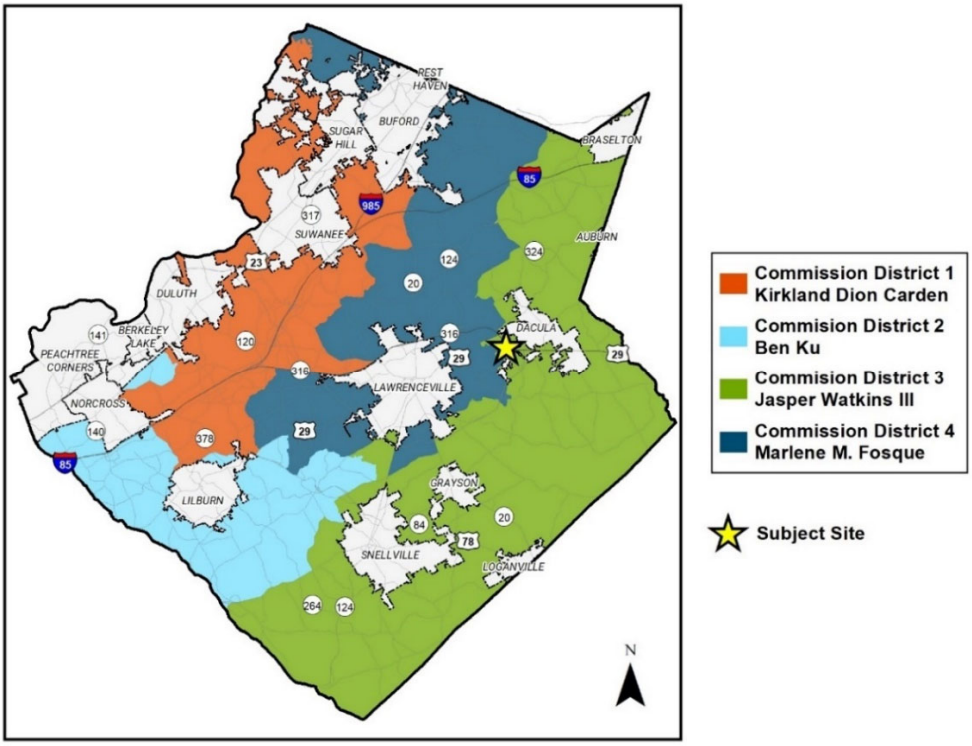
GWINNETT COUNTY
DEPARTMENT OF PLANNING AND DEVELOPMENT
446 West Crogan Street, Suite 300 | Lawrenceville, GA 30046-2440
678.518.6000
GwinnettCounty.com

PLANNING AND DEVELOPMENT DEPARTMENT
CASE REPORT

Case Number:	**RZM2022-00030**
Current Zoning:	**MU-R** (Regional Mixed-Use District)
Request:	Rezoning to **RM-24** (Multifamily Residence District)
Address:	1705 Winder Highway
Map Number:	R5243 008
Site Area:	58.93 acres
Units:	497
Proposed Development:	Apartments
Commission District:	District 3 – Commissioner Watkins
Character Area:	Innovation District

Staff Recommendation: **APPROVAL WITH CONDITIONS**

Planning Commission Recommendation: **APPROVAL WITH CONDITIONS**



Planning Commission Advertised Public Hearing Date: 7/6/2022 (Public Hearing Held/Recommendation Tabled to 8/2/2022)
Board of Commissioners Advertised Public Hearing Date: 7/26/2022 (Public Hearing Tabled to 8/23/2022)

Applicant:	Dacula Development Partners, LLC c/o Mahaffey, Pickens, Tucker, LLP 1550 North Brown Road, Suite 125 Lawrenceville, GA 30043	**Owner:**	WUSF 2 Sugarloaf, LLC 8800 North Gainey Center Drive, Suite 345 Scottsdale, AZ 85258
Contact:	Shane Lanham	**Contact Phone:**	770.232.0000

Zoning History

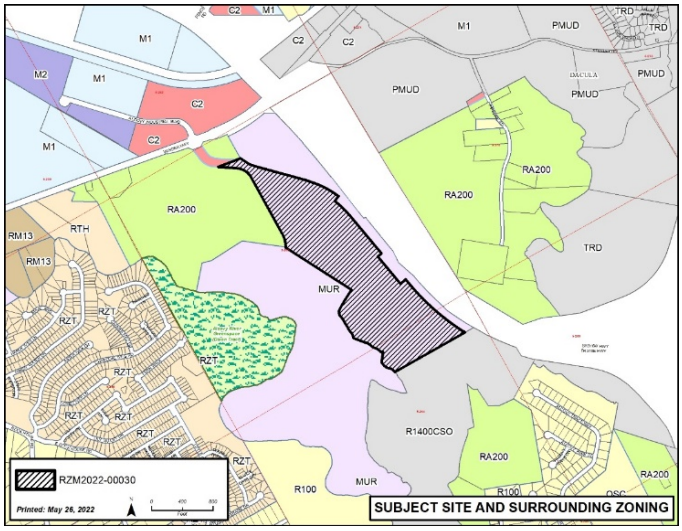
The subject property is zoned MU-R (Regional Mixed-Use District). In 2013, rezoning case RZC2013-00008 amended the zoning of the northern portion of the property from RA-200 (Agriculture-Residence District) to C-2 (General Business District) for retail and office uses. In 2015, rezoning case RZM2015-00003 changed the entire subject property's zoning from C-2 and RA-200 to MU-R for a regional mixed-use development.

Existing Site Condition

The subject site is a 58.93-acre portion of a larger 158.65-acre parcel located at the southeast corner of the intersection of Winder Highway and Georgia Highway 316. The site contains a vacant single-family home, is mostly wooded, and includes a pond. Additionally, several stream branches and the Colonial Pipeline easement bisect the property. The topography slopes downward from north to south towards the area of the site near the streams. A sidewalk exists along the northwest side of Winder Highway. The nearest Gwinnett Transit stop is 3.9 miles from the site.

Surrounding Use and Zoning

The subject site is surrounded by single-family residences on large lots, undeveloped land, and commercial uses. Among these properties are parcels that were rezoned for denser or more intense uses, but which remain either undeveloped or developed with a single-family home that existed prior to the rezoning. The following is a summary of surrounding uses and zoning:



Location	Land Use	Zoning	Density
Proposed	Apartments	RM-24	8.84 units per acre
North	Single-Family Residential Single-Family Residential	RA-200 MU-R	0.02 units per acre 0.02 units per acre
East	Undeveloped Undeveloped	RA-200 PMUD (Dacula)	N/A N/A
South	Single-Family Residential	R1400 CSO (Dacula)	0.01 units per acre
West	Undeveloped Single-Family Residential	MU-R RA-200	N/A 0.02 units per acre

Project Summary

The applicant requests rezoning of a 58.93-acre property zoned MU-R to RM-24 for apartments, including:

- 497 apartment units, yielding a net density of 8.84 units per acre.
- 354 traditional apartment residences within five buildings ranging from three to five stories, which would be constructed to the north of the Colonial Pipeline easement and stream.
- 152 carriage units, containing three to eight units per building, located to the south of the pipeline and stream.
- One, two, and three-bedroom traditional apartment units with a minimum of 700, 1,000, and 1,250 square feet, respectively.
- Two and three-bedroom carriage units, containing a minimum of 935 and 1,250 square feet, respectively.
- Building elevations depicting brick and fiber-cement siding.
- Access provided via a new public right of way from Winder Highway, which would align with Alcovy Industrial Boulevard.
- Two proposed entrances from the new public right of way to the five apartment buildings and a single access from the new right of way to the carriage units.
- A total of 1,070 parking spaces, including surface parking for the apartment buildings. Parking for the carriage units is provided via single-car garages and two driveway spaces for each unit, and amenity area parking.
- A total of 21 percent (12.3 acres) of common area.
- Swimming pools for both the traditional apartments and carriage units, as well as a clubhouse in the carriage unit portion of the development.
- Internal 4-foot-wide sidewalks alongside the new right of way and within the carriage units.
- A mail kiosk near the entrance of the carriage unit section of the development.
- Six stormwater management facilities located throughout the development.

Zoning and Development Standards

The applicant is requesting a rezoning to RM-24, Multifamily Residence District. The following is a summary of applicable development standards from the Unified Development Ordinance (UDO):

Standard	Required	Proposed	Meets Standard?
Building Height	Maximum 65’	<65’	YES
Front Yard Setback	Minimum 15’	15’	YES
Side Yard Setback	Minimum 15’	15’	YES
Rear Yard Setback	Minimum 30’	30’	YES
Heated Floor Area	Minimum 600 square feet for one-bedroom Minimum 800 square feet for two-bedroom Minimum 1,000 square feet for three-bedroom	700 square feet (one-bedroom) 935 square feet (two-bedroom) 1,250 square feet (three-bedroom)	YES
Density	Maximum 24 units per acre	8.84 units per acre	YES
Common Area	20%	21%	YES
Parking	Minimum 746 spaces Maximum 1,491 spaces	1,070 spaces	YES

Internal and External Agency Review

In addition to these Development Standards, the applicant must meet all other UDO requirements related to infrastructure improvements. Internal and external agency review comments are attached (Exhibit E). Standard site and infrastructure improvements will also be required related to transportation, stormwater, water, and sewer utilities. Recommended improvements not already required by the UDO have been added as staff recommended conditions.

Staff Analysis

Rezoning Request Analysis: According to the UDO, if a proposed amendment is for the rezoning of property the Department shall evaluate the request and make a recommendation with respect to the standards governing exercise of zoning power as defined in Section 270-20.5. After this evaluation, staff makes the following findings based on the standards from the UDO:

A. Whether a proposed zoning will permit a use that is suitable in view of the use and development of adjacent and nearby property.

The site is surrounded by residential and commercial uses. To the north, west, and south are single-family homes on lots containing multiple acres. A shopping center is located across Winder Highway to the north. Although the proposed multifamily development is incompatible with existing uses, properties to the west and south are zoned for denser and more intense developments which have not yet been constructed. The requested RM-24 zoning is suitable considering the MU-R, C-2, and R1400 CSO (City of Dacula) zoning classifications of surrounding properties.

B. Whether a proposed rezoning will adversely affect the existing use or usability of adjacent or nearby property.

The existing use and usability of adjacent or nearby properties could be adversely impacted by the proposed density. The densities of the surrounding single-family homes are significantly lower than that which is proposed for the subject property; however, denser and more intense developments were approved on adjacent properties. The proposed development would generate fewer daily trips than if the approved site plan was to be developed. Furthermore, the proposed five-story height, and carriage units are much lower in comparison to the eleven buildings of office, commercial, and retail space, with a 12-story height limit, as approved in 2015 for this property under MU-R zoning.

C. Whether the property to be affected by a proposed rezoning has a reasonable economic use as currently zoned.

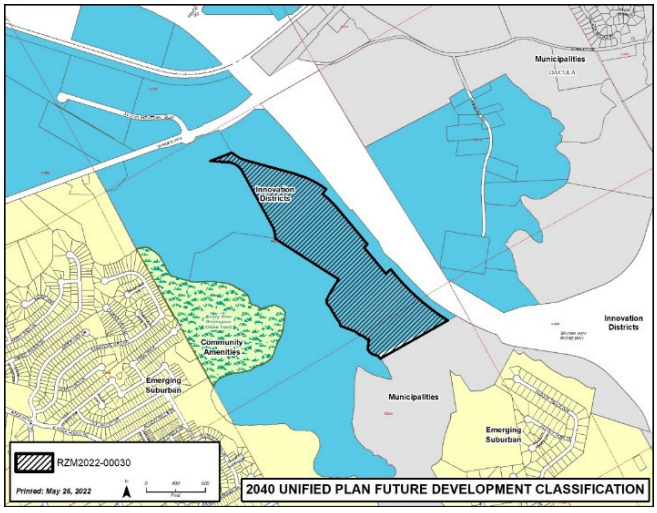
The property has a reasonable economic use as currently zoned.

D. Whether the proposed rezoning will result in a use which will or could cause an excessive or burdensome use of existing streets, transportation facilities, utilities, or schools.

An increase in impacts on public facilities would be anticipated in the form of traffic, utility demand, and stormwater runoff; however, appropriate conditions, site development requirements, and planning would mitigate these impacts. An increased impact is anticipated on school enrollment. Agency review comments related to any potential improvements concerning this rezoning request are attached (Exhibit E).

E. Whether the proposed rezoning is in conformity with the policy and intent of the Unified Plan and Future Development Map.

The 2040 Unified Plan Future Development Map indicates the subject property is within the Innovation District Character Area. This designation promotes technology and research and development uses, and it encourages an enterprise-type relationship between universities and research and development companies. Residential uses, including apartments, are expressly encouraged to support the research and development enterprises; therefore, the proposed rezoning is in conformity with the policy and intent of the Unified Plan and Future Development Map.



F. Whether there are other existing or changing conditions affecting the use and development of the property which give supporting grounds for either approval or disapproval of the proposed rezoning.

Although the proposed apartment development is inconsistent with adjacent existing single-family homes, several of these properties were rezoned for denser and more intense developments. Moreover, apartments were approved nearby to the west on Winder Highway in 2019 and 2021. The subject property's location near Georgia Highway 316, surrounded by MU-R, C-2, and R1400 CSO (City of Dacula) zoning, and within the Innovation District Character Area provide supporting grounds for approval of the proposed rezoning.

Staff Recommendation

Based on the staff's evaluation of the request and the standards governing exercise of zoning power, the Department of Planning and Development recommends **APPROVAL WITH CONDITIONS** of the rezoning request.

Planning Commission Recommendation

Based on staff's evaluation of the request, information presented at the public hearing, and the Planning Commission's consideration of the standards governing the exercise of zoning power related to this application, the Planning Commission recommends **APPROVAL WITH CONDITIONS** of the rezoning request.

Planning Commission Recommended Conditions (includes Staff Recommended Conditions, as Amended)

Approval as **RM-24** (Multifamily Residence District) for the development of a multifamily residential development, subject to the following conditions:

1. The proposed development shall be constructed in general conformance with Exhibit B: Site Plan dated ~~received May 5, 2022~~ **presented at the July 6, 2022, Planning Commission public hearing**, Exhibit C: Building Elevations dated received May 5, 2022, with revisions required by conditions of approval as reviewed and approved by the Department of Planning and Development.

2. Uses on the site shall be limited to multifamily dwellings**, including townhomes and carriage-style units,** with a maximum of 497 units and accessory uses and structures.

3. The minimum heated floor area per dwelling unit shall be 700 square feet. Efficiency units shall be prohibited, and the ~~complex~~ **apartment-style units** shall be limited to a maximum of 10 percent of units as three bedrooms or larger.

4. Buildings shall be constructed to the standards of the Design Category 3. Building elevations shall be submitted for review and approval by the Director of Planning and Development prior to the issuance of a development permit.

5. All grassed areas shall be sodded.

6. Stormwater BMP facilities shall be screened from view of adjoining properties and rights of way by decorative fencing and/or landscaping in compliance with the Gwinnett County Stormwater Management Manual.

7. Amenity areas shall consist of, at minimum, a common area including a swimming pool, clubhouse, walking trails, and pocket parks. The design and location of all common areas shall be subject to the review and approval of the Department of Planning and Development.

8. Buildings located along the right of way shall have direct pedestrian access to the external sidewalk.

9. All road frontages shall be landscaped by the developer and maintained by the property management company. Entrances shall include a decorative masonry entrance feature. Landscape and entrance feature plans shall be subject to review and approval by the Department of Planning and Development.

10. The developer shall coordinate with the Gwinnett County Department of Transportation Preconstruction Director on the proposed intersection project F-1256 (SR 316 from Winder Highway to Hi-Hope Road).

11. The developer shall coordinate with the Gwinnett County Department of Transportation, Traffic Engineering Division, on the signalization of the intersection of Winder Highway and Alcovy Industrial Boulevard.

~~12. The developer shall coordinate with the Georgia Department of Transportation (GDOT) on projects: (1) 0000300 – SR 8/US 29 at Alcovy River, and (2) M004884 – SR 8/US 29 from south of CS 1315/Stanley Court to northeast of the Barrow County line.~~

13. The newly construction extension of Alcovy Industrial Boulevard shall be brought to minimum Gwinnett County standards for a new roadway.

14. The newly constructed extension of Alcovy Industrial Boulevard shall show a cul-de-sac or other approved turnaround beyond the shown access entrance to the 152 multifamily carriage units.

15. At no cost to Gwinnett County, the developer shall provide a future trail connection through this parcel, as indicated in the Gwinnett Countywide Trails Master Plan according to the Unified Development Ordinance Section 900-110. Further review of a trail location and design shall be required and coordinated with the Department of Community Services.

16. The developer shall install a double staggered row of 8-foot-tall evergreen trees spaced on 12-foot centers in a single row and spaced with 6 feet between rows along the common property boundary line of the subject property of the application and the Williams property (parcel number R5243 002). The evergreen trees shall contain an equal distribution of Thuga Green Giants, Cryptomeria, Tree Form Hollies, and Southern Magnolias; provided, however, that such plantings shall not be required within the pipeline easements.

17. The developer shall install a 6-foot-tall chain link fence with nine-gauge wire and 2-inch diamond size with a top rail of 1 5/8-inch diameter and line posts of 2 3/8-inch diameter and gate posts, corner posts, and terminals with a diameter of 2 7/8 inches, with 40 wall thickness

of galvanized tubing along the common property boundary line of the subject property of the application and the Williams property (parcel number R5243 002).

18. **The developer shall install four curb cuts along the proposed new roadway to provide access to the Williams property (parcel number R5243 002). The location of said curb cuts is subject to approval by Gwinnett DOT.**

19. **The final plat for the subject property of the application shall include a disclosure that the property is located adjacent to an active agricultural use, which includes all of the sights, sounds, and smells of such use.**

20. **Subject to the approval of Gwinnett County DOT, the developer shall designate an interior road or access drive as Little Orth Lane.**

Exhibits:

A. Site Visit Photos
B. Site Plan
C. Building Elevations
D. Letter of Intent and Applicant's Response to Standards
E. Internal and External Agency Review Comments
F. Traffic Impact Study
G. Maps
H. Site Plan Presented at the July 6, 2022 Planning Commission Public Hearing

Exhibit A: Site Visit Photos

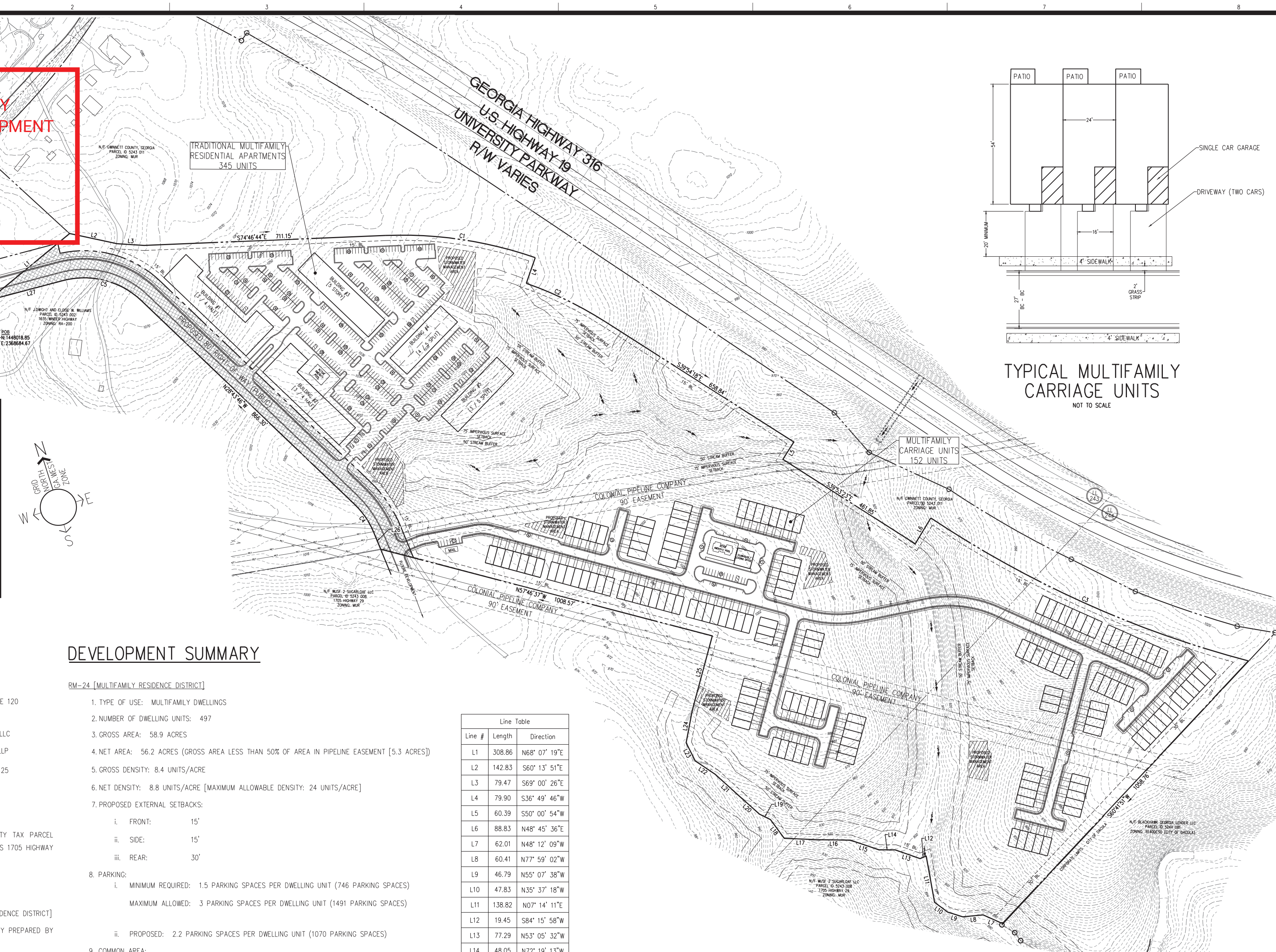
Existing single-family residence on property

Rear of residence: acreage proposed for development

Exhibit B: Site Plan

[attached]

GWINNETT COUNTY
PLANNING AND DEVELOPMENT
RECEIVED
5/5/2022



VICINITY MAP

NOT TO SCALE
SOURCE: U.S. GEOLOGICAL SURVEY

TYPICAL MULTIFAMILY CARRIAGE UNITS

NOT TO SCALE

SITE DATA

1. PROPERTY OWNER: WUSF 2 SUGARLOAF LLC
   14614 NORTH KIERLAND BLVD, SUITE 120
   SCOTTSDALE, AZ 85254-5743
2. APPLICANT: DACULA DEVELOPMENT PARTNERS, LLC
   C/O MAHAFFEY PICKENS TUCKER, LLP
   1550 NORTH BROWN ROAD, SUITE 125
   LAWRENCEVILLE, GA 30043
   CONTACT: SHANE LANHAM
   TELEPHONE: 770-232-0000
3. SUBJECT PROPERTY IS A PART OF GWINNETT COUNTY TAX PARCEL 5243 008. THE STREET ADDRESS OF THE PROPERTY IS 1705 HIGHWAY 29, DACULA, GEORGIA.
4. PROPERTY AREA (GROSS): 58.9 ACRES
5. CURRENT ZONING DISTRICT: MUR (RZC2013-00008)
6. PROPOSED ZONING DISTRICT: RM-24 [MULTIFAMILY RESIDENCE DISTRICT]
7. BOUNDARY INFORMATION IS FROM A BOUNDARY SURVEY PREPARED BY BLUE LANDWORKS, LLC, AND DATED APRIL 28, 2022.
8. TOPOGRAPHIC INFORMATION BASED ON GWINNETT COUNTY GIS, DATUM REFERENCE NGVD 1989.
9. NO PORTION OF THIS PROPERTY IS LOCATED WITHIN A DESIGNATED FLOOD HAZARD AREA PER FLOOD INSURANCE RATE MAP COMMUNITY PANEL NO 13135C0076F, EFFECTIVE DATE OF SEPTEMBER 29, 2006.
10. WATER AND SANITARY SEWER SERVICE TO BE PROVIDED BY GWINNETT COUNTY.
11. A 50-FOOT UNDISTURBED BUFFER WILL BE MAINTAINED ADJACENT TO ALL STATE WATERS, EXCEPT FOR APPROVED TRANSPORTATION AND UTILITY CROSSINGS.
12. THIS SITE PLAN IS CONCEPTUAL IN NATURE AND IS SUBJECT TO CHANGE.

