lane	No	--	--	--	--
	NB Right Turn Lane	No	--	--	--	--
Reynolds Road & Western Site Driveway	EB Left Turn Lane	No	--	--	--	--
	WB Right Turn Lane	No	--	--	--	--
Reynolds Road & Eastern Site Driveway	EB Left Turn Lane	No	--	--	--	--
	WB Right Turn Lane	No	--	--	--	--

¹= Approximate distance between the realigned Sharp Rd/Sheehan Rd intersection with Route 41 and the proposed Convenience Store access.

SIGNAL WARRANT ANALYSIS

A traffic signal warrant analysis was conducted at the following intersections in accordance with PennDOT Publication 212, *Official Traffic Control Devices*, Subchapter D, "Highway Traffic Signals":

- » Route 41 & Sunny Dell Road
- » Route 41 & Proposed Site Main Access
- » Limestone Road & Route 41 South On-Off Ramps

TPD examined traffic volumes at the above intersections to determine if Warrant 3- Peak Hour Volume Warrant, Warrant will be satisfied based on design year traffic volume projections with development of the

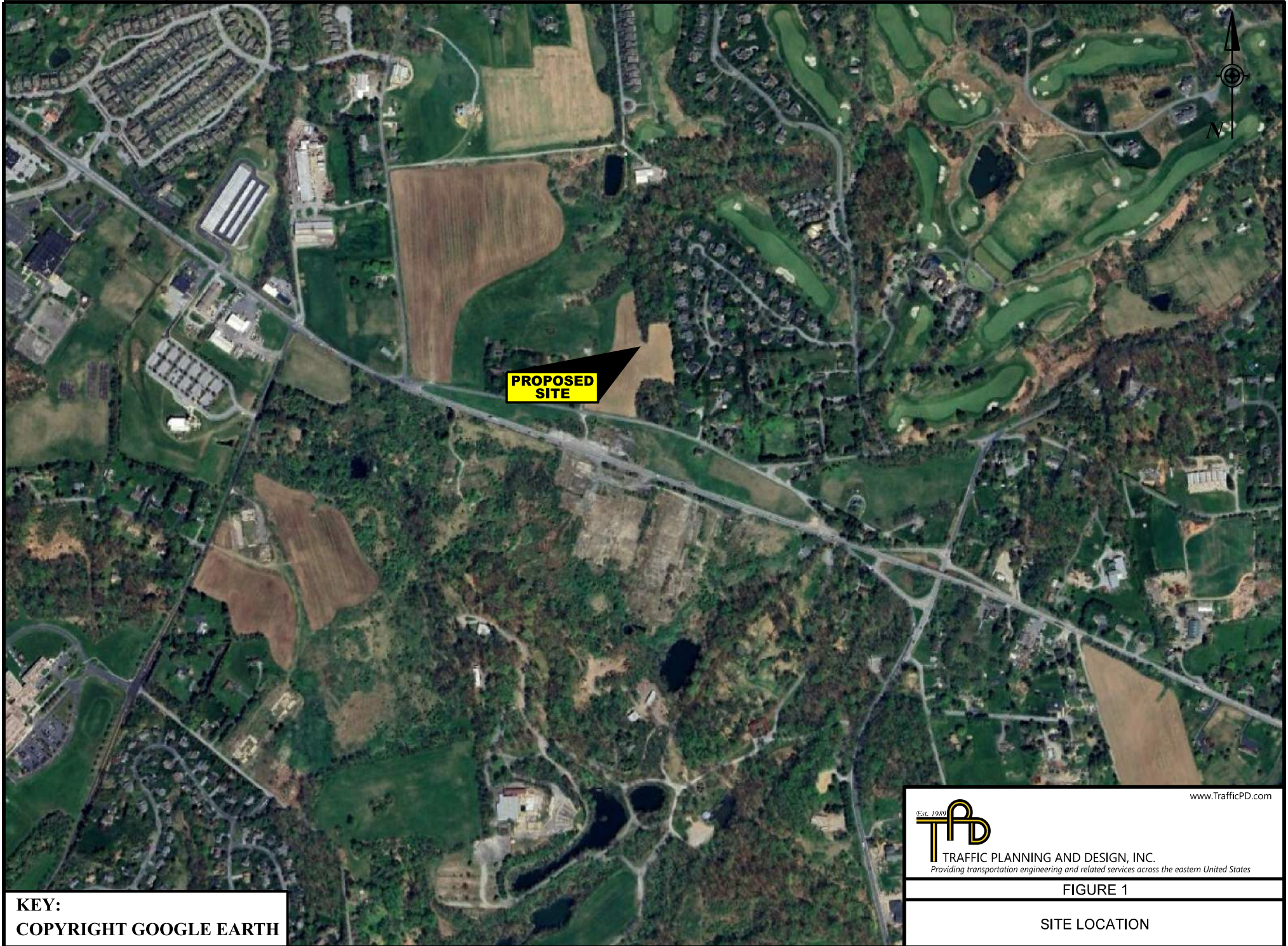
proposed site. All relevant signal warrant analyses worksheets are included in **Appendix G. Table 25** summarizes the results of traffic signal warrant analysis.

TABLE 25
PEAK HOUR VOLUME WARRANT ANALYSIS

Warrant Evaluated	Intersection	Number of Unique Hours Met	Warrant Satisfied?
Peak-Hour Vehicular Volume	Route 41 & Sunny Dell Road	3	Yes
	Route 41 & Proposed Site Main Driveway	3	Yes
	Limestone Road & Route 41 South On-Off Ramps	3	Yes

RECOMMENDATIONS & CONCLUSIONS

Recommendations and conclusions are provided in the executive summary.



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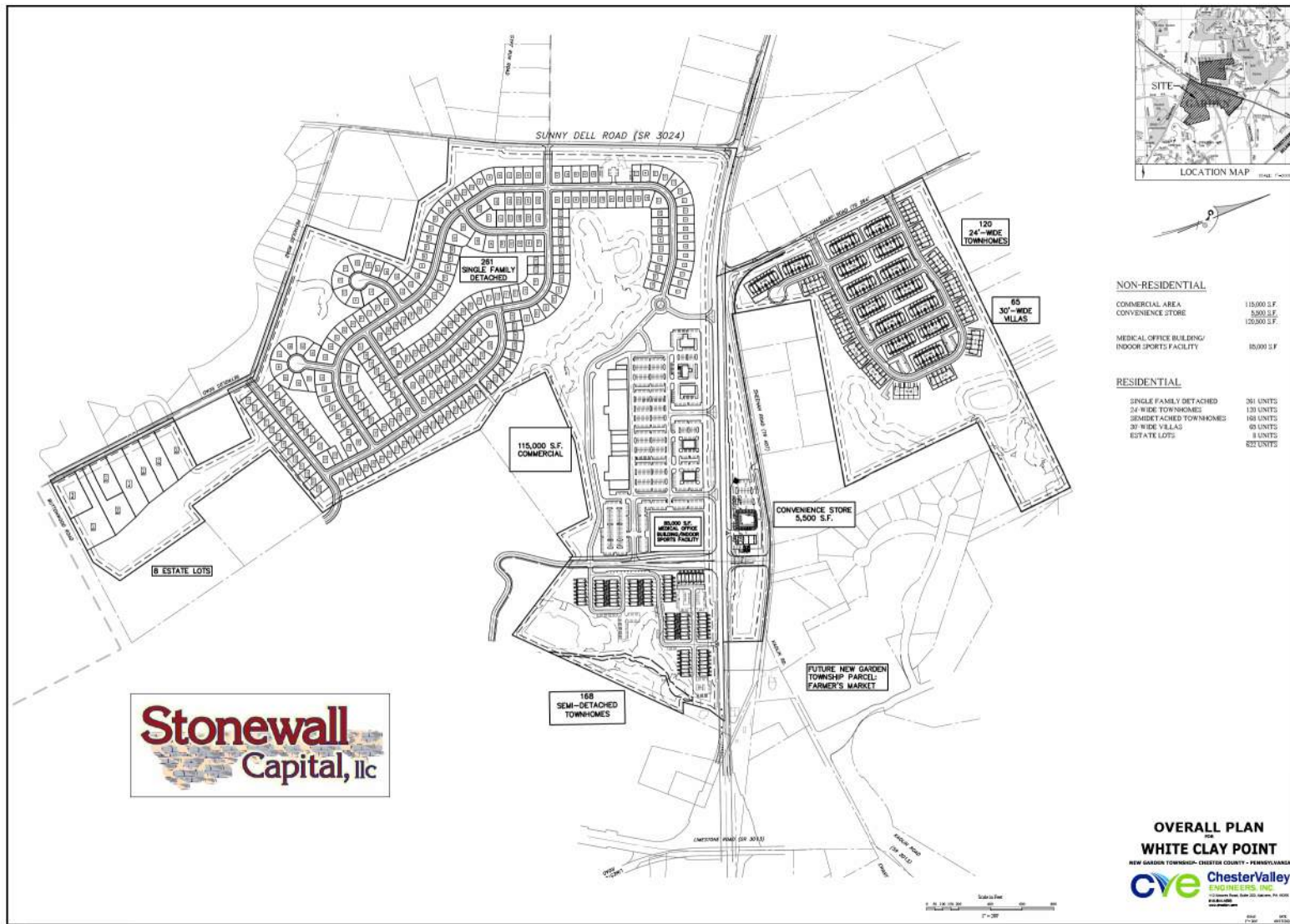


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FIGURE 1

SITE LOCATION

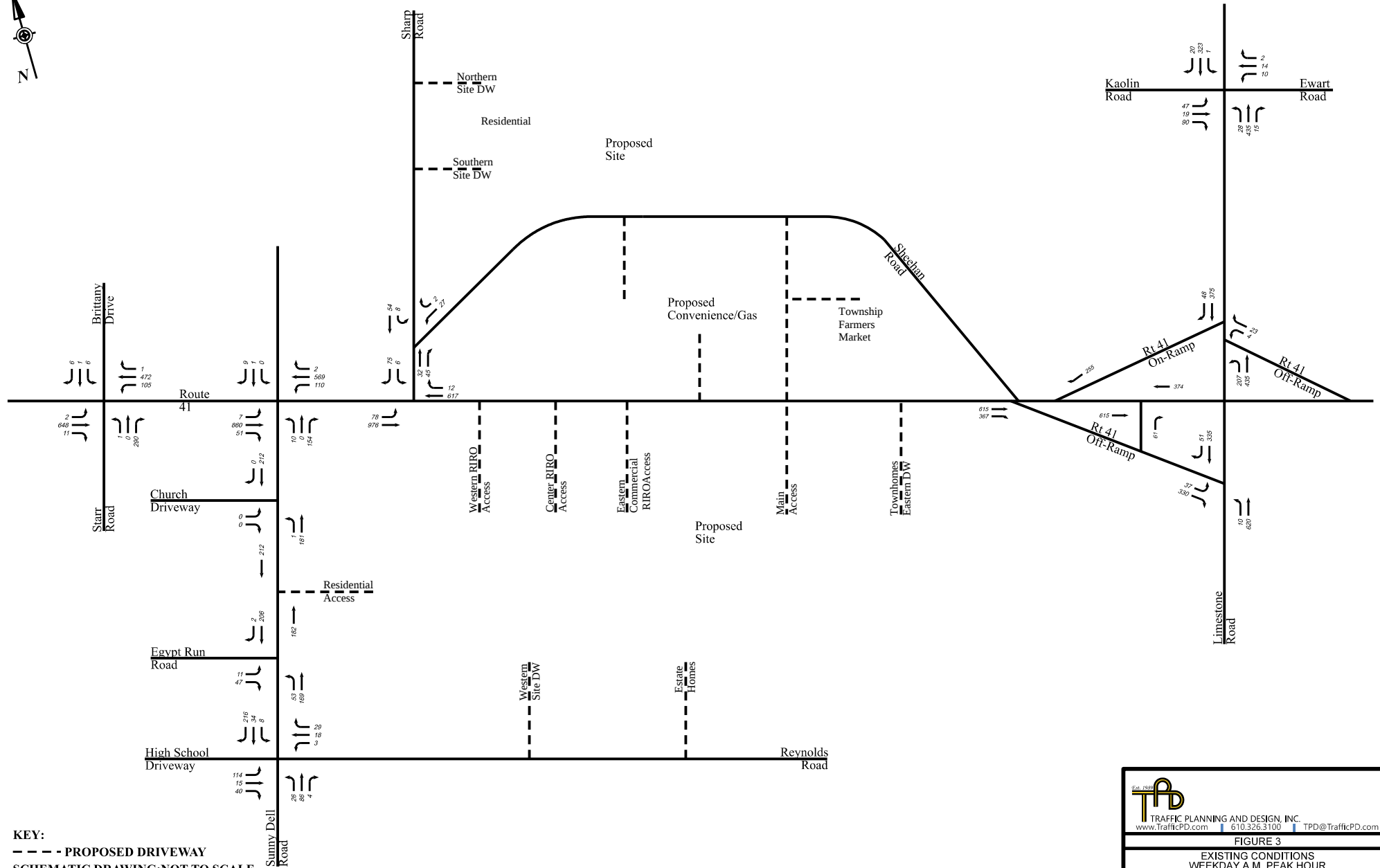


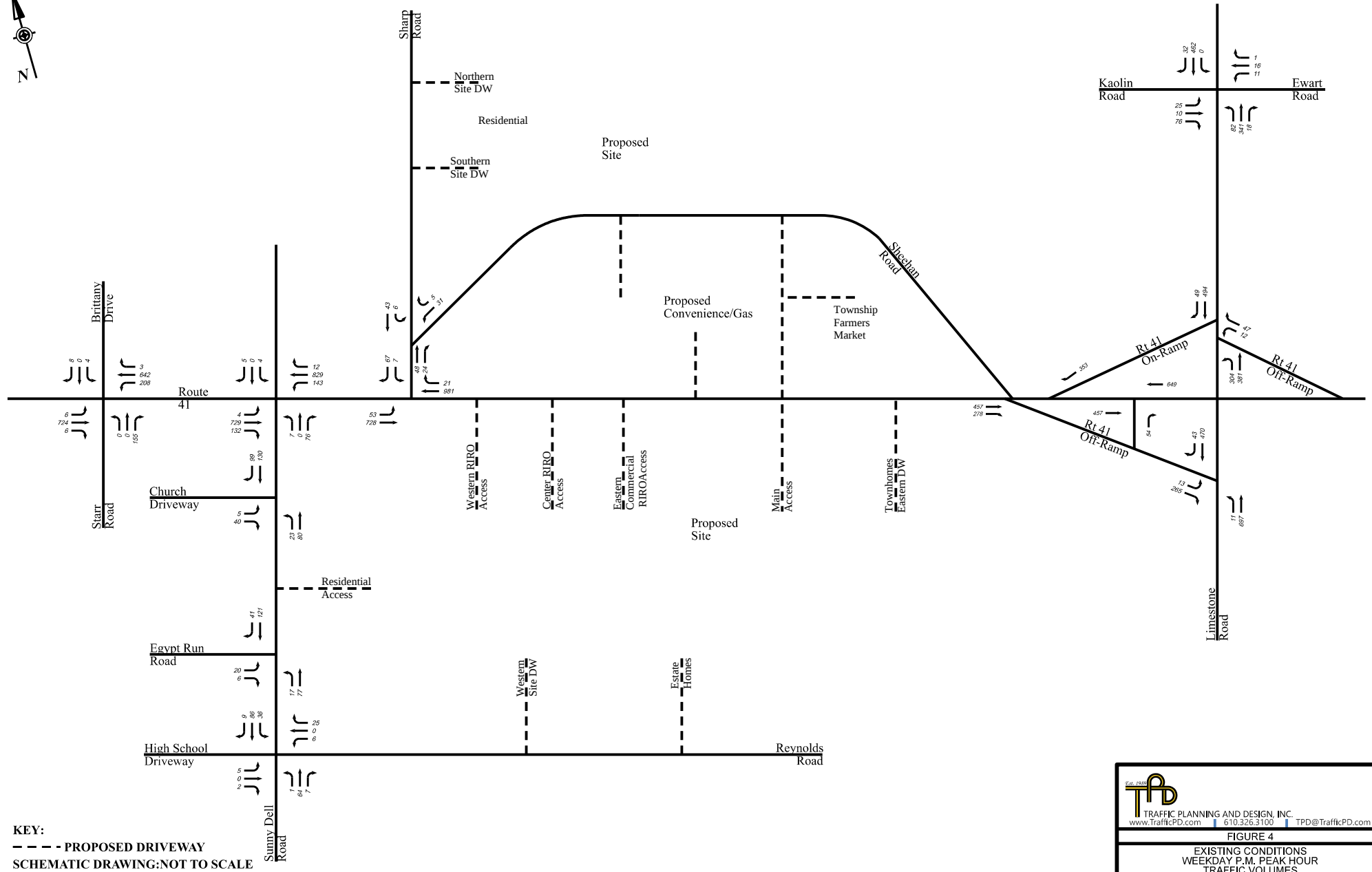
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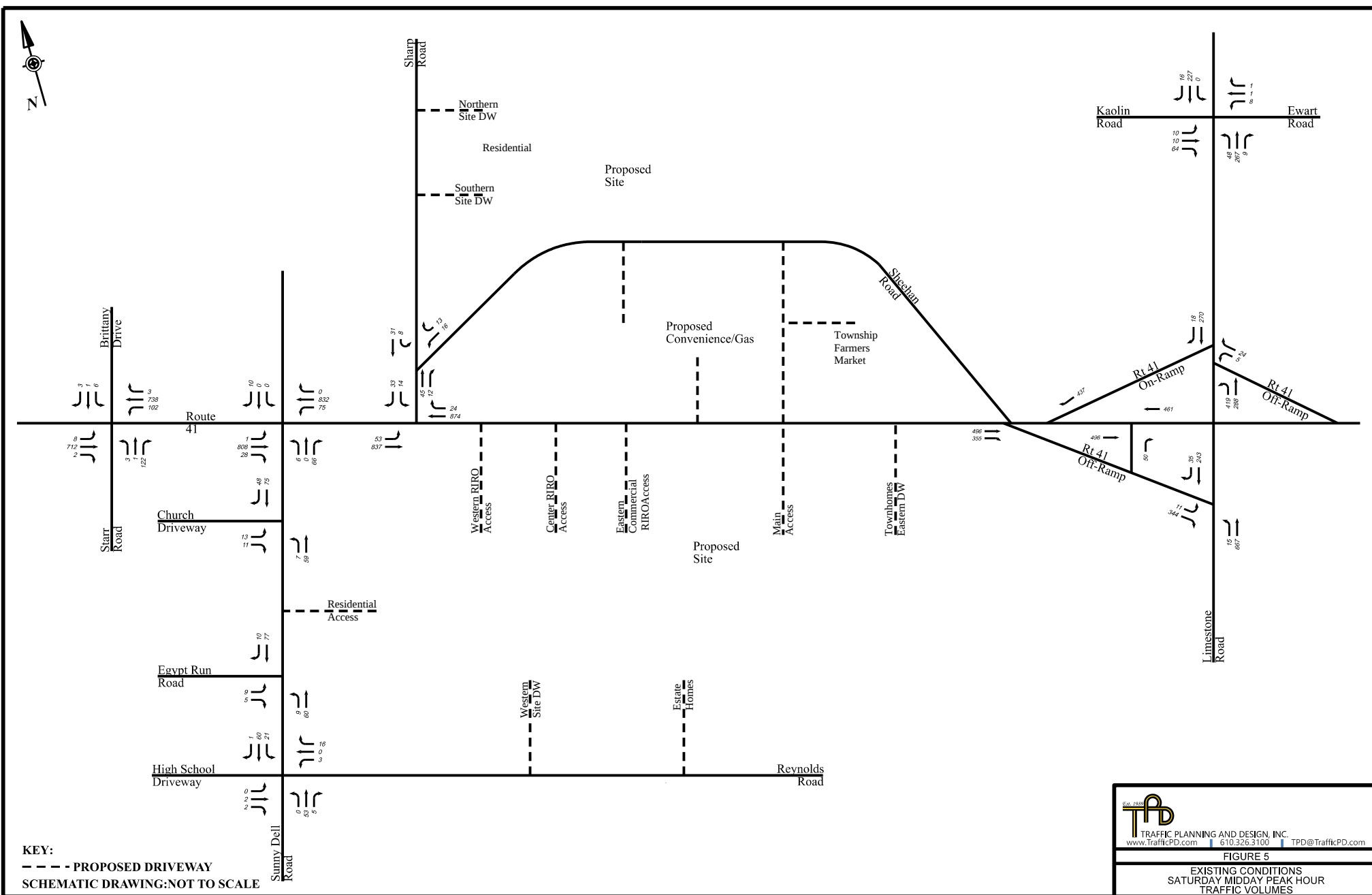
FIGURE 2

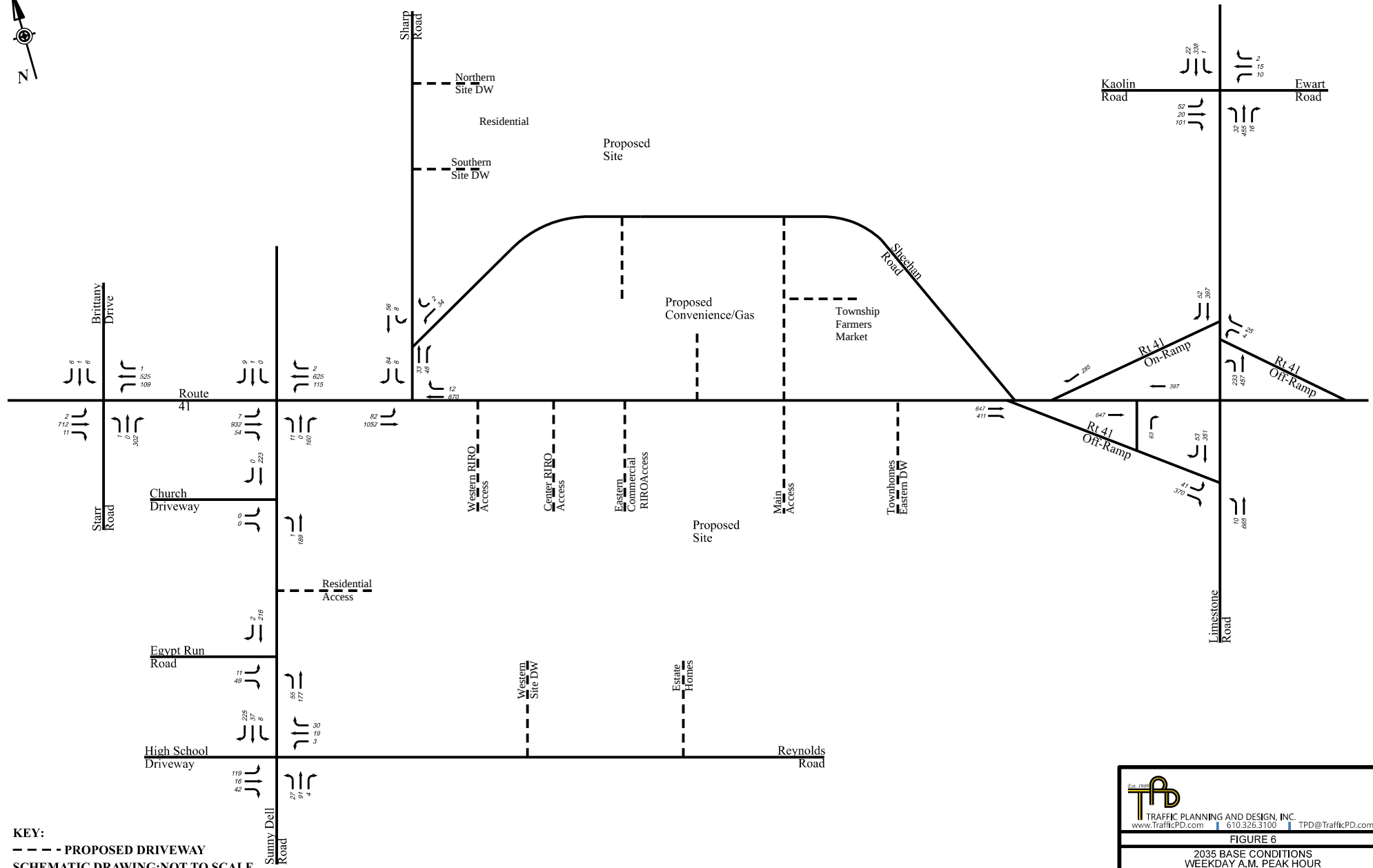
SITE PLAN

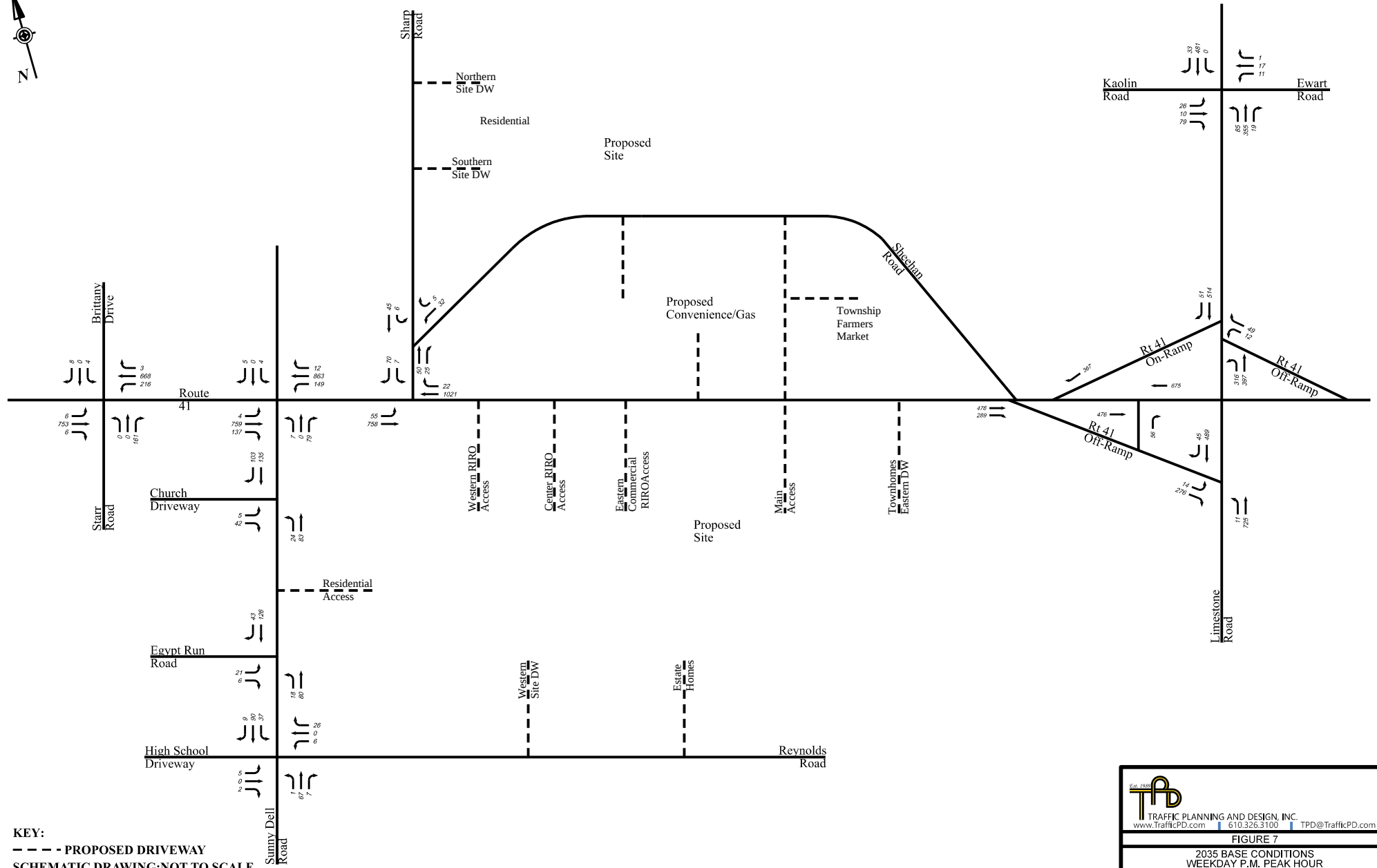
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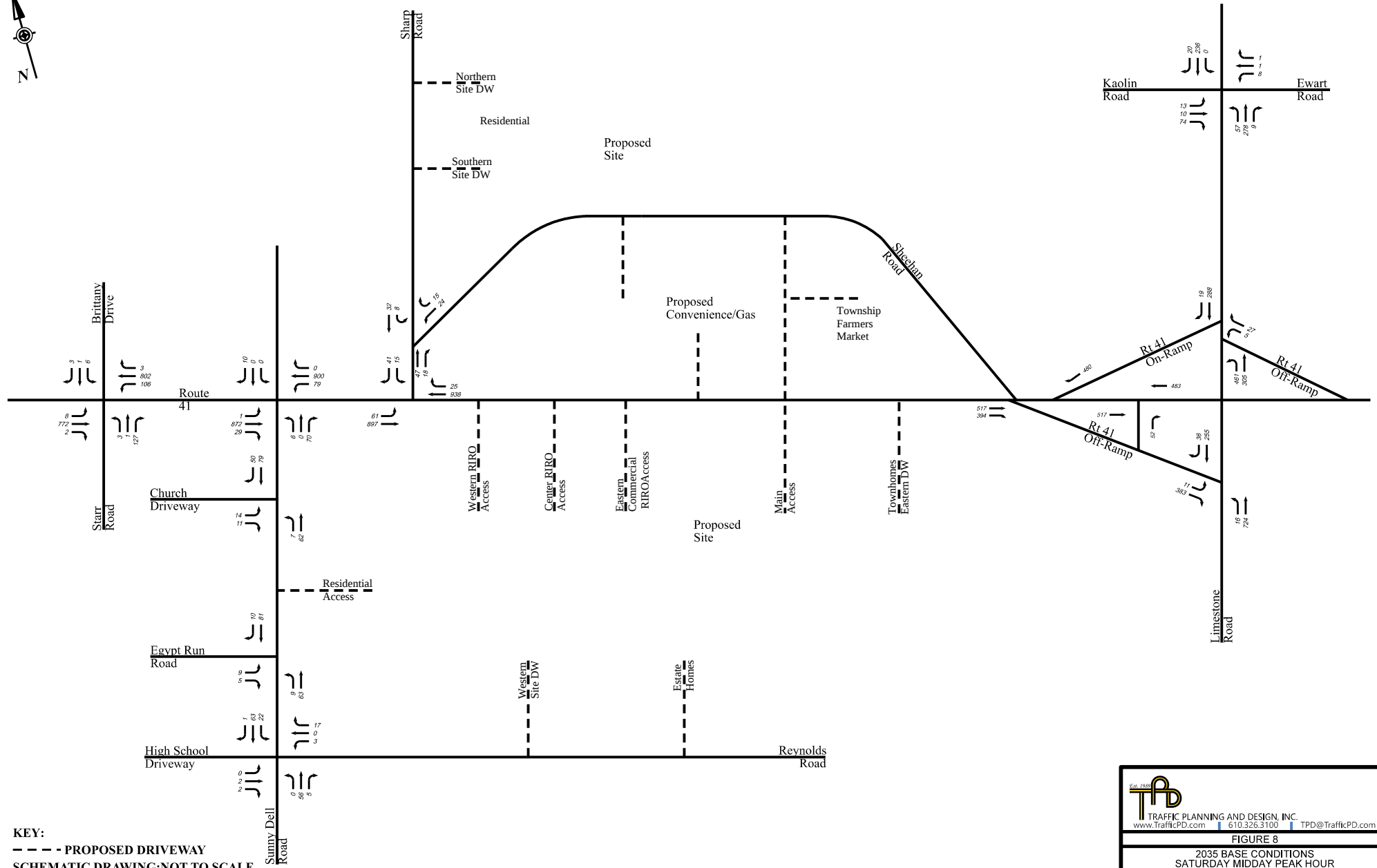


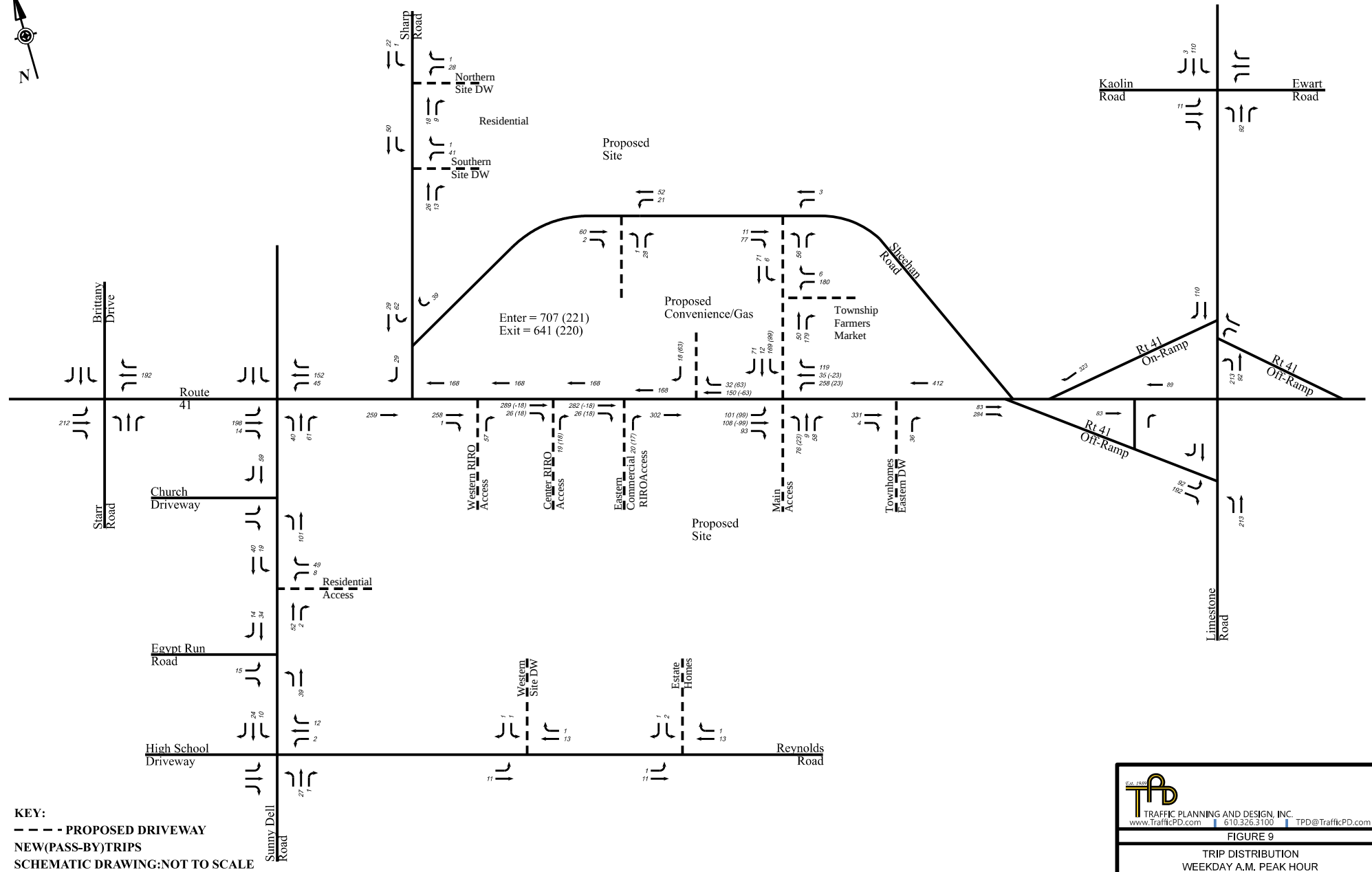


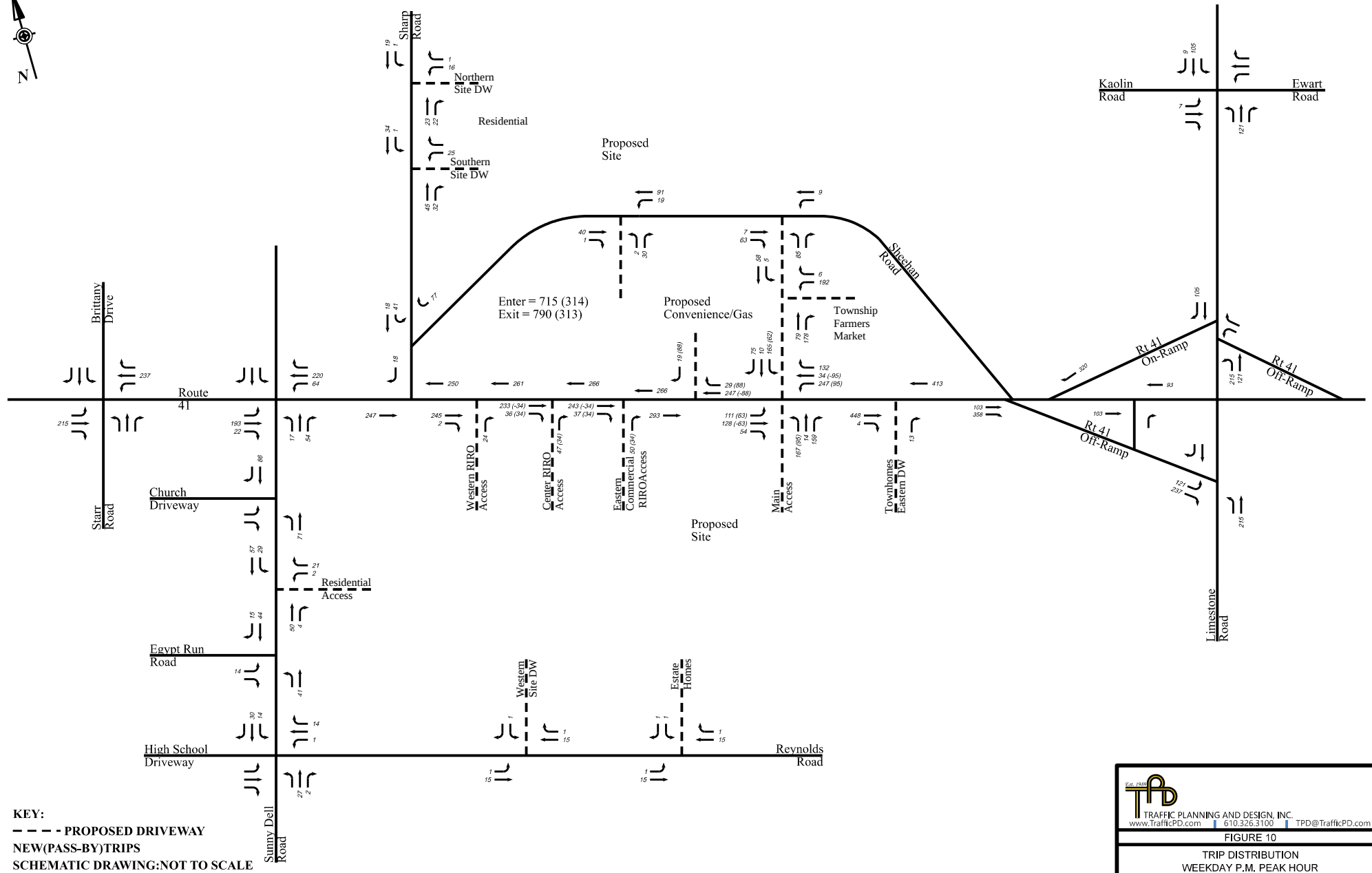


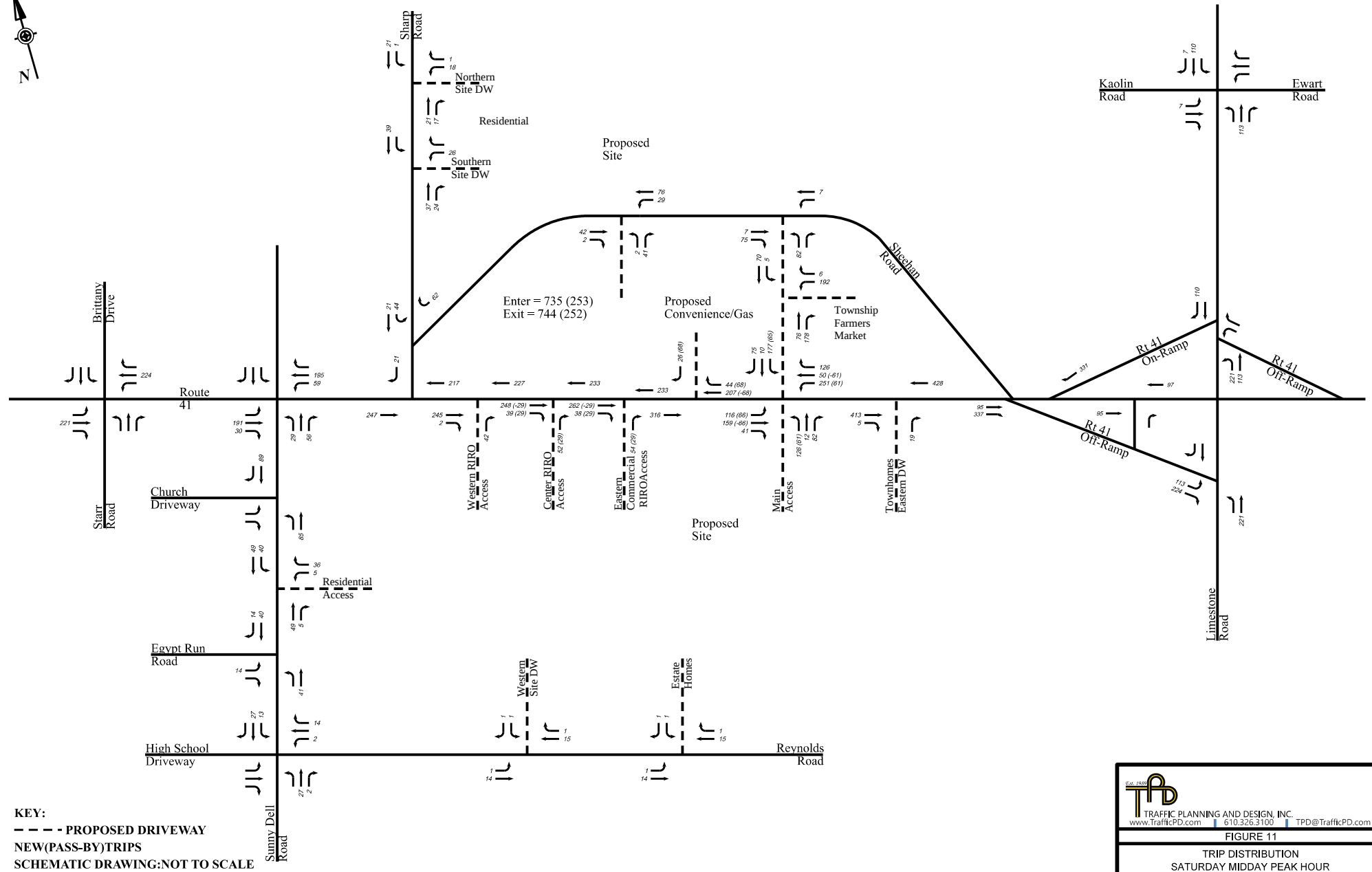


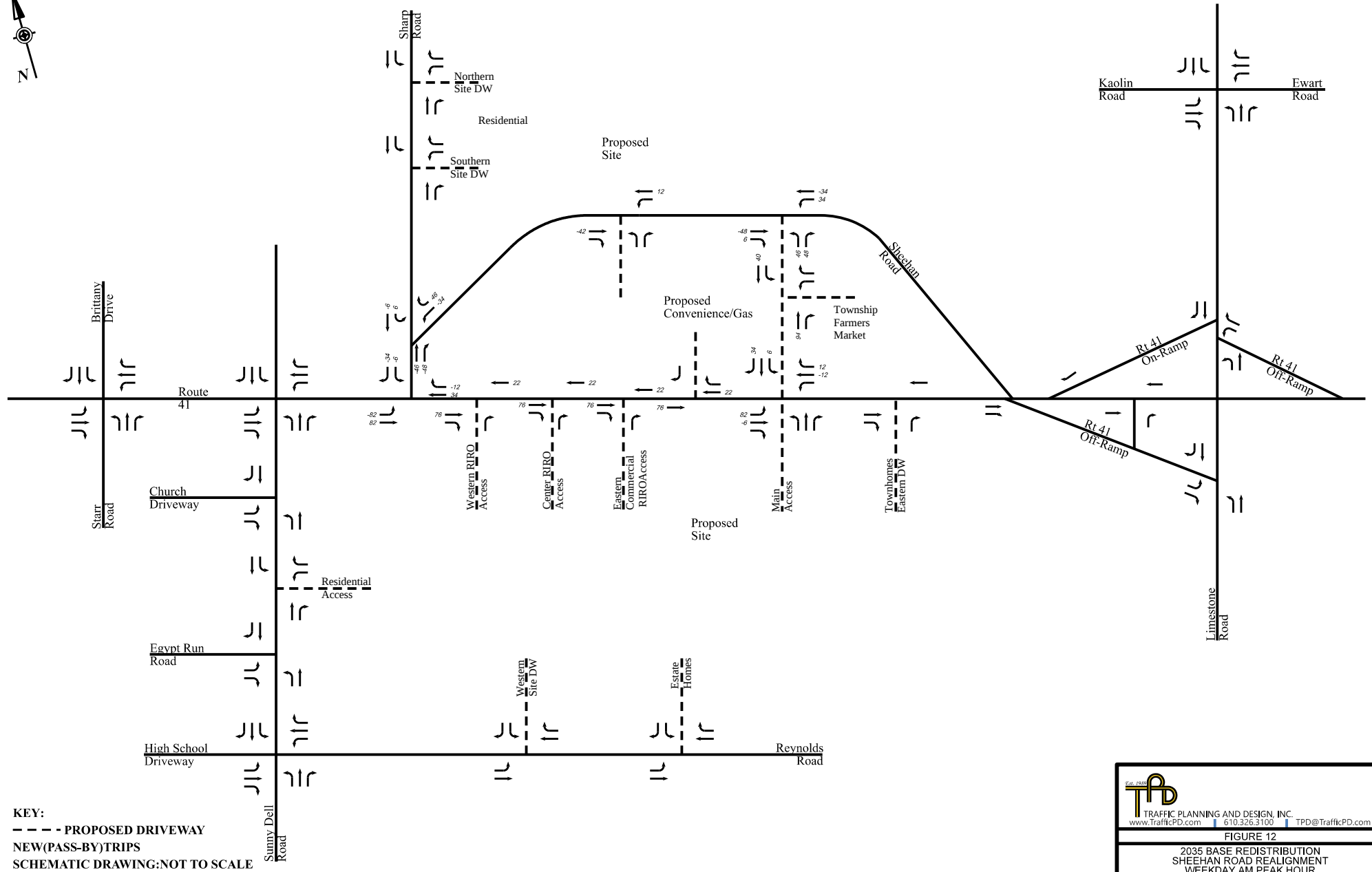


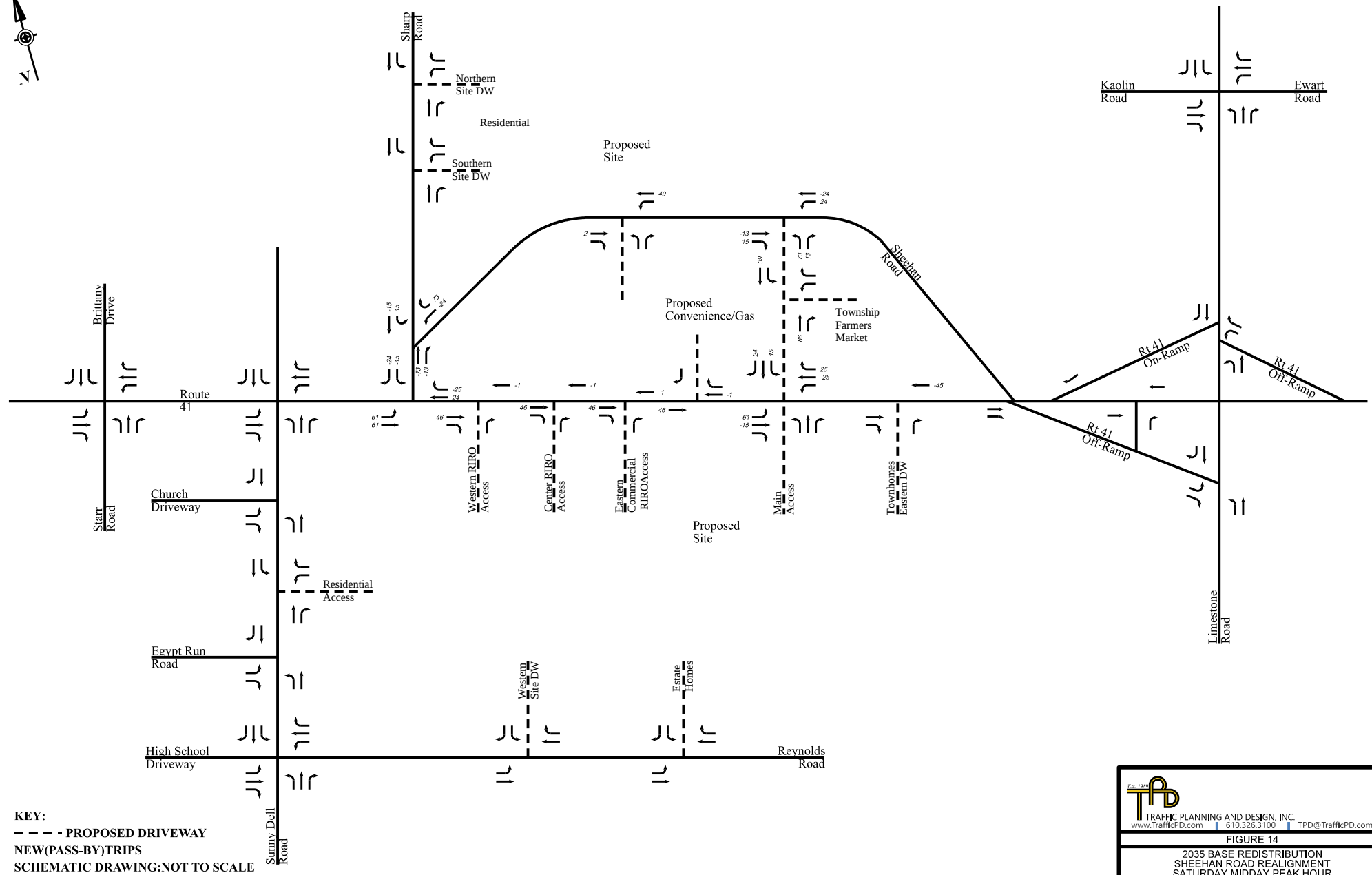


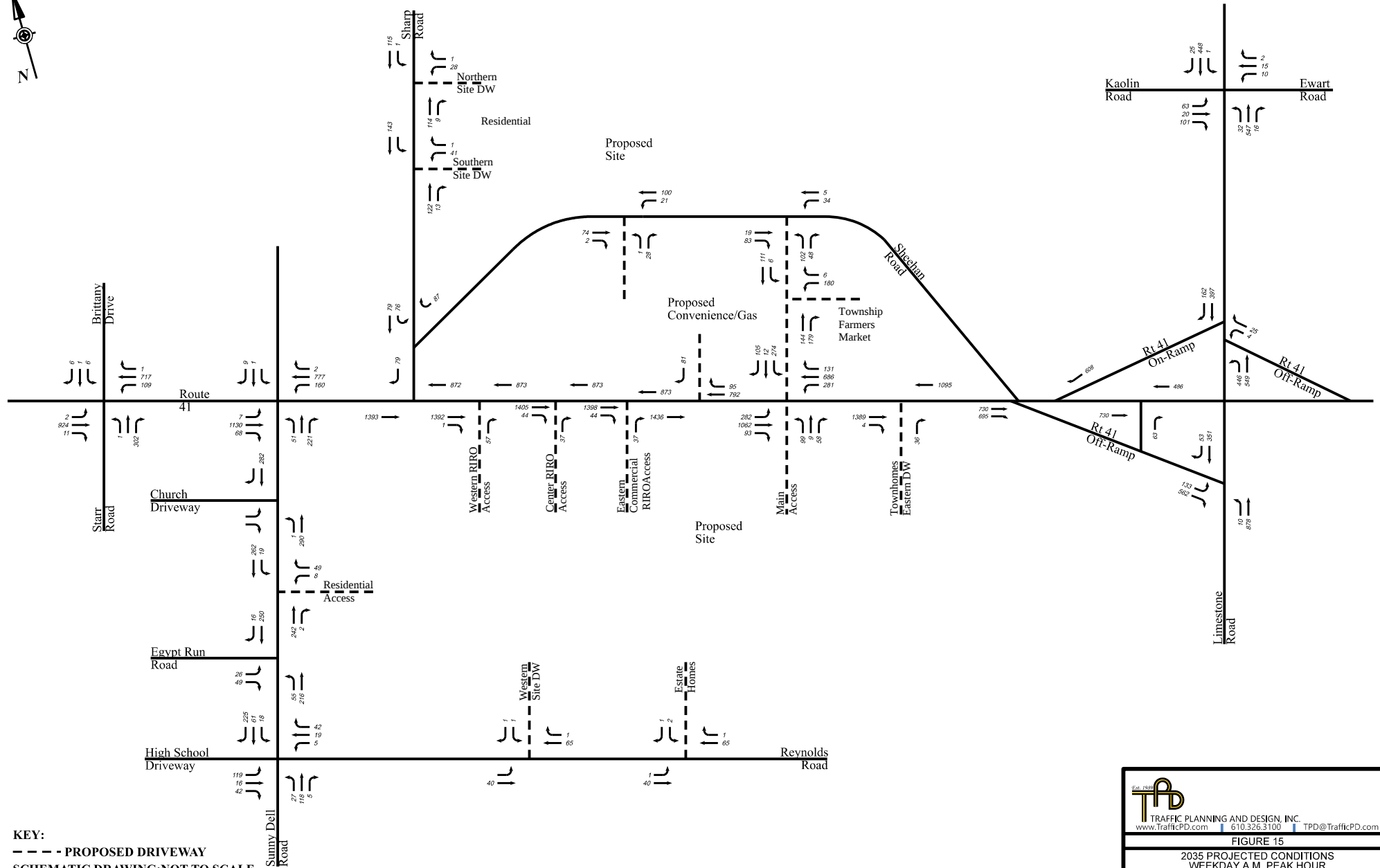


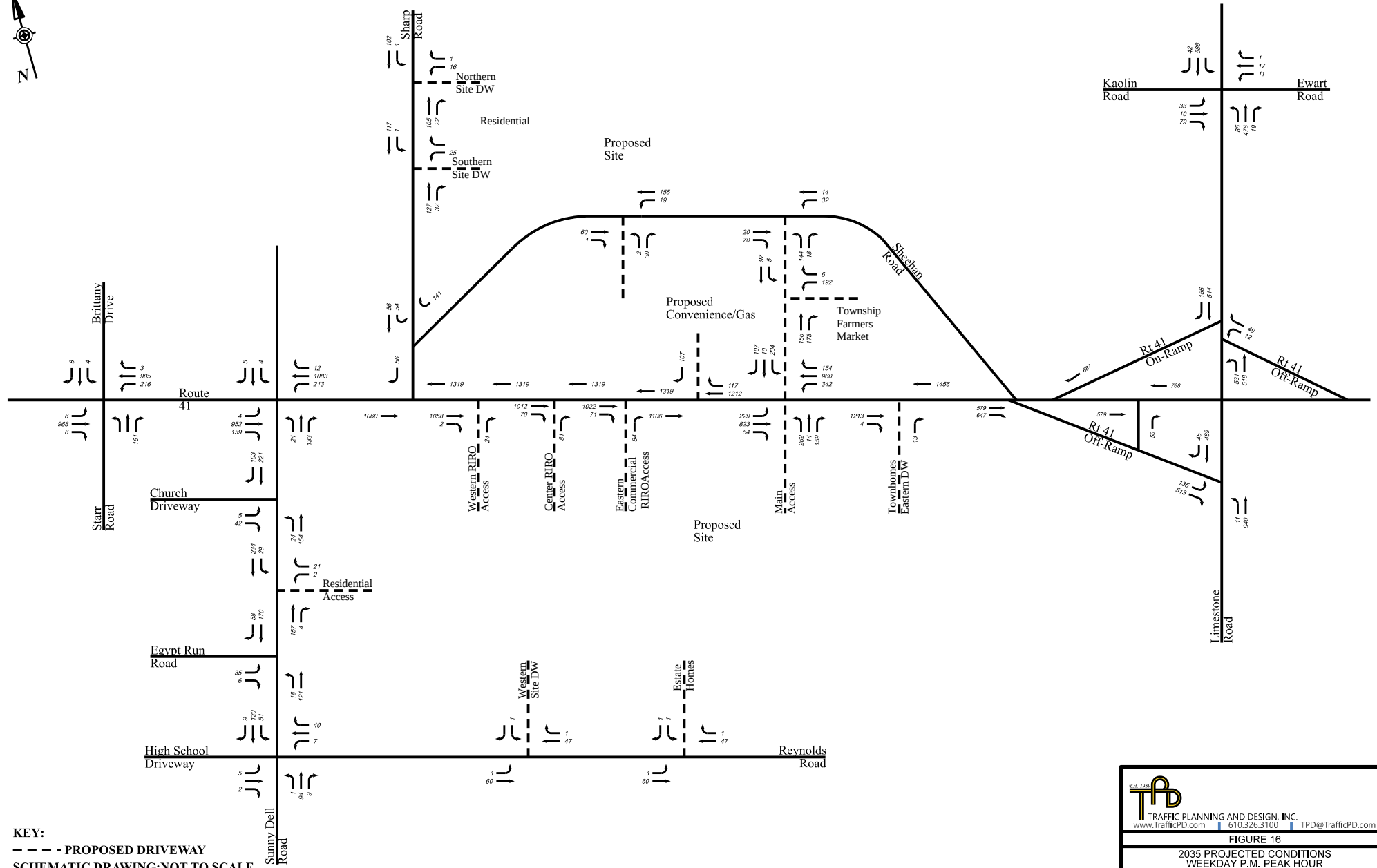


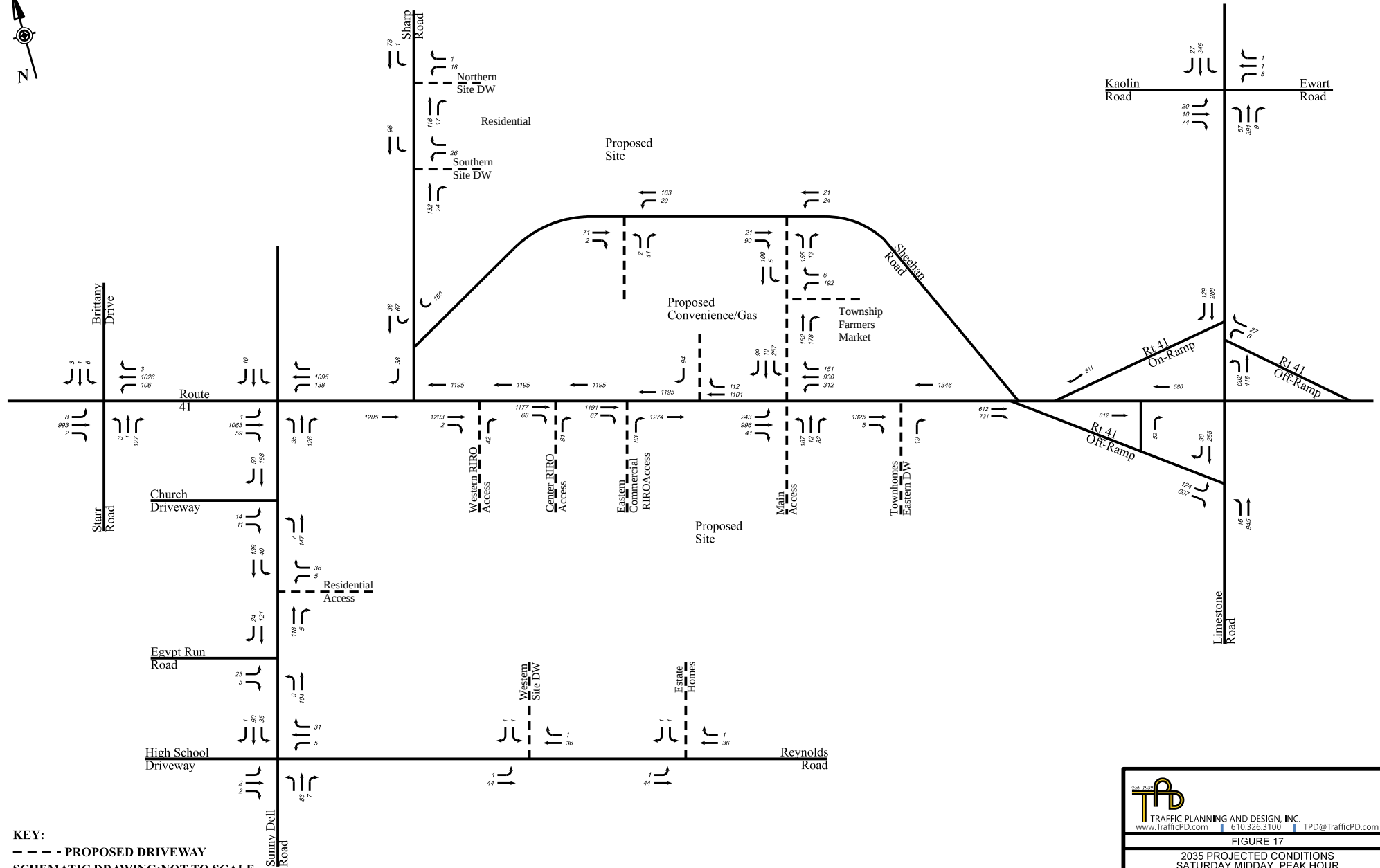


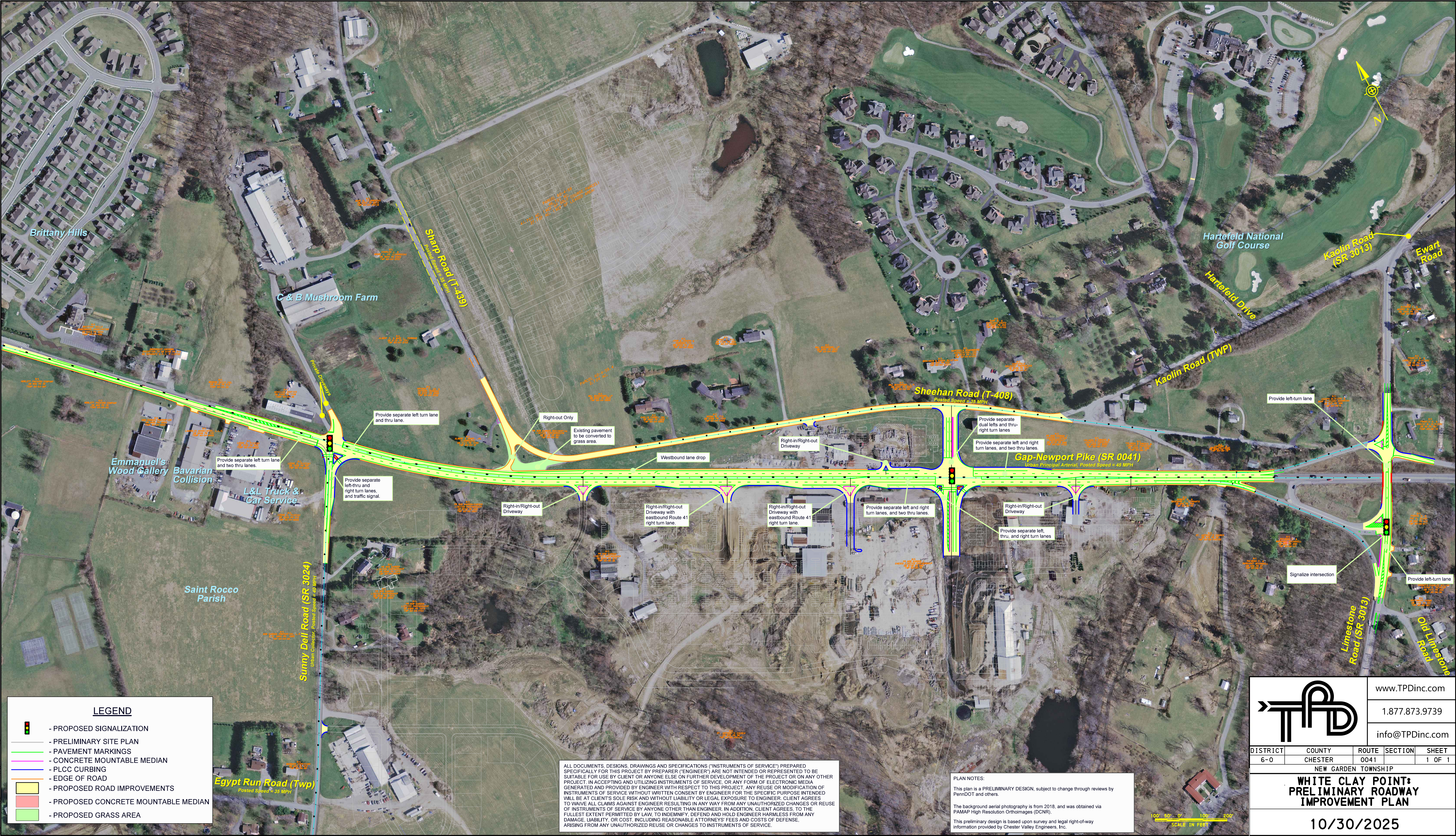












LEGEND

- PROPOSED SIGNALIZATION

- PRELIMINARY SITE PLAN

- PAVEMENT MARKINGS

- CONCRETE MOUNTABLE MEDIAN

- PLCC CURBING

- EDGE OF ROAD

- PROPOSED ROAD IMPROVEMENTS

- PROPOSED CONCRETE MOUNTABLE MEDIAN

- PROPOSED GRASS AREA

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PLAN NOTES:

This plan is a PRELIMINARY DESIGN, subject to change through reviews by PennDOT and others.

The background aerial photography is from 2018, and was obtained via PAMAP High Resolution Orthomages (DOW).

This preliminary design is based upon survey and legal right-of-way information provided by Chester Valley Engineers, Inc.

www.TPDinc.com
1.877.873.9739
info@TPDinc.com

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	CHESTER	0041		1 OF 1

NEW GARDEN TOWNSHIP

WHITE CLAY POINT:
PRELIMINARY ROADWAY
IMPROVEMENT PLAN

10/30/2025