INLAND PASS MIXED-USE (DRI #3207)

TRANSPORTATION IMPACT ANALYSIS

DACULA, GWINNETT COUNTY, GEORGIA

March 2021

Prepared For:

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EXECUTIVE SUMMARY

Watkins Real Estate Group is in the rezoning process for 5 parcels totaling 73.8-acres on Harbins Road south of SR 316/University Parkway opposite W Drowning Creek Road in the City of Dacula, Georgia (Case No. 2020-CD-RZ-03). The current zoning for four of the parcels is Central Business District (C-3) and the fifth parcel is Light Industry District (M-1). The rezoning request is to convert the parcels to Planned Mixed-Use District (PMUD). The project site has a future land use classification of Community Mixed Activity Use Center per the City of Dacula's Future Land Use Map. The proposed mixed-use development will consist of residential, commercial, office-industrial, and 4 outparcels, as well as a proposed community park. The project will be completed in two phases. The residential multi-family apartments and senior living are to be complete in 2024 and the overall project to be complete in 2025.

The ARC's Unified Growth Policy Map (UGPM) identifies the area as "Developing Suburbs". Since the mixed-use project exceeds the 500,000 SF mixed-use threshold required to be designated as a Development of Regional Impact (DRI), the developer must follow a reviewing process outlined by the Georgia Regional Transportation Authority (GRTA). The ensuing transportation impact analysis report is presented as part of a DRI Review Package per GRTA's standards for review by all interested stakeholders to determine the regional impact of the development of Inland Pass Mixed-Use Development (DRI #3207).

Following a Pre-Review and Methodology meeting, the transportation impact analysis was completed for the predetermined study network agreed upon by GRTA as detailed in GRTA's Letter of Understanding dated December 4, 2020. In response to the trends in traffic volumes related to the COVID-19 pandemic, a combination of available historical data was used to "normalize" traffic patterns and adjust the field collected data at the study intersections. The capacity analysis of the study network included the following traffic conditions:

- 2021 Existing (adjusted)
- 2025 No Build
- 2025 No Build with System Improvements
- 2025 Build with No Improvements
- 2025 Build with System Improvements
- 2025 Build with System and Site Improvements

At the time of this study, programmed transportation improvements within the study network include the Dacula Road at US 29/SR 8 Intersection and Bridge Project (2021 completion) and the Harbins Rd at SR 316 New Interchange (2022 completion). These transportation improvements were included in the 2025 No Build traffic simulation model. Moreover, estimated trips generated by the Summerwind subdivision development currently under construction on Alcovy Road opposite Ewing Chapel Road were included in the 2025 No Build traffic conditions as well. Based on the results of the 2025 No Build traffic operations analysis, the following are recommended as System Improvements within the study network, prior to the introduction of Inland Pass' new trips:

System Improvement Location	System Improvement Recommendation
Harbins Road at W Drowning Creek Road	Install eastbound left turn storage lane Install southbound right turn decel lane
Harbins Road at Alcovy Rd	Install traffic signal Install eastbound right turn lane
Harbins Road at New Hope Road	Install southbound right turn lane Install northbound left turn lane Install eastbound left turn lane

For the proposed traffic signal at Alcovy Road, further evaluation may be needed beyond this study pending the final intersection design at the intersection related to the SR 316/University Parkway at Harbins Road new interchange project.

The recommended System Improvements were carried over to the 2025 Build traffic simulation model. With the addition of the Inland Pass new trips, the following Site Mitigation Improvements are recommended**:**

Site Mitigation Improvement Location	Site Mitigation Improvement Recommendation
Harbins Rd at W Drowning Creek Rd	Install Traffic Signal Install southbound left turn storage lane Install northbound right turn decel lane Install northbound left turn storage lane

These Site Mitigation Improvements coupled with the recommended System Improvements result in acceptable LOS throughout the study network. Delay for some side street approaches would be experienced; however, additional improvements beyond the current programmed transportation project yield minimal benefit-cost ratio given traffic volumes entering the intersections.

With the requested rezoning of the assembled parcels to Planned Mixed-Use District (PMUD) for the Inland Pass Mixed-Use Development, the proposed site is compatible with the City of Dacula's Future Land Use Plan, which designates the parcels as Community Mixed Activity Use Center. The proposed retail, office, and residential land uses offer amenities to both the onsite residents as well as those in the surrounding community.

INTRODUCTION

Watkins Real Estate Group is in the rezoning process for 5 parcels totaling 73.8-acres on Harbins Road south of SR 316/University Parkway opposite W Drowning Creek Road in the City of Dacula, Gwinnett County, Georgia. Figure 1 shows the site location relative to the adjacent roadway network.

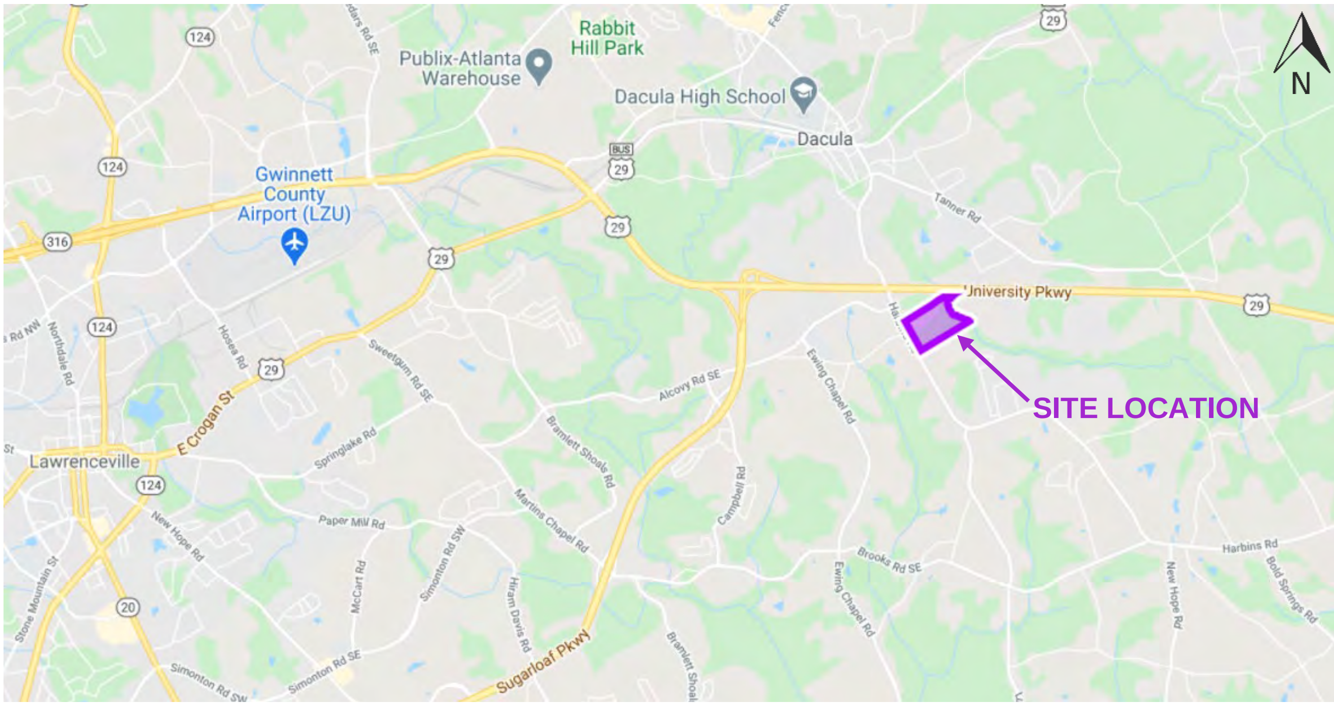

Figure 1: Site Location Relative to Adjacent Roadway Network

SITE PLAN

The proposed mixed-use development, to be known as Inland Pass, will consist of residential, retail, office, and 4 outparcels. Included on the site is a proposed community park. The total provided open space is 17.85 acres. Table 1 shows the land uses and proposed size of each. The proposed conceptual site plan is shown in Figure 2 and included as Appendix A as well.

Table 1: Inland Pass Proposed Land Uses

Land Use	Size
Retail Tract – Supermarket	48,387 SF
Retail Tract – Shops	14,000 SF
Commercial/Office/ Industrial Tract	6.41 Acres
Apartments Tract	320 Units
Senior Living Tract	180 Units
Outparcel #1	1.37 acres
Outparcel #2	1.56 acres
Outparcel #3	1.09 acres
Outparcel #4	1.81 acres

Figure 2: Inland Pass (DRI #3207) Conceptual Site Plan (As of 02.12.2021)

SITE ACCESS

For Inland Pass' site access, four access points are proposed on Harbins Road. The main access point is proposed as a fourth leg to the existing intersection of Harbins Road and W Drowning Creek Road. A traffic signal is proposed at this location as well. North of the main driveway, a right-in/right-out driveway is proposed to provide access to Outparcels 1 and 2, including a northbound deceleration lane for ingress. South of the main driveway, a right-in/right-out driveway is proposed to provide access to the retail tract, including a northbound deceleration lane for ingress. The southernmost driveway is proposed as right-out egress and northbound right-turn and southbound left turn ingress.

PEDESTRIAN CIRCULATION AND ACCESS

For pedestrian access, sidewalks are provided along the main driveway (Site Driveway #1) on both sides of the road leading to the commercial, residential, and community park within the site. For internal circulation, each of the shown land uses has sidewalks around the buildings. It is intended to have crosswalks striped at locations within the site where pedestrian foot traffic is expected to provide an interconnected network for pedestrian circulation.

PARKING

All parking will be located on-site in proposed lots throughout the site. Refer to site plan included as Attachment A for a detailed visual of parking locations and configurations for the site.

PROJECT TIMELINE AND PHASING

The project is proposed in two phases. The residential multi-family apartments and senior living are to be complete in 2024 and the overall project to be complete in 2025. For the purposes of the traffic impact study, the analysis year will be 2025.

ZONING AND LAND USE

The current zoning for four of the parcels is Central Business District (C-3) and the fifth parcel is Light Industry District (M-1). Figure 3 shows the site's parcels current zoning per the City of Dacula's Zoning Map. The rezoning request is to convert the parcels to Planned Mixed-Use District (PMUD). The full Zoning map is included in Attachment B. The project site has a future land use classification of Community Mixed Activity Use Center per the City of Dacula's Future Land Use Map as shown in Figure 4. The full Future Land Use map is included in Attachment B.

The ARC's Unified Growth Policy Map (UGPM) identifies the area as a "Developing Suburbs" as shown in Figure 5. The DRI trigger for this development was the rezoning application (Case No. 2020-CD-RZ-03) with the City of Dacula filed November 13, 2020 for the site and subsequently the establishment that the proposed development will exceed the threshold for mixed-use of 500,000 SF for an ARC Developing Suburb.

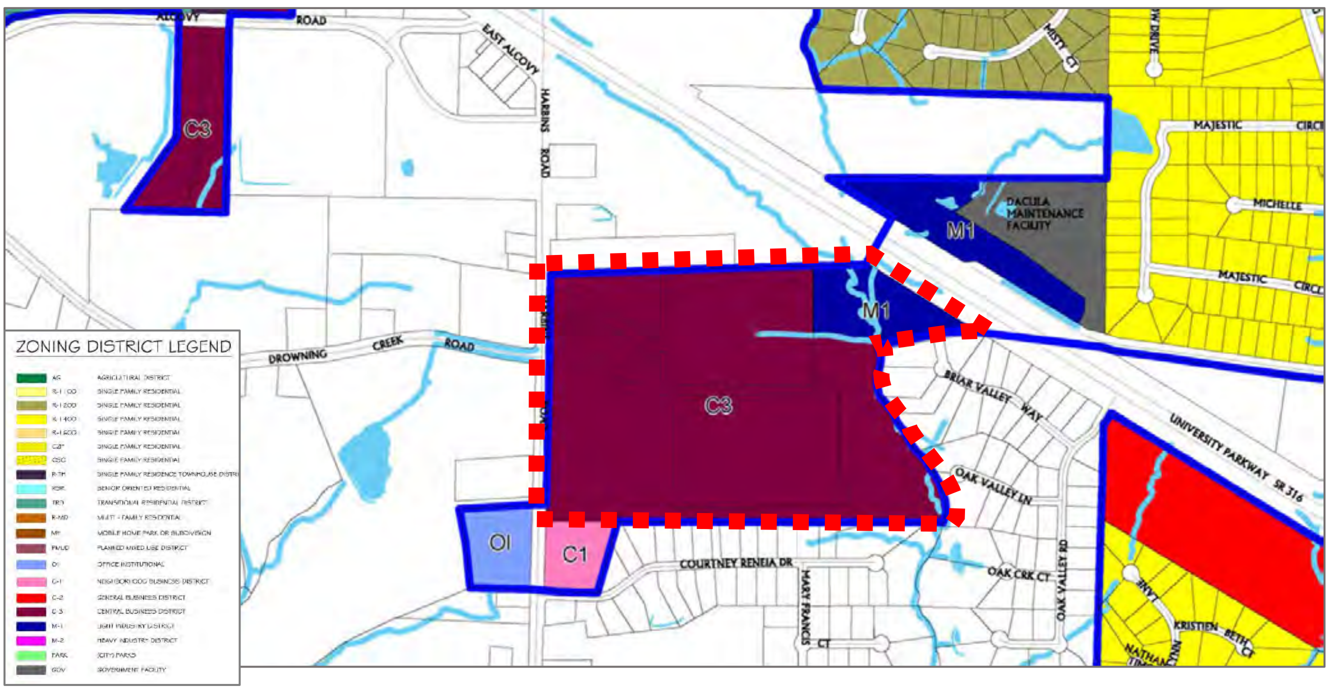

Figure 3: Site's Location per the City of Dacula's Zoning Map

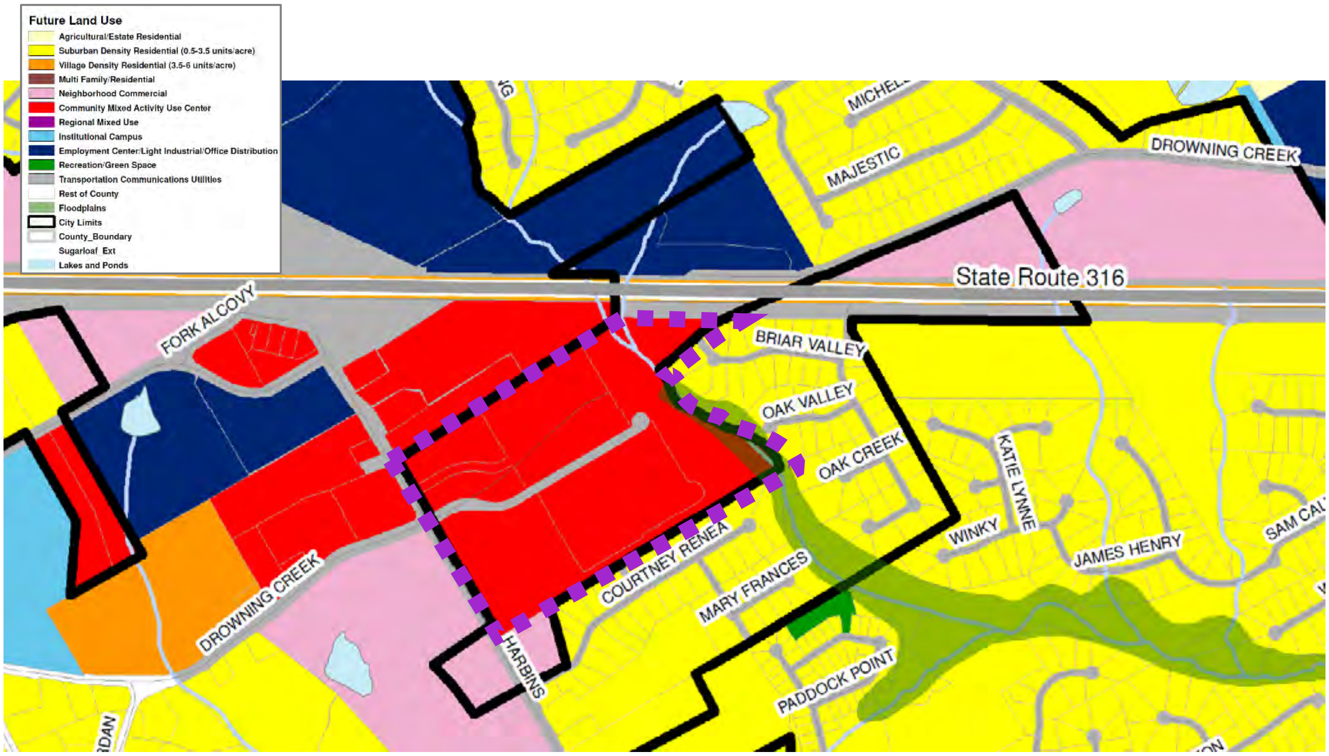

Figure 4: Site's Location per the City of Dacula's Future Land Use Map

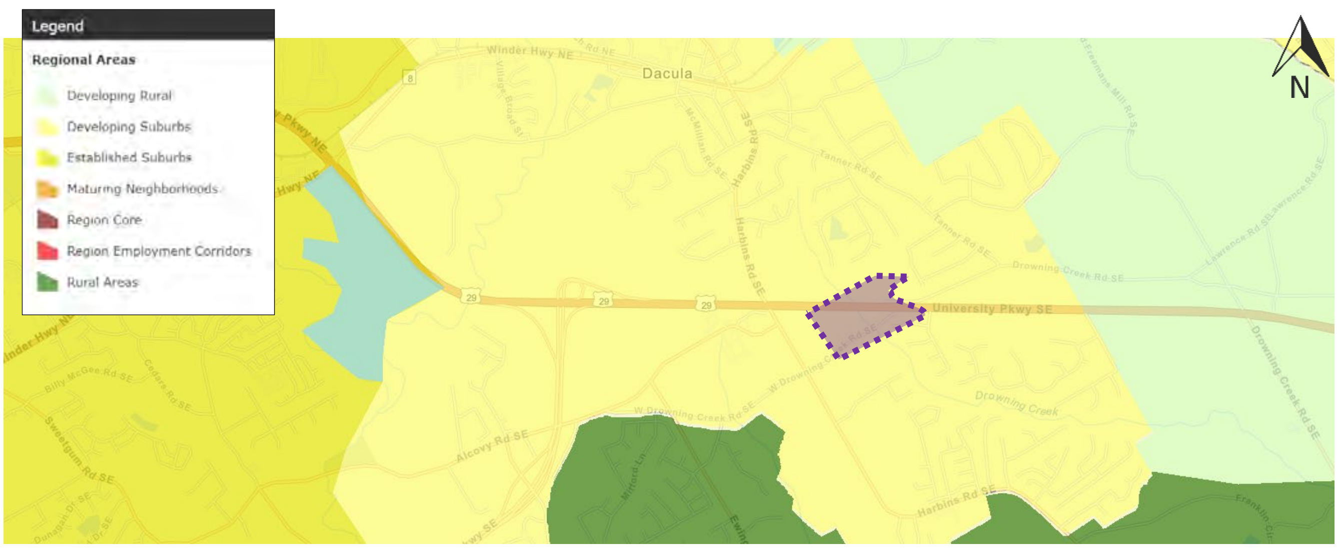

Figure 5: Site's Location per the ARC's Unified Policy Growth Map

TRIP GENERATION

The Institute of Transportation Engineers' (ITE) Trip Generation Manual, 10th edition, was used to quantify the new trips generated by the proposed development per Land Use Code (LUC). For the five outparcels and office industrial tract, assumptions were made for the potential land uses in coordination with the developer. For developments with mixed uses such as Inland Pass ITE recognizes that due to different factors, actual total trips are less that the aggregate total of the individual land uses, which is detailed in the ITE Trip Generation Handbook, 3rd edition. Table 2 details the assumptions for the Inland Pass Trip Generation.

Table 2: Trip Generation Assumptions

Reduction Type	Used?	Reduction Type	Used?	Reduction Type	Used?
Internal Capture	Yes	**Pass-By Trips**	Yes	**Alternative Mode**	No

Per GRTA guidelines for DRIs, the maximum reduction allowed for pass-by trips is 15% of the adjacent roadway's project traffic. Using the available traffic data for traffic on Harbins Road, the calculated pass-by reduction exceeds this maximum. Consequently, to meet the criteria, the number of pass-by trips per the ITE Trip Generation factors would have to be reduced by 36%.

The gross and net two-way daily plus peak weekday morning and weekday afternoon volumes are shown in Table 3 for the proposed development. Appendix B includes the detailed worksheets for the trip generation.

Table 3: Inland Pass Mixed-Use Development Trip Generation Summary

Description	LUC	Quantity	Daily	AM Peak			PM Peak		
			Two-way	Enter	Exit	Total	Enter	Exit	Total
Multifamily Housing (Mid-Rise)	221	320 Units	1,742	28	79	107	82	53	135
Senior Living	252	180 Units	698	13	23	36	25	20	45
Office/Commercial/ Industrial Tract (6.41 ac) *(Medical Office)*	720	100,000 SF	3,754	174	49	223	95	246	341
Retail Tract - Shops *(Shopping Center)*	820	14,000 SF	1,579	98	61	159	61	66	127
Retail Tract - Anchor Store *(Supermarket)*	850	48,387 SF	4,644	111	74	185	232	223	455
Outparcel #4 (1.81 ac) *(Drive-in Bank)*	912	6,000 SF	614	33	24	57	61	62	123
Outparcel #3 (1.10 ac) *(High Turnover Sit-Down Rest)*	932	5,000 SF	561	27	23	50	30	19	49
Outparcel #1 (1.86 ac) *(Fast Food w/ Drive Thru)*	934	4,000 SF	1,884	82	79	161	68	63	131
Outparcel #2 (1.59 ac) *(Fast Food w/ Drive Thru)*	934	4,000 SF	1,884	82	79	161	68	63	131
Gross Site Trips (without reductions)			**17,360**	**648**	**491**	**1,139**	**722**	**815**	**1,537**
Internal Capture for Office[1 2]			*-855*	*-33*	*-45*	*-78*	*-13*	*-23*	*-36*
Internal Capture for Retail[1 2]			*-1,615*	*-32*	*-26*	*-58*	*-101*	*-103*	*-204*
Internal Capture for Restaurant[1 2]			*-1,640*	*-69*	*-43*	*-112*	*-62*	*-80*	*-142*
Internal Capture for Residential[1 2]			*-967*	*-3*	*-23*	*-26*	*-70*	*-40*	*-110*
Shopping Center Pass-by Trips - 0% AM; 34% PM[3 8]			*-198*	*0*	*0*	*0*	*-79*	*-76*	*-154*
Supermarket Pass-By Trips - 0% AM, 36% PM[4 8]			*-586*	*0*	*0*	*0*	*-35*	*-33*	*-68*
High Turnover Sit Down Rest Pass-by-Trips - 0% AM, 43% PM[5 8]			*-71*	*0*	*0*	*0*	*-15*	*-15*	*-30*
Fast Food with Drive Thru Pass-by-Trips - 49% AM, 50% PM[6 8]			*-746*	*-33*	*-38*	*-70*	*-28*	*-18*	*-45*
Drive-In Bank Pass-By Trips - 29% AM, 35% PM[7 8]			*-129*	*-6*	*-4*	*-11*	*-13*	*-14*	*-28*
Total Trip Reductions			***-6,807***	***-176***	***-179***	***-355***	***-416***	***-402***	***-817***
Net External Site Trips (with reductions)			**10,553**	**472**	**312**	**784**	**306**	**413**	**720**

1) Daily Internal Capture rate is an average of AM & PM rates.
2) AM/PM Internal capture percentages and trips were calculated using NCHRP 684 Internal Trip Capture Estimation Tool.
3) For daily pass-by trips, 78% of Shopping Center Trips are made in PM.
4) For daily pass-by trips, 74% of Supermarket Trips are made in PM.
5) For daily pass-by trips, 74% of High Turnover Sit-down Restaurant Trips are made in PM.
6) For daily pass-by trips, 23% and 77% of Fast-Food Restaurant Trips are made in AM and PM, respectively.
7) For daily pass-by trips, 38% & 62% of Drive-In Bank Trips are made in AM & PM, respectively.
8) Total Pass-By trips reduced by 36% to meet "15% maximum pass-by trips reduction" based on estimated ADT on Harbins Road.

TRIP DISTRIBUTION

The distribution of Inland Pass' new trips was determined based on locations of major roadways and highways that will serve the development; anticipated travel patterns; and surrounding land uses. Figure 6 shows the area wide trip distribution for the proposed development. Given the mixed-use nature of the site, separate trip orientations were developed for retail trips to/from the site versus trip patterns for the residential and office trips to/from the site.

Figure 6: Area-wide Trip Distribution for Proposed Development

STUDY NETWORK

Based on the type of roadway and a LOS standard as designated in Table 5.4 of GRTA's DRI Review Package Technical Guidelines, the percent of service flow volume used by the project's traffic was calculated for each adjacent roadway using the preliminary trip distribution percentages in Figure 6. Every roadway segment starting from the site location that consumed more than 7% of the service volume was identified. The worksheet to determine thresholds are included in Attachment C. The signalized and major unsignalized intersections along those roadway segments were identified as study intersections in Figure 7. The proposed study intersections are shown in Table 4. Aerial photography of the study intersections is shown in Figure 8 through Figure 17.

Table 4: Proposed Study Intersections

Study Intersections	
1. W Drowning Creek Rd- Main Driveway at Harbins Road	7. New Hope Road at Harbins Rd
2. Alcovy Rd at Harbins Road	8. W Drowning Creek Rd at Jordan Rd
3. SR 316/University Parkway at Harbins Road Ramps	9. W Drowning Creek Rd at Ewing Chapel Rd
4. Tanner Road at Harbins Road	10. W Drowning Creek Rd at Alcovy Rd
5. SR 8/Winder Hwy at Harbins Road	11. Ewing Chapel Rd at Jordan Road
6. Ace McMillian Road at Harbins Road	Site Driveways at Harbins Road

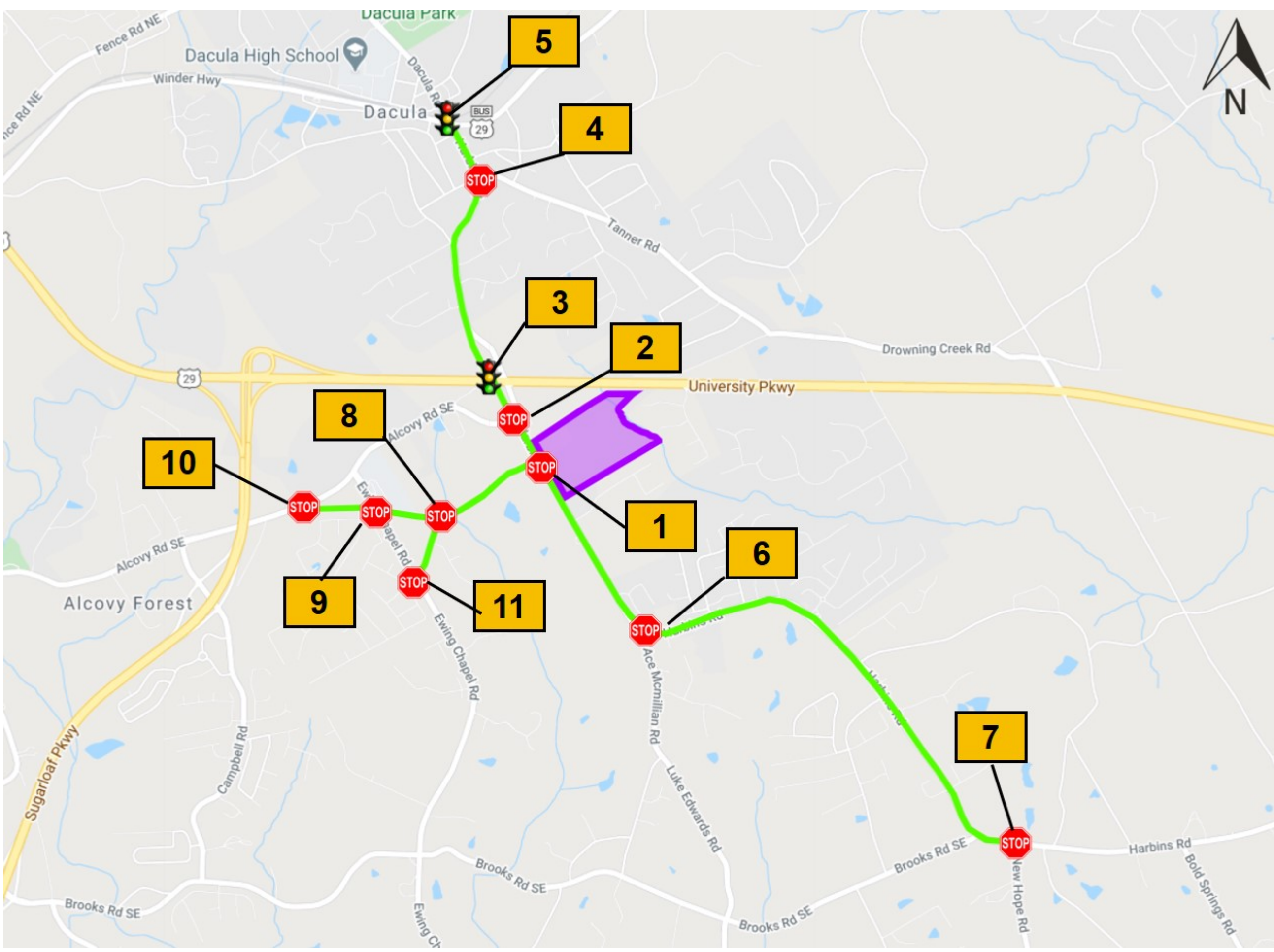

Figure 7: Study Intersections per GRTA's 7% Threshold

Figure 8: Intersection 1 – Harbins Road at W Drowning Creek Road

Figure 9: Intersection 2 – Harbins Road at Alcovy Road

Figure 10: Intersection 3 – Harbins Road at SR 316/University Parkway

Figure 11: Intersection 4 – Harbins Road at Tanner Road-Sanjo Street

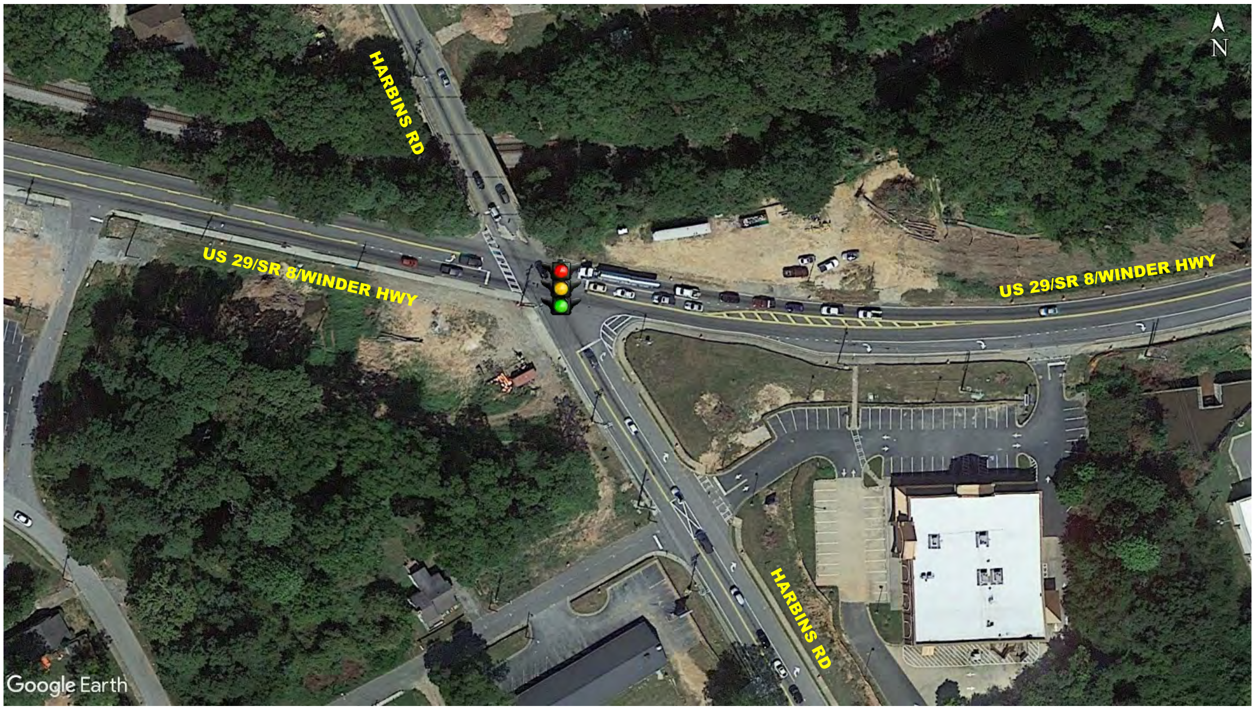

Figure 12: Intersection 5 – Harbins Road-Dacula Road at US 29/SR 8/Winder Highway

Figure 13: Intersection 6 – Harbins Road at Ace McMillian Rd

Figure 14: Intersection 7 – Harbins Road at New Hope Road

Figure 15: Intersection 8 – W Drowning Creek Road at Jordan Road

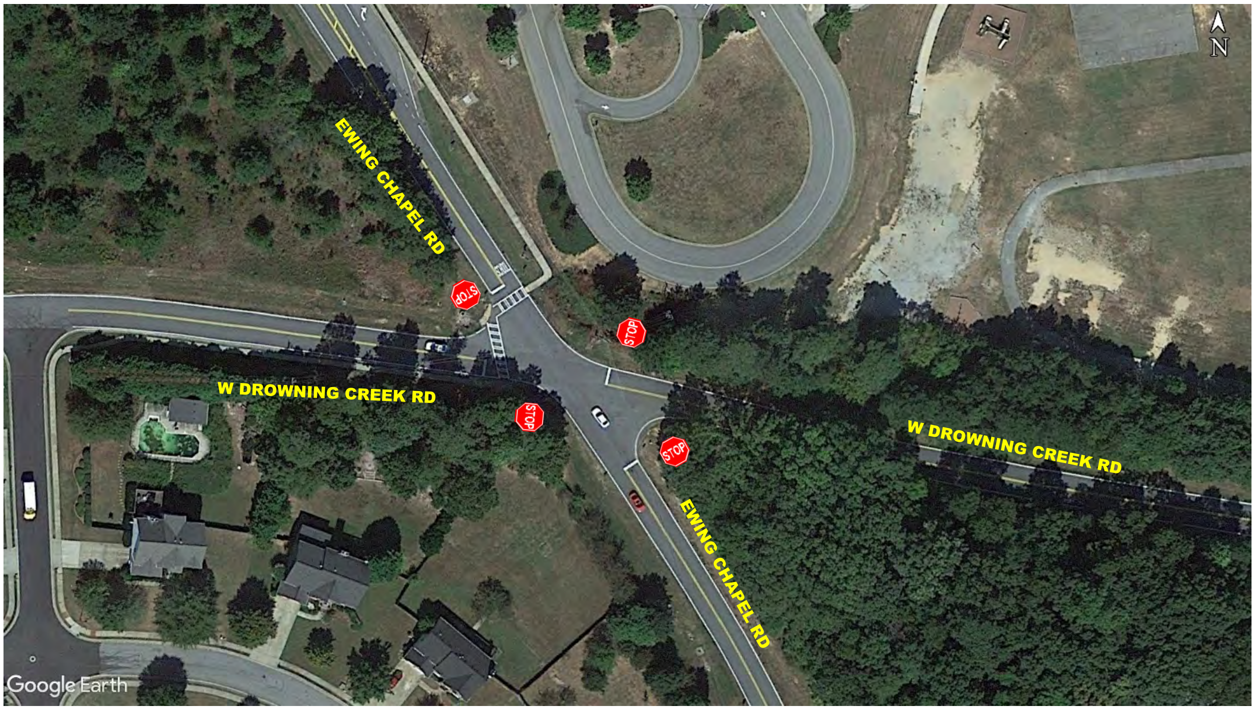

Figure 16: Intersection 9 – W Drowning Creek Road at Ewing Chapel Road

Figure 17: Intersection 10 – W Drowning Creek Road at Alcovy Road

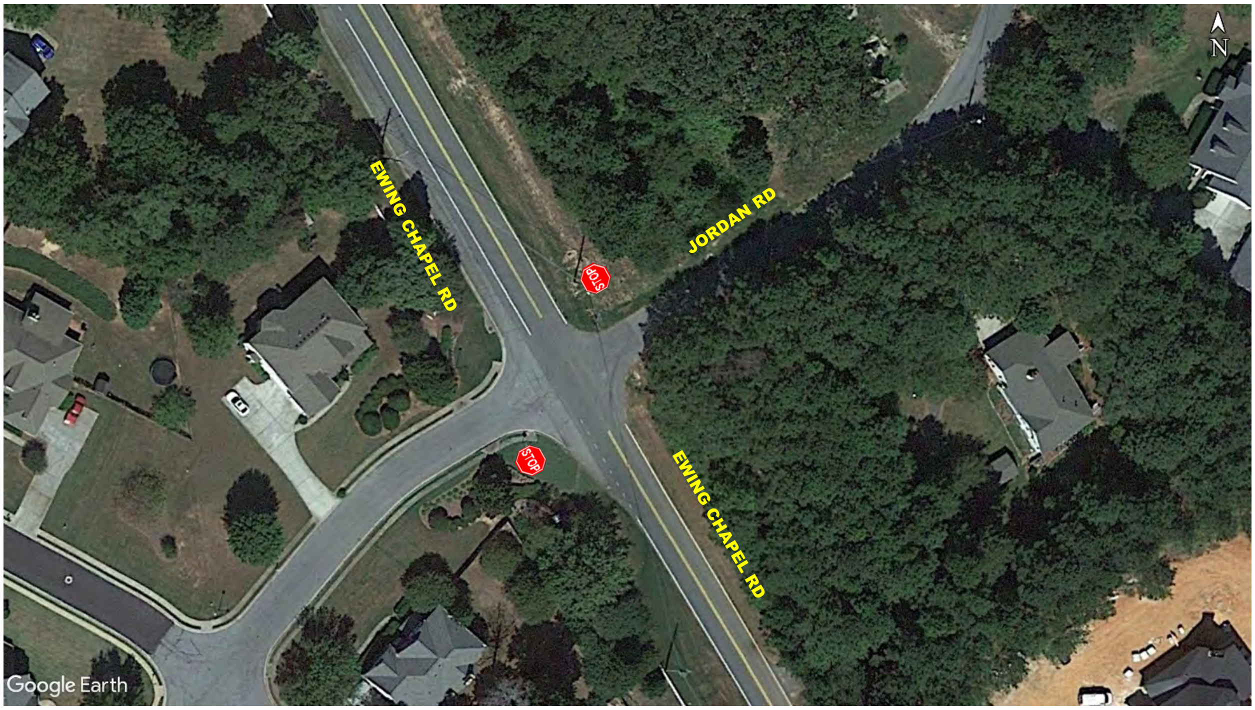

Figure 18: Intersection 11 – Ewing Chapel Road at Jordan Road

EXISTING TRANSPORTATION FACILITIES

ROADWAY FACILITIES

The Inland Pass Mixed-Use development will abut Harbins Road south of SR 316/University Parkway. Harbins Road is a two-lane undivided roadway that extends from US 29/SR 8/Winder Highway to the north and southeast into Barrow County. The posted speed limit on Harbins Road south of SR 316/University Parkway is 45 mph and north of SR 316/University Parkway is 35 mph. Currently, Harbins Road south of SR 316/University is primarily surrounded by residential subdivisions and agricultural land uses. There are two schools south of site, Harbins Preparatory School just south of Ace McMillian Road and Harbins Elementary School accessed via New Hope Road southwest of Harbins Road. Also, Alcova Elementary School is located on Alcovy Road east of Ewing Chapel Road.

Table 5 summarizes the character of the other roadway facilities located within the study network.

Table 5: Adjacent Roadway Network Classifications

Roadway	Classification	# of Lanes	Speed Limit
Harbins Road	Minor Arterial	2-Lane Undivided	45 MPH (S of SR 316) 35 MPH (N of SR 316)
SR 316/University Parkway	Principal Arterial	6-Lane Divided	65 MPH
SR 8/Winder Highway	Minor Arterial	2-Lane Undivided	35 MPH
W Drowning Creek Road	Local Road	2-Lane Undivided	35 MPH
Jordan Road	Local Road	2-Lane Undivided	35 MPH
Ewing Chapel Road	Local Road	2-Lane Undivided	35 MPH
Alcovy Road	Local Road	2-Lane Undivided	35 MPH
Ace McMillian Road	Local Road	2-Lane Undivided	35 MPH
New Hope Road	Local Road	2-Lane Undivided	35 MPH

TRANSIT FACILITIES

There is no fixed route transit service in proximity to the Inland Pass site. Xpress, operated by the Atlanta-Region Transit Link Authority (ATL), does have a Park-and-Ride location on Dacula Road north of US 29/SR 8/Winder Highway for Route No. 416. Route No. 416 stops at the Dacula Park-and-Ride (Hebron Church) and provides express service to/from Downtown Atlanta. Xpress provides service Monday through Friday from approximately 5 AM to 7 PM.

PEDESTRIAN AND BICYCLE FACILITIES

There are no existing sidewalks along Harbins Road south of SR 316/University Parkway aside from discontinuous segments abutting some residential subdivisions. There is sidewalk along the west side of Harbins Road north of Harbin Oak Drive, which is approximately 1,500 feet north of SR 316/University Parkway.

Gwinnett County's Countywide Trails Master Plan (2018) identifies the "Harbins Greenway" as a proposed off-road trail to connect three major Gwinnett County Parks: Harbins Conservation Park, Tribble Mill Park, and Palm Creek Park. In addition to the three parks, this greenway will also intersect with Archer High School. As an off-road trail, the alignment will be constructed within the existing landscape and feature natural vegetation on both sides.

Relative to the Inland Pass site, the nearest portion of the trail is at the New Hope Road intersection southwest of Harbins Road. Figure 19 shows the proposed Harbins Greenway Map extracted from Gwinnett's Trails Master Plan. With the community park proposed as part of the Inland Pass development, an assessment of future trail connections along Harbins Road are recommended.

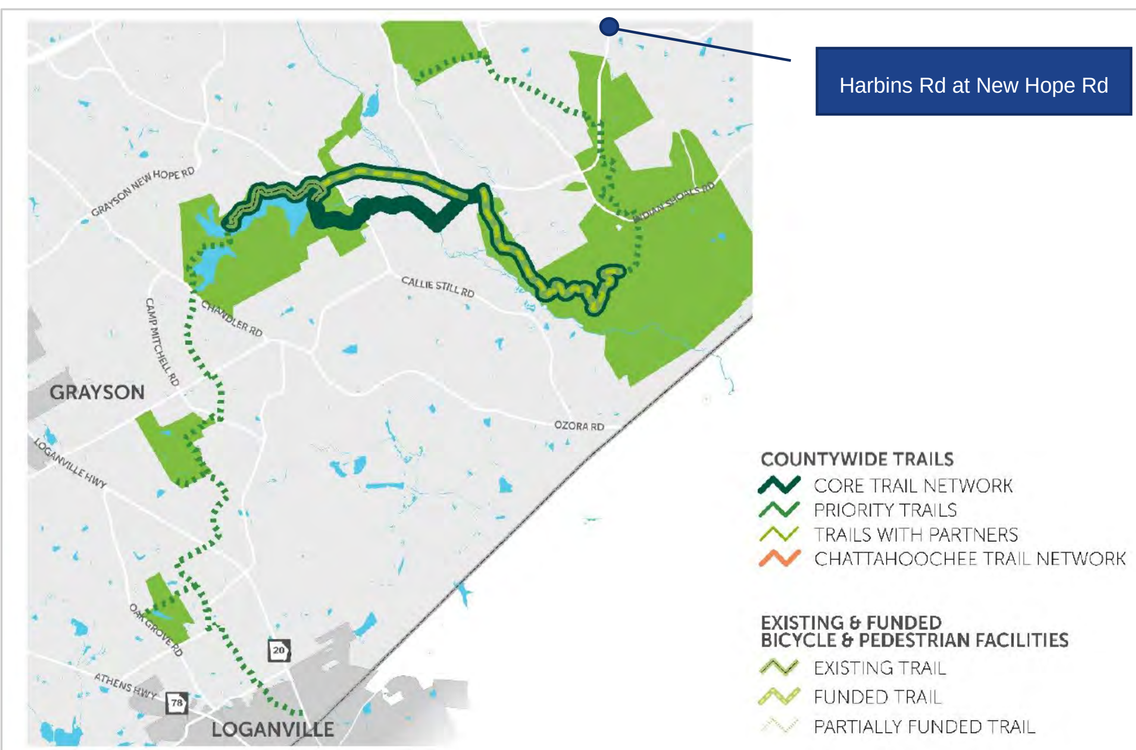

Figure 19: Harbins Greenway Map, Gwinnett's Countywide Trails Master Plan (2018)

TRAFFIC VOLUME ADJUSTMENT ANALYSIS

In response to the trends in traffic volumes related to the COVID-19 pandemic, a combination of available historical data was used to “normalize” traffic patterns and adjust the field collected data at the study intersections. Moreover, lingering effects from detours related to the bridge relocation as part of the US 29/SR 8/Winder Highway at Dacula Road project were considered as well. In January 2021, weekday peak hour turning movement counts were collected in the field at all study intersections as well as a 24-hour bi-directional classification counts on the Harbins Road.

Historical 24-hour volume retrieved from GDOT’s Traffic Analysis & Data Application (TADA) and traffic diagrams from the SR 316/University Parkway at Harbins Road interchange project were project to 2021 AADT to serve as a “normalized baseline for traffic volumes. The historical data was then compared to the field data collected adjusted to 2021 AADT. The percent difference in these volumes were compared and adjustment factors were developed and balanced per the total traffic volume entering each intersection. Using engineering judgement and knowledge of traffic flow in the area, adjustment factors for entire study network were developed. Figure 20 shows the adjustment factors per road segment.

These adjustment factors were then applied to the peak hour turning movement counts collected at the study intersection segments. For continuity between the study intersections, a uniform average peak hour will be used for each peak period for the capacity analyses. The average peak hour for the morning and afternoon peak periods is 7:15 AM to 8:15 AM and 4:45 PM to 5:45 PM, respectively. The adjusted 2021 existing peak hour volumes are shown on Figure 21. The sheets for the raw traffic count are in Appendix C.

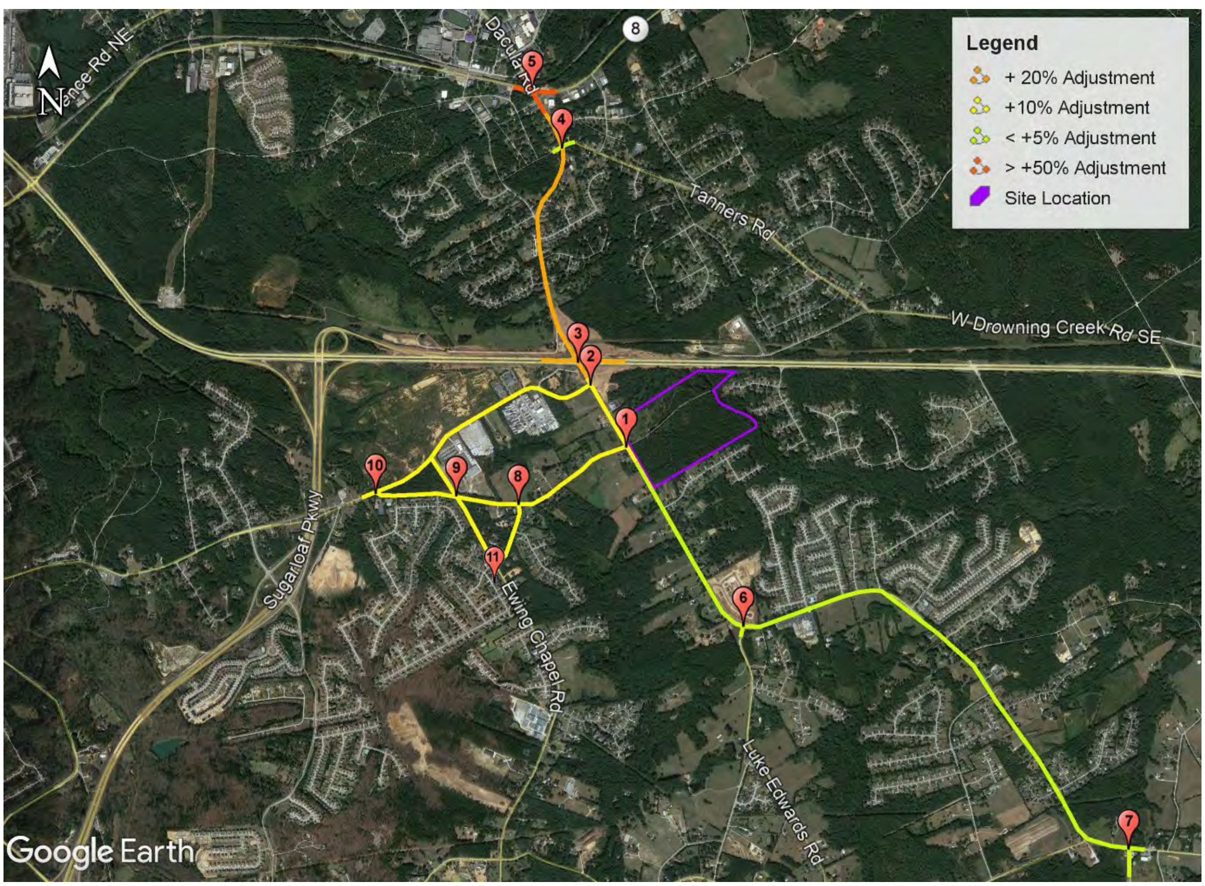

Figure 20: Map of Traffic Adjustment Factors for Study Network

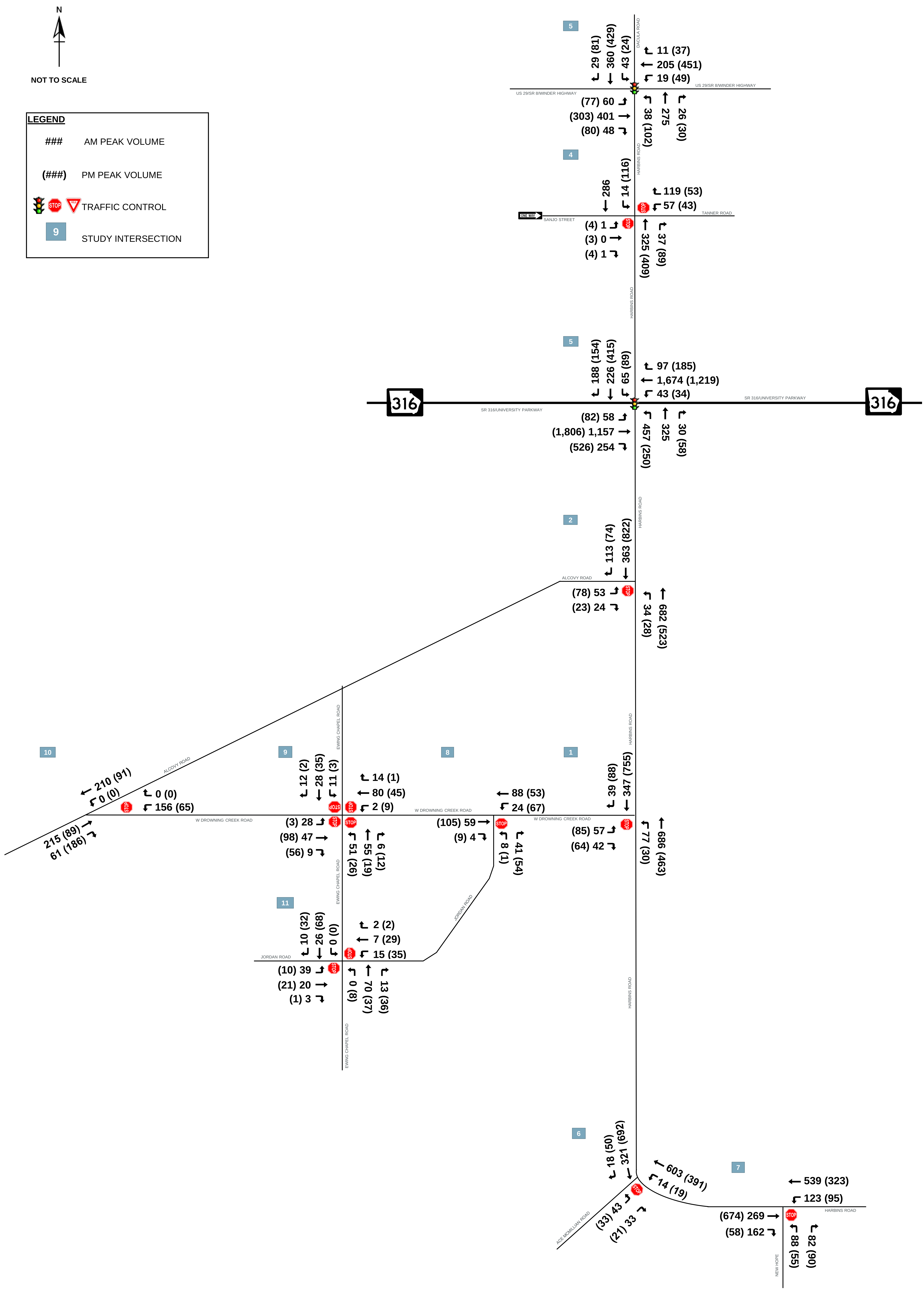

Figure 21: 2021 Existing Peak Hour Traffic Volumes (Adjusted)

PLANNED/PROGRAMMED IMPROVEMENTS

Programmed and planned transportation plans in the vicinity of the proposed development were reviewed per the ARC's Atlanta's Region Plan, GDOT Statewide TIP (STIP), Regional Transportation Plan (RTP), GDOT's Construction Work Program, and Gwinnett County's Comprehensive Transportation Plan and SPLOST. Table 6 lists the projects and the completion year.

Table 6: Planned and Programmed Transportation Improvements in Study Area

Source	Year	(Project ID) Name
Gwinnett DOT/2014 SPLOST	2021	Dacula Road at US 29/SR 8 Intersection and Bridge Project
Gwinnett CTP/ 2017 SPLOST	2022	GCbri_093 (Harbins Rd at SR 316 New Interchange)
Gwinnett DOT	2025	SR 316 at Harbins Road Park and Ride
Gwinnett CTP/ 2017 SPLOST	TBD	Harbins Road Widening (SR 8 to SR 316)
Gwinnett CTP/ 2017 SPLOST	TBD	DAC_174 (Tanner Road Safety and Alignment)
ARC RTP/GDOT	2030	P.I. 0013901 (SR 316 – New Interchange at Drowning Creek Rd)
ARC RTP/GDOT	2030	P.I. 0006924 (Sugarloaf Parkway Extension – Phase 2)
ARC RTP/GDOT	TBD	P.I. 0016070 (Gwinnett County ITS Enhancements – Phase 2)

The planned improvements that will have the most direct impact on the traffic surrounding Inland Pass include the new interchange at SR 316/University Parkway and Harbins Road and the intersection and bridge project at US 29/SR 8/Winder Highway and Harbins Road-Dacula Road. At the time of this study, the intersection improvements at US 29/SR 8/Winder Highway and Harbins Road-Dacula Road are underway and are scheduled to be complete Spring 2021. Prior to the finalization of this study, the bridge is open, and the detour has been removed. Improvements include replacing bridge, adding an eastbound right turn lane, a northbound left turn lane, westbound right turn lane, and southbound left and right turn lanes. The new interchange project includes grade separating SR 316//University Parkway an Harbins Road and created to interchange ramps. The project is scheduled to be complete in 2022.

For the purposes of this traffic study, the US 29/SR 8/Winder Highway and Harbins Road-Dacula Road were included in the 2021 Existing traffic simulation model. The new interchange project was included in the 2025 No Build and 2025 Build traffic simulation models. Figure 22 shows the 2025 No Build lane configurations at the study intersections.

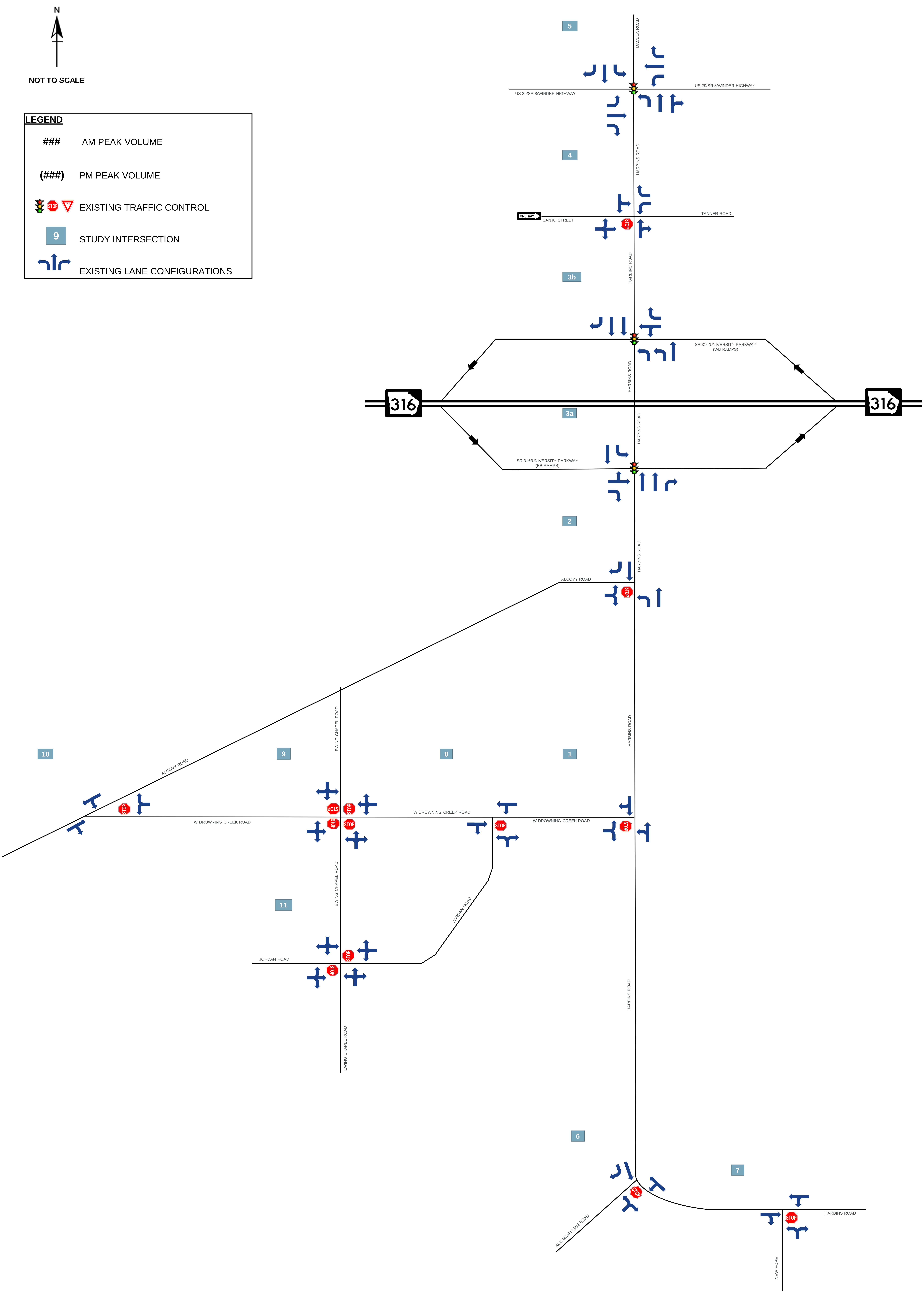

Figure 22: 2025 No Build Lane Configurations at Study Intersections

TRAFFIC FORECASTING

Based on the historical growth rates in the area according to Georgia's Traffic Analysis & Data Application (TADA), population forecasts and knowledge of proposed developments in the area, a 2% annual growth rate (AGR) is recommended to project the traffic to the 2025 build-out year. The historical growth rates worksheet is included in Appendix B.

In addition to the standard AGR, one major development, the Summerwind subdivision, is currently under construction and will brought on-line prior to the Inland Pass build out. The residential development will consist of 273 single-family lots and will be accessed via Alcovy Road opposite its intersection with Ewing Chapel Road. A trip generation estimate was completed for the site and distributed at the study intersections based on its anticipated trip distribution. These trips were added to the 2025 No Build traffic conditions.

To determine the base traffic conditions prior to the introduction of new trips generated by the Inland Pass development, the existing 2021 traffic volumes were grown to the 2025 build-out year using the AGR plus the addition of the trips generated by the Summerwind residential development. The resulting 2025 No Build traffic volumes are shown in Figure 23. All traffic volume worksheets are attached in Appendix B: Study Network Data Worksheets.

NEW TRIPS ASSIGNMENT

The assignment of the Inland Pass new trips is based on area-wide trip distribution in Figure 6. Figure 24 shows the trip distribution assignment at the study intersections. Percentages from Figure 24 were then applied to the net peak hour trips from Table 3. The distribution of pass-by trips for the retail land uses is shown in Figure 25 and the net new trips for the Inland Pass development is shown in Figure 26.

The Build traffic volumes were calculated by adding the Inland Pass new trips and pass-by trips to the No Build traffic volumes, and the 2025 Build traffic volumes are shown on Figure 27.

All trip generation data and traffic volume worksheets are in Appendix B: Study Network Data Worksheets.

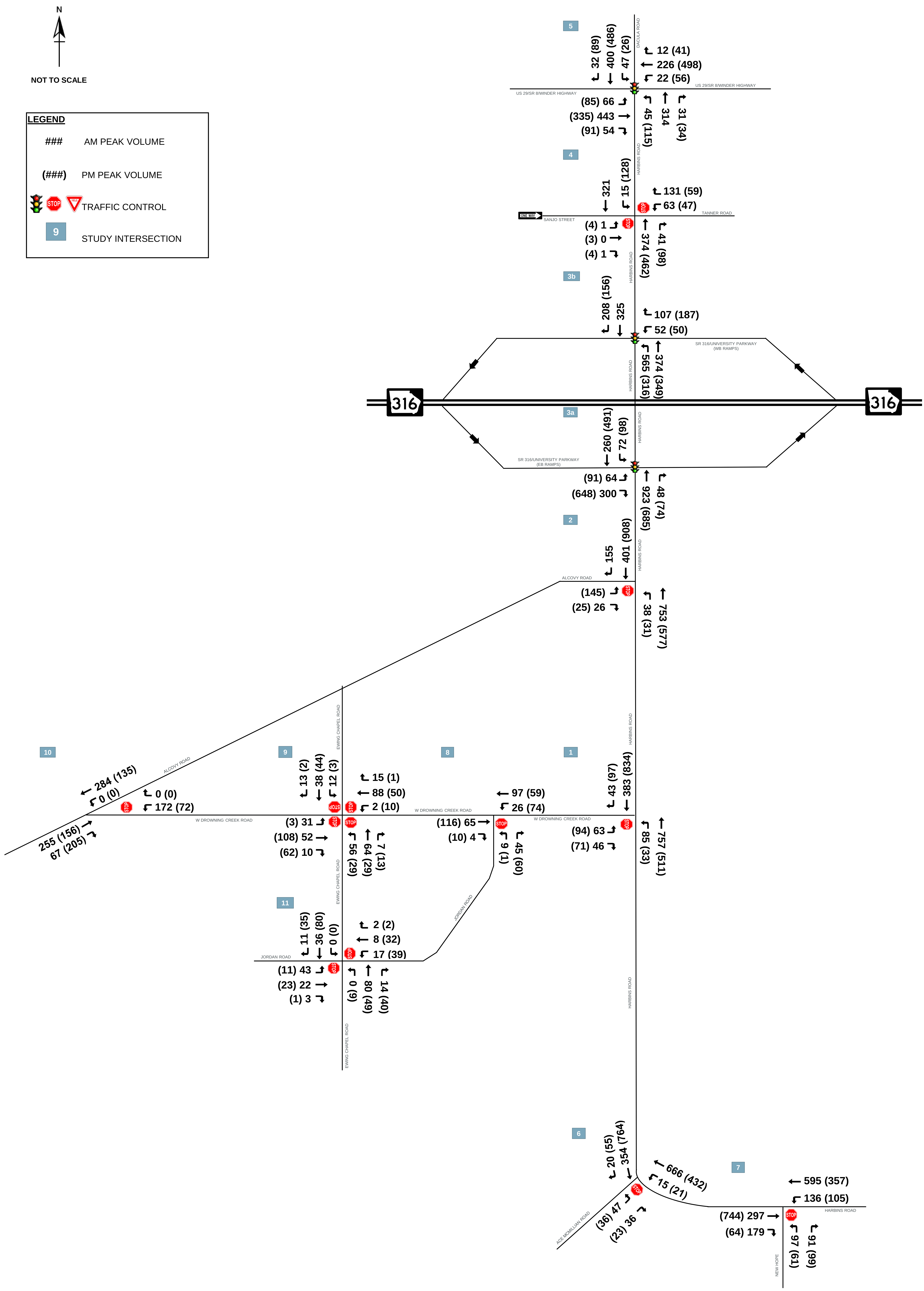

Figure 23: 2025 No Build Peak Hour Traffic Volumes

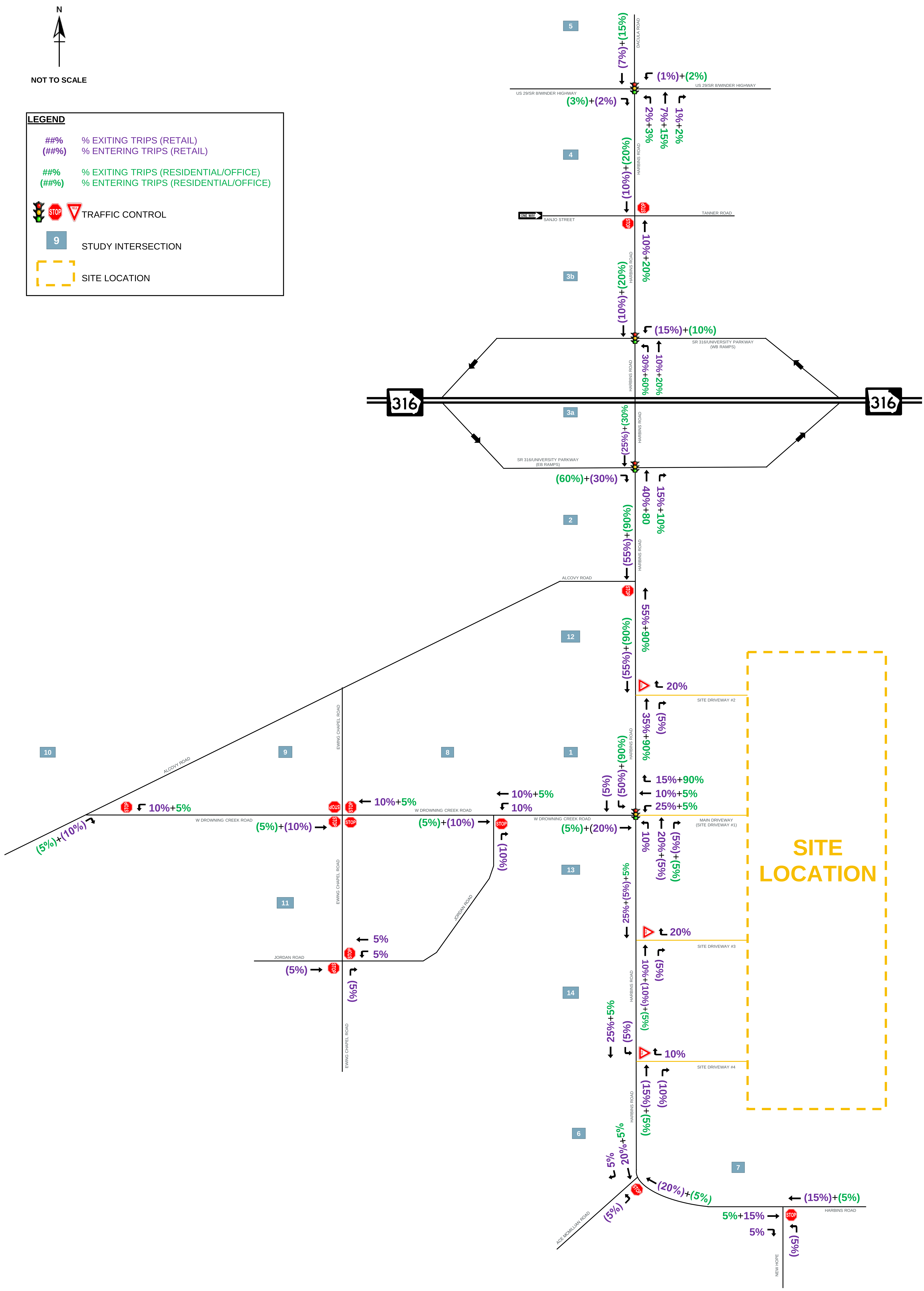

Figure 24: New Trips Lane Assignment at Study Intersections

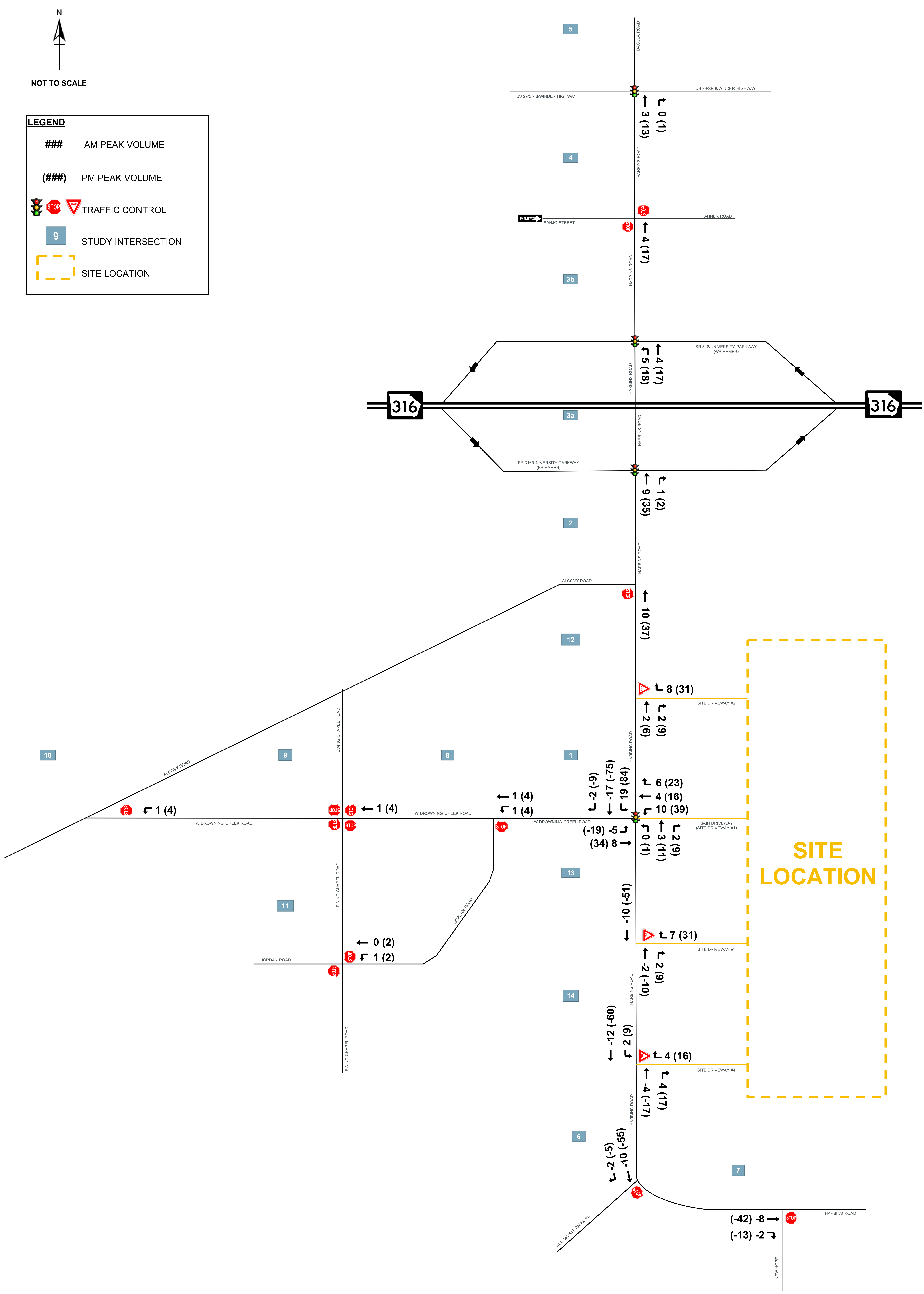

Figure 25: Pass-By Trips for Inland Pass Retail Land Uses

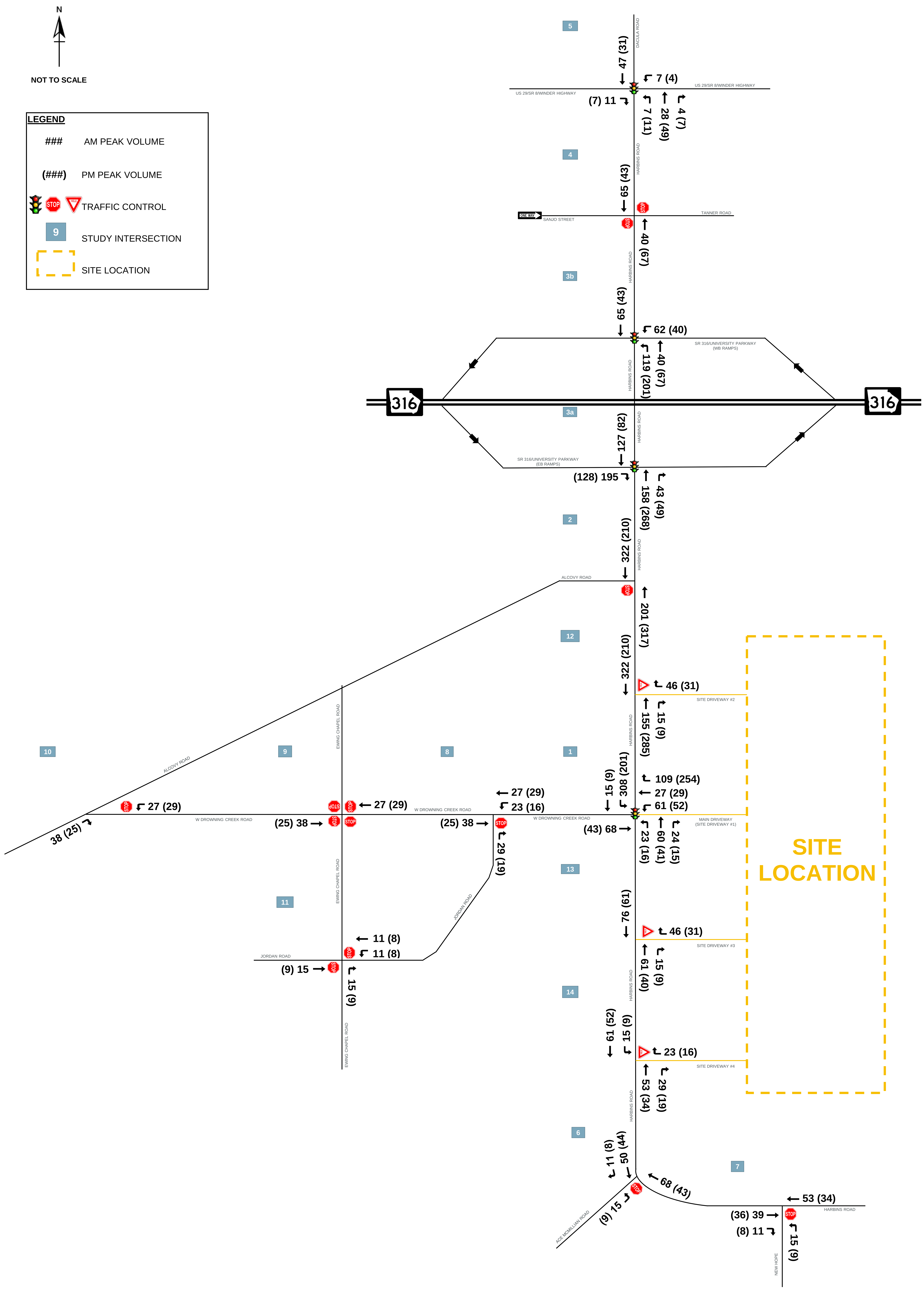

Figure 26: Net New Trips Generated by Inland Pass Mixed-Use Development

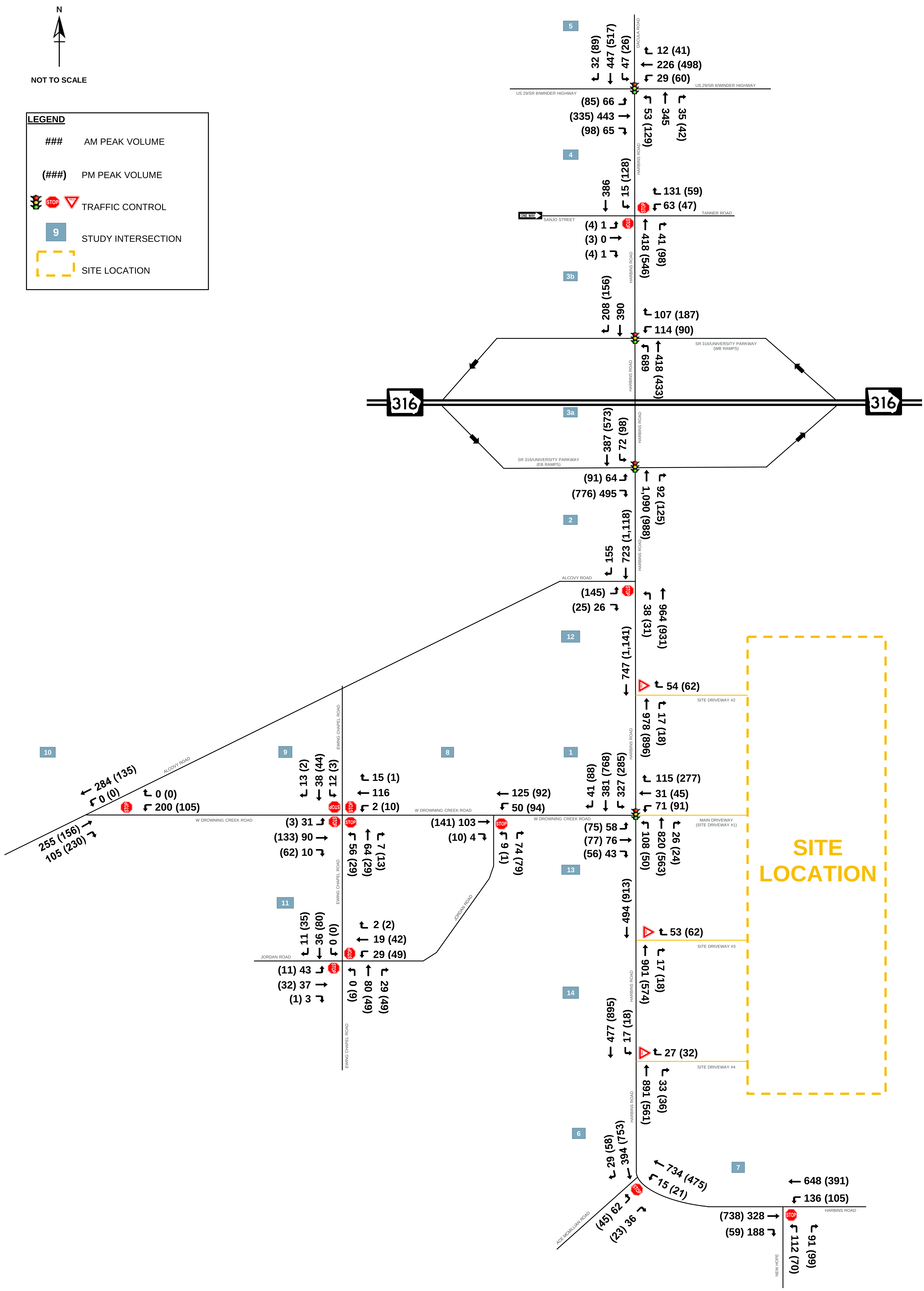

Figure 27: 2025 Build Peak Hour Traffic Volumes

TRAFFIC OPERATIONS ANALYSIS

The Transportation Research Board's Highway Capacity Manual, 2016 edition (HCM 2016) methodology was used to analyze level of service and delay at study intersections via Synchro simulation software. Level of Service (LOS) is defined as a qualitative measure that describes operational conditions and motorists' perceptions within a traffic stream. The HCM defines six levels of service, which are quantified by average control delay. The LOS criteria for signalized and unsignalized intersections are given in Table 7. LOS are reported for individual movements as well as for the intersection as a whole; thus, an individual movement of an intersection may experience a low level of service, while the intersection, as a whole, may operate acceptably.

For signalized intersections, LOS and capacity analyses are necessary to determine the overall operation of the intersection. The capacity analysis is defined by a volume to capacity ratio (v/c) for each lane group. A v/c ratio greater than 1.0 indicates that the volume of traffic on the roadway has exceeded the capacity available, resulting in a temporary surplus of demand.

For unsignalized intersections, the only criteria for evaluating traffic operation are the LOS of the turning movements and the overall intersection. LOS for unsignalized intersections, with stop control on the minor street only, are reported for the side street approaches. Low LOS for side street approaches is not uncommon, as vehicles may experience delay in turning onto a major roadway.

Per GRTA's technical guidelines, the LOS standard for all intersections will be LOS D, except for intersections currently at or below LOS E.

Table 7: Level of Service Criteria for Signalized and Unsignalized Intersections

	SIGNALIZED	UNSIGNALIZED
Level of Service	**Average Delay (sec)**	**Average Delay (sec)**
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	> 50

Using the collected traffic data, lane configurations, signal timing data, and other pertinent inputs, LOS and delay were evaluated for the 2021 Existing (adjusted), 2025 No Build and 2025 Build traffic conditions during the morning and afternoon peak hours.

EXISTING TRAFFIC OPERATIONS ANALYSIS

Using the adjusted existing traffic volumes from Figure 21, a traffic operations analysis for the 2021 existing traffic conditions was completed. The simulation model for the existing conditions included the bridge and intersection improvements for the US 29/SR 8/Winder Highway at Harbins Road-Dacula Road project. The results of the analysis are shown in Table 8 and the Synchro output sheets are included Appendix D: Capacity Analysis Outputs.

Table 8: 2025 Existing LOS and Delay at Study Intersections

#	Study Intersection	Traffic Control	AM Peak	PM Peak
1	**Harbins Rd @ W Drowning Creek Rd** *Eastbound Approach*	Side Street Stop Controlled	**n/a**[1] *E (43.2 s)*	**n/a**[1] *F (136.3 s)*
2	**Harbins Rd @ Alcovy Rd** *Eastbound Approach*	Side Street Stop Controlled	**n/a**[1] *E (35.7 s)*	**n/a**[1] *F (138.8 s)*
3	**Harbins Rd @ SR 316/University Pkwy** *Eastbound Approach* *Westbound Approach* *Northbound Approach* *Southbound Approach*	Traffic Signal	**D (42.6 s)** *C (22.1 s)* *D (42.0 s)* *E (70.0 s)* *E (60.8 s)*	**D (54.0 s)** *E (58.1 s)* *C (24.9 s)* *F (85.8 s)* *E (71.8 s)*
4	**Harbins Rd @ Sanjo St-Tanner Rd** *Eastbound Approach* *Westbound Approach*	Side Street Stop Controlled	**n/a**[1] *C (15.2 s)* *B (14.1 s)*	**n/a**[1] *D (27.6 s)* *D (29.5 s)*
5	**Harbins Rd-Dacula Rd @ US 29/SR 8/Winder Hwy** *Eastbound Approach* *Westbound Approach* *Northbound Approach* *Southbound Approach*	Traffic Signal	**C (31.7 s)** *B (13.7 s)* *B (14.9 s)* *D (48.2 s)* *D (48.9 s)*	**C (32.5 s)** *B (15.7 s)* *C (21.0 s)* *D (49.2 s)* *D (40.7 s)*
6	**Harbins Rd @ Ace McMillian Rd** *Eastbound Approach*	Side Street Stop Controlled	**n/a**[1] *C (19.7 s)*	**n/a**[1] *C (24.7 s)*
7	**Harbins Rd @ New Hope Rd** *Eastbound Approach*	Side Street Stop Controlled	**n/a**[1] *F (50.0 s)*	**n/a**[1] *E (37.3 s)*
8	**Jordan Rd @ W Drowning Creek Rd** *Northbound Approach*	Side Street Stop Controlled	**n/a**[1] *A (9.2 s)*	**n/a**[1] *A (9.2 s)*
9	**Ewing Chapel Rd @ W Drowning Creek Rd** *Eastbound Approach* *Westbound Approach* *Northbound Approach* *Southbound Approach*	All-Way Stop Controlled	**A (8.6 s)** *A (9.0 s)* *A (8.4 s)* *A (8.7 s)* *A (8.4 s)*	**A (8.0 s)** *A (8.1 s)* *A (7.8 s)* *A (7.9 s)* *A (7.8 s)*
10	**Alcovy Rd @ W Drowning Creek Rd** *Westbound Approach*	Side Street Stop Controlled	**n/a**[1] *D (27.7 s)*	**n/a**[1] *B (11.0 s)*
11	**Ewing Chapel Rd @ Jordan Rd** *Eastbound Approach* *Westbound Approach*	Side Street Stop Controlled	**n/a**[1] *A (9.8 s)* *A (9.6 s)*	**n/a**[1] *B (10.4 s)* *B (10.6 s)*

1. *For Side-Street Stop Controlled (SSSC) intersections, LOS are reported for the side street approaches only.*

Under existing conditions, the overall LOS at many of the study intersections is at or above LOS D during the morning and afternoon peak hours. At the signalized intersection of SR 316/University Parkway and Harbins Road, some of the approaches are currently operating below LOS D. For unsignalized intersection, the side street approaches at the following intersection are operating below the LOS D during both the morning and afternoon peak periods:

1. Harbins Road at W Drowning Creek Road
2. Harbins Road at Alcovy Road
3. Harbins Road at New Hope Road

It is important to note that it is likely that at side-street stop-controlled intersections where the delay is excessive, motorists may, in reality, be executing turns from the side streets by accepting smaller gaps than are applied by model assumptions.

NO BUILD TRAFFIC OPERATIONS ANALYSIS

To quantify traffic operations prior to the introduction of the new trips generated by the Inland Pass development, LOS and delay were calculated for the 2025 No Build traffic volumes shown in Figure 23. These volumes included the addition of trips from the Summerwind residential development on Alcovy Road and the simulation model included the SR 316 at Harbins Road new interchange as 2025 base conditions. The results of the 2025 No Build traffic operations analysis are shown in Table 9. The Synchro output sheets are included Appendix D: Capacity Analysis Outputs.

Table 9: 2025 No Build LOS and Delay at Study Intersections

#	Study Intersection	Traffic Control	NO BUILD AM Peak	NO BUILD PM Peak
1	**Harbins Rd @ W Drowning Creek Rd** *Eastbound Approach*	Side Street Stop Controlled	**n/a**[1] *E (45.6 s)*	**n/a**[1] *F (154.4 s)*
2	**Harbins Rd @ Alcovy Rd** *Eastbound Approach* *Northbound Approach* *Southbound Approach*	Side Street Stop Controlled | Traffic Signal (Sys Imp)	**n/a**[1] *F (104.6 s)* *n/a* *n/a*	**n/a**[1] *F (336.5 s)*[2] *n/a* *n/a*
3A	**Harbins Rd @ SR 316/University Pkwy (EB Ramps)** *Eastbound Approach* *Northbound Approach* *Southbound Approach*	Traffic Signal	**A (9.6 s)** *C (24.1 s)* *A (6.1 s)* *A (4.1 s)*	**C (25.4 s)** *C (26.4 s)* *C (25.6 s)* *C (23.7 s)*
3B	**Harbins Rd @ SR 316/University Pkwy (WB Ramps)** *Westbound Approach* *Northbound Approach* *Southbound Approach*	Traffic Signal	**C (32.7 s)** *C (32.0 s)* *D (40.6 s)* *B (19.0 s)*	**B (19.3 s)** *C (26.6 s)* *C (21.9 s)* *B (14.3 s)*
4	**Harbins Rd @ Sanjo St-Tanner Rd** *Eastbound Approach* *Westbound Approach*	Side Street Stop Controlled	**n/a**[1] *C (16.5 s)* *C (15.2 s)*	**n/a**[1] *D (34.2 s)* *E (39.4 s)*
5	**Harbins Rd-Dacula Rd @ US 29/SR 8/Winder Hwy** *Eastbound Approach* *Westbound Approach* *Northbound Approach* *Southbound Approach*	Traffic Signal	**C (31.7 s)** *B (17.4 s)* *B (17.2 s)* *D (42.6 s)* *D (47.4 s)*	**D (35.2 s)** *B (18.8 s)* *C (26.3 s)* *D (54.6 s)* *D (37.1 s)*
6	**Harbins Rd @ Ace McMillian Rd** *Eastbound Approach*	Side Street Stop Controlled	**n/a**[1] *C (23.3 s)*	**n/a**[1] *D (30.7 s)*
7	**Harbins Rd @ New Hope Rd** *Eastbound Approach*	Side Street Stop Controlled	**n/a**[1] *F (107.5 s)*	**n/a**[1] *F (64.0 s)*
8	**Jordan Rd @ W Drowning Creek Rd** *Northbound Approach*	Side Street Stop Controlled	**n/a**[1] *A (9.2 s)*	**n/a**[1] *A (9.2 s)*
9	**Ewing Chapel Rd @ W Drowning Creek Rd** *Eastbound Approach* *Westbound Approach* *Northbound Approach* *Southbound Approach*	All-Way Stop Controlled	**A (8.7 s)** *A (9.1 s)* *A (8.4 s)* *A (8.8 s)* *A (8.5 s)*	**A (8.0 s)** *A (8.2 s)* *A (7.8 s)* *A (8.0 s)* *A (7.9 s)*
10	**Alcovy Rd @ W Drowning Creek Rd** *Westbound Approach*	Side Street Stop Controlled	**n/a**[1] *E (39.2 s)*	**n/a**[1] *B (11.9 s)*
11	**Ewing Chapel Rd @ Jordan Rd** *Eastbound Approach* *Westbound Approach*	Side Street Stop Controlled	**n/a**[1] *A (9.9 s)* *A (9.7 s)*	**n/a**[1] *B (10.5 s)* *B (10.8 s)*

1. *For Side-Street Stop Controlled (SSSC) intersections, LOS are reported for the side street approaches only.*
2. *Delay is more than 300 seconds, which is upper bound of HCM capacity analysis methodology.*

As shown in Table 9, the traffic operations at most study intersections remain relatively the same as the 2021 existing conditions apart from the significant improvements to the LOS at SR 316 due to the new interchange.

For the unsignalized intersections, the side street approaches at the three intersections identified under the 2021 Existing conditions as deficient will continue to operate below the LOS standard. The side street approaches control delay incrementally increases by the 2025 No Build traffic condition, with Harbins Road at Alcovy Road's eastbound delay being excessive during afternoon peak period. Also, the westbound approach at Harbins Road and Tanner Road-Sanjo Street and the westbound approach at Alcovy Road and Ewing Chapel Road would operate at LOS E during the afternoon peak period. It is important to note that it is likely that at side-street stop-controlled intersections where the delay is excessive, motorists may, in reality, be executing turns from the side streets by accepting smaller gaps than are applied by model assumptions.

SYSTEM IMPROVEMENTS ANALYSIS

Improvements that are identified as "System Improvements" address deficiencies that are found in the study network for the "No Build" conditions without the addition of traffic from the proposed development. Table 10 shows the proposed System Improvements to the study network.

Table 10: Proposed System Improvements to Study Network

System Improvement Location	System Improvement Recommendation
Harbins Road at W Drowning Creek Road	Install eastbound left turn storage lane Install southbound right turn decel lane
Harbins Road at Alcovy Rd	Install traffic signal Install eastbound right turn lane
Harbins Road at New Hope Road	Install southbound right turn lane Install northbound left turn lane Install eastbound left turn lane

For the proposed traffic signal at Alcovy Road, further evaluation may be needed beyond this study pending the final intersection design at the intersection related to the SR 316/University Parkway at Harbins Road new interchange project.

For the westbound side street approach at Harbins Road and Tanner Road-Sanjo Street, no additional improvements are recommended given the Tanner Road realignment project and Harbins Road Widening project that are programmed. For the westbound side street approach at Alcovy Road and Ewing Chapel Road, no additional improvements are recommended because the traffic volumes entering the intersection and a benefit-cost analysis of the potential improvements versus the potential improvements in delay were minimal.

Table 11 shows the 2025 No Build operations when the proposed System Improvements are made to the study network. These system Improvements result in the overall study network and particular intersections operating with significantly less delay and/or an enhanced LOS. These are recommended for consideration in future local and state transportation planning.

Table 11: 2025 No Build + System Improvements LOS and Delay at Study Intersections

#	Study Intersection	Traffic Control	NO BUILD + SYSTEM IMP AM Peak	NO BUILD + SYSTEM IMP PM Peak
1	**Harbins Rd @ W Drowning Creek Rd**	Side Street Stop Controlled (Sys Imp)	**n/a[1]**	**n/a[1]**
	Eastbound Approach		*E (36.1 s)*	*F (64.0 s)*
2	**Harbins Rd @ Alcovy Rd**	Traffic Signal (Sys Imp)	**B (11.3 s)**	**B (12.4 s)**
	Eastbound Approach		*E (56.1 s)*	*E (57.3 s)*
	Northbound Approach		*A (7.0 s)*	*A (5.6 s)*
	Southbound Approach		*A (3.4 s)*	*A (9.1 s)*
3A	**Harbins Rd @ SR 316/University Pkwy (EB Ramps)**	Traffic Signal	**A (9.2 s)**	**C (26.3 s)**
	Eastbound Approach		*C (24.1 s)*	*C (27.9 s)*
	Northbound Approach		*A (5.3 s)*	*C (26.8 s)*
	Southbound Approach		*A (4.1 s)*	*C (23.7 s)*
3B	**Harbins Rd @ SR 316/University Pkwy (WB Ramps)**	Traffic Signal	**C (33.1 s)**	**B (19.4 s)**
	Westbound Approach		*C (32.0 s)*	*C (26.6 s)*
	Northbound Approach		*D (41.3 s)*	*C (22.2 s)*
	Southbound Approach		*B (19.0 s)*	*B (14.3 s)*
4	**Harbins Rd @ Sanjo St-Tanner Rd**	Side Street Stop Controlled	**n/a[1]**	**n/a[1]**
	Eastbound Approach		*C (16.5 s)*	*D (34.2 s)*
	Westbound Approach		*C (15.2 s)*	*E (39.4 s)*
5	**Harbins Rd-Dacula Rd @ US 29/SR 8/Winder Hwy**	Traffic Signal	**C (32.4 s)**	**D (35.3 s)**
	Eastbound Approach		*B (17.4 s)*	*B (18.8 s)*
	Westbound Approach		*B (17.2 s)*	*C (26.3 s)*
	Northbound Approach		*D (45.8 s)*	*D (54.9 s)*
	Southbound Approach		*D (47.4 s)*	*D (37.1 s)*
6	**Harbins Rd @ Ace McMillian Rd**	Side Street Stop Controlled	**n/a[1]**	**n/a[1]**
	Eastbound Approach		*C (23.3 s)*	*D (30.7 s)*
7	**Harbins Rd @ New Hope Rd**	Side Street Stop Controlled (Sys Imp)	**n/a[1]**	**n/a[1]**
	Eastbound Approach		*E (37.2 s)*	*D (30.8 s)*
8	**Jordan Rd @ W Drowning Creek Rd**	Side Street Stop Controlled	**n/a[1]**	**n/a[1]**
	Northbound Approach		*A (9.2 s)*	*A (9.2 s)*
9	**Ewing Chapel Rd @ W Drowning Creek Rd**	All-Way Stop Controlled	**A (8.7 s)**	**A (8.0 s)**
	Eastbound Approach		*A (9.1 s)*	*A (8.2 s)*
	Westbound Approach		*A (8.4 s)*	*A (7.8 s)*
	Northbound Approach		*A (8.8 s)*	*A (8.0 s)*
	Southbound Approach		*A (8.5 s)*	*A (7.9 s)*
10	**Alcovy Rd @ W Drowning Creek Rd**	Side Street Stop Controlled	**n/a[1]**	**n/a[1]**
	Westbound Approach		*E (39.2 s)*	*B (11.9 s)*
11	**Ewing Chapel Rd @ Jordan Rd**	Side Street Stop Controlled	**n/a[1]**	**n/a[1]**
	Eastbound Approach		*A (9.9 s)*	*B (10.5 s)*
	Westbound Approach		*A (9.7 s)*	*B (10.8 s)*

1. *For Side-Street Stop Controlled (SSSC) intersections, LOS are reported for the side street approaches only.*

BUILD TRAFFIC OPERATIONS ANALYSIS

To quantify traffic operations after the introduction of DRI #3207 - Inland Pass Mixed-Use Development's new trips, LOS and delay were calculated for the build traffic conditions for 2025 build-out year. The results of the analysis for the 2025 Build conditions with no improvements and with the proposed System Improvements are shown in Table 12. The Synchro output sheets are included Appendix D: Capacity Analysis Outputs.

Table 12: 2025 Build LOS and Delay at Study Intersections

			BUILD (NO IMPROVEMENTS)		BUILD (INCL. SYSTEM IMP)	
#	Study Intersection	Traffic Control	AM Peak	PM Peak	AM Peak	PM Peak
1	**Harbins Rd @ W Drowning Creek Rd**	Side Street Stop Controlled	**n/a[1]**	**n/a[1]**	**n/a[1]**	**n/a[1]**
	Eastbound Approach		*F (***)[2]*	*F (***)[2]*	*F (***)[2]*	*F (***)[2]*
	Westbound Approach		*F (***)[2]*	*F (***)[2]*	*F (***)[2]*	*F (***)[2]*
	Northbound Approach		*n/a*	*n/a*	*n/a*	*n/a*
	Southbound Approach		*n/a*	*n/a*	*n/a*	*n/a*
2	**Harbins Rd @ Alcovy Rd**	Side Street Stop Controlled & Traffic Signal **(Sys Imp)**	**n/a[1]**	**n/a[1]**	**B (12.6 s)**	**C (22.2 s)**
	Eastbound Approach		*F (***)[2]*	*F (***)[2]*	*E (56.3 s)*	*E (69.9 s)*
	Northbound Approach		*n/a*	*n/a*	*B (10.5 s)*	*B (12.3 s)*
	Southbound Approach		*n/a*	*n/a*	*A (6.4 s)*	*C (22.9 s)*
3A	**Harbins Rd @ SR 316/University Pkwy (EB Ramps)**	Traffic Signal	**B (13.6 s)**	**D (40.6 s)**	**B (13.0 s)**	**D (45.6 s)**
	Eastbound Approach		*C (26.9 s)*	*E (64.5 s)*	*C (27.0 s)*	*F (82.1 s)*
	Northbound Approach		*B (10.6 s)*	*C (30.8 s)*	*A (9.5 s)*	*C (29.0 s)*
	Southbound Approach		*A (5.0 s)*	*C (26.1 s)*	*A (5.0 s)*	*C (26.1 s)*
3B	**Harbins Rd @ SR 316/University Pkwy (WB Ramps)**	Traffic Signal	**C (34.7 s)**	**C (24.4 s)**	**C (34.8 s)**	**C (24.4 s)**
	Westbound Approach		*D (39.0 s)*	*C (30.3 s)*	*D (39.0 s)*	*C (30.3 s)*
	Northbound Approach		*D (38.6 s)*	*C (23.4 s)*	*D (38.8 s)*	*C (23.3 s)*
	Southbound Approach		*C (25.8 s)*	*C (23.6 s)*	*C (25.8 s)*	*C (23.6 s)*
4	**Harbins Rd @ Sanjo St-Tanner Rd**	Side Street Stop Controlled	**n/a[1]**	**n/a[1]**	**n/a[1]**	**n/a[1]**
	Eastbound Approach		*C (18.7 s)*	*E (42.4 s)*	*C (18.7 s)*	*E (42.4 s)*
	Westbound Approach		*C (17.1 s)*	*F (57.5 s)*	*C (17.1 s)*	*F (57.5 s)*
5	**Harbins Rd-Dacula Rd @ US 29/SR 8/Winder Hwy**	Traffic Signal	**C (32.2 s)**	**C (31.0 s)**	**C (34.6 s)**	**C (31.0 s)**
	Eastbound Approach		*B (19.2 s)*	*C (21.9 s)*	*B (19.2 s)*	*C (21.9 s)*
	Westbound Approach		*B (18.4 s)*	*C (31.8 s)*	*B (18.4 s)*	*C (31.8 s)*
	Northbound Approach		*D (40.6 s)*	*D (37.2 s)*	*D (50.4 s)*	*D (37.2 s)*
	Southbound Approach		*D (46.5 s)*	*C (30.4 s)*	*D (46.5 s)*	*C (30.4 s)*
6	**Harbins Rd @ Ace McMillian Rd**	Side Street Stop Controlled	**n/a[1]**	**n/a[1]**	**n/a[1]**	**n/a[1]**
	Eastbound Approach		*D (33.6 s)*	*E (36.0 s)*	*D (33.6 s)*	*E (36.0 s)*
7	**Harbins Rd @ New Hope Rd**	Side Street Stop Controlled	**n/a[1]**	**n/a[1]**	**n/a[1]**	**n/a[1]**
	Eastbound Approach		*F (219.8 s)*	*F (85.4 s)*	*F (62.4 s)*	*E (35.8 s)*
8	**Jordan Rd @ W Drowning Creek Rd**	Side Street Stop Controlled	**n/a[1]**	**n/a[1]**	**n/a[1]**	**n/a[1]**
	Northbound Approach		*A (9.6 s)*	*A (9.5 s)*	*A (9.6 s)*	*A (9.5 s)*
9	**Ewing Chapel Rd @ W Drowning Creek Rd**	All-Way Stop Controlled	**A (9.2 s)**	**A (8.3 s)**	**A (9.2 s)**	**A (8.3 s)**
	Eastbound Approach		*A (9.7 s)*	*A (8.5 s)*	*A (9.7 s)*	*A (8.5 s)*
	Westbound Approach		*A (8.9 s)*	*A (8.1 s)*	*A (8.9 s)*	*A (8.1 s)*
	Northbound Approach		*A (9.2 s)*	*A (8.1 s)*	*A (9.2 s)*	*A (8.1 s)*
	Southbound Approach		*A (8.8 s)*	*A (8.0 s)*	*A (8.8 s)*	*A (8.0 s)*
10	**Alcovy Rd @ W Drowning Creek Rd**	Side Street Stop Controlled	**n/a[1]**	**n/a[1]**	**n/a[1]**	**n/a[1]**
	Westbound Approach		*F (59.7 s)*	*B (12.6 s)*	*F (59.7 s)*	*B (12.6 s)*
11	**Ewing Chapel Rd @ Jordan Rd**	Side Street Stop Controlled	**n/a[1]**	**n/a[1]**	**n/a[1]**	**n/a[1]**
	Eastbound Approach		*B (10.2 s)*	*B (10.8 s)*	*B (10.2 s)*	*B (10.8 s)*
	Westbound Approach		*B (10.0 s)*	*B (11.2 s)*	*B (10.0 s)*	*B (11.2 s)*

1. *For Side-Street Stop Controlled (SSSC) intersections, LOS are reported for the side street approaches only.*
2. *Delay is more than 300 seconds, which is upper bound of HCM capacity analysis methodology.*

With the proposed System Improvements, the traffic operations at majority of the study intersections remain relatively the same as the 2025 No Build conditions except for the significantly worst delay at Harbins Road and W Drowning Creek, where Inland Pass main site driveway will be added as a fourth leg.

For the unsignalized intersections, the side street approaches at the intersections identified under the 2025 No Build conditions as deficient will continue to operate below the LOS standard. The side street approaches control delay incrementally increases with the addition of the new trips generated by the Inland Pass development. With the addition of the Inland Pass new trips the side street approaches at the following unsignalized intersections would operate below the LOS standard:

- Harbins Road at W Drowning Creek-Inland Pass Main Driveway
- Harbins Road at Alcovy Road
- Harbins Road at Ace McMillian Road (AM and PM Peak)
- Harbins Road at New Hope Road (AM and PM Peak)
- Alcovy Road at Ewing Chapel Road (AM Peak)

It is important to note that it is likely that at side-street stop-controlled intersections where the delay is excessive, motorists may, in reality, be executing turns from the side streets by accepting smaller gaps than are applied by model assumptions.

NO BUILD VERSUS BUILD COMPARATIVE ANALYSIS

For a comparative analysis, Table 13 shows the net difference in delay for the No Build and Build traffic conditions at the study intersections for the 2025 analysis year, excluding the proposed system improvements.

The results of Table 13 indicate that there will be the highest increase in delay will be at the intersection of Harbins Road and W Drowning Creek Road where the development's main driveway will be added as a fourth leg to the intersection. Without any System Improvements, the Alcovy Road approach at Harbins Road would suffer as well. If System Improvements were applied, the highest increase in delay will be 25.2 seconds for the eastbound approach at New Hope Road during the morning peak hour.

Table 13: Net Difference in Delay between No Build and Build Traffic Conditions

			NO BUILD vs BUILD (NO IMP)		NO BUILD (SYS) vs BUILD (SYS)	
#	Study Intersection	Traffic Control	AM Peak	PM Peak	AM Peak	PM Peak
1	**Harbins Rd @ W Drowning Creek Rd**	Side Street Stop Controlled	**n/a[1]**	**n/a[1]**	**n/a[1]**	**n/a[1]**
	Eastbound Approach		*> 300 s[2]*	*> 300 s[2]*	*> 300 s[2]*	*> 300 s[2]*
2	**Harbins Rd @ Alcovy Rd**	Side Street Stop Controlled & Traffic Signal **(Sys Imp)**	**n/a[1]**	**n/a[1]**	**+1.3**	**+9.8 s**
	Eastbound Approach		*> 300 s[2]*	*> 300 s[2]*	*+0.2 s*	*+12.6 s*
	Northbound Approach		*n/a*	*n/a*	*+3.5 s*	*+6.7 s*
	Southbound Approach		*n/a*	*n/a*	*+3.0 s*	*+13.8 s*
3	**Harbins Rd @ SR 316/University Pkwy (EB Ramps)**	Traffic Signal	**+4.0 s**	**+15.2 s**	**+3.8 s**	**+19.3 s**
	Eastbound Approach		*+2.8 s*	*+38.1 s*	*+2.9 s*	*+54.2 s*
	Northbound Approach		*+4.5 s*	*+5.2 s*	*+4.2 s*	*+2.2 s*
	Southbound Approach		*+0.9 s*	*+2.4 s*	*+0.9 s*	*+2.4 s*
	Harbins Rd @ SR 316/University Pkwy (WB Ramps)	Traffic Signal	**+2.0 s**	**+5.1 s**	**+1.7 s**	**+5.0 s**
	Westbound Approach		*+7.0 s*	*+3.7 s*	*+7.0 s*	*+3.7 s*
	Northbound Approach		*-2.0 s*	*+1.5 s*	*-2.5 s*	*+1.1 s*
	Southbound Approach		*+6.8 s*	*+9.3 s*	*+6.8 s*	*+9.3 s*
4	**Harbins Rd @ Sanjo St-Tanner Rd**	Side Street Stop Controlled	**n/a[1]**	**n/a[1]**	**n/a[1]**	**n/a[1]**
	Eastbound Approach		*+2.2 s*	*+8.2 s*	*+2.2 s*	*+8.2 s*
	Westbound Approach		*+1.9 s*	*+18.1 s*	*+1.9 s*	*+18.1 s*
5	**Harbins Rd-Dacula Rd @ US 29/SR 8/Winder Hwy**	Traffic Signal	**+0.5 s**	**-4.2 s**	**+2.2 s**	**-4.3 s**
	Eastbound Approach		*+1.8 s*	*+3.1 s*	*+1.8 s*	*+3.1 s*
	Westbound Approach		*+1.2 s*	*+5.5 s*	*+1.2 s*	*+5.5 s*
	Northbound Approach		*-2.0 s*	*-17.4 s*	*+4.6 s*	*-17.7 s*
	Southbound Approach		*-0.9 s*	*-6.7 s*	*-0.9 s*	*-6.7 s*
6	**Harbins Rd @ Ace McMillian Rd**	Side Street Stop Controlled	**n/a[1]**	**n/a[1]**	**n/a[1]**	**n/a[1]**
	Eastbound Approach		*+10.3 s*	*+5.3 s*	*+10.3 s*	*+5.3 s*
7	**Harbins Rd @ New Hope Rd**	Side Street Stop Controlled	**n/a[1]**	**n/a[1]**	**n/a[1]**	**n/a[1]**
	Eastbound Approach		*+112.3 s*	*+21.4 s*	*+25.2 s*	*+5.0 s*
8	**Jordan Rd @ W Drowning Creek Rd**	Side Street Stop Controlled	**n/a[1]**	**n/a[1]**	**n/a[1]**	**n/a[1]**
	Northbound Approach		*+0.4 s*	*+0.3 s*	*+0.4 s*	*+0.3 s*
9	**Ewing Chapel Rd @ W Drowning Creek Rd**	All-Way Stop Controlled	**+0.5 s**	**+0.3 s**	**+0.5 s**	**+0.3 s**
	Eastbound Approach		*+0.6 s*	*+0.3 s*	*+0.6 s*	*+0.3 s*
	Westbound Approach		*+0.5 s*	*+0.3 s*	*+0.5 s*	*+0.3 s*
	Northbound Approach		*+0.4 s*	*+0.1 s*	*+0.4 s*	*+0.1 s*
	Southbound Approach		*+0.3 s*	*+0.1 s*	*+0.3 s*	*+0.1 s*
10	**Alcovy Rd @ W Drowning Creek Rd**	Side Street Stop Controlled	**n/a[1]**	**n/a[1]**	**n/a[1]**	**n/a[1]**
	Westbound Approach		*+20.5 s*	*+0.7 s*	*+20.5 s*	*+0.7 s*
11	**Ewing Chapel Rd @ Jordan Rd**	Side Street Stop Controlled	**n/a[1]**	**n/a[1]**	**n/a[1]**	**n/a[1]**
	Eastbound Approach		*+0.3 s*	*+0.3 s*	*+0.3 s*	*+0.3 s*
	Westbound Approach		*+0.3 s*	*+0.4 s*	*+0.3 s*	*+0.4 s*

1. *For Side-Street Stop Controlled (SSSC) intersections, LOS are reported for the side street approaches only.*
2. *Delay is more than 300 seconds, which is upper bound of HCM capacity analysis methodology.*

SITE IMPACT ANALYSIS

Improvements that are identified as “Site Mitigation Improvements” address deficiencies that are caused by site traffic and can be identified as related to the proposed development. Based on the 2025 Build traffic operations, no additional Site Mitigations improvements are recommended in additional to the proposed System Improvements for the 2025 No Build conditions. Table 14 shows the proposed Site Mitigation Improvements to the study network

Table 14: Proposed Site Mitigation Improvements to Study Network

Site Mitigation Improvement Location	Site Mitigation Improvement Recommendation
Harbins Rd at W Drowning Creek Rd	Install Traffic Signal Install southbound left turn storage lane Install northbound right turn decel lane Install northbound left turn storage lane

For side street approaches at Harbins Road at Alcovy Road and Harbins Road at New Hope Road, no additional improvements were recommended than those detailed under System Improvements. For the westbound side street approach at Harbins Road and Tanner Road-Sanjo Street, no additional improvements are recommended given the Tanner Road realignment project and Harbins Road Widening project that are programmed. For Harbins Road at Ace McMillian Road and Alcovy Road at Ewing Chapel Road, no additional improvements are recommended because the traffic volumes entering the intersection and a benefit-cost analysis of the potential improvements versus the potential improvements in delay were minimal.

Table 15 shows the 2025 Build operations when the proposed Site Mitigation Improvements are made to the study network. These system Improvements result in the overall study network and particular intersections operating with significantly less delay and/or an improved LOS. It is important to note that it is likely that at side-street stop-controlled intersections where the delay is excessive, motorists may, in reality, be executing turns from the side streets by accepting smaller gaps than are applied by model assumptions.

Table 15: 2025 Build + Site Mitigation Improvements LOS and Delay at Study Intersections

1. *For Side-Street Stop Controlled (SSSC) intersections, LOS are reported for the side street approaches only.*

#	Study Intersection	Traffic Control	SYS + SITE IMPROVEMENTS	
			AM Peak	PM Peak
1	**Harbins Rd @ W Drowning Creek Rd** *Eastbound Approach* *Westbound Approach* *Northbound Approach* *Southbound Approach*	Traffic Signal (Site Imp)	**D (38.4 s)** *D (50.7 s)* *D (48.1 s)* *C (33.3 s)* *D (39.1 s)*	**B (18.0 s)** *D (43.8 s)* *C (32.5 s)* *B (17.6 s)* *A (8.3 s)*
2	**Harbins Rd @ Alcovy Rd** *Eastbound Approach* *Northbound Approach* *Southbound Approach*	Traffic Signal (Sys Imp)	**B (13.2 s)** *E (56.8 s)* *B (11.6 s)* *A (6.4 s)*	**C (21.4 s)** *E (69.9 s)* *B (10.4 s)* *C (22.9 s)*
3A	**Harbins Rd @ SR 316/University Pkwy (EB Ramps)** *Eastbound Approach* *Northbound Approach* *Southbound Approach*	Traffic Signal	**B (14.1 s)** *C (27.0 s)* *B (11.5 s)* *A (5.0 s)*	**D (45.7 s)** *F (82.1 s)* *C (29.1 s)* *C (26.1 s)*
3B	**Harbins Rd @ SR 316/University Pkwy (WB Ramps)** *Westbound Approach* *Northbound Approach* *Southbound Approach*	Traffic Signal	**D (35.5 s)** *D (39.0 s)* *D (40.0 s)* *C (25.8 s)*	**C (24.3 s)** *C (30.3 s)* *C (23.1 s)* *C (23.6 s)*
4	**Harbins Rd @ Sanjo St-Tanner Rd** *Eastbound Approach* *Westbound Approach*	Side Street Stop Controlled	**n/a[1]** *C (18.7 s)* *C (17.1 s)*	**n/a[1]** *E (42.4 s)* *F (57.5 s)*
5	**Harbins Rd-Dacula Rd @ US 29/SR 8/Winder Hwy** *Eastbound Approach* *Westbound Approach* *Northbound Approach* *Southbound Approach*	Traffic Signal	**D (35.1 s)** *B (19.2 s)* *B (18.4 s)* *D (52.6 s)* *D (46.5 s)*	**C (31.0 s)** *C (21.9 s)* *C (31.8 s)* *D (37.2 s)* *C (30.4 s)*
6	**Harbins Rd @ Ace McMillian Rd** *Eastbound Approach*	Side Street Stop Controlled	**n/a[1]** *D (33.6 s)*	**n/a[1]** *E (36.0 s)*
7	**Harbins Rd @ New Hope Rd** *Eastbound Approach*	Side Street Stop Controlled (Sys Imp)	**n/a[1]** *F (62.4 s)*	**n/a[1]** *E (35.8 s)*
8	**Jordan Rd @ W Drowning Creek Rd** *Northbound Approach*	Side Street Stop Controlled	**n/a[1]** *A (9.6 s)*	**n/a[1]** *A (9.5 s)*
9	**Ewing Chapel Rd @ W Drowning Creek Rd** *Eastbound Approach* *Westbound Approach* *Northbound Approach* *Southbound Approach*	All-Way Stop Controlled	**A (9.2 s)** *A (9.7 s)* *A (8.9 s)* *A (9.2 s)* *A (8.8 s)*	**A (8.3 s)** *A (8.5 s)* *A (8.1 s)* *A (8.1 s)* *A (8.0 s)*
10	**Alcovy Rd @ W Drowning Creek Rd** *Westbound Approach*	Side Street Stop Controlled	**n/a[1]** *F (59.7 s)*	**n/a[1]** *B (12.6 s)*
11	**Ewing Chapel Rd @ Jordan Rd** *Eastbound Approach* *Westbound Approach*	Side Street Stop Controlled	**n/a[1]** *B (10.2 s)* *B (10.0 s)*	**n/a[1]** *B (10.8 s)* *B (11.2 s)*

1. *For Side-Street Stop Controlled (SSSC) intersections, LOS are reported for the side street approaches only.*

SITE ACCESS ANALYSIS

SITE INGRESS/EGRESS

The following access configurations were utilized when modeling the proposed site driveway intersections and are recommended for the site's construction plans. Table 16 shows the traffic operations at the site driveways given the proposed layouts. The Synchro output sheets are included Appendix D: Capacity Analysis Outputs.

Main Driveway (Site Driveway #1)-W Drowning Creek Road at Harbins Road

The driveway will consist of two exiting lanes (separate right-turn and through/left-turn lanes) and one entering lane. A traffic signal is recommended at this intersection. A Traffic Signal Warrant Analysis was completed showing that a signal is warranted at this intersection and is included in Appendix E. Included with signal design is a northbound channelized right turn deceleration lane and a northbound left turn storage lane are recommended, as well as the System recommended eastbound left turn storage lane and southbound right turn lane.

Site Driveway #2 (northernmost) at Harbins Road

The driveway will consist of a single channelized right-in/right-out exiting lane and a single entering lane. A northbound channelized right turn deceleration lane is recommended as well.

Site Driveway #3 (south of main driveway) at Harbins Road

The driveway will consist of a single channelized right-in/right-out exiting lane and a single entering lane. A northbound channelized right turn deceleration lane is recommended as well.

Site Driveway #4 (southernmost) at Harbins Road

The driveway will consist of a single channelized right-out exiting lane and a single entering lane. A southbound left turn storage lane and a northbound channelized right turn deceleration lane are recommended as well.

Table 16: 2025 Build LOS and Delay at Site Driveways

#	Study Intersection	Traffic Control	AM Peak	PM Peak
1	**Harbins Rd @ W Drowning Creek Rd** *Eastbound Approach* *Westbound Approach* *Northbound Approach* *Southbound Approach*	Side Street Stop Controlled | Traffic Signal (Site Imp)	**D (38.4 s)** *D (50.7 s)* *D (48.1 s)* *C (33.3 s)* *D (39.1 s)*	**B (18.0 s)** *D (43.8 s)* *C (32.5 s)* *B (17.6 s)* *A (8.3 s)*
12	**Harbins Rd @ Site Driveway #2** *Westbound Approach*	Side Street Stop Controlled	**n/a**[1] *C (21.9 s)*	**n/a**[1] *C (20.1 s)*
13	**Harbins Rd @ Site Driveway #3** *Westbound Approach*	Side Street Stop Controlled	**n/a**[1] *C (19.6 s)*	**n/a**[1] *B (13.6 s)*
14	**Harbins Rd @ Site Driveway #4** *Westbound Approach*	Side Street Stop Controlled	**n/a**[1] *C (17.9 s)*	**n/a**[1] *B (12.8 s)*

Under the Build traffic conditions, all site driveways will operate above acceptable Levels of Service for during both peak periods. Figure 28 shows the future recommended lane configurations at the study intersections given the proposed System and Site Mitigation improvements.

ON SITE CIRCULATION

The proposed site plan for Inland Pass Mixed-Use development was reviewed to determine if the on-site circulation was sufficient in terms of vehicles, pedestrians, and parking. The site plan shows adequate parking per the City of Dacula's development standards and internal sidewalks throughout the site.

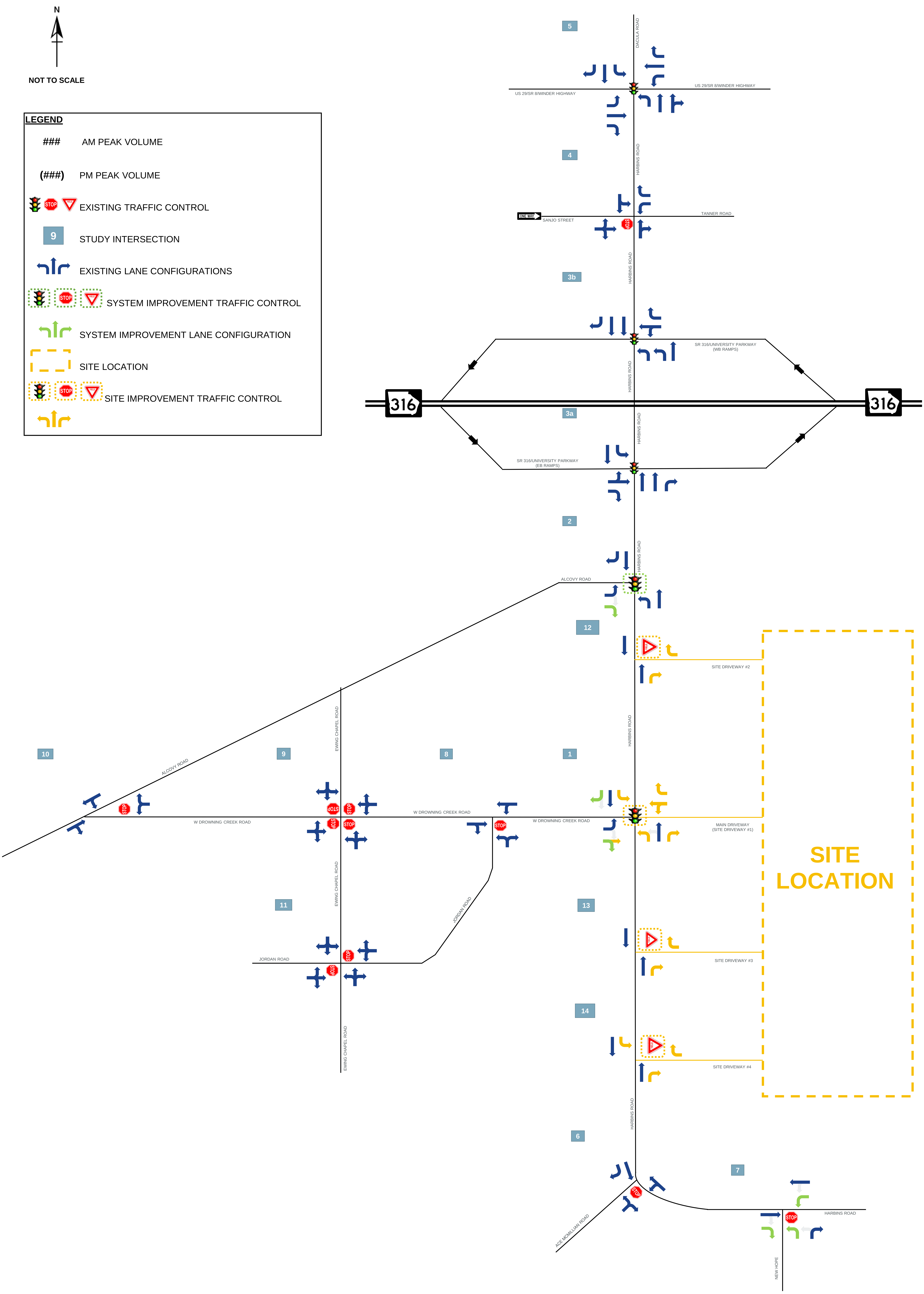

Figure 28: Future Recommended Lane Configurations at Study Intersections (System and Site Mitigation Improvements)

SUMMARY AND CONCLUSION

Watkins Real Estate Group is in the rezoning process for 5 parcels totaling 73.8-acres on Harbins Road south of SR 316/University Parkway opposite W Drowning Creek Road in the City of Dacula, Georgia (Case No. 2020-CD-RZ-03). The proposed mixed-use development will consist of residential, commercial, office-industrial, and 4 outparcels, as well as a proposed community park. The project will be completed in two phases. The residential multi-family apartments and senior living are to be complete in 2024 and the overall project to be complete in 2025.

Since the mixed-use project exceeds the 500,000 SF mixed-use threshold required to be designated as a Development of Regional Impact (DRI), the developer must follow a reviewing process outlined by the Georgia Regional Transportation Authority (GRTA). Following a Pre-Review and Methodology meeting, the transportation impact analysis was completed for the predetermined study network agreed upon by GRTA as detailed in GRTA's Letter of Understanding dated December 4, 2020.

In response to the trends in traffic volumes related to the COVID-19 pandemic, a combination of available historical data was used to "normalize" traffic patterns and adjust the field collected data at the study intersections. The capacity analysis of the study network included 2021 Existing (adjusted), 2025 No Build, and 2025 Build traffic conditions. At the time of this study, programmed transportation improvements within the study network were included in the 2025 No Build traffic simulation model as well as estimated trips generated by the Summerwind subdivision development currently under construction on Alcovy Road.

Based on the results of the 2025 "No Build" traffic operations analysis, the following are recommended as System Improvements within the study network, prior to the introduction of Inland Pass' new trips:

System Improvement Location	System Improvement Recommendation
Harbins Road at W Drowning Creek Road	Install eastbound left turn storage lane Install southbound right turn decel lane
Harbins Road at Alcovy Rd	Install traffic signal Install eastbound right turn lane
Harbins Road at New Hope Road	Install southbound right turn lane Install northbound left turn lane Install eastbound left turn lane

For the proposed traffic signal at Alcovy Road, further evaluation may be needed beyond this study pending the final intersection design at the intersection related to the SR 316/University Parkway at Harbins Road new interchange project.

With the addition of the Inland Pass new trips, the following Site Mitigation Improvements are recommended**:**

Site Mitigation Improvement Location	Site Mitigation Improvement Recommendation
Harbins Rd at W Drowning Creek Rd	Install Traffic Signal Install southbound left turn storage lane Install northbound right turn decel lane Install northbound left turn storage lane

These Site Mitigation Improvements coupled with the recommended System Improvements result in a relatively acceptable LOS within the study network. Delay for some side street approaches would be experienced; however, additional improvements beyond the current programmed transportation project yield minimal benefit-cost ratio give traffic volumes entering the intersections.

OTHER PERTINENT FACTORS

With the requested rezoning of the assembled parcels to Planned Mixed-Use District (PMUD) for the Inland Pass Mixed-Use Development, the proposed site is in line with the City of Dacula's Future Land Use Plan, which designates the parcels as Community Mixed Activity Use Center.

The proposed retail, office, and residential land uses offer amenities to both the onsite residents as well as those in the surrounding community. Moreover, the proposed community park, coupled with the Harbins Greenway projects southwest of Harbins Road aids in supporting a more active and robust transportation network for the City of Dacula residents.