DEVELOPMENT SUMMARY

RM-24 [MULTIFAMILY RESIDENCE DISTRICT]

1. TYPE OF USE: MULTIFAMILY DWELLINGS
2. NUMBER OF DWELLING UNITS: 497
3. GROSS AREA: 58.9 ACRES
4. NET AREA: 56.2 ACRES (GROSS AREA LESS THAN 50% OF AREA IN PIPELINE EASEMENT [5.3 ACRES])
5. GROSS DENSITY: 8.4 UNITS/ACRE
6. NET DENSITY: 8.8 UNITS/ACRE [MAXIMUM ALLOWABLE DENSITY: 24 UNITS/ACRE]
7. PROPOSED EXTERNAL SETBACKS:
   i. FRONT: 15'
   ii. SIDE: 15'
   iii. REAR: 30'
8. PARKING:
   i. MINIMUM REQUIRED: 1.5 PARKING SPACES PER DWELLING UNIT (746 PARKING SPACES)
      MAXIMUM ALLOWED: 3 PARKING SPACES PER DWELLING UNIT (1491 PARKING SPACES)
   ii. PROPOSED: 2.2 PARKING SPACES PER DWELLING UNIT (1070 PARKING SPACES)
9. COMMON AREA:
   ii. MINIMUM REQUIRED: 11.9 ACRES (20%)
   iii. PROVIDED: 12.3 ACRES (21%)

Line Table

Line #	Length	Direction
L1	308.86	N68° 07' 19"E
L2	142.83	S60° 13' 51"E
L3	79.47	S69° 00' 26"E
L4	79.90	S36° 49' 46"W
L5	60.39	S50° 00' 54"W
L6	88.83	N48° 45' 36"E
L7	62.01	N48° 12' 09"W
L8	60.41	N77° 59' 02"W
L9	46.79	N55° 07' 38"W
L10	47.83	N35° 37' 18"W
L11	138.82	N07° 14' 11"E
L12	19.45	S84° 15' 58"W
L13	77.29	N53° 05' 32"W
L14	48.05	N72° 19' 13"W
L15	88.65	N53° 44' 00"W
L16	97.82	N71° 33' 12"W
L17	97.03	N70° 02' 43"W
L18	68.58	N18° 43' 06"W
L19	36.14	N46° 20' 27"W
L20	75.89	N30° 29' 32"W
L21	99.34	N30° 20' 09"W
L22	70.78	N38° 37' 24"W
L23	59.73	N09° 00' 05"W
L24	96.93	N28° 16' 18"E
L25	226.86	N32° 38' 54"E
L26	52.98	N04° 47' 44"W
L27	225.77	N87° 14' 34"W

Curve Table

Curve #	Arc Length	Radius	Chord Bearing	Chord Distance
C1	448.15	1190.00	S64° 00' 03"E	445.51
C2	258.37	1110.00	S46° 29' 08"E	257.79
C3	1029.73	3114.79	S48° 11' 31"E	1025.05
C4	102.10	245.00	N16° 49' 43"W	101.36
C5	250.09	245.00	N58° 03' 44"W	239.38

BLUE LANDWORKS

SCALE: 1" = 100'

SUGARLOAF CROSSING
1705 HIGHWAY 29, DACULA, GEORGIA

REZONING EXHIBIT

PROJECT# 2021.040
REZ

Exhibit C: Building Elevations

[attached]

Exhibit D: Letter of Intent and Applicant's Response to Standards

[attached]

Matthew P. Benson
G. Tyler Boyd
Catherine W. Davidson
Gerald Davidson, Jr.*
Rebecca B. Gober
Brian T. Easley
Christopher D. Holbrook

Shane M. Lanham
Jeffrey R. Mahaffey
Jessica R. Pickens
Steven A. Pickens
Andrew D. Stancil
R. Lee Tucker, Jr.

*Of Counsel

LETTER OF INTENT FOR REZONING APPLICATION OF DACULA DEVELOPMENT PARTNERS, LLC

Mahaffey Pickens Tucker, LLP submits this Letter of Intent and attached rezoning application (the "Application") on behalf of Dacula Development Partners, LLC, (the "Applicant"), for the purpose of requesting the rezoning of an approximately 58.93-acre tract of land (the "Property") situated along University Parkway (State Route 316) near its intersection with Winder Highway (U.S. Route 29). The Property is a component of Gwinnett County tax parcel number R5243 008. The surrounding area is characterized by a mix of land uses including commercial, industrial, and residential. The Property is currently zoned MU-R.

The Applicant is requesting to rezone the Property to the RM-24 zoning classification in order to develop the Property as a multifamily residential community including multifamily carriage units and traditional apartment residences. The proposed development would be accessed by a new public right-of-way which would also provide access to the balance of the parent tax parcel located to the south. The proposed new road would intersect with Winder Highway aligned with Alcovy Industrial Boulevard. The proposed development includes a total of 497 residential units with 354 traditional apartment-style units and 152 multi-family carriage units. The carriage units would be provided with three to eight units per building and single-car garages. Both two- and three-bedroom configurations are provided with two-bedroom units having a minimum heated floor area of 935 square feet and the three-bedroom units having a minimum of 1,250 square feet. In addition to the single-car garage, each unit would also have two surface parking spaces in front of the unit on a private driveway. The apartment-style homes would be provided in five buildings with parking provided in an interior surface parking lot. One-bedroom units would have a minimum of 700 square feet of heated floor area. Two-bedroom units would have a minimum of 1,000 square feet, and three-bedroom units would have a minimum of 1,250 square feet. As

depicted on the site plan submitted with the Application, Building 1 and Building 2 are set back fifteen feet from the proposed right-of-way to create an attractive streetscape and encourage walkability among the overall community. Active amenities are provided for each component of the proposed development including a pool and patio area for the use and enjoyment of residents. Large areas of green space would also serve as a passive amenity for residents and could be activated with walking trails, pocket parks, and dog-walking areas.

The proposed development is compatible with surrounding land uses and is in line with the policies of the Gwinnett County 2040 Unified Plan (the "2040 Plan"). More intense commercial and industrial land uses located at the intersection of University Parkway and Winder Highway would step down to the proposed medium-density residential development before stepping down further to less dense single-family detached land uses and zoning classifications to the south, including land zoned R-ZT in unincorporated Gwinnett County and R-1400 CSO in the City of Dacula. The 2040 Plan designates the Property as within the Innovation District Character Area which specifically identifies "townhomes and apartments" as potential development types. While industrial and office uses are encouraged for much of the Innovation District Character Area, the 2040 Plan provides that these land uses "should be supported where appropriate by opportunities for uses including residential and multi-use commercial uses." The proposed development would utilize a site that is extremely challenging to challenging to develop due to streams and steep topography for an appropriate land use while also complementing existing and future industrial and commercial land uses. Residents of the proposed community would have convenient access to nearby employment uses as well as regional employment centers located in the Gwinnett Progress Center and along the University Parkway corridor including the upcoming Rowen Development.

The recently-published Gwinnett County Comprehensive Housing Study (the "Housing Study") outlines in great detail the current housing inventory of Gwinnett County and analyzes the current and future demand for housing in the County. The Housing Study also addresses evolving demand for more diverse housing and provides that "[c]hanging housing trends, particularly smaller households and lower-income households point toward demand for an increasingly diverse assortment of housing types." In addition to evolving housing preferences, the Housing Study highlights a strong baseline demand for new housing, generally. The Housing Study's "demand model predicts that current and future Gwinnett residents would buy or rent over 15,000 new

housing units each year if they were provided at attainable prices for those buyers and renters. Over the past ten years, Gwinnett's housing market has delivered an average of just 3,560 new housing units each year, meeting just 24% of demand." Accordingly, the Housing Study concludes that "Gwinnett is showing a significant mismatch between demand for housing and the supply of new housing units delivered."

Accordingly, the proposed development is compatible with surrounding land uses and zoning classifications, is in line with the policy and intent of the 2040 Plan, and would meet extremely strong demand for housing units and diversity of housing as outlined in the Housing Study. The Applicant and its representatives welcome the opportunity to meet with staff of the Gwinnett County Department of Planning & Development to answer any questions or to address any concerns relating to the matters set forth in this letter or in the Rezoning Application filed herewith. The Applicant respectfully requests your approval of the Application.

Respectfully submitted this 5th day of May, 2022.

MAHAFFEY PICKENS TUCKER, LLP

Shane Lanham

Shane M. Lanham
Attorneys for the Applicant

REZONING APPLICANT'S RESPONSE

STANDARDS GOVERNING THE EXERCISE OF THE ZONING POWER

PURSUANT TO REQUIREMENTS OF THE UNIFIED DEVELOPMENT ORDINANCE, THE BOARD OF COMMISSIONERS FINDS THAT THE FOLLOWING STANDARDS ARE RELEVANT IN BALANCING THE INTEREST IN PROMOTING THE PUBLIC HEALTH, SAFETY, MORALITY OR GENERAL WELFARE AGAINST THE RIGHT TO THE UNRESTRICTED USE OF PROPERTY AND SHALL GOVERN THE EXERCISE OF THE ZONING POWER.

PLEASE RESPOND TO THE FOLLOWING STANDARDS IN THE SPACE PROVIDED OR USE AN ATTACHMENT AS NECESSARY:

(A) WHETHER A PROPOSED REZONING WILL PERMIT A USE THAT IS SUITABLE IN VIEW OF THE USE AND DEVELOPMENT OF ADJACENT AND NEARBY PROPERTY:

Please see attached

(B) WHETHER A PROPOSED REZONING WILL ADVERSELY AFFECT THE EXISTING USE OR USABILITY OF ADJACENT OR NEARBY PROPERTY:

Please see attached

(C) WHETHER THE PROPERTY TO BE AFFECTED BY A PROPOSED REZONING HAS REASONABLE ECONOMIC USE AS CURRENTLY ZONED:

Please see attached

(D) WHETHER THE PROPOSED REZONING WILL RESULT IN A USE WHICH WILL OR COULD CAUSE AN EXCESSIVE OR BURDENSOME USE OF EXISTING STREETS, TRANSPORTATION FACILITIES, UTILITIES, OR SCHOOLS:

Please see attached

(E) WHETHER THE PROPOSED REZONING IS IN CONFORMITY WITH THE POLICY AND INTENT OF THE LAND USE PLAN:

Please see attached

(F) WHETHER THERE ARE OTHER EXISTING OR CHANGING CONDITIONS AFFECTING THE USE AND DEVELOPMENT OF THE PROPERTY WHICH GIVE SUPPORTING GROUNDS FOR EITHER APPROVAL OR DISAPPROVAL OF THE PROPOSED REZONING:

Please see attached

REZONING APPLICANT'S RESPONSE

STANDARDS GOVERNING THE EXERCISE OF THE ZONING POWER

(A) Yes, approval of the Application will permit a use that is suitable in view of the use and development of adjacent and nearby property. The Property is located in close proximity to land zoned for commercial, industrial, and residential uses.

(B) No, approval of the Application will not adversely affect the existing use or usability of any of the nearby properties. Rather, the proposed development will complement the diverse mix of land uses in the surrounding area and provide an appropriate transition of land uses from more intense commercial and industrial uses located along the University Parkway corridor towards less intense single-family detached uses to the south.

(C) Due to the size, location, layout, and dimensions of the subject property, the Applicant submits that the Property does not have reasonable economic use as currently zoned.

(D) No, approval of the Application will not result in an excessive or burdensome use of the infrastructure systems. The Property has convenient access to major transportation corridors such as University Parkway (State Route 316) and Winder Highway (U.S. Route 29) with utilities available nearby.

(E) Yes, approval of the Application would be in conformity with the policy and intent of the Gwinnett County 2040 Unified Plan. The Property is located within the Innovation District Character area which specifically encourages "townhomes and apartments as potential development types. Moreover, the proposed development would advance general housing policies and goals outlined in the 2040 Unified Plan and the Gwinnett County Comprehensive Housing Study.

(F) The Applicant submits that current market conditions and the subject Property's severe physical challenges preclude development of the Property as currently zoned which provides additional supporting grounds for approval of the Application.

Exhibit E: Internal and External Agency Review Comments

[attached]

TRC Meeting Date:	June 15, 2022
Department/Agency Name:	DOCS
Reviewer Name:	Glenn Boorman
Reviewer Title:	Deputy Division Director – Project Admin – Parks & Recreation
Reviewer Email Address:	glenn.boorman@gwinnettcounty.com
Case Number:	RZM2022-00030
Case Address:	1705 Winder Highway

	Comments:	**X**	**YES**		**NO**
1	The parcel associated with this request has a future trail shown along the Alcovy River according to the Gwinnett Countywide Trails Master Plan. Although the area of this parcel indicated for development in not near the trail, any development of this parcel needs to take this trail into consideration.				
2					
3					
4					
5					
6					
7					

	Recommended Zoning Conditions:	**X**	**YES**		**NO**
1	At no cost to the County a future trail connection through this parcel shall be provided as indicated on the Gwinnett Countywide Trails Master Plan according to UDO Section 900-110. Further review of a potential trail location and design will be required and coordinated with the Department of Community Services.				
2					
3					
4					
5					

Note: Attach additional pages, if needed

Revised 7/26/2021

TRC Meeting Date:	6.15.22
Department/Agency Name:	Transportation
Reviewer Name:	Brent Hodges
Reviewer Title:	Construction Manager 1
Reviewer Email Address:	Brent.Hodges@gwinnettcounty.com
Case Number:	RZM2022-00030
Case Address:	1705 Winder Highway

	Comments:	**X**	**YES**		**NO**
1	Winder Highway is a major arterial. ADT = 9,080.				
2	3.9 miles to nearest transit facility (#2454819) Collins Hill Road and Collins Industrial Way.				
3	Provide sight distance certification for ALL driveways/streets connecting to classified roads in accordance with sections 900-40.6 and 900-50.7 of the Unified Development Ordinance (UDO).				
4	In the event that the driveway/street connecting the (152) unit multi-family carriage units is dedicated as Gwinnett County right-of-way, the developer shall provide Traffic Calming Measures, per the Gwinnett County Traffic Calming Guide, to maintain maximum vehicle operating speed of 25 MPH.				

	Recommended Zoning Conditions:	**X**	**YES**		**NO**
1	The Developer shall coordinate with Gwinnett County Department of Transportation Preconstruction Director Tony Harris on the proposed intersection project F-1256 (SR 316 from Winder Highway to Hi-Hope Road).				
2	The Developer shall coordinate with the Georgia Department of Transportation (GDOT) on projects: (1) 0000300 – SR 8/US 29 at Alcovy River (3 miles north of Lawrenceville); and (2) M004884 – SR 8/US 29 from south of CS 1315/Stanley Court to northeast of Barrow County Line.				
3	The newly constructed extension of Alcovy Industrial Boulevard shall be brought to minimum Gwinnett County standards for a new roadway.				
4	The newly constructed extension of Alcovy Industrial Boulevard shall show a cul-de-sac, or other approved turnaround, just beyond the shown access entrance to the (152) multi-family carriage units.				
5	Developer shall coordinate with Gwinnett County Department of Transportation, Traffic Engineering Division, on the signalization of the intersection of Winder Highway and Alcovy Industrial Boulevard.				
6					
7					

Note: Attach additional pages, if needed

Revised 7/26/2021

Residential Rezoning Impact on Local Schools
Prepared for Gwinnett County BOC, July, 2022

		2022-23			2023-24			2024-25			Proposed Zoning
	School	Forecast	Capacity	+/- Cap.	Forecast	Capacity	+/- Cap.	Forecast	Capacity	+/- Cap.	Approximate Student Projections from Proposed Developments
RZM2022-00014	**Meadowcreek HS (or McClure Health)**	2,570	2,850	-280	2,634	2,850	-216	2,674	2,850	-176	12
	Radloff MS	1,377	1,575	-198	1,391	1,575	-184	1,405	1,575	-170	9
	Meadowcreek ES	923	925	-2	946	925	21	970	925	45	16
RZM2022-00020	**Parkview HS**	3,208	2,900	308	3,240	2,900	340	3,224	2,900	324	48
	Trickum MS	2,160	1,775	385	2,182	1,775	407	2,170	1,775	395	36
	Arcado ES	889	750	139	898	750	148	907	750	157	64
RZM2022-00024 & RZM2022-00025	**Peachtree Ridge HS**	3,262	3,050	212	3,295	3,050	245	3,271	3,050	221	20
	Northbrook MS	882	1,025	-143	870	1,025	-155	879	1,025	-146	14
	Jackson ES	1,426	1,475	-49	1,440	1,475	-35	1,455	1,475	-20	26
RZM2022-00029	**Lanier HS**	1,994	1,900	94	2,034	1,900	134	2,075	1,900	175	20
	Lanier MS	1,387	1,700	-313	1,395	1,700	-305	1,423	1,700	-277	14
	Sugar Hill ES	1,198	1,075	123	1,222	1,075	147	1,246	1,075	171	26
RZM2022-00030	**Dacula HS**	2,565	2,550	15	2,670	2,550	120	2,748	2,550	198	41
	Dacula MS	1,852	1,900	-48	1,906	1,900	6	1,962	1,900	62	30
	Alcova ES	1,423	1,150	273	1,451	1,150	301	1,495	1,150	345	53
RZR2022-00019	**Seckinger HS**	1,345	2,800	-1,455	1,810	2,800	-990	2,015	2,800	-785	5
	Jones MS	1,568	1,575	-7	1,599	1,575	24	1,623	1,575	48	3
	Ivy Creek ES	1,504	1,275	229	1,519	1,275	244	1,542	1,275	267	6

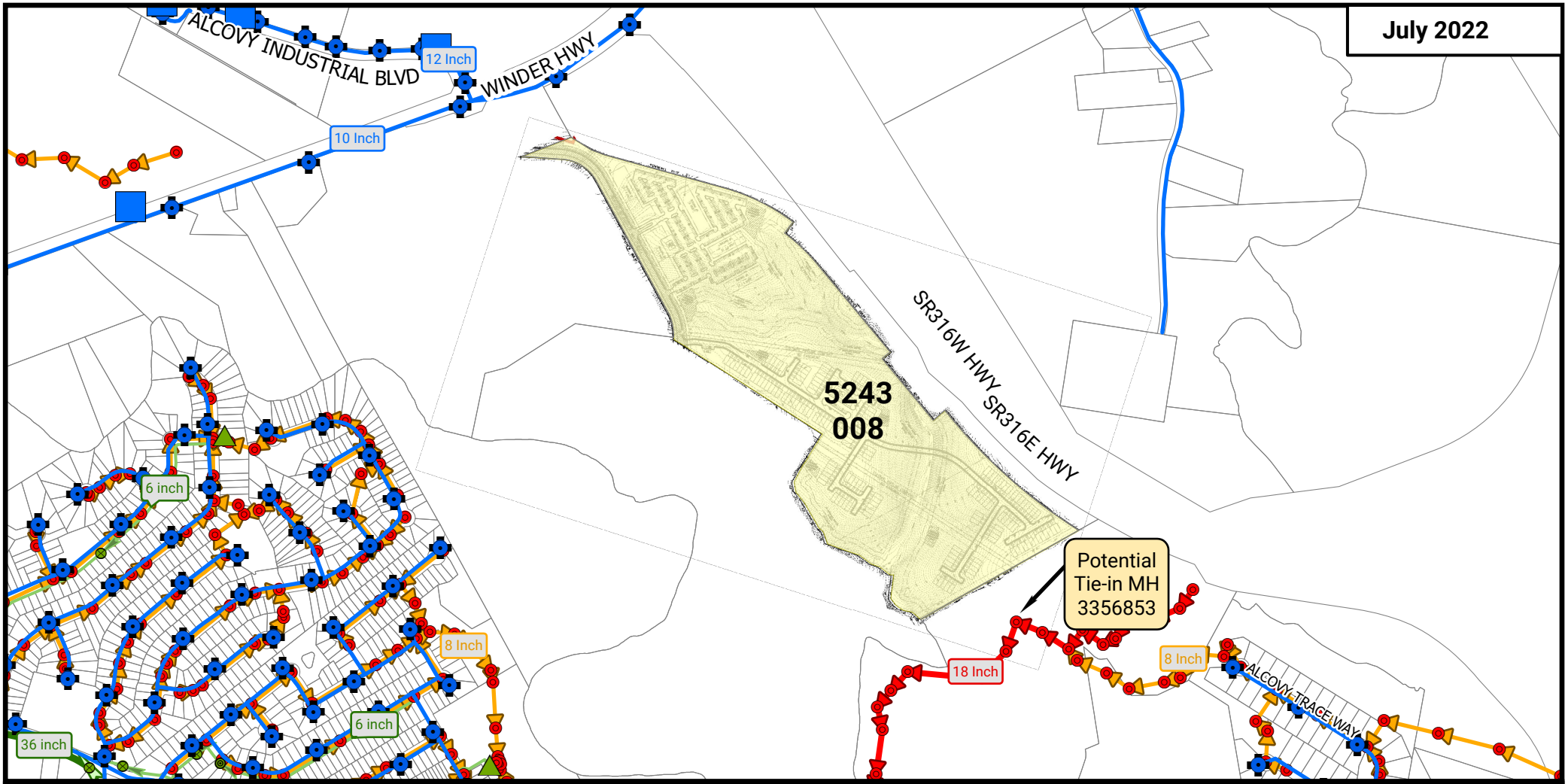
TRC Meeting Date:	June 15, 2022
Department/Agency Name:	DWR
Reviewer Name:	Mike Pappas
Reviewer Title:	GIS Planning Manager
Reviewer Email Address:	Michael.pappas@gwinnettcounty.com
Case Number:	RZM2022-00030
Case Address:	1705 Winder Highway

	Comments:	**X**	**YES**		**NO**
1	Water: The development may connect to an existing 10-inch water main at the intersection of Winder Highway and Alcovy Industrial Boulevard.				
2	Sewer: A Sewer Capacity Certification is required to confirm capacity.				
3	Sewer: Pending available sewer capacity, proposed development may connect to an existing 18-inch sanitary sewer main located approximately 400 feet south on parcel 5244 081.				
4	Sewer: An easement will be required to access this sewer.				
5					
6					
7					

	Recommended Zoning Conditions:		**YES**	**X**	**NO**
1					
2					
3					
4					
5					
6					
7					

Note: Attach additional pages, if needed

Revised 7/26/2021



Water Comments: The development may connect to an existing 10-inch water main at the intersection of Winder Highway and Alcovy Industrial Boulevard.

Sewer Comments: A Sewer Capacity Certification is required to confirm capacity. Pending available sewer capacity, proposed development may connect to an existing 18-inch sanitary sewer main located approximately 400 feet south on parcel 5244 081. An easement will be required to access this sewer.

Water Availability: Water demands imposed by the proposed development may require upsizing or extensions of existing water mains in order to meet Gwinnett County Standards and fire flow demands. Any cost associated with such required improvements will be the responsibility of the development. Current Gwinnett County Standards require a minimum of 12" pipe size for commercial developments and a minimum of 8" pipe size for residential developments. Additionally, connection to a minimum of 12" and 8" mains are required for commercial and residential developments, respectively. It is the responsibility of the developer's engineer to confirm pressure and volumes are available for the development.

Sewer Availability: A Sewer Capacity Certification must be obtained from Gwinnett County to confirm the existing system can serve the development. Sewer demands imposed by the proposed development may require upsizing and/or extensions of existing sewer mains, and/or upsizing of an existing pump station, and/or installation of a new pump station. Any cost associated with such required improvements will be the responsibility of the development. The developer shall provide easements for future sewer connection to all locations designated by Gwinnett County during plan review.

Water and Sewer Design and Construction Requirements: Extensions of the water and/or sanitary sewer systems within the subject development must conform to this department's policies, Gwinnett County's ordinances, and the Water Main and Sanitary Sewer Design and Construction Standards and Specifications, dated April 5th, 2016. Subsequent to design, construction, inspection, and final acceptance of the required utilities, service would then become available under the applicable utility permit rate schedules.

Private Road Developments: Any development with private roads must comply with the Standard Policy Requirement for the Installation of Water and Sanitary Sewer Mains within Private Developments. This policy stipulates minimum easement requirements and location of public mains and appurtenances, among other requirements.

Exhibit F: Traffic Impact Study

[attached]

Traffic Impact Study

Dacula Crossing Residential Subdivision
Gwinnett County, Georgia

May 2, 2022

MARC R. ACAMPORA, PE, LLC
TRAFFIC ENGINEERING

Traffic Impact Study

Proposed Dacula Crossing Residential Subdivision
Gwinnett County, Georgia

study prepared for:

TPA Residential
1776 Peachtree Street, NW
Atlanta, Georgia 30309

May 2, 2022

MARC R. ACAMPORA, PE, LLC
TRAFFIC ENGINEERING

858 Myrtle Street, NE
Atlanta, Georgia 30308
(678) 637-1763

e-mail: acamporatraffic@comcast.net

Contents

Tables

Figures

Introduction

This study assesses the traffic impact of a proposed residential subdivision in Gwinnett County, Georgia. The site is located on the southeast side of Georgia Highway 8 at Alcovy Industrial Boulevard, as shown in Figure 1. The site will be developed with 345 apartment units and 152 multifamily carriage units. Vehicular access will be provided at one access on GA 8, aligning with Alcovy Industrial Boulevard.

The purpose of this traffic impact study is to determine existing traffic operating conditions in the vicinity of the proposed subdivision, project future traffic volumes, assess the impact of the subject development, then develop conclusions and recommendations to mitigate the project traffic impact and ensure safe and efficient existing and future traffic conditions in the vicinity of the project.

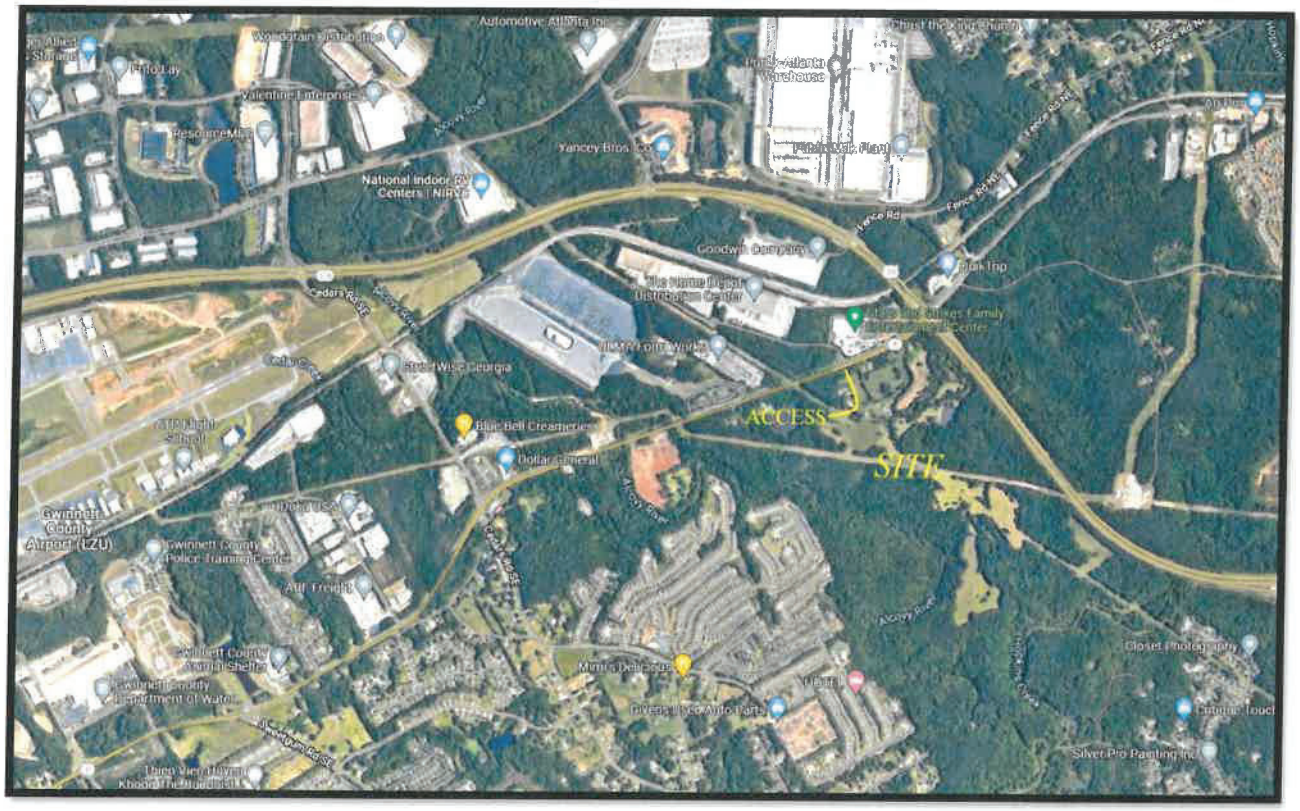


Figure 1 – Site Location Map

Existing Traffic Conditions

Existing traffic operating conditions in the vicinity of the proposed subdivision were assessed. The following is a description of existing transportation facilities, traffic volumes, and intersection operations.

Description of Existing Roadways

Georgia State Route 8 is a southwest – northeast urban minor arterial (Georgia DOT designation) with one through lane in each directions and left and right turn lanes at major intersections including at the signalized intersections at Cedars Road and GA 316. A westbound right turn lane is also provided at Alcovy Industrial Boulevard, which is side street stop sign controlled at GA 8. The terrain along the road is gently rolling and the posted speed limit is 45 mph.

In 2019 (pre-pandemic) the Georgia Department of Transportation (Georgia DOT) recorded an Annual Average Daily Traffic (AADT) volume of 13,300 vehicles per day (vpd) on GA 8 west of Alcovy Industrial Boulevard, while in 2020 (during the pandemic) the count was 9,080 vpd. A 24-hour bi-directional traffic volume count collected for this study on GA 8 at the proposed project access location showed an eastbound volume of 5,714 vehicles and a westbound volume of 5,495 vehicles, for a two-way volume of 11,209 vehicles, which is higher than 2020 but lower than pre-pandemic levels.

Pedestrian, Bicycle, and Transit Accessibility

There is sidewalk along the north side of GA 8 from Alcovy Industrial Boulevard almost to GA 316, but none on the south side of GA 8 in this vicinity. There are no dedicated bicycle lanes in the vicinity of the proposed development. Gwinnett County Transit serves most of the County, but there is no regularly scheduled mass transit service in the immediate vicinity of the site.

Existing Traffic Volumes

Existing full turning movement peak hour traffic volume counts were collected at the following intersections in the vicinity of the site:

1. GA 8 at Cedars Road
2. GA 8 at Alcovy Industrial Boulevard
3. GA 316 at GA 8

The counts were collected on Wednesday, April 20, 2022, from 7:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 6:00 p.m. Area schools were in session on the day on which the counts were recorded.

In addition, a 24-hour bi-directional count, which was presented above, was collected on the same day on GA 8 at the project access location.

The locations of the traffic counts are presented in Figure 2.

Figure 2 – Traffic Volume Count Locations

From the intersection turning movement count data, the highest four consecutive 15-minute interval volumes at each intersection, during each time period, were determined. These volumes make up the existing weekday a.m. and p.m. peak hour traffic volumes at each intersection and are shown in Figure 3. The raw count data is found in Appendix A.

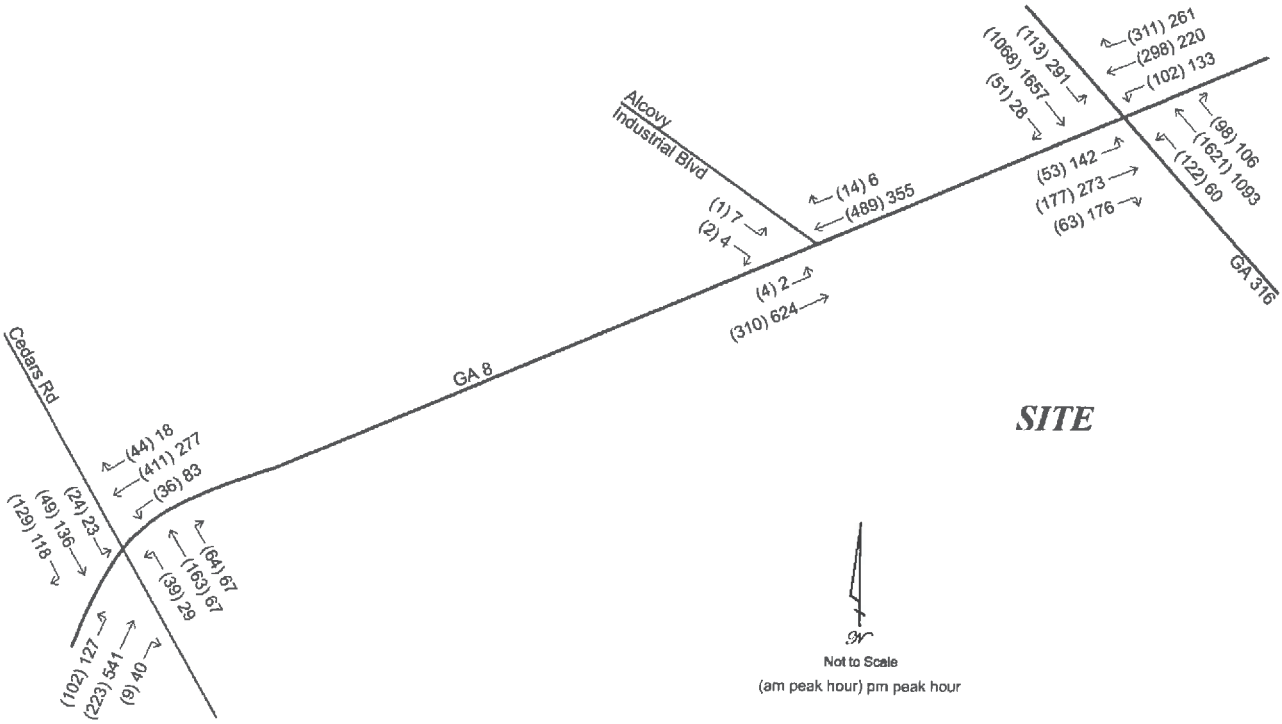


Figure 3 – Existing Weekday A.M. and P.M. Peak Hour Traffic Volumes

Existing Intersection Operations

Existing traffic operations were analyzed at the counted intersections using Synchro software, version 10, in accordance with the methodology presented in the Transportation Research Board's 2016 *Highway Capacity Manual* (*HCM 6*). This methodology is presented in Appendix B. The results of the analysis are shown in Table 1. Computer printouts containing detailed results of the existing analysis are located in Appendix C. Levels of service and delays are provided for each overall intersection and for each controlled approach or movement. Locations that operate unacceptably (LOS E or LOS F) are presented in bold type.

Table 1 – Existing Intersection Operations

Intersection / Approach	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay (s/veh)	LOS	Delay (s/veh)
1. GA 8 at Cedars Road (signal)	B	17.3	B	15.2
northbound approach	B	14.2	B	11.8
southbound approach	B	12.4	B	11.9
eastbound approach	B	13.6	B	15.0
westbound approach	C	24.1	C	20.1
2. GA 8 at Alcovy Industrial Boulevard (side street stop)	A	0.1	A	0.2
southbound left turn	C	17.6	C	22.0
southbound right turn	B	11.7	B	10.6
eastbound left turn	A	8.6	A	8.2
3. GA 316 at GA 8 (signal)	D	35.2	D	39.6
northbound approach (GA 316 westbound)	C	32.2	C	26.0
southbound approach (GA 316 eastbound)	C	25.5	D	38.1
eastbound approach (GA 8)	D	47.0	***E***	***69.7***
westbound approach (GA 8)	***E***	***68.4***	***E***	***56.4***

The existing analysis reveals acceptable operating conditions at the Cedars Road and Alcovy Industrial Boulevard intersections, and generally acceptable operations at the GA 316 intersection. However, due to the very heavy volumes on GA 316, the signal timing favors those approaches, which results in higher delays on the GA 8 approaches. Adjusting the greetime allocation on the signal would reduce the delays on the GA 8 approaches, but would increase the delays for many more vehicles on GA 316. Therefore, this is not recommended. This intersection is scheduled to be converted to an interchange in the near future (this is discussed in the next section of this report). It would not be feasible to implement any changes in lane configurations or widenings, which would only be in place for a short time. Given this imminent roadway project, and the fact that the overall intersection operates acceptably, no mitigation is recommended for this intersection.

No-Build Traffic Conditions

A 2027 no-build condition was developed. This represents the traffic conditions that will exist in the future at the anticipated date of the build-out of the subdivision, but not including the subdivision's trips. The purpose of the analysis of this condition is to isolate the traffic impacts of the proposed development from background growth in volumes that are expected to occur in the area while the subdivision is under construction.

In order to develop no-build volumes, a background growth factor was developed using historic Georgia DOT 24-hour traffic counts that were collected in this area for the years 2016 through 2020 (the latest year for which data was available at the time of this study), as shown in Table 2.

Table 2 – Historic Georgia DOT Traffic Volume Counts and Annual Growth Rates

Year	GA 8 W of Alcovy Ind	Annual Growth	GA 316 E of Cedars	Annual Growth	Winder Hwy E of Village Broad	Annual Growth
Station ID	135-0038		135-0252		135-0040	
2016	8,970		48,800		11,100	
2017	9,500	5.9%	51,700	5.9%	10,700	-3.6%
2018	13,200	38.9%	58,800	13.7%	10,500	-1.9%
2019	13,300	0.8%	59,200	0.7%	10,600	1.0%
2020	9,080	-31.7%	50,300	-15.0%	9,740	-8.1%
avg growth		*0.2%*		*0.6%*		*-2.6%*

Growth in the area has been generally positive and low-to-moderate. Each location experienced a decrease from 2019 to 2020, which is considered an anomaly due to the pandemic. The location on GA 8 closest to the site, experienced a dramatic increase in volumes in a one year period, and a dramatic drop (more than typical) during covid, so that overall growth was almost flat. GA 316 likewise saw almost flat growth, but, removing the pandemic, saw a moderate positive. Winder Highway saw a decrease in all but one year. Based on the growth trends identified in Table 2, and taking the pandemic into consideration, a 2.0% annual growth factor was applied to the existing volumes when projecting the future no-build volumes. The growth factor was applied for five years, for a total of 10.4% growth that will occur while the proposed subdivision is under construction. The existing traffic volumes were increased by the 10.4% growth factor. The results are the 2027 no-build traffic volumes that will be on the roadway network in the future when the proposed subdivision is completely developed, but excluding the subdivision's trips.

Programmed Transportation Infrastructure Improvements

A Gwinnett County Comprehensive Transportation Plan is in progress. The Atlanta Regional Commission's (ARC) interactive projects map and the Georgia DOT Projects website were reviewed for programmed (scheduled and funded) and planned (anticipated) transportation infrastructure projects in the vicinity of the proposed development. The following projects were identified:

GW-394 – This project will create a grade-separated diamond interchange at the intersection of GA 316 at GA 8. The project is expected to begin construction in 2024.

GW-184D – This project includes the closure of the existing Fence Road intersection with SR 316 and construction of Fence Road Connector between existing Fence Road to the west and the ramp terminus of SR 316 ramps with US 29/SR 8 Winder Hwy to the east. Fence Road Connector aligns with the existing QT driveway access to US 29/SR 8 Winder Hwy. The Fence Road Connector Bridge will span over existing CSX Railroad tracks.

The no-build and future intersection analysis at GA 316 / GA 8 was modeled as the current signalized configuration, recognizing that in the near future, the intersection will be completely reconfigured. Appendix F contains the project information sheets for these projects.

No-Build Intersection Operations

The no-build condition includes the no-build traffic volumes, as described above. These were entered into the Synchro model and the 2027 no-build traffic operations were analyzed at the study intersections using Synchro 10 software in accordance with the HCM 6 methodology. The results of the no-build analysis are shown in Table 3. Computer printouts containing detailed results of the no-build analysis are located in Appendix D. Levels of service and delays are provided for each overall intersection and for each controlled approach or movement. Locations that operate unacceptably (LOS E or LOS F) are presented in bold type.

Table 3 – No-Build Intersection Operations

Intersection / Approach	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay (s/veh)	LOS	Delay (s/veh)
1. GA 8 at Cedars Road (signal)	C	20.4	B	15.7
northbound approach	C	26.2	B	14.0
southbound approach	B	15.1	B	14.2
eastbound approach	B	13.6	B	14.6
westbound approach	C	24.3	B	19.9
2. GA 8 at Alcovy Industrial Boulevard (side street stop)	A	0.1	A	0.2
southbound left turn	C	19.3	D	25.3
southbound right turn	B	12.1	B	10.9
eastbound left turn	A	8.8	A	8.3
3. GA 316 at GA 8 (signal)	D	51.6	D	54.3
northbound approach (GA 316 westbound)	***E***	***61.2***	C	29.9
southbound approach (GA 316 eastbound)	C	30.1	D	54.9
eastbound approach (GA 8)	D	47.9	***F***	***89.7***
westbound approach (GA 8)	***E***	***75.4***	***F***	***88.2***

The no-build analysis shows a moderate deterioration in operations due to anticipated growth in this area. As with the existing condition, the only failure is occurring on approaches, but not the overall intersection, at the GA 316 / GA 8 intersection. By the 2027 future analysis condition, this intersection is anticipated to have been rebuilt as a grade-separated diamond interchange. Recognizing this imminent project, and the fact that the overall intersection will still be operating acceptably, no mitigation is identified for this intersection for the no-build condition.

Project Traffic Characteristics

This section describes the anticipated traffic characteristics of the proposed subdivision, including a site description, how much traffic the project will generate, and where that traffic will travel.

Project Description

The site will be developed with 345 apartment units and 152 multifamily carriage units. Vehicular access will be provided at one access on GA 8 aligning with Alcovy Industrial Boulevard. The site plan is presented in Figure 4.

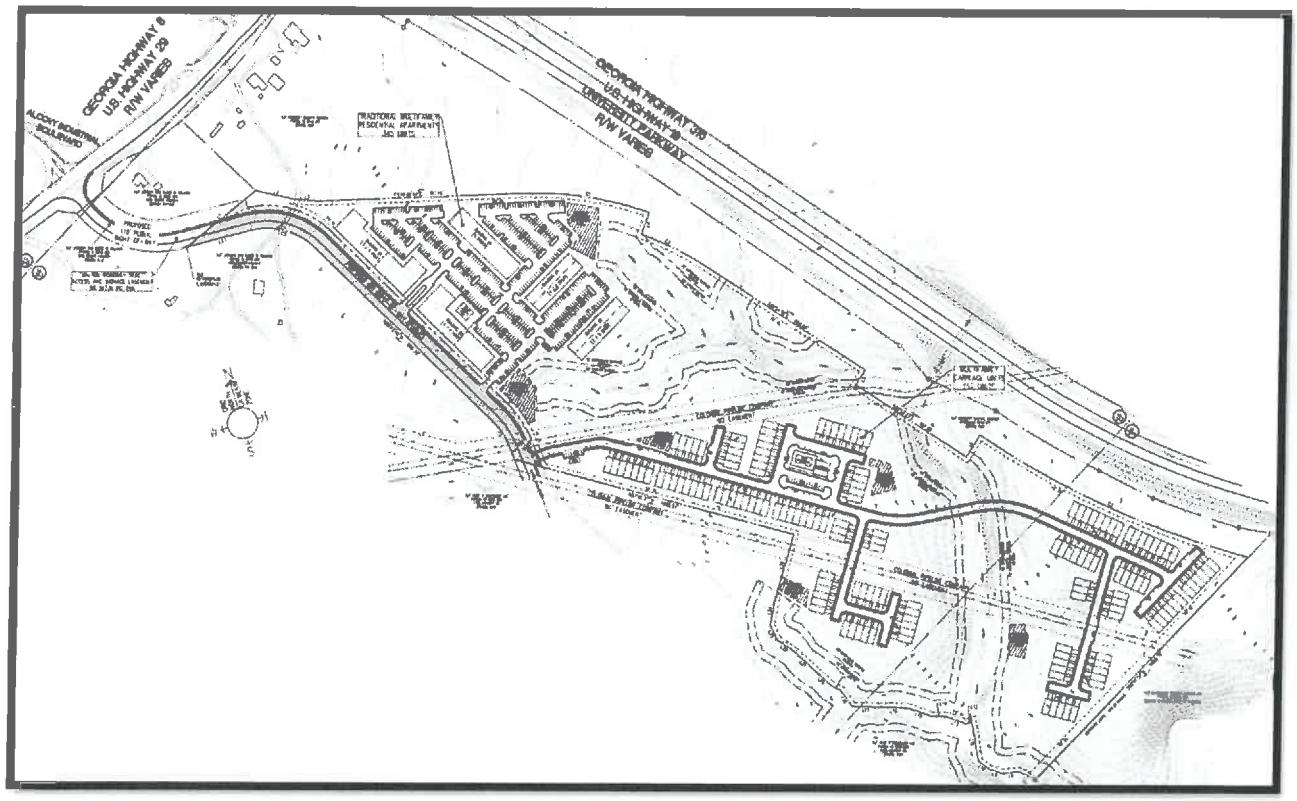


Figure 4 – Site Plan for Proposed Sugarloaf Crossing Subdivision

Trip Generation

Trip generation is an estimate of the number of entering and exiting vehicular trips that will be generated by the proposed development. The volume of traffic that will be generated by the subdivision was calculated using the equations in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11th Edition (the current edition). ITE Land Use 220 – Multi-Family Housing (Low-Rise) was chosen for the apartments and ITE Land Use 215 – Single-Family Attached Housing was chosen as representative of the multifamily carriage units. The trip generation for the subdivision is presented in Table 4.

Table 4 – Sugarloaf Crossing Subdivision Trip Generation

Land Use	ITE Code	Size	A.M. Peak Hour			P.M. Peak Hour			24-Hour
			In	Out	Total	In	Out	Total	2-Way
Apartments	220	345 units	31	99	130	106	63	169	2,288
Multifamily Carriage Units	215	152 units	22	51	73	49	38	87	1,108
Project Totals		*497 units*	*53*	*150*	*203*	*155*	*101*	*256*	*3,396*

The proposed subdivision will generate 203 a.m. peak hour trips, 256 p.m. peak hour trips, and 3,396 weekday trips.

Trip Distribution and Assignment

The trip distribution percentages indicate what proportion of the project's trips will travel to and from various directions. The trip distribution percentages for the subdivision were developed based on the locations and proximity of likely trip origins and destinations including regional employment centers, retail and offices in the area, nearby schools, other regional trip attractors, and the major routes of travel in the area, most notably GA 316. The new project trips, shown in Table 4, were assigned to the roadway network based on the distribution percentages. The trip distribution percentages and the a.m. and p.m. peak hour trips expected to be generated by the proposed subdivision are shown in Figure 5.

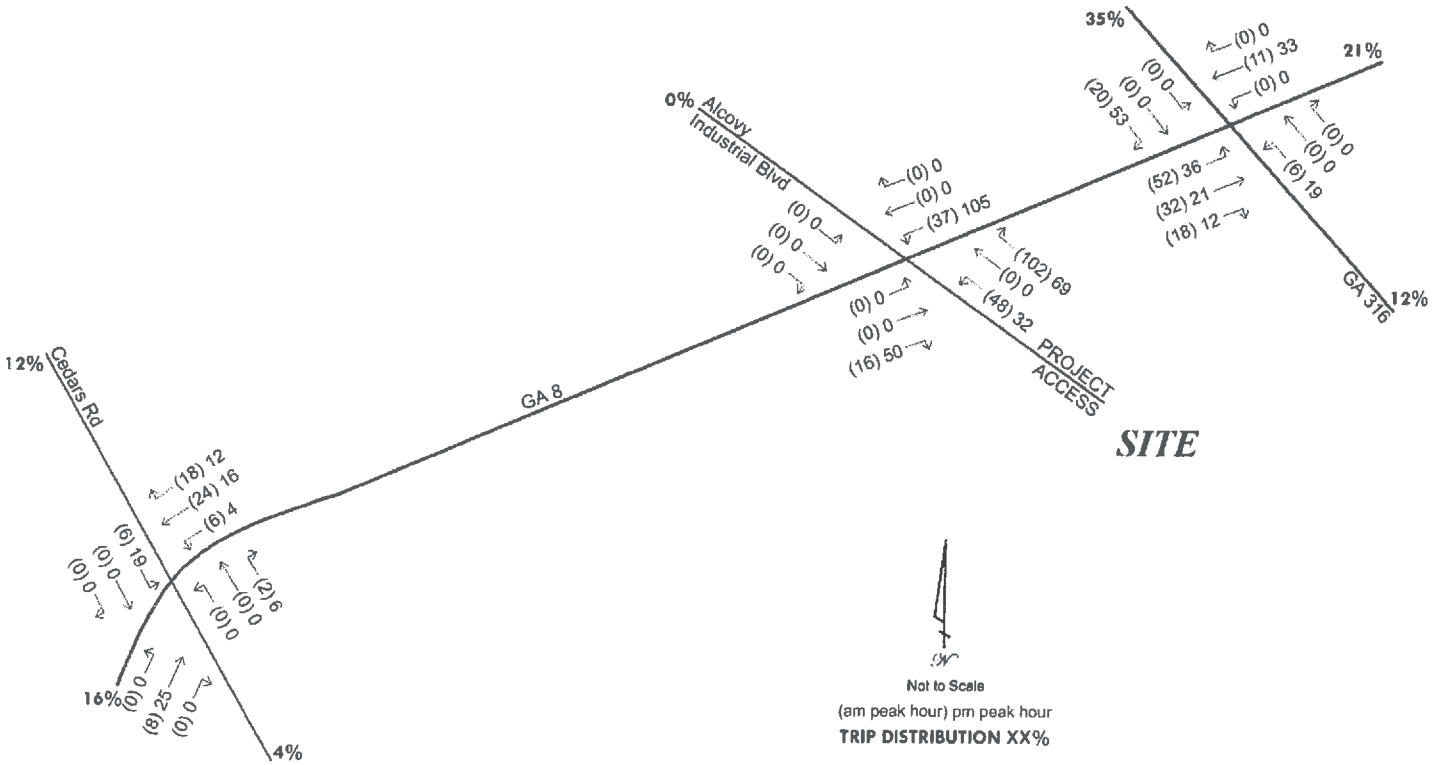


Figure 5 – Weekday A.M. and P.M. Peak Hour Project Trips and Distribution Percentages

Future Traffic Conditions

The future volumes consist of the no-build volumes plus the trips that will be generated by the proposed subdivision. The future volumes are shown in Figure 6.

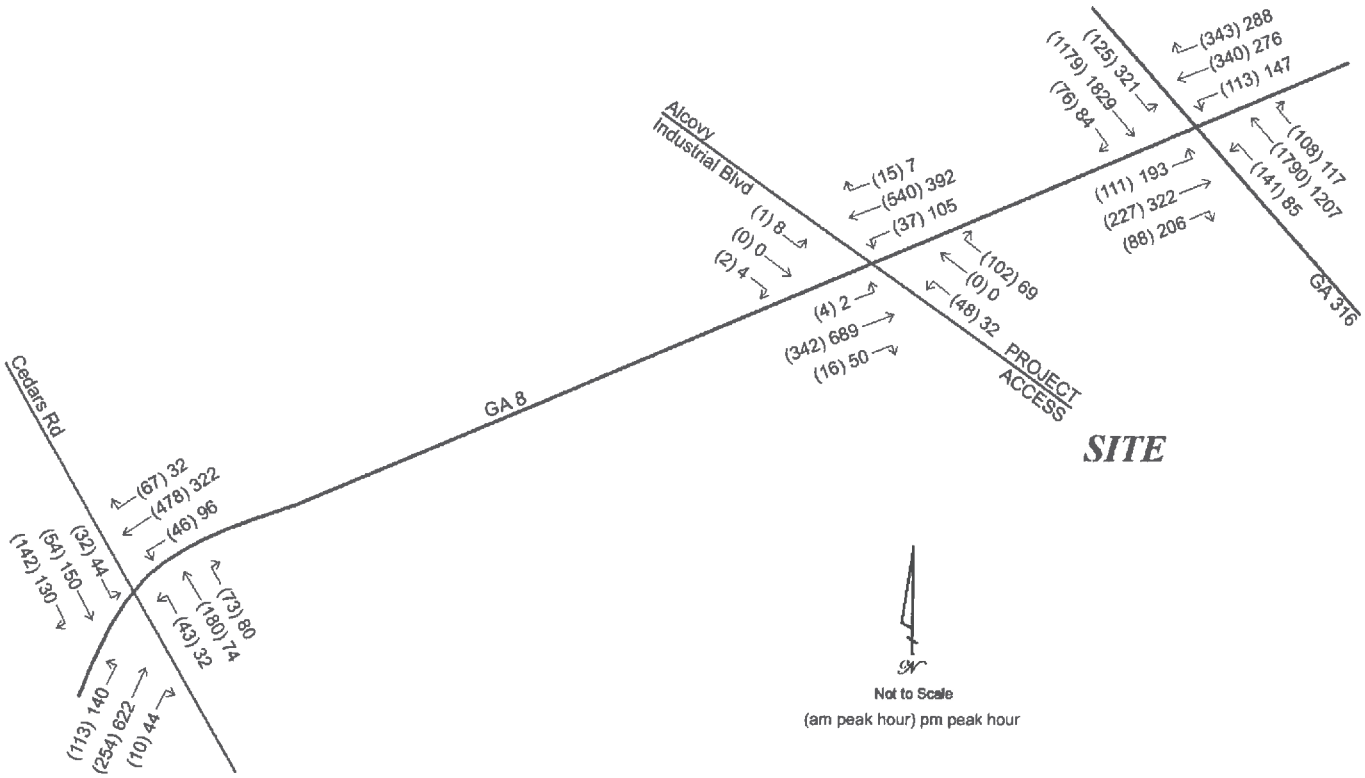


Figure 6 – Future Weekday A.M. and P.M. Peak Hour Volumes

Auxiliary Lane Requirements at Site Access

Georgia Highway 8 falls under the jurisdiction of the Georgia DOT. Therefore, in order to determine if an eastbound right turn lane or westbound left turn lane are required at the project accesses on GA 8, the Georgia DOT standards for determining the need for these auxiliary lanes, as set forth in their *Regulations for Driveway and Encroachment Control (Driveway Manual)*, revision 5.0 dated 7/3/2019, were reviewed.

The right turn lane analysis was based on *Driveway Manual* Table 4-6, Minimum Volumes Requiring Right Turn Lanes, which is shown below as Table 5.

Table 5 – Georgia DOT Right Turn Lane Standards

Posted Speed	2 Lane Routes		More than 2 Lanes on Main Road	
	AADT		AADT	
	< 6000	>=6000	<10000	>=10000
35 MPH or Less	200 RTV a day	100 RTV a day	200 RTV a day	100 RTV a day
40 to 50 MPH	150 RTV a day	75 RTV a day	150 RTV a day	75 RTV a day
55 to 60 MPH	100 RTV a day	50 RTV a day	100 RTV a day	50 RTV a day
>= 65 MPH	Always	Always	Always	Always

Table 4-6 Minimum Volumes Requiring Right Turn Lanes

The AADT on GA 8 was 13,300 vpd in 2019 (pre-pandemic) and counted at 11,209 vehicles for this study, both of which are above the 6,000 vpd threshold for a road with two lanes. For a 45 mph speed limit, above 6,000 vpd, the right turn volume (RTV) above which a right turn lane is required is 75 right turn vehicles (RTV) per day. The daily eastbound right turn volume for the proposed development is calculated at 543 RTV. This volume is higher than the 75 RTV threshold and, therefore, an eastbound right turn lane is required at the project access.

The left turn lane analysis at each access was based on *Driveway Manual* Table 4-7a, Minimum Volumes Requiring Left Turn Lanes, which is shown below as Table 6.

Table 6 – Georgia DOT Left Turn Lane Standards

LEFT TURN REQUIREMENTS-FULL CONSTRUCTION				
Posted Speed	2 Lane Routes		More than 2 Lanes on Main Road	
	ADT		ADT	
	<6000	>=6000	<10000	>=10000
35 MPH or Less	300 LTV a day	200 LTV a day	400 LTV a day	300 LTV a day
40 to 50 MPH	250 LTV a day	175 LTV a day	325 LTV a day	250 LTV a day
>= 55 MPH	200 LTV a day	150 LTV a day	250 LTV a day	200 LTV a day

Table 4-7a Minimum Volumes Requiring Left Turn Lanes

The AADT on GA 8 was 13,300 vpd in 2019 (pre-pandemic) and counted at 11,209 vehicles for this study, both of which are above the 6,000 vpd threshold for a road with two lanes. For a 45 mph speed limit, above 6,000 vpd, the left turn volume (LTV) above which a left turn lane is required is 175 left turn vehicles (LTV) per day. The daily westbound left turn volume for the proposed development is calculated at 1,155 LTV. This volume is substantially higher than the 175 LTV threshold and, therefore, a westbound left turn lane is required at the project access.

Exiting the site, a separate left turn lane and right turn lane should be provided. The exiting approach should be controlled by side street stop sign and accompanying stop bar.

Future Intersection Operations

An operational analysis was performed for the anticipated future project build-out at the study intersections and the project access aligning with Alcovy Industrial Boulevard. The analysis assumes that an eastbound right turn lane and a westbound left turn lane will be constructed on GA 8 at the subdivision access. The analysis also assumes separate left and right turn lanes will be provided exiting the site and that the northbound exiting approach will be controlled by side street stop sign and accompanying stop bar. Table 7 presents the results of the future analysis. Computer printouts containing detailed results of the future analysis are located in Appendix E. Levels of service and delays are provided for each overall intersection and for each controlled approach or movement. Locations that operate unacceptably (LOS E or LOS F) are presented in bold type.

Table 7 – Future Intersection Operations

Intersection / Approach	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay (s/veh)	LOS	Delay (s/veh)
1. GA 8 at Cedars Road (signal)	C	26.2	B	18.5
northbound approach	D	49.5	C	22.7
southbound approach	B	18.5	C	24.1
eastbound approach	B	13.4	B	14.4
westbound approach	C	24.5	B	19.7
2. GA 8 at Alcovy Industrial Boulevard (side street stop)	A	3.0	A	4.1
northbound left turn / through (exiting project)	D	31.6	***F***	***66.4***
northbound right turn (exiting project)	B	11.9	C	16.9
southbound left turn / through	D	32.8	***F***	***72.3***
southbound right turn	B	12.1	B	10.9
eastbound left turn	A	8.8	A	8.3
westbound left turn (entering project)	A	8.3	B	10.3
3. GA 316 at GA 8 (signal)	D	54.0	***E***	***63.5***
northbound approach (GA 316 westbound)	***E***	***57.8***	C	32.1
southbound approach (GA 316 eastbound)	C	30.1	***E***	***62.4***
eastbound approach (GA 8)	***E***	***69.0***	***F***	***105.9***
westbound approach (GA 8)	***F***	***94.3***	***F***	***111.7***

The future analysis with the addition of the proposed subdivision's trips reveals a moderate deterioration in operations. The Cedars Road intersection will continue to operate acceptably. The GA 316 / GA 8 intersection will continue to have failing approaches, as identified in the existing and no-build analysis. As stated previously, because this intersection will be improved shortly, no mitigation is recommended. Therefore, no off-site mitigation is identified for the future build condition.

The analysis shows that the subdivision access will work well with the recommended lanes and control in the a.m. peak hour. However, the side street left turns will incur high delays in the p.m. peak hour. This is not unusual on

side street stop sign controlled approaches at busy highways such as GA 8. The left turns from Alcovy Industrial Boulevard that incur the LOS F are minimal, with eight (8) vehicles making this turn in the p.m. peak hour. The left turns from the proposed subdivision that will incur the LOS F will be more substantial, but still moderate compared with the volumes on GA 8. Mitigating these delays would require a change in control, most typically to a signal. However, the side street volumes are not sufficient to satisfy volume-based warrants for signalization according to Georgia DOT standards. As an alternative, a roundabout would typically not be considered appropriate in this context of a busy state route at a minor local street and a private subdivision driveway. Therefore, no feasible mitigation is identified for this intersection.

The project civil/site engineer should comply with all applicable design standards including sight distances, turn radii, turn lane storage and taper lengths, driveway widths, islands, angles with the adjacent roadways, and grades.

Conclusions and Recommendations

This traffic impact study evaluates the impact of a proposed residential subdivision in Gwinnett County. The site is located on the southeast side of Georgia Highway 8 at Alcovy Industrial Boulevard. The site will be developed with 345 apartment units and 152 multifamily carriage units. Vehicular access will be provided at one access on GA 8, aligning with Alcovy Industrial Boulevard. The following are the findings and recommendations of this study:

1. The existing analysis reveals acceptable operating conditions at the Cedars Road and Alcovy Industrial Boulevard intersections, and generally acceptable operations at the GA 316 intersection, with some approaches failing.

2. A programmed improvement scheduled for construction in 2024 will reconfigure the GA 316 / GA 8 intersection as a grade-separated diamond interchange. Because of this imminent improvement, no mitigation is recommended for this intersection.

3. Traffic volume growth in this area has been positive and moderate and this is expected to continue into the future.

4. With the growth in background traffic volumes, the Cedars Road and Alcovy Industrial Boulevard intersections will continue to operate acceptably in the no-build condition and no mitigation is identified.

5. The proposed subdivision will generate 203 a.m. peak hour trips, 256 p.m. peak hour trips, and 3,396 weekday trips.

6. The future analysis with the addition of the proposed subdivision's trips reveals a moderate deterioration in operations. The Cedars Road intersection will continue to operate acceptably. The GA 316 / GA 8 intersection will continue to have failing approaches, as identified in the existing and no-build analysis, but, because this intersection will be improved shortly, no mitigation is recommended. Therefore, no off-site mitigation is identified for the future build condition.

7. The auxiliary turn lane analysis revealed that an eastbound right turn lane and a westbound left turn lane are required on GA 8 at the subdivision access.

8. Exiting the site, a separate left turn lane and right turn lane should be provided. The exiting approach should be controlled by side street stop sign and accompanying stop bar.

9. The analysis shows that the subdivision access will work well with the recommended lanes and control in the a.m. peak hour. However, the side street left turns will incur high delays in the p.m. peak hour. No feasible mitigation is identified for this intersection.

10. The programmed new interchange at GA 316 / GA 8 can be expected to impact GA 8 and may impact the subject property. It is recommended that the proposed Sugarloaf Crossing site plan take any programmed changes in roadway alignment or widening into consideration.

11. The project civil/site engineer should comply with all applicable design standards including sight distances, turn radii, turn lane storage and taper lengths, driveway widths, islands, angles with the adjacent roadways, and grades.

Appendix A

Traffic Count Data and Volume Worksheets

Dacula Crossing Subdivision Traffic Impact Study
Gwinnett County, Georgia

May 2022

Intersection: 1. Georgia Highway 8 at Cedars Road

Weekday A.M. Peak Hour

	Northbound Cedars Road				Southbound Cedars Road				Eastbound GA 8				Westbound GA 8			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, April 20, 2022 7:15-8:15)	39	163	64	266	24	49	129	202	102	223	9	334	36	411	44	491
Total Annual Background Growth	10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%	
2027 No-Build Volumes	43	180	71	294	26	54	142	223	113	246	10	369	40	454	49	542
Proposed Sugarloaf Crossing Subdivision Trips	0	0	2	2	6	0	0	6	0	8	0	8	6	24	18	48
Build Volumes	43	180	73	296	32	54	142	229	113	254	10	377	46	478	67	590

Weekday P.M. Peak Hour

	Northbound Cedars Road				Southbound Cedars Road				Eastbound GA 8				Westbound GA 8			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, April 20, 2022 4:00-5:00)	29	67	67	163	23	136	118	277	127	541	40	708	83	277	18	378
Total Annual Background Growth	10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%	
2027 No-Build Volumes	32	74	74	180	25	150	130	306	140	597	44	782	92	306	20	417
Proposed Sugarloaf Crossing Subdivision Trips	0	0	6	6	19	0	0	19	0	25	0	25	4	16	12	32
Build Volumes	32	74	80	186	44	150	130	325	140	622	44	807	96	322	32	449

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Dacula Crossing Subdivision Traffic Impact Study
Gwinnett County, Georgia

May 2022

Intersection: 2. Georgia Highway 8 at Alcovy Industrial Boulevard

Weekday A.M. Peak Hour

	Northbound Sugarloaf Crossing Access				Southbound Alcovy Industrial Boulevard				Eastbound GA 8				Westbound GA 8			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, April 20, 2022 7:15-8:15)					1		2	3	4	310		314		489	14	503
Total Annual Background Growth					10.4%		10.4%		10.4%	10.4%				10.4%	10.4%	
2027 No-Build Volumes					1		2	3	4	342		347		540	15	555
Proposed Sugarloaf Crossing Subdivision Trips	48	0	102	150	0	0	0	0	0	0	16	16	37	0	0	37
Build Volumes	48	0	102	150	1	0	2	3	4	342	16	363	37	540	15	592

Weekday P.M. Peak Hour

	Northbound Sugarloaf Crossing Access				Southbound Alcovy Industrial Boulevard				Eastbound GA 8				Westbound GA 8			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, April 20, 2022 4:00-5:00)					7		4	11	2	624		626		355	6	361
Total Annual Background Growth					10.4%		10.4%		10.4%	10.4%				10.4%	10.4%	
2027 No-Build Volumes					8		4	12	2	689		691		392	7	399
Proposed Sugarloaf Crossing Subdivision Trips	32	0	69	101	0	0	0	0	0	0	50	50	105	0	0	105
Build Volumes	32	0	69	101	8	0	4	12	2	689	50	741	105	392	7	504

MARC R. ACAMPORA, PE, LLC

Dacula Crossing Subdivision Traffic Impact Study
Gwinnett County, Georgia

May 2022

Intersection: 3. Georgia Highway 316 at Georgia Highway 8

Weekday A.M. Peak Hour

	Northbound GA 316 (westbound)				Southbound GA 316 (eastbound)				Eastbound GA 8				Westbound GA 8			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, April 20, 2022 7:00-8:00)	122	1621	98	1841	113	1068	51	1232	53	177	63	293	102	298	311	711
Total Annual Background Growth	10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%	
2027 No-Build Volumes	135	1790	108	2032	125	1179	56	1360	59	195	70	323	113	329	343	785
Proposed Sugarloaf Crossing Subdivision Trips	6	0	0	6	0	0	20	20	52	32	18	102	0	11	0	11
Build Volumes	141	1790	108	2038	125	1179	76	1380	111	227	88	425	113	340	343	796

Weekday P.M. Peak Hour

	Northbound GA 316 (westbound)				Southbound GA 316 (eastbound)				Eastbound GA 8				Westbound GA 8			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, April 20, 2022 5:00-6:00)	60	1093	106	1259	291	1657	28	1976	142	273	176	591	133	220	261	614
Total Annual Background Growth	10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%	
2027 No-Build Volumes	66	1207	117	1390	321	1829	31	2182	157	301	194	652	147	243	288	678
Proposed Sugarloaf Crossing Subdivision Trips	19	0	0	19	0	0	53	53	36	21	12	69	0	33	0	33
Build Volumes	85	1207	117	1409	321	1829	84	2235	193	322	206	721	147	276	288	711

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Appendix B

Intersection Analysis Methodology

Intersection Analysis Methodology

The methodology used for evaluating traffic operations at intersections is presented in the Transportation Research Board's *Highway Capacity Manual*, 2016 edition (HCM 6). Synchro 10 software, which emulates the HCM 6 methodology, was used for all analyses. The following is an overview of the methodology employed for the analysis of signalized intersections and roundabouts and stop-sign controlled (unsignalized) intersections. Levels of service (LOS) are assigned letters A through F. LOS A indicates operations with very low control delay while LOS F describes operations with high control delay. LOS F is considered to be unacceptable by most drivers, while LOS E is typically considered to be the limit of acceptable delay.

Signalized Intersections and Roundabouts – Level of service for a signalized intersection and a roundabout is defined in terms of control delay per vehicle. For signalized intersections and roundabouts, a composite intersection level of service is determined. The thresholds for each level of service are higher for signalized intersections and roundabouts than for unsignalized intersections. This is attributable to a variety of factors including expectation and acceptance of higher delays at signals/roundabouts, and the fact that drivers can relax when waiting at a signal as opposed to having to remain attentive as they proceed through the unsignalized intersection. The level of service criteria for signalized intersections and roundabouts are shown in Table A.

Table A – Level of Service Criteria for Signalized Intersections and Roundabouts

Control Delay (s/veh)	LOS
≤ 10	A
> 10 and ≤ 20	B
> 20 and ≤ 35	C
> 35 and ≤ 55	D
> 55 and ≤ 80	E
> 80	F

Source: Highway Capacity Manual 6

Unsignalized Intersections – Level of service for an unsignalized intersection is defined in terms of control delay per vehicle. Control delay is that portion of delay attributable to the control device and includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The delays at unsignalized intersections are based on gap acceptance theory, factoring in availability of gaps, usefulness of the gaps, and the priority of right-of-way given to each traffic stream. The level of service criteria for unsignalized intersections are presented in Table B.

Table B – Level of Service Criteria for Unsignalized Intersections

Control Delay (s/veh)	LOS
0 – 10	A
> 10 and ≤ 15	B
> 15 and ≤ 25	C
> 25 and ≤ 35	D
> 35 and ≤ 50	E
> 50	F

Source: Highway Capacity Manual 6

Appendix C

Existing Intersection Operational Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	223	9	36	411	44	39	163	64	24	49	129
Future Volume (veh/h)	102	223	9	36	411	44	39	163	64	24	49	129
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1796	1856	1856	1796	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	110	240	0	40	452	0	46	192	75	29	58	154
Peak Hour Factor	0.93	0.93	0.93	0.91	0.91	0.91	0.85	0.85	0.85	0.84	0.84	0.84
Percent Heavy Veh, %	3	7	3	3	7	3	3	3	3	3	3	3
Cap, veh/h	289	785		452	547		126	480	673	167	302	673
Arrive On Green	0.07	0.44	0.00	0.30	0.30	0.00	0.43	0.43	0.43	0.43	0.43	0.43
Sat Flow, veh/h	1767	1796	1572	1131	1796	1572	145	1123	1572	223	705	1572
Grp Volume(v), veh/h	110	240	0	40	452	0	238	0	75	87	0	154
Grp Sat Flow(s),veh/h/ln	1767	1796	1572	1131	1796	1572	1268	0	1572	928	0	1572
Q Serve(g_s), s	2.7	5.8	0.0	1.7	15.6	0.0	1.3	0.0	1.9	0.7	0.0	4.1
Cycle Q Clear(g_c), s	2.7	5.8	0.0	1.7	15.6	0.0	16.9	0.0	1.9	16.6	0.0	4.1
Prop In Lane	1.00		1.00	1.00		1.00	0.19		1.00	0.33		1.00
Lane Grp Cap(c), veh/h	289	785		452	547		607	0	673	469	0	673
V/C Ratio(X)	0.38	0.31		0.09	0.83		0.39	0.00	0.11	0.19	0.00	0.23
Avail Cap(c_a), veh/h	373	1415		796	1092		607	0	673	469	0	673
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.4	12.2	0.0	16.7	21.5	0.0	13.0	0.0	11.5	12.6	0.0	12.1
Incr Delay (d2), s/veh	0.8	0.2	0.0	0.1	3.3	0.0	1.9	0.0	0.3	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.9	0.0	0.4	6.1	0.0	2.3	0.0	0.6	0.7	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.3	12.4	0.0	16.8	24.8	0.0	14.9	0.0	11.8	12.8	0.0	12.3
LnGrp LOS	B	B		B	C		B	A	B	B	A	B
Approach Vol, veh/h		350	A		492	A		313			241	
Approach Delay, s/veh		13.6			24.1			14.2			12.4	
Approach LOS		B			C			B			B	

Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		33.0		33.6		33.0	8.8	24.8				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		28.5		52.5		28.5	7.5	40.5				
Max Q Clear Time (g_c+I1), s		18.9		7.8		18.6	4.7	17.6				
Green Ext Time (p_c), s		1.0		1.3		0.6	0.1	2.7				

Intersection Summary	
HCM 6th Ctrl Delay	17.3
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	310	489	14	1	2
Future Vol, veh/h	4	310	489	14	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	400	0	200
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	95	95	75	75
Heavy Vehicles, %	10	7	7	20	20	10
Mvmt Flow	5	369	515	15	1	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	530	0	-	0	894	515
Stage 1	-	-	-	-	515	-
Stage 2	-	-	-	-	379	-
Critical Hdwy	4.2	-	-	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	5.6	-
Follow-up Hdwy	2.29	-	-	-	3.68	3.39
Pot Cap-1 Maneuver	998	-	-	-	290	544
Stage 1	-	-	-	-	565	-
Stage 2	-	-	-	-	654	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	998	-	-	-	288	544
Mov Cap-2 Maneuver	-	-	-	-	288	-
Stage 1	-	-	-	-	562	-
Stage 2	-	-	-	-	654	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	13.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	998	-	-	-	288	544
HCM Lane V/C Ratio	0.005	-	-	-	0.005	0.005
HCM Control Delay (s)	8.6	0	-	-	17.6	11.7
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0	-	-	-	0	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	177	63	102	298	311	122	1621	98	113	1068	51
Future Volume (veh/h)	53	177	63	102	298	311	122	1621	98	113	1068	51
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1796	1707	1796	1796	1796	1707	1707	1796	1796	1707	1707
Adj Flow Rate, veh/h	63	211	0	112	327	0	128	1706	0	122	1148	0
Peak Hour Factor	0.84	0.84	0.84	0.91	0.91	0.91	0.95	0.95	0.95	0.93	0.93	0.93
Percent Heavy Veh, %	13	7	13	7	7	7	13	13	7	7	13	13
Cap, veh/h	144	335		235	352		286	1839		152	1825	
Arrive On Green	0.04	0.19	0.00	0.05	0.20	0.00	0.05	0.57	0.00	0.05	0.56	0.00
Sat Flow, veh/h	1626	1796	1447	1711	1796	1522	1626	3244	1522	3319	3244	1447
Grp Volume(v), veh/h	63	211	0	112	327	0	128	1706	0	122	1148	0
Grp Sat Flow(s),veh/h/ln	1626	1796	1447	1711	1796	1522	1626	1622	1522	1659	1622	1447
Q Serve(g_s), s	3.7	13.0	0.0	6.1	21.5	0.0	4.0	57.7	0.0	4.4	28.8	0.0
Cycle Q Clear(g_c), s	3.7	13.0	0.0	6.1	21.5	0.0	4.0	57.7	0.0	4.4	28.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	144	335		235	352		286	1839		152	1825	
V/C Ratio(X)	0.44	0.63		0.48	0.93		0.45	0.93		0.80	0.63	
Avail Cap(c_a), veh/h	144	335		235	352		355	1839		152	1825	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.0	45.0	0.0	38.7	47.4	0.0	14.6	23.8	0.0	56.7	17.8	0.0
Incr Delay (d2), s/veh	2.1	3.7	0.0	1.5	30.7	0.0	1.1	9.7	0.0	25.6	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	6.1	0.0	2.8	12.6	0.0	1.5	23.3	0.0	2.4	10.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.1	48.7	0.0	40.1	78.1	0.0	15.7	33.5	0.0	82.3	19.4	0.0
LnGrp LOS	D	D		D	E		B	C		F	B	
Approach Vol, veh/h		274	A		439	A		1834	A		1270	A
Approach Delay, s/veh		47.0			68.4			32.2			25.5	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	72.5	10.6	26.9	10.5	72.0	9.5	28.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	68.0	6.1	22.4	11.1	62.4	5.0	23.5
Max Q Clear Time (g_c+I1), s	6.4	59.7	8.1	15.0	6.0	30.8	5.7	23.5
Green Ext Time (p_c), s	0.0	6.7	0.0	0.6	0.1	10.6	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	35.2
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	127	541	40	83	277	18	29	67	67	23	136	118
Future Volume (veh/h)	127	541	40	83	277	18	29	67	67	23	136	118
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1796	1856	1856	1796	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	141	601	0	86	286	0	34	79	79	25	148	128
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.85	0.85	0.85	0.92	0.92	0.92
Percent Heavy Veh, %	3	7	3	3	7	3	3	3	3	3	3	3
Cap, veh/h	430	800		255	526		230	494	638	128	662	638
Arrive On Green	0.08	0.45	0.00	0.29	0.29	0.00	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1767	1796	1572	812	1796	1572	375	1219	1572	147	1632	1572
Grp Volume(v), veh/h	141	601	0	86	286	0	113	0	79	173	0	128
Grp Sat Flow(s),veh/h/ln	1767	1796	1572	812	1796	1572	1595	0	1572	1779	0	1572
Q Serve(g_s), s	3.1	16.8	0.0	6.0	8.1	0.0	0.0	0.0	1.9	0.0	0.0	3.2
Cycle Q Clear(g_c), s	3.1	16.8	0.0	13.6	8.1	0.0	2.3	0.0	1.9	3.7	0.0	3.2
Prop In Lane	1.00		1.00	1.00		1.00	0.30		1.00	0.14		1.00
Lane Grp Cap(c), veh/h	430	800		255	526		724	0	638	789	0	638
V/C Ratio(X)	0.33	0.75		0.34	0.54		0.16	0.00	0.12	0.22	0.00	0.20
Avail Cap(c_a), veh/h	540	1679		601	1293		724	0	638	789	0	638
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.6	14.0	0.0	23.5	18.0	0.0	11.4	0.0	11.2	11.8	0.0	11.6
Incr Delay (d2), s/veh	0.4	1.4	0.0	0.8	0.9	0.0	0.5	0.0	0.4	0.1	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	5.5	0.0	1.1	2.9	0.0	0.9	0.0	0.6	1.3	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.1	15.4	0.0	24.2	18.8	0.0	11.8	0.0	11.6	11.9	0.0	11.8
LnGrp LOS	B	B		C	B		B	A	B	B	A	B
Approach Vol, veh/h		742	A		372	A		192			301	
Approach Delay, s/veh		15.0			20.1			11.8			11.9	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	2	4	6	7	8
Phs Duration (G+Y+Rc), s	29.0	31.4	29.0	9.2	22.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	24.5	56.5	24.5	8.5	43.5
Max Q Clear Time (g_c+I1), s	4.3	18.8	5.7	5.1	15.6
Green Ext Time (p_c), s	0.8	4.0	1.2	0.1	2.1

Intersection Summary	
HCM 6th Ctrl Delay	15.2
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	624	355	6	7	4
Future Vol, veh/h	2	624	355	6	7	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	400	0	200
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	94	94	92	92
Heavy Vehicles, %	10	7	7	20	20	10
Mvmt Flow	2	709	378	6	8	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	384	0	-	0	1091	378
Stage 1	-	-	-	-	378	-
Stage 2	-	-	-	-	713	-
Critical Hdwy	4.2	-	-	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	5.6	-
Follow-up Hdwy	2.29	-	-	-	3.68	3.39
Pot Cap-1 Maneuver	1132	-	-	-	220	651
Stage 1	-	-	-	-	655	-
Stage 2	-	-	-	-	454	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1132	-	-	-	219	651
Mov Cap-2 Maneuver	-	-	-	-	219	-
Stage 1	-	-	-	-	653	-
Stage 2	-	-	-	-	454	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	17.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1132	-	-	-	219	651
HCM Lane V/C Ratio	0.002	-	-	-	0.035	0.007
HCM Control Delay (s)	8.2	0	-	-	22	10.6
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	273	176	133	220	261	60	1093	106	291	1657	28
Future Volume (veh/h)	142	273	176	133	220	261	60	1093	106	291	1657	28
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1796	1707	1796	1796	1796	1707	1707	1796	1796	1707	1707
Adj Flow Rate, veh/h	154	297	0	141	234	0	64	1163	0	303	1726	0
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.94	0.94	0.94	0.96	0.96	0.96
Percent Heavy Veh, %	13	7	13	7	7	7	13	13	7	7	13	13
Cap, veh/h	218	322		181	322		142	1627		358	1857	
Arrive On Green	0.06	0.18	0.00	0.06	0.18	0.00	0.04	0.50	0.00	0.11	0.57	0.00
Sat Flow, veh/h	1626	1796	1447	1711	1796	1522	1626	3244	1522	3319	3244	1447
Grp Volume(v), veh/h	154	297	0	141	234	0	64	1163	0	303	1726	0
Grp Sat Flow(s),veh/h/ln	1626	1796	1447	1711	1796	1522	1626	1622	1522	1659	1622	1447
Q Serve(g_s), s	7.2	19.4	0.0	7.2	14.7	0.0	2.3	33.2	0.0	10.7	58.0	0.0
Cycle Q Clear(g_c), s	7.2	19.4	0.0	7.2	14.7	0.0	2.3	33.2	0.0	10.7	58.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	218	322		181	322		142	1627		358	1857	
V/C Ratio(X)	0.71	0.92		0.78	0.73		0.45	0.71		0.85	0.93	
Avail Cap(c_a), veh/h	218	324		181	324		151	1627		395	1857	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	42.4	48.1	0.0	41.2	46.2	0.0	26.5	23.1	0.0	52.3	23.3	0.0
Incr Delay (d2), s/veh	10.1	30.6	0.0	19.1	7.9	0.0	2.2	2.7	0.0	14.5	9.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	11.4	0.0	1.8	7.2	0.0	1.0	13.0	0.0	5.2	23.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.5	78.7	0.0	60.3	54.0	0.0	28.7	25.8	0.0	66.8	33.1	0.0
LnGrp LOS	D	E		E	D		C	C		E	C	
Approach Vol, veh/h		451	A		375	A		1227	A		2029	A
Approach Delay, s/veh		69.7			56.4			26.0			38.1	
Approach LOS		E			E			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.4	64.3	11.7	25.9	8.9	72.8	11.7	25.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.2	59.1	7.2	21.5	5.0	68.3	7.2	21.5
Max Q Clear Time (g_c+I1), s	12.7	35.2	9.2	21.4	4.3	60.0	9.2	16.7
Green Ext Time (p_c), s	0.2	9.6	0.0	0.0	0.0	6.7	0.0	0.5

Intersection Summary	
HCM 6th Ctrl Delay	39.6
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Appendix D

No-Build Intersection Operational Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	113	246	10	40	454	49	43	180	71	26	54	142
Future Volume (veh/h)	113	246	10	40	454	49	43	180	71	26	54	142
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1796	1856	1856	1796	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	122	265	0	44	499	0	51	212	84	31	64	169
Peak Hour Factor	0.93	0.93	0.93	0.91	0.91	0.91	0.85	0.85	0.85	0.84	0.84	0.84
Percent Heavy Veh, %	3	7	3	3	7	3	3	3	3	3	3	3
Cap, veh/h	283	826		468	592		77	274	645	86	145	645
Arrive On Green	0.07	0.46	0.00	0.33	0.33	0.00	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1767	1796	1572	1106	1796	1572	36	667	1572	41	353	1572
Grp Volume(v), veh/h	122	265	0	44	499	0	263	0	84	95	0	169
Grp Sat Flow(s),veh/h/ln	1767	1796	1572	1106	1796	1572	704	0	1572	394	0	1572
Q Serve(g_s), s	3.0	6.5	0.0	1.9	17.9	0.0	3.2	0.0	2.3	1.5	0.0	4.9
Cycle Q Clear(g_c), s	3.0	6.5	0.0	1.9	17.9	0.0	28.5	0.0	2.3	27.6	0.0	4.9
Prop In Lane	1.00		1.00	1.00		1.00	0.19		1.00	0.33		1.00
Lane Grp Cap(c), veh/h	283	826		468	592		351	0	645	231	0	645
V/C Ratio(X)	0.43	0.32		0.09	0.84		0.75	0.00	0.13	0.41	0.00	0.26
Avail Cap(c_a), veh/h	359	1358		749	1048		351	0	645	231	0	645
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.7	11.9	0.0	16.3	21.6	0.0	16.6	0.0	12.7	16.4	0.0	13.5
Incr Delay (d2), s/veh	1.0	0.2	0.0	0.1	3.4	0.0	13.7	0.0	0.4	1.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	2.2	0.0	0.4	7.0	0.0	3.8	0.0	0.8	0.9	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.7	12.1	0.0	16.3	25.0	0.0	30.3	0.0	13.2	17.6	0.0	13.7
LnGrp LOS	B	B		B	C		C	A	B	B	A	B
Approach Vol, veh/h		387	A		543	A		347			264	
Approach Delay, s/veh		13.6			24.3			26.2			15.1	
Approach LOS		B			C			C			B	

Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		33.0		36.4		33.0	9.0	27.4				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		28.5		52.5		28.5	7.5	40.5				
Max Q Clear Time (g_c+I1), s		30.5		8.5		29.6	5.0	19.9				
Green Ext Time (p_c), s		0.0		1.5		0.0	0.1	3.0				

Intersection Summary	
HCM 6th Ctrl Delay	20.4
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	342	540	15	1	2
Future Vol, veh/h	4	342	540	15	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	400	0	200
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	95	95	75	75
Heavy Vehicles, %	10	7	7	20	20	10
Mvmt Flow	5	407	568	16	1	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	584	0	-	0	985	568
Stage 1	-	-	-	-	568	-
Stage 2	-	-	-	-	417	-
Critical Hdwy	4.2	-	-	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	5.6	-
Follow-up Hdwy	2.29	-	-	-	3.68	3.39
Pot Cap-1 Maneuver	952	-	-	-	255	507
Stage 1	-	-	-	-	533	-
Stage 2	-	-	-	-	628	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	952	-	-	-	253	507
Mov Cap-2 Maneuver	-	-	-	-	253	-
Stage 1	-	-	-	-	529	-
Stage 2	-	-	-	-	628	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	14.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	952	-	-	-	253	507
HCM Lane V/C Ratio	0.005	-	-	-	0.005	0.005
HCM Control Delay (s)	8.8	0	-	-	19.3	12.1
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0	-	-	-	0	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	195	70	113	329	343	135	1790	108	125	1179	56
Future Volume (veh/h)	59	195	70	113	329	343	135	1790	108	125	1179	56
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1796	1707	1796	1796	1796	1707	1707	1796	1796	1707	1707
Adj Flow Rate, veh/h	70	232	0	124	362	0	142	1884	0	134	1268	0
Peak Hour Factor	0.84	0.84	0.84	0.91	0.91	0.91	0.95	0.95	0.95	0.93	0.93	0.93
Percent Heavy Veh, %	13	7	13	7	7	7	13	13	7	7	13	13
Cap, veh/h	141	340		244	370		250	1786		153	1754	
Arrive On Green	0.05	0.19	0.00	0.06	0.21	0.00	0.06	0.55	0.00	0.05	0.54	0.00
Sat Flow, veh/h	1626	1796	1447	1711	1796	1522	1626	3244	1522	3319	3244	1447
Grp Volume(v), veh/h	70	232	0	124	362	0	142	1884	0	134	1268	0
Grp Sat Flow(s),veh/h/ln	1626	1796	1447	1711	1796	1522	1626	1622	1522	1659	1622	1447
Q Serve(g_s), s	4.1	14.3	0.0	7.0	23.9	0.0	4.6	65.5	0.0	4.8	35.1	0.0
Cycle Q Clear(g_c), s	4.1	14.3	0.0	7.0	23.9	0.0	4.6	65.5	0.0	4.8	35.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	141	340		244	370		250	1786		153	1754	
V/C Ratio(X)	0.50	0.68		0.51	0.98		0.57	1.06		0.87	0.72	
Avail Cap(c_a), veh/h	154	355		244	370		310	1786		153	1754	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.5	44.9	0.0	36.9	47.0	0.0	18.6	26.7	0.0	56.4	20.6	0.0
Incr Delay (d2), s/veh	2.7	5.1	0.0	1.7	41.0	0.0	2.0	37.5	0.0	38.7	2.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	6.8	0.0	3.0	14.8	0.0	1.8	33.1	0.0	2.8	13.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.2	50.0	0.0	38.6	88.0	0.0	20.7	64.3	0.0	95.1	23.2	0.0
LnGrp LOS	D	D		D	F		C	F		F	C	
Approach Vol, veh/h		302	A		486	A		2026	A		1402	A
Approach Delay, s/veh		47.9			75.4			61.2			30.1	
Approach LOS		D			E			E			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	70.0	12.0	27.0	11.2	68.8	10.0	29.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	65.5	7.5	23.5	11.1	59.9	6.5	24.5
Max Q Clear Time (g_c+I1), s	6.8	67.5	9.0	16.3	6.6	37.1	6.1	25.9
Green Ext Time (p_c), s	0.0	0.0	0.0	0.7	0.1	10.5	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	51.6
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	597	44	92	306	20	32	74	74	25	150	130
Future Volume (veh/h)	140	597	44	92	306	20	32	74	74	25	150	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1796	1856	1856	1796	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	156	663	0	95	315	0	38	87	87	27	163	141
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.85	0.85	0.85	0.92	0.92	0.92
Percent Heavy Veh, %	3	7	3	3	7	3	3	3	3	3	3	3
Cap, veh/h	457	870		251	600		213	452	593	117	617	593
Arrive On Green	0.08	0.48	0.00	0.33	0.33	0.00	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	1767	1796	1572	766	1796	1572	374	1198	1572	143	1635	1572
Grp Volume(v), veh/h	156	663	0	95	315	0	125	0	87	190	0	141
Grp Sat Flow(s),veh/h/ln	1767	1796	1572	766	1796	1572	1572	0	1572	1778	0	1572
Q Serve(g_s), s	3.5	19.6	0.0	7.5	9.2	0.0	0.0	0.0	2.4	0.0	0.0	4.0
Cycle Q Clear(g_c), s	3.5	19.6	0.0	17.4	9.2	0.0	4.6	0.0	2.4	4.6	0.0	4.0
Prop In Lane	1.00		1.00	1.00		1.00	0.30		1.00	0.14		1.00
Lane Grp Cap(c), veh/h	457	870		251	600		665	0	593	734	0	593
V/C Ratio(X)	0.34	0.76		0.38	0.52		0.19	0.00	0.15	0.26	0.00	0.24
Avail Cap(c_a), veh/h	546	1562		508	1203		665	0	593	734	0	593
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.1	13.7	0.0	24.8	17.5	0.0	13.5	0.0	13.3	14.0	0.0	13.8
Incr Delay (d2), s/veh	0.4	1.4	0.0	0.9	0.7	0.0	0.6	0.0	0.5	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	6.4	0.0	1.3	3.3	0.0	1.2	0.0	0.8	1.7	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.5	15.1	0.0	25.7	18.2	0.0	14.1	0.0	13.9	14.2	0.0	14.1
LnGrp LOS	B	B		C	B		B	A	B	B	A	B
Approach Vol, veh/h		819	A		410	A		212			331	
Approach Delay, s/veh		14.6			19.9			14.0			14.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		29.0		36.0		29.0	9.8	26.2				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		24.5		56.5		24.5	8.5	43.5				
Max Q Clear Time (g_c+I1), s		6.6		21.6		6.6	5.5	19.4				
Green Ext Time (p_c), s		0.8		4.6		1.3	0.1	2.4				

Intersection Summary	
HCM 6th Ctrl Delay	15.7
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	689	392	7	8	4
Future Vol, veh/h	2	689	392	7	8	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	400	0	200
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	94	94	92	92
Heavy Vehicles, %	10	7	7	20	20	10
Mvmt Flow	2	783	417	7	9	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	424	0	-	0	1204	417
Stage 1	-	-	-	-	417	-
Stage 2	-	-	-	-	787	-
Critical Hdwy	4.2	-	-	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	5.6	-
Follow-up Hdwy	2.29	-	-	-	3.68	3.39
Pot Cap-1 Maneuver	1094	-	-	-	187	619
Stage 1	-	-	-	-	628	-
Stage 2	-	-	-	-	419	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1094	-	-	-	186	619
Mov Cap-2 Maneuver	-	-	-	-	186	-
Stage 1	-	-	-	-	626	-
Stage 2	-	-	-	-	419	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	20.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1094	-	-	-	186	619
HCM Lane V/C Ratio	0.002	-	-	-	0.047	0.007
HCM Control Delay (s)	8.3	0	-	-	25.3	10.9
HCM Lane LOS	A	A	-	-	D	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	157	301	194	147	243	288	66	1207	117	321	1829	31
Future Volume (veh/h)	157	301	194	147	243	288	66	1207	117	321	1829	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1796	1707	1796	1796	1796	1707	1707	1796	1796	1707	1707
Adj Flow Rate, veh/h	171	327	0	156	259	0	70	1284	0	334	1905	0
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.94	0.94	0.94	0.96	0.96	0.96
Percent Heavy Veh, %	13	7	13	7	7	7	13	13	7	7	13	13
Cap, veh/h	206	323		160	290		122	1601		389	1859	
Arrive On Green	0.08	0.18	0.00	0.06	0.16	0.00	0.04	0.49	0.00	0.12	0.57	0.00
Sat Flow, veh/h	1626	1796	1447	1711	1796	1522	1626	3244	1522	3319	3244	1447
Grp Volume(v), veh/h	171	327	0	156	259	0	70	1284	0	334	1905	0
Grp Sat Flow(s),veh/h/ln	1626	1796	1447	1711	1796	1522	1626	1622	1522	1659	1622	1447
Q Serve(g_s), s	9.2	21.5	0.0	7.0	16.9	0.0	2.5	39.6	0.0	11.8	68.5	0.0
Cycle Q Clear(g_c), s	9.2	21.5	0.0	7.0	16.9	0.0	2.5	39.6	0.0	11.8	68.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	206	323		160	290		122	1601		389	1859	
V/C Ratio(X)	0.83	1.01		0.97	0.89		0.58	0.80		0.86	1.02	
Avail Cap(c_a), veh/h	206	323		160	290		128	1601		428	1859	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	42.1	49.0	0.0	45.1	49.1	0.0	28.3	25.4	0.0	51.8	25.5	0.0
Incr Delay (d2), s/veh	23.8	53.1	0.0	62.6	27.4	0.0	5.6	4.3	0.0	14.9	27.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	14.4	0.0	4.2	9.8	0.0	1.1	15.8	0.0	5.7	31.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.9	102.1	0.0	107.7	76.5	0.0	33.9	29.7	0.0	66.7	52.9	0.0
LnGrp LOS	E	F		F	E		C	C		E	F	
Approach Vol, veh/h		498	A		415	A		1354	A		2239	A
Approach Delay, s/veh		89.7			88.2			29.9			54.9	
Approach LOS		F			F			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.5	63.5	11.5	26.0	9.0	73.0	13.7	23.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.4	58.1	7.0	21.5	5.0	68.5	9.2	19.3
Max Q Clear Time (g_c+I1), s	13.8	41.6	9.0	23.5	4.5	70.5	11.2	18.9
Green Ext Time (p_c), s	0.2	8.8	0.0	0.0	0.0	0.0	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	54.3
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Appendix E

Future Intersection Operational Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	113	254	10	46	478	67	43	180	73	32	54	142
Future Volume (veh/h)	113	254	10	46	478	67	43	180	73	32	54	142
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1796	1856	1856	1796	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	122	273	0	51	525	0	51	212	86	38	64	169
Peak Hour Factor	0.93	0.93	0.93	0.91	0.91	0.91	0.85	0.85	0.85	0.84	0.84	0.84
Percent Heavy Veh, %	3	7	3	3	7	3	3	3	3	3	3	3
Cap, veh/h	278	847		478	617		62	215	632	72	91	632
Arrive On Green	0.06	0.47	0.00	0.34	0.34	0.00	0.40	0.40	0.40	0.40	0.40	0.40
Sat Flow, veh/h	1767	1796	1572	1097	1796	1572	5	535	1572	5	227	1572
Grp Volume(v), veh/h	122	273	0	51	525	0	263	0	86	102	0	169
Grp Sat Flow(s),veh/h/ln	1767	1796	1572	1097	1796	1572	540	0	1572	233	0	1572
Q Serve(g_s), s	3.0	6.7	0.0	2.3	19.2	0.0	0.4	0.0	2.5	0.3	0.0	5.1
Cycle Q Clear(g_c), s	3.0	6.7	0.0	2.3	19.2	0.0	28.5	0.0	2.5	28.5	0.0	5.1
Prop In Lane	1.00		1.00	1.00		1.00	0.19		1.00	0.37		1.00
Lane Grp Cap(c), veh/h	278	847		478	617		277	0	632	163	0	632
V/C Ratio(X)	0.44	0.32		0.11	0.85		0.95	0.00	0.14	0.63	0.00	0.27
Avail Cap(c_a), veh/h	351	1329		728	1026		277	0	632	163	0	632
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.8	11.7	0.0	16.0	21.6	0.0	18.9	0.0	13.4	17.9	0.0	14.2
Incr Delay (d2), s/veh	1.1	0.2	0.0	0.1	3.7	0.0	42.2	0.0	0.4	7.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	2.3	0.0	0.5	7.6	0.0	6.0	0.0	0.8	1.2	0.0	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.9	11.9	0.0	16.1	25.3	0.0	61.1	0.0	13.9	25.2	0.0	14.4
LnGrp LOS	B	B		B	C		E	A	B	C	A	B
Approach Vol, veh/h		395	A		576	A		349			271	
Approach Delay, s/veh		13.4			24.5			49.5			18.5	
Approach LOS		B			C			D			B	

Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		33.0		37.9		33.0	9.1	28.9				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		28.5		52.5		28.5	7.5	40.5				
Max Q Clear Time (g_c+I1), s		30.5		8.7		30.5	5.0	21.2				
Green Ext Time (p_c), s		0.0		1.5		0.0	0.1	3.1				

Intersection Summary	
HCM 6th Ctrl Delay	26.2
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	342	16	37	540	15	48	0	102	1	0	2
Future Vol, veh/h	4	342	16	37	540	15	48	0	102	1	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	150	150	-	400	-	-	0	-	-	200
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	95	95	95	85	85	85	75	75	75
Heavy Vehicles, %	10	7	2	2	7	20	2	2	2	20	2	10
Mvmt Flow	5	407	19	39	568	16	56	0	120	1	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	584	0	0	426	0	0	1071	1079	407	1133	1082	568
Stage 1	-	-	-	-	-	-	417	417	-	646	646	-
Stage 2	-	-	-	-	-	-	654	662	-	487	436	-
Critical Hdwy	4.2	-	-	4.12	-	-	7.12	6.52	6.22	7.3	6.52	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.3	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.3	5.52	-
Follow-up Hdwy	2.29	-	-	2.218	-	-	3.518	4.018	3.318	3.68	4.018	3.39
Pot Cap-1 Maneuver	952	-	-	1133	-	-	198	218	644	166	217	507
Stage 1	-	-	-	-	-	-	613	591	-	432	467	-
Stage 2	-	-	-	-	-	-	456	459	-	530	580	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	952	-	-	1133	-	-	191	209	644	131	208	507
Mov Cap-2 Maneuver	-	-	-	-	-	-	191	209	-	131	208	-
Stage 1	-	-	-	-	-	-	609	587	-	429	451	-
Stage 2	-	-	-	-	-	-	438	443	-	428	576	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.5	18.2	19
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	191	644	952	-	-	1133	-	-	131	507
HCM Lane V/C Ratio	0.296	0.186	0.005	-	-	0.034	-	-	0.01	0.005
HCM Control Delay (s)	31.6	11.9	8.8	0	-	8.3	-	-	32.8	12.1
HCM Lane LOS	D	B	A	A	-	A	-	-	D	B
HCM 95th %tile Q(veh)	1.2	0.7	0	-	-	0.1	-	-	0	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	111	227	88	113	340	343	141	1790	108	125	1179	76
Future Volume (veh/h)	111	227	88	113	340	343	141	1790	108	125	1179	76
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1796	1707	1796	1796	1796	1707	1707	1796	1796	1707	1707
Adj Flow Rate, veh/h	132	270	0	124	374	0	148	1884	0	134	1268	0
Peak Hour Factor	0.84	0.84	0.84	0.91	0.91	0.91	0.95	0.95	0.95	0.93	0.93	0.93
Percent Heavy Veh, %	13	7	13	7	7	7	13	13	7	7	13	13
Cap, veh/h	143	352		207	355		253	1803		152	1768	
Arrive On Green	0.05	0.20	0.00	0.05	0.20	0.00	0.06	0.56	0.00	0.05	0.54	0.00
Sat Flow, veh/h	1626	1796	1447	1711	1796	1522	1626	3244	1522	3319	3244	1447
Grp Volume(v), veh/h	132	270	0	124	374	0	148	1884	0	134	1268	0
Grp Sat Flow(s),veh/h/ln	1626	1796	1447	1711	1796	1522	1626	1622	1522	1659	1622	1447
Q Serve(g_s), s	6.1	17.1	0.0	6.3	23.7	0.0	4.8	66.7	0.0	4.8	35.0	0.0
Cycle Q Clear(g_c), s	6.1	17.1	0.0	6.3	23.7	0.0	4.8	66.7	0.0	4.8	35.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	143	352		207	355		253	1803		152	1768	
V/C Ratio(X)	0.93	0.77		0.60	1.05		0.58	1.04		0.88	0.72	
Avail Cap(c_a), veh/h	143	352		207	355		281	1803		152	1768	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	43.4	45.7	0.0	39.5	48.2	0.0	18.6	26.7	0.0	56.9	20.4	0.0
Incr Delay (d2), s/veh	53.3	9.8	0.0	4.7	62.8	0.0	2.5	34.0	0.0	40.5	2.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	8.6	0.0	3.2	16.7	0.0	1.9	32.8	0.0	2.9	13.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	96.7	55.5	0.0	44.2	110.9	0.0	21.1	60.6	0.0	97.5	22.9	0.0
LnGrp LOS	F	E		D	F		C	F		F	C	
Approach Vol, veh/h		402	A		498	A		2032	A		1402	A
Approach Delay, s/veh		69.0			94.3			57.8			30.1	
Approach LOS		E			F			E			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	71.2	10.8	28.0	11.3	69.9	10.6	28.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	66.7	6.3	23.5	8.9	63.3	6.1	23.7
Max Q Clear Time (g_c+I1), s	6.8	68.7	8.3	19.1	6.8	37.0	8.1	25.7
Green Ext Time (p_c), s	0.0	0.0	0.0	0.6	0.1	11.2	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	54.0
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	622	44	96	322	32	32	74	80	44	150	130
Future Volume (veh/h)	140	622	44	96	322	32	32	74	80	44	150	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1796	1856	1856	1796	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	156	691	0	99	332	0	38	87	94	48	163	141
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.85	0.85	0.85	0.92	0.92	0.92
Percent Heavy Veh, %	3	7	3	3	7	3	3	3	3	3	3	3
Cap, veh/h	465	902		249	641		76	139	573	72	202	573
Arrive On Green	0.08	0.50	0.00	0.36	0.36	0.00	0.36	0.36	0.36	0.36	0.36	0.36
Sat Flow, veh/h	1767	1796	1572	746	1796	1572	17	382	1572	18	555	1572
Grp Volume(v), veh/h	156	691	0	99	332	0	125	0	94	211	0	141
Grp Sat Flow(s),veh/h/ln	1767	1796	1572	746	1796	1572	400	0	1572	573	0	1572
Q Serve(g_s), s	3.5	20.9	0.0	8.3	9.8	0.0	0.9	0.0	2.7	1.2	0.0	4.2
Cycle Q Clear(g_c), s	3.5	20.9	0.0	19.5	9.8	0.0	24.5	0.0	2.7	24.5	0.0	4.2
Prop In Lane	1.00		1.00	1.00		1.00	0.30		1.00	0.23		1.00
Lane Grp Cap(c), veh/h	465	902		249	641		215	0	573	274	0	573
V/C Ratio(X)	0.34	0.77		0.40	0.52		0.58	0.00	0.16	0.77	0.00	0.25
Avail Cap(c_a), veh/h	524	1509		477	1188		215	0	573	274	0	573
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.8	13.6	0.0	25.4	17.1	0.0	17.5	0.0	14.5	17.7	0.0	14.9
Incr Delay (d2), s/veh	0.4	1.4	0.0	1.0	0.6	0.0	10.9	0.0	0.6	12.4	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	6.8	0.0	1.4	3.6	0.0	1.8	0.0	1.0	3.0	0.0	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.2	15.0	0.0	26.4	17.7	0.0	28.4	0.0	15.1	30.1	0.0	15.2
LnGrp LOS	B	B		C	B		C	A	B	C	A	B
Approach Vol, veh/h		847	A		431	A		219			352	
Approach Delay, s/veh		14.4			19.7			22.7			24.1	
Approach LOS		B			B			C			C	

Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		29.0		38.3		29.0	9.8	28.5				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		24.5		56.5		24.5	7.5	44.5				
Max Q Clear Time (g_c+I1), s		26.5		22.9		26.5	5.5	21.5				
Green Ext Time (p_c), s		0.0		4.8		0.0	0.1	2.5				

Intersection Summary	
HCM 6th Ctrl Delay	18.5
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↱	↰	↑	↱		↕	↱		↕	↱
Traffic Vol, veh/h	2	689	50	105	392	7	32	0	69	8	0	4
Future Vol, veh/h	2	689	50	105	392	7	32	0	69	8	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	150	150	-	400	-	-	0	-	-	200
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	94	94	94	75	75	75	92	92	92
Heavy Vehicles, %	10	7	2	2	7	20	2	2	2	20	2	10
Mvmt Flow	2	783	57	112	417	7	43	0	92	9	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	424	0	0	840	0	0	1432	1435	783	1503	1485	417
Stage 1	-	-	-	-	-	-	787	787	-	641	641	-
Stage 2	-	-	-	-	-	-	645	648	-	862	844	-
Critical Hdwy	4.2	-	-	4.12	-	-	7.12	6.52	6.22	7.3	6.52	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.3	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.3	5.52	-
Follow-up Hdwy	2.29	-	-	2.218	-	-	3.518	4.018	3.318	3.68	4.018	3.39
Pot Cap-1 Maneuver	1094	-	-	795	-	-	112	134	394	91	125	619
Stage 1	-	-	-	-	-	-	385	403	-	434	469	-
Stage 2	-	-	-	-	-	-	461	466	-	326	379	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1094	-	-	795	-	-	99	115	394	62	107	619
Mov Cap-2 Maneuver	-	-	-	-	-	-	99	115	-	62	107	-
Stage 1	-	-	-	-	-	-	384	402	-	433	403	-
Stage 2	-	-	-	-	-	-	393	400	-	249	378	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.1	32.6	51.8
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	99	394	1094	-	-	795	-	-	62	619
HCM Lane V/C Ratio	0.431	0.234	0.002	-	-	0.141	-	-	0.14	0.007
HCM Control Delay (s)	66.4	16.9	8.3	0	-	10.3	-	-	72.3	10.9
HCM Lane LOS	F	C	A	A	-	B	-	-	F	B
HCM 95th %tile Q(veh)	1.8	0.9	0	-	-	0.5	-	-	0.5	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	193	322	206	147	276	288	85	1207	117	321	1829	84
Future Volume (veh/h)	193	322	206	147	276	288	85	1207	117	321	1829	84
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1796	1707	1796	1796	1796	1707	1707	1796	1796	1707	1707
Adj Flow Rate, veh/h	210	350	0	156	294	0	90	1284	0	334	1905	0
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.94	0.94	0.94	0.96	0.96	0.96
Percent Heavy Veh, %	13	7	13	7	7	7	13	13	7	7	13	13
Cap, veh/h	206	341		160	284		128	1572		389	1817	
Arrive On Green	0.09	0.19	0.00	0.06	0.16	0.00	0.04	0.48	0.00	0.12	0.56	0.00
Sat Flow, veh/h	1626	1796	1447	1711	1796	1522	1626	3244	1522	3319	3244	1447
Grp Volume(v), veh/h	210	350	0	156	294	0	90	1284	0	334	1905	0
Grp Sat Flow(s),veh/h/ln	1626	1796	1447	1711	1796	1522	1626	1622	1522	1659	1622	1447
Q Serve(g_s), s	10.8	22.8	0.0	7.0	19.0	0.0	3.3	40.5	0.0	11.9	67.2	0.0
Cycle Q Clear(g_c), s	10.8	22.8	0.0	7.0	19.0	0.0	3.3	40.5	0.0	11.9	67.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	206	341		160	284		128	1572		389	1817	
V/C Ratio(X)	1.02	1.03		0.98	1.03		0.70	0.82		0.86	1.05	
Avail Cap(c_a), veh/h	206	341		160	284		128	1572		426	1817	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	41.8	48.6	0.0	45.6	50.5	0.0	28.3	26.4	0.0	52.0	26.4	0.0
Incr Delay (d2), s/veh	67.3	55.4	0.0	63.9	62.4	0.0	16.1	4.8	0.0	15.1	35.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	15.4	0.0	4.3	13.4	0.0	1.8	16.2	0.0	5.7	33.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	109.1	104.0	0.0	109.5	112.9	0.0	44.4	31.2	0.0	67.1	61.6	0.0
LnGrp LOS	F	F		F	F		D	C		E	F	
Approach Vol, veh/h		560	A		450	A		1374	A		2239	A
Approach Delay, s/veh		105.9			111.7			32.1			62.4	
Approach LOS		F			F			C			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.6	62.6	11.5	27.3	9.5	71.7	15.3	23.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.4	56.8	7.0	22.8	5.0	67.2	10.8	19.0
Max Q Clear Time (g_c+I1), s	13.9	42.5	9.0	24.8	5.3	69.2	12.8	21.0
Green Ext Time (p_c), s	0.2	8.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	63.5
HCM 6th LOS	E

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Appendix F

Programmed Improvements Information Sheets

Atlanta Region's Plan RTP (2020) PROJECT FACT SHEET

Short Title	SR 316 INTERCHANGE AT US 29
GDOT Project No.	0013897
Federal ID No.	N/A
Status	Programmed
Service Type	Roadway / Interchange Capacity
Sponsor	Gwinnett County
Jurisdiction	Regional - Northeast
Analysis Level	In the Region's Air Quality Conformity Analysis

Existing Thru Lane	N/A	**LCI**		**Network Year**	2030
Planned Thru Lane	N/A	**Flex**		**Corridor Length**	0.8 miles

Detailed Description and Justification

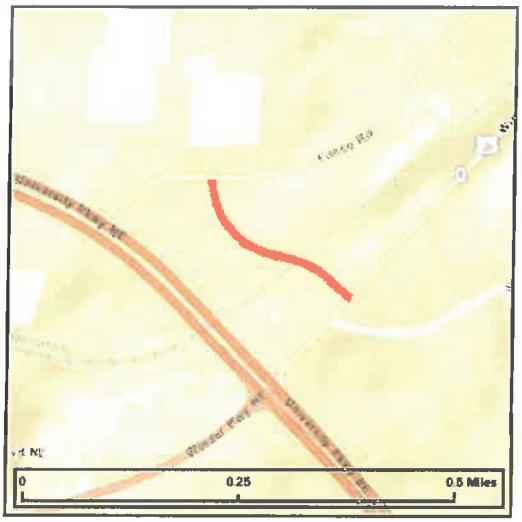
This is a grade-seperated diamond interchange project along SR 316 at US 29.

Phase Status & Funding Information		Status	FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
					FEDERAL	STATE	BONDS	LOCAL/PRIVATE
PE	Transportation Funding Act (HB 170)	AUTH	2017	**$1,016,000**	~~$0,000~~	~~$1,016,000~~	~~$0,000~~	~~$0,000~~
PE	Transportation Funding Act (HB 170)	AUTH	2020	**$1,750,000**	~~$0,000~~	~~$1,750,000~~	~~$0,000~~	~~$0,000~~
PE	Transportation Funding Act (HB 170)	AUTH	2021	**$10,159,568**	~~$0,000~~	~~$10,159,568~~	~~$0,000~~	~~$0,000~~
ROW	Transportation Funding Act (HB 170)		2022	**$18,000,000**	$0,000	$18,000,000	$0,000	$0,000
UTL	Transportation Funding Act (HB 170)		2024	**$4,000,000**	$0,000	$4,000,000	$0,000	$0,000
CST	Transportation Funding Act (HB 170)		2024	**$47,000,000**	$0,000	$47,000,000	$0,000	$0,000
				$81,925,568	**$0,000**	**$81,925,568**	**$0,000**	**$0,000**

SCP: Scoping PE: Preliminary engineering / engineering / design / planning PE-OV: GDOT oversight services for engineering ROW: Right-of-way Acquistion
UTL: Utility relocation CST: Construction / Implementation ALL: Total estimated cost, inclusive of all phases

Atlanta Region's Plan RTP (2020) PROJECT FACT SHEET

Short Title	FENCE ROAD CONNECTOR - NEW ALIGNMENT FROM FENCE ROAD TO US 29 (WINDER HIGHWAY) APPROXIMATELY 0.25 MILES NORTH OF SR 316
GDOT Project No.	0013896
Federal ID No.	N/A
Status	Programmed
Service Type	Roadway / Operations & Safety
Sponsor	Gwinnett County
Jurisdiction	Gwinnett County
Analysis Level	In the Region's Air Quality Conformity Analysis



Existing Thru Lane	0	**LCI**		**Network Year**	2030
Planned Thru Lane	2	**Flex**		**Corridor Length**	0.5 miles

Detailed Description and Justification

This project includes the closure of the existing Fence Road intersection with SR 316 and construction of Fence Road Connector between existing Fence Road to the west and the ramp terminus of SR 316 ramps with US 29/SR 8 Winder Hwy to the east. Fence Road Connector aligns with the existing QT driveway access to US 29/SR 8 Winder Hwy. The Fence Road Connector Bridge will span over existing CSX Railroad. MSE walls will be used at both bridge approaches due to the alignment proximity to the existing cemetery and businesses. The project length is approximately 0.2 mile.

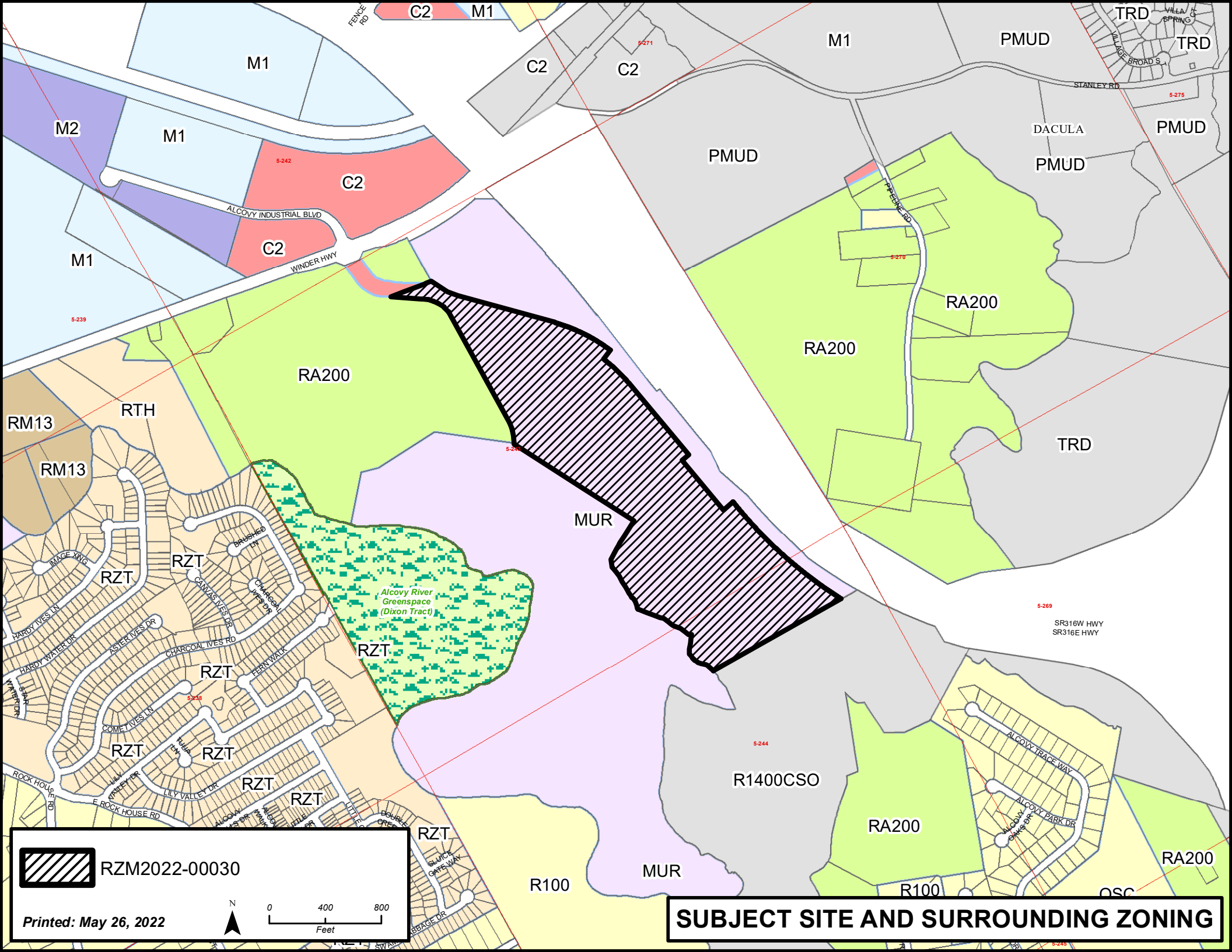
Phase Status & Funding Information		Status	FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
					FEDERAL	STATE	BONDS	LOCAL/PRIVATE
PE	Transportation Funding Act (HB 170)	AUTH	2017	**$168,000**	~~$0,000~~	~~$168,000~~	~~$0,000~~	~~$0,000~~
PE	Transportation Funding Act (HB 170)	AUTH	2021	**$448,477**	~~$0,000~~	~~$448,477~~	~~$0,000~~	~~$0,000~~
ROW	Transportation Funding Act (HB 170)		2022	**$3,000,000**	$0,000	$3,000,000	$0,000	$0,000
UTL	Transportation Funding Act (HB 170)		2024	**$400,000**	$0,000	$400,000	$0,000	$0,000
CST	Transportation Funding Act (HB 170)		2024	**$5,000,000**	$0,000	$5,000,000	$0,000	$0,000
				$9,016,477	**$0,000**	**$9,016,477**	**$0,000**	**$0,000**

SCP: Scoping PE: Preliminary engineering / engineering / design / planning PE-OV: GDOT oversight services for engineering ROW: Right-of-way Acquistion
UTL: Utility relocation CST: Construction / Implementation ALL: Total estimated cost, inclusive of all phases

Exhibit G: Maps

[attached]


ALCOVY INDUSTRIAL BLVD
WINDER HWY
SR316W HWY
SR316E HWY
CHARCOAL IVES RD
RZM2022-00030
Printed: May 26, 2022
N
0
200
400
Feet


RZM2022-00030
Printed: May 26, 2022
N
0
400
800
Feet
SUBJECT SITE AND SURROUNDING ZONING
M1
M2
C2
PMUD
TRD
RA200
RTH
RM13
RZT
MUR
R1400CSO
R100
OSC
DACULA
ALCOVY INDUSTRIAL BLVD
WINDER HWY
STANLEY RD
PIPELINE RD
FENCE RD
SR316W HWY
SR316E HWY
Alcovy River Greenspace (Dixon Tract)
IMAGE XING
HARDY IVES LN
HARDY WATER DR
ASTER IVES DR
CANVAS IVES DR
CHARCOAL IVES DR
CHARCOAL IVES RD
FERN WALK
COMET IVES LN
LILY VALLEY DR
ROCK HOUSE RD
E ROCK HOUSE RD
SLUICE GATE WAY
ALCOVY TRACE WAY
ALCOVY PARK DR

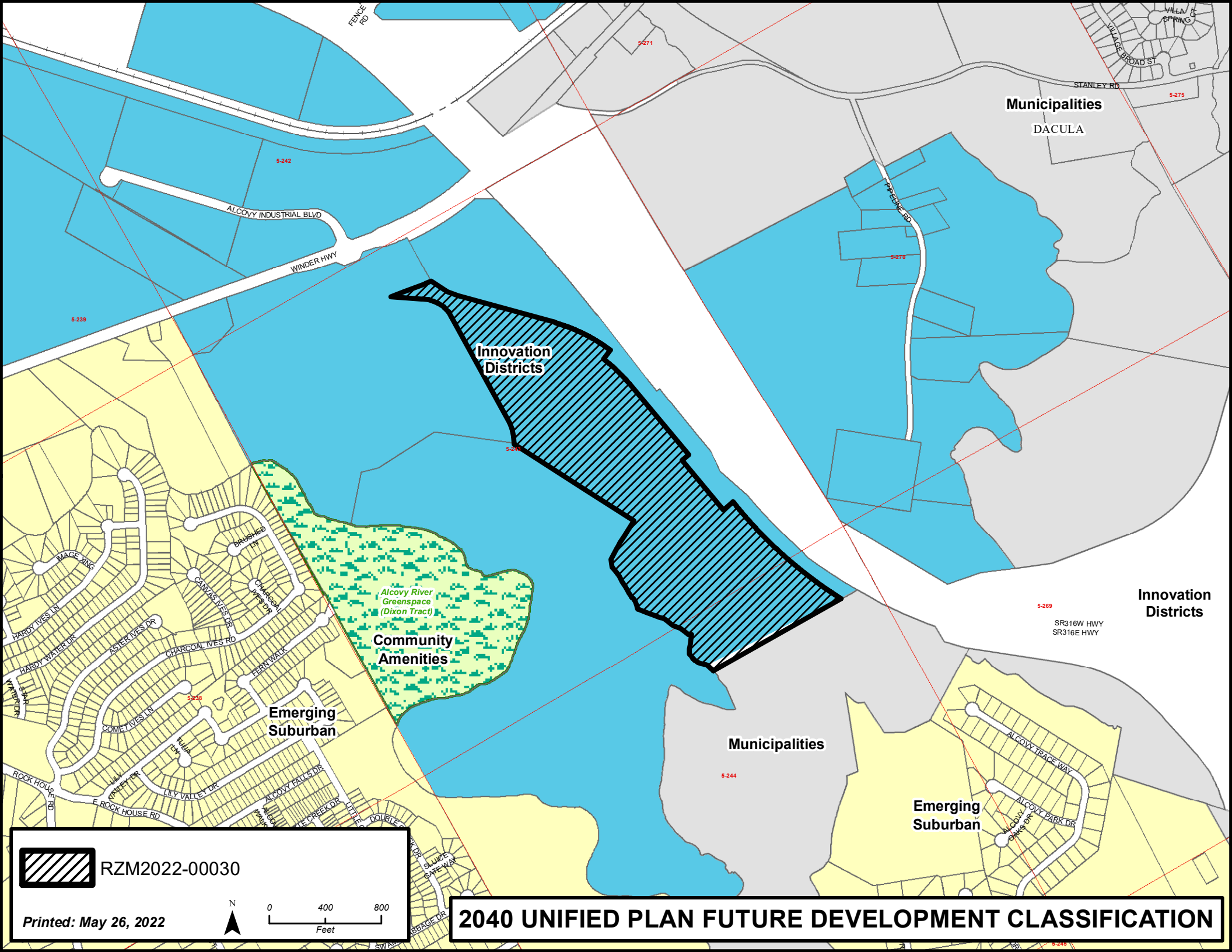

Municipalities
DACULA
Innovation Districts
Alcovy River Greenspace (Dixon Tract)
Community Amenities
Emerging Suburban
Municipalities
Innovation Districts
Emerging Suburban
ALCOVY INDUSTRIAL BLVD
WINDER HWY
PIPELINE RD
STANLEY RD
VILLAGE BROAD ST
FENCE RD
SR316W HWY
SR316E HWY
MAGE XING
BRUSHED LN
CANVAS IVES DR
CHARCOAL IVES DR
HARDY IVES LN
HARDY WATER DR
ASTER IVES DR
CHARCOAL IVES RD
FERN WALK
STAR WATER DR
COMET IVES LN
LILY VALLEY DR
E ROCK HOUSE RD
ROCK HOUSE RD
ALCOVY FALLS DR
ALCOVY TRACE WAY
ALCOVY PARK DR
RZM2022-00030
Printed: May 26, 2022
N
0
400
800
Feet
2040 UNIFIED PLAN FUTURE DEVELOPMENT CLASSIFICATION

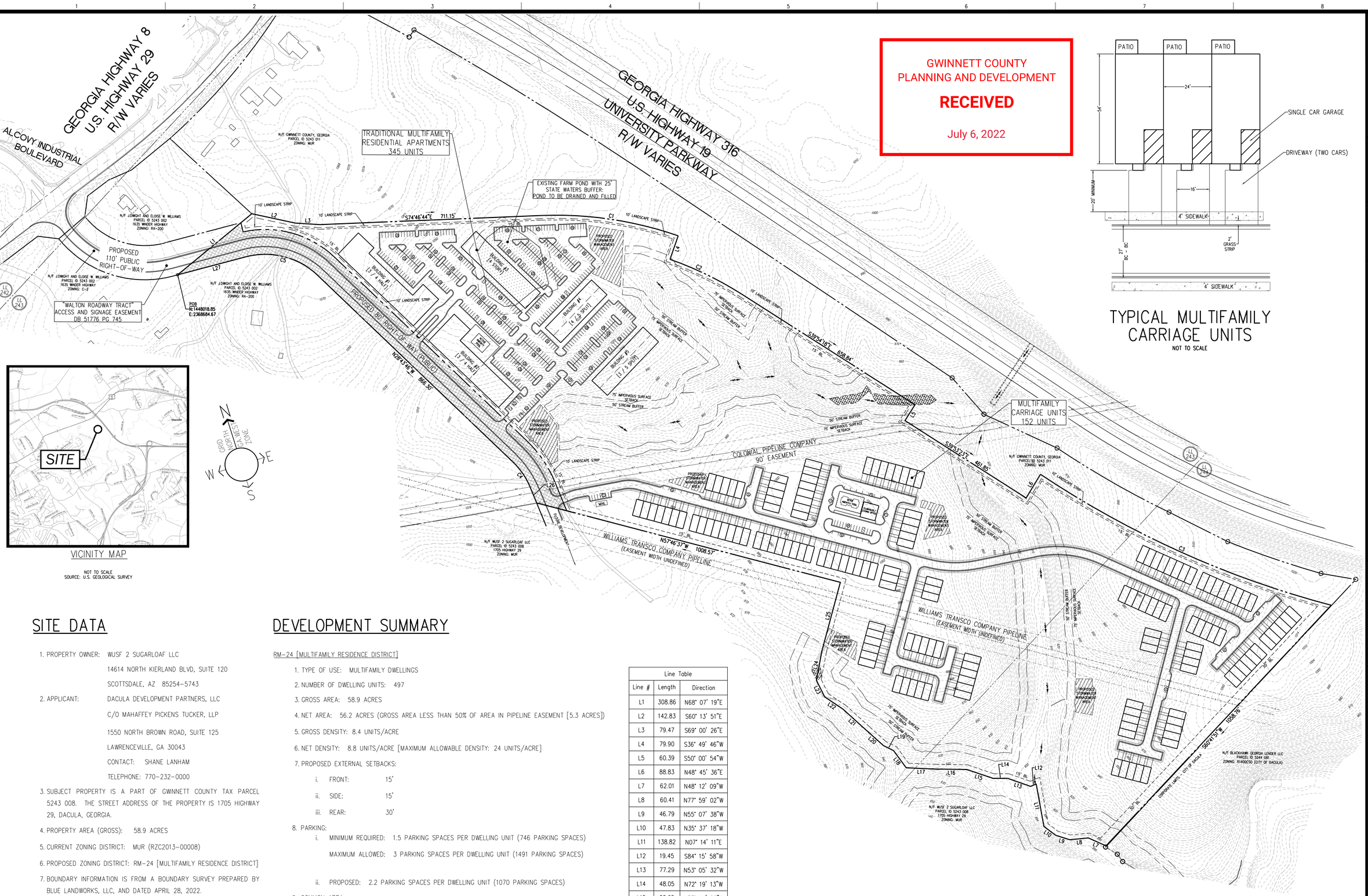
Exhibit H: Site Plan Presented at the July 6, 2022 Planning Commission Public Hearing

[attached]

GWINNETT COUNTY
PLANNING AND DEVELOPMENT

RECEIVED

July 6, 2022



TYPICAL MULTIFAMILY CARRIAGE UNITS

NOT TO SCALE

VICINITY MAP

NOT TO SCALE
SOURCE: U.S. GEOLOGICAL SURVEY

SITE DATA

1. PROPERTY OWNER: WUSF 2 SUGARLOAF LLC
   14614 NORTH KIERLAND BLVD, SUITE 120
   SCOTTSDALE, AZ 85254-5743
2. APPLICANT: DACULA DEVELOPMENT PARTNERS, LLC
   C/O MAHAFFEY PICKENS TUCKER, LLP
   1550 NORTH BROWN ROAD, SUITE 125
   LAWRENCEVILLE, GA 30043
   CONTACT: SHANE LANHAM
   TELEPHONE: 770-232-0000
3. SUBJECT PROPERTY IS A PART OF GWINNETT COUNTY TAX PARCEL 5243 008. THE STREET ADDRESS OF THE PROPERTY IS 1705 HIGHWAY 29, DACULA, GEORGIA.
4. PROPERTY AREA (GROSS): 58.9 ACRES
5. CURRENT ZONING DISTRICT: MUR (RZC2013-00008)
6. PROPOSED ZONING DISTRICT: RM-24 [MULTIFAMILY RESIDENCE DISTRICT]
7. BOUNDARY INFORMATION IS FROM A BOUNDARY SURVEY PREPARED BY BLUE LANDWORKS, LLC, AND DATED APRIL 28, 2022.
8. TOPOGRAPHIC INFORMATION BASED ON GWINNETT COUNTY GIS, DATUM REFERENCE NGVD 1989.
9. NO PORTION OF THIS PROPERTY IS LOCATED WITHIN A DESIGNATED FLOOD HAZARD AREA PER FLOOD INSURANCE RATE MAP COMMUNITY PANEL NO 13135C0076F, EFFECTIVE DATE OF SEPTEMBER 29, 2006.
10. WATER AND SANITARY SEWER SERVICE TO BE PROVIDED BY GWINNETT COUNTY.
11. A 50-FOOT UNDISTURBED BUFFER WILL BE MAINTAINED ADJACENT TO ALL STATE WATERS, EXCEPT FOR APPROVED TRANSPORTATION AND UTILITY CROSSINGS.
12. THIS SITE PLAN IS CONCEPTUAL IN NATURE AND IS SUBJECT TO CHANGE.

DEVELOPMENT SUMMARY

RM-24 [MULTIFAMILY RESIDENCE DISTRICT]

1. TYPE OF USE: MULTIFAMILY DWELLINGS
2. NUMBER OF DWELLING UNITS: 497
3. GROSS AREA: 58.9 ACRES
4. NET AREA: 56.2 ACRES (GROSS AREA LESS THAN 50% OF AREA IN PIPELINE EASEMENT [5.3 ACRES])
5. GROSS DENSITY: 8.4 UNITS/ACRE
6. NET DENSITY: 8.8 UNITS/ACRE [MAXIMUM ALLOWABLE DENSITY: 24 UNITS/ACRE]
7. PROPOSED EXTERNAL SETBACKS:
   i. FRONT: 15'
   ii. SIDE: 15'
   iii. REAR: 30'
8. PARKING:
   i. MINIMUM REQUIRED: 1.5 PARKING SPACES PER DWELLING UNIT (746 PARKING SPACES)
   MAXIMUM ALLOWED: 3 PARKING SPACES PER DWELLING UNIT (1491 PARKING SPACES)
   ii. PROPOSED: 2.2 PARKING SPACES PER DWELLING UNIT (1070 PARKING SPACES)
9. COMMON AREA:
   ii. MINIMUM REQUIRED: 11.9 ACRES (20%)
   iii. PROVIDED: 12.3 ACRES (21%)

BUILDING SUMMARY:

APARTMENTS: 415,000 SF (345 UNITS)
CARRIAGE UNITS: 145,000 SF (152 UNITS)

Line Table		
Line #	Length	Direction
L1	308.86	N68° 07' 19"E
L2	142.83	S60° 13' 51"E
L3	79.47	S69° 00' 26"E
L4	79.90	S36° 49' 46"W
L5	60.39	S50° 00' 54"W
L6	88.83	N48° 45' 36"E
L7	62.01	N48° 12' 09"W
L8	60.41	N77° 59' 02"W
L9	46.79	N55° 07' 38"W
L10	47.83	N35° 37' 18"W
L11	138.82	N07° 14' 11"E
L12	19.45	S84° 15' 58"W
L13	77.29	N53° 05' 32"W
L14	48.05	N72° 19' 13"W
L15	88.65	N53° 44' 00"W
L16	97.82	N71° 33' 12"W
L17	97.03	N70° 02' 43"W
L18	68.58	N18° 43' 06"W
L19	36.14	N46° 20' 27"W
L20	75.89	N30° 29' 32"W
L21	99.34	N30° 20' 09"W
L22	70.78	N38° 37' 24"W
L23	59.73	N09° 00' 05"W
L24	96.93	N28° 16' 18"E
L25	226.86	N32° 38' 54"E
L26	52.98	N04° 47' 44"W
L27	225.77	N87° 14' 34"W

Curve Table				
Curve #	Arc Length	Radius	Chord Bearing	Chord Distance
C1	448.15	1190.00	S64° 00' 03"E	445.51
C2	258.37	1110.00	S46° 29' 08"E	257.79
C3	1029.73	3114.79	S48° 11' 31"E	1025.05
C4	102.10	245.00	N16° 49' 43"W	101.36
C5	250.09	245.00	N58° 03' 44"W	239.38

BLUE LANDWORKS
CONSULTING ENGINEERS & SURVEYORS
LICENSE # PE7005518
LICENSE # LSF001044
5019 WEST BROAD STREET
SUITE M100
SUGAR HILL, GEORGIA 30518
TELEPHONE: (678) 804-8586
INFO@BLUELANDWORKS.COM
WWW.BLUELANDWORKS.COM

ISSUE #	DATE	REVISIONS
1	04/19/22	PRE-APPLICATION CONFERENCE
2	05/19/22	REZ - INITIAL SUBMITTAL
3	07/01/22	ADDRESSING COUNTY COMMENTS
4	07/05/22	REVISE HEIGHT OF BUILDING #3, ADD WILLIAMS TRANSCO LABEL

SCALE: 1" = 100'
0 100 200 300 feet
scale

SUGARLOAF CROSSING
1705 HIGHWAY 29, DACULA, GEORGIA

5TH LAND DISTRICT
A PORTION OF PARCEL 5243 008

LAND LOTS 243, 244
GWINNETT COUNTY, GA
GEORGIA

DRAWN BY:

REZONING EXHIBIT

PROJECT# 2021.040
REZ

V:\2021-040 - Sugarloaf Crossing - Dacula\1000 - Planning\Sugarloaf Crossing Rezoning Exhibit.dwg, REZ - 7/5/2022 12:28 PM by Grant Crowe

GWINNETT COUNTY
PLANNING AND DEVELOPMENT

RECEIVED

5/5/2022

Gwinnett County Planning Division
Rezoning Application
Last Updated 5/2021

REZONING APPLICATION

AN APPLICATION TO AMEND THE OFFICIAL ZONING MAP OF GWINNETT COUNTY, GA.

APPLICANT INFORMATION	PROPERTY OWNER INFORMATION
NAME: Dacula Development Partners, LLC c/o Mahaffey Pickens Tucker, LLP	NAME: WUSF 2 Sugarloaf, LLC
ADDRESS: 1550 North Brown Road, Suite 125	ADDRESS: 8800 N. Gainey Center Dr., Suite 345 ~~14614 N Kierland Blvd, Ste 120~~
CITY: Lawrenceville	CITY: Scottsdale
STATE: Georgia ZIP: 30043	STATE: Arizona ZIP: 85258 ~~85254~~
PHONE: 770 232 0000	PHONE: 770 232 0000

CONTACT PERSON: Shane Lanham PHONE: 770 232 0000

CONTACT'S E-MAIL: slanham@mptlawfirm.com

APPLICANT IS THE:

☐ OWNER'S AGENT ☐ PROPERTY OWNER ☑ CONTRACT PURCHASER

PRESENT ZONING DISTRICTS(S): MU-R REQUESTED ZONING DISTRICT: RM-24

PARCEL NUMBER(S): 5243 008 (portion) ACREAGE: +/- 58.93

ADDRESS OF PROPERTY: 1705 Highway 29

PROPOSED DEVELOPMENT: Multifamily residential development

RESIDENTIAL DEVELOPMENT	NON-RESIDENTIAL DEVELOPMENT
No. of Lots/Dwelling Units 497	No. of Buildings/Lots: NA
Dwelling Unit Size (Sq. Ft.): Varies per UDO	Total Building Sq. Ft. NA
Gross Density: 8.4 units per acre	Density: NA
Net Density: 8.8 units per acre	

PLEASE ATTACH A LETTER OF INTENT EXPLAINING WHAT IS PROPOSED

LAND DESCRIPTION

SUGARLOAF CROSSING

1705 HIGHWAY 29
DACULA, GEORGIA

All that tract or parcel of land lying and being in Land Lot 243 and 244 of the 5th Land District Gwinnett County Georgia as shown on a Boundary Survey prepared by Blue Landworks containing 58.93 acres and being more particularly described as follows.

Commencing at an iron pin found (axle) at the Land Lot corners of Land Lots 238, 239, 242, and 243 Thence North 73 degrees 53 minutes 36 seconds East 1,483.38 feet to at an iron pin found (1/2" rebar with cap) said pin having the state plane coordinates of **N:1448018.85 E:2368684.67** Georgia West Zone and being the **True Point of Beginning.**

Thence North 68 degrees 07 minutes 19 seconds East 308.86 feet to an iron pin found (1/2" rebar with cap).

Thence South 60 degrees 13 minutes 51 seconds East 142.83 feet to a point.

Thence South 69 degrees 00 minutes 26 seconds East 79.47 feet to a point.

Thence South 74 degrees 46 minutes 44 seconds East 711.15 feet to a point.

Thence 448.15 feet along the arc of a curve to the right having a radius of 1,190.00 feet and a chord bearing and distance of South 64 degrees 00 minutes 03 seconds East 445.51 feet to an iron pin found (1/2" rebar with cap).

Thence South 36 degrees 49 minutes 46 seconds West 79.90 feet to an iron pin found (1/2" rebar with cap).

Thence 258.37 feet along the arc of a curve to the right having a radius of 1110.00 feet and a chord bearing and distance of South 46 degrees 29 minutes 08 seconds East 257.79 feet to an iron pin found (1/2" rebar with cap).

Thence South 39 degrees 54 minutes 18 seconds East 658.84 feet to an iron pin found (1/2" rebar with cap).

Thence South 50 degrees 00 minutes 54 seconds West 60.39 feet to an iron pin found (1/2" rebar with cap).

Thence South 39 degrees 53 minutes 23 seconds East 461.85 feet to an iron pin found (1/2" rebar with cap).

Thence North 48 degrees 45 minutes 36 seconds East 88.83 feet to an iron pin found (1/2" rebar with cap).

Thence 1029.73 along the arc of a curve to the left having a radius of 3114.79 feet and a chord bearing and distance of South 48 degrees 11 minutes 31 seconds East 1,025.05 feet to an iron pin found (1/2" rebar with cap).

4-28-2022

Thence South 60 degrees 41 minutes 51 seconds West 1,058.76 feet to a point in the centerline of a Creek.

Thence continuing along said centerline creek the following calls North 48 degrees 12 minutes 09 seconds West 62.01 feet to a point.

Thence North 77 degrees 59 minutes 02 seconds West 60.41 feet to a point.

Thence North 55 degrees 07 minutes 38 seconds West 46.79 feet to a point.

Thence North 35 degrees 37 minutes 18 seconds West 47.83 feet to a point

Thence North 07 degrees 14 minutes 11 seconds East 138.82 feet to a point.

Thence South 84 degrees 15 minutes 58 seconds West 19.45 feet to a point.

Thence North 53 degrees 05 minutes 32 seconds West 77.29 feet to a point.

Thence North 72 degrees 19 minutes 13 seconds West 48.05 feet to a point.

Thence North 53 degrees 44 minutes 00 seconds West 88.65 feet to a point.

Thence North 71 degrees 33 minutes 12 seconds West 97.82 feet to a point.

Thence North 70 degrees 02 minutes 43 seconds West 97.03 feet to a point.

Thence North 18 degrees 43 minutes 06 seconds West 68.58 feet to a point.

Thence North 46 degrees 20 minutes 27 seconds West 36.14 feet to a point.

Thence North 30 degrees 29 minutes 32 seconds West 75.89 feet to a point.

Thence North 30 degrees 20 minutes 09 seconds West 99.34 feet to a point.

Thence North 38 degrees 37 minutes 24 seconds West 70.78 feet to a point.

Thence North 09 degrees 00 minutes 05 seconds West 59.73 feet to a point.

Thence North 28 degrees 16 minutes 18 seconds East 96.93 feet to a point (said point being at a spring head).

Thence North 32 degrees 38 minutes 54 seconds East 226.86 feet to a point on the northern margin of a 90-foot easement to Colonial Pipeline Company.

Thence continuing along said northern margin North 57 degrees 46 minutes 37 seconds West 1,008.57 feet to a point on the northern margin of a 90-foot easement to colonial pipeline company and the southern margin of an intersecting 90-foot easement to Colonial Pipeline Company.

Thence North 04 degrees 47 minutes 44 seconds West 52.98 fee to an iron pin found (1/2" rebar with cap).

Thence 102.10 feet along the arc of a curve to the left having a radius of 245.00 feet and a chord bearing and distance of North 16 degrees 49 minutes 43 seconds West 101.36 feet to an iron pin found (1/2" rebar with cap).

Thence North 28 degrees 43 minutes 46 seconds West 866.30 feet to an iron pin found (1/2" rebar with cap).

Thence 250.09 feet along the arc of a curve to the left having a radius of 245.00 feet and a chord bearing and distance of North 58 degrees 03 minutes 44 seconds West 239.38 feet to an iron pin found (1/2" rebar with cap).

Thence North 87 degrees 14 minutes 34 seconds West 225.77 feet to an iron pin found (1/2" rebar with cap) said pin being the **True Point of Beginning.**

GWINNETT COUNTY
PLANNING AND DEVELOPMENT
RECEIVED
5/5/2022

SURVEY REFERENCES

1. EXEMPTION PLAT PREPARED BY ROCHESTER AND ASSOCIATES INC FOR DWIGHT & ELOISE WILLIAMS DATED APRIL 17, 2012, AND RECORDED IN THE GWINNETT COUNTY RECORDS AT PLAT BOOK 129, PAGE 156.
2. ALTA/ACSM LAND TITLE SURVEY PREPARED BY ROCHESTER AND ASSOCIATES INC DATED MARCH 17TH, 2011
3. GWINNETT COUNTY DEED BOOK 51776 PAGE 735

GENERAL NOTES

1. IPS (IRON PIN SET) IS 1/2" RE-BAR; NS (NAIL SET) IS MAGNAIL.
2. THERE WAS NO OBSERVED EVIDENCE OF CURRENT EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS.
3. THERE WAS NO OBSERVED EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS.
4. THE LOCATIONS OF UNDERGROUND UTILITIES ARE TAKEN FROM VISIBLE EVIDENCE, CONSTRUCTION PLANS AND/OR PREVIOUS SURVEYS AND SHOULD BE CONSIDERED APPROXIMATE.
5. OTHER UNDERGROUND UTILITIES MAY BE LOCATED ON THIS PROPERTY. PIPE SIZES ARE TAKEN FROM CONSTRUCTION PLANS AND/OR PREVIOUS SURVEYS WHERE NOT VERIFIABLE.

SURVEY NOTES

1. PROPERTY CONTAINS 58.93 ACRES
2. THIS PARCELS ADDRESS IS SHOWN ON GWINNETT COUNTY RECORDS AS BEING:1705 HIGHWAY 29, DACULA, 30045.
3. SAID DESCRIBED PROPERTY DOES NOT LIE WITHIN A FLOODPLAIN ACCORDING TO FLOOD INSURANCE RATE MAP NO. 13135C0075F. WITH A DATE OF IDENTIFICATION OF SEPTEMBER 29TH 2006, FOR COMMUNITY NUMBER 13135C, IN GWINNETT COUNTY, STATE OF GEORGIA, WHICH IS THE CURRENT FLOOD INSURANCE RATE MAP FOR THE COMMUNITY IN WHICH SAID PROPERTY IS SITUATED.
4. PROPERTY IS IDENTIFIED AS A PORTION OF GWINNETT COUNTY TAX PARCEL: 5243 008

SURVEYOR'S CERTIFICATION BOUNDARY SURVEY

THE PROPERTY HEREON LIES COMPLETELY WITHIN A JURISDICTION WHICH DOES NOT REVIEW OR APPROVE ANY PLATS OR THIS TYPE OF PLAT PRIOR TO RECORDING. RECORDATION OF THIS PLAT DOES NOT IMPLY APPROVAL OF ANY LOCAL JURISDICTION, AVAILABILITY OF PERMITS, COMPLIANCE WITH LOCAL REGULATIONS OR REQUIREMENTS, OR SUITABILITY FOR ANY USE OR PURPOSE OF THE LAND. FURTHERMORE, THE UNDERSIGNED LAND SURVEYOR CERTIFIES THAT THIS PLAT COMPLIES WITH THE MINIMUM TECHNICAL STANDARDS FOR PROPERTY SURVEYS IN GEORGIA AS SET FORTH IN THE RULES AND REGULATIONS OF THE GEORGIA BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS AND AS SET FORTH IN O.C.G.A. SECTION 15-6-67.

FIELD INFORMATION FOR THIS SURVEY WAS OBTAINED THE EQUIPMENT USED WAS A 20TL GNSS RECEIVER WITH CARLSON SURVCE DATA COLLECTION SOFTWARE. ALL COORDINATES ARE BASED ON NAD83(2011) AND GEOID12B. NETWORK RTK CORRECTIONS WERE RECEIVED VIA A CELLULAR MODEM. THE TYPE OF SURVEY WAS NETWORK RTK UTILIZING THE TRIMBLE VRS REAL TIME NETWORK OPERATED BY EGPS SOLUTIONS, INC. THE RELATIVE POSITIONAL ACCURACY, AS CALCULATED ACCORDING TO THE FEDERAL GEOGRAPHIC DATA COMMITTEE PART 3: NATIONAL STANDARD FOR SPATIAL DATA ACCURACY, IS .04 FT. HORIZONTAL AND .07 FT. VERTICAL AT THE 95% CONFIDENCE LEVEL. THIS MAP OR PLAT HAS BEEN CALCULATED FOR CLOSURE AND IS FOUND TO BE ACCURATE WITHIN ONE FOOT IN 504,286 FEET.

DATE OF LAST FIELD WORK: 04/26/2022

DATE PLAT WAS SEALED: 04/28/2022

GEORGIA REGISTERED No. 2767 LAND SURVEYOR THOMAS W. WOODSMALL

NAME: THOMAS W. WOODSMALL
REGISTRATION/LICENSE NUMBER: 2767 (GEORGIA)
DATE OF EXPIRATION: DECEMBER 31, 2022

LAND DESCRIPTION

ALL THAT TRACT OR PARCEL OF LAND LYING AND BEING IN LAND LOT 243 AND 244 OF THE 5TH/ LAND DISTRICT GWINNETT COUNTY GEORGIA AS SHOWN ON A BOUNDARY SURVEY PREPARED BY BLUE LANDWORKS CONTAINING 58.93 ACRES AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS.

COMMENCING AT AN IRON PIN FOUND (AXLE) AT THE LAND LOT CORNERS OF LAND LOTS 238, 239, 242, AND 243 THENCE NORTH 73 DEGREES 53 MINUTES 36 SECONDS EAST 1,483.38 FEET TO AT AN IRON PIN FOUND (1/2" REBAR WITH CAP) SAID PIN HAVING THE STATE PLANE COORDINATES OF **N:1448018.85 E:2368684.67** GEORGIA WEST ZONE AND BEING THE **TRUE POINT OF BEGINNING.**

THENCE NORTH 68 DEGREES 07 MINUTES 19 SECONDS EAST 308.86 FEET TO AN IRON PIN FOUND (1/2"REBAR WITH CAP).
THENCE SOUTH 60 DEGREES 13 MINUTES 51 SECONDS EAST 142.83 FEET TO A POINT.
THENCE SOUTH 69 DEGREES 00 MINUTES 26 SECONDS EAST 79.47 FEET TO A POINT.
THENCE SOUTH 74 DEGREES 46 MINUTES 44 SECONDS EAST 711.15 FEET TO A POINT.
THENCE 448.15 FEET ALONG THE ARC OF A CURVE TO THE RIGHT HAVING A RADIUS OF 1,190.00 FEET AND A CHORD BEARING AND DISTANCE OF SOUTH 64 DEGREES 00 MINUTES 03 SECONDS EAST 445.51 FEET TO AN IRON PIN FOUND (1/2" REBAR WITH CAP).
THENCE SOUTH 36 DEGREES 49 MINUTES 46 SECONDS WEST 79.90 FEET TO AN IRON PIN FOUND (1/2"REBAR WITH CAP).
THENCE 258.37 FEET ALONG THE ARC OF A CURVE TO THE RIGHT HAVING A RADIUS OF 1110.00 FEET AND A CHORD BEARING AND DISTANCE OF SOUTH 46 DEGREES 29 MINUTES 08 SECONDS EAST 257.79 FEET TO AN IRON PIN FOUND (1/2" REBAR WITH CAP).
THENCE SOUTH 39 DEGREES 54 MINUTES 18 SECONDS EAST 658.84 FEET TO AN IRON PIN FOUND (1/2"REBAR WITH CAP).
THENCE SOUTH 50 DEGREES 00 MINUTES 54 SECONDS WEST 60.39 FEET TO AN IRON PIN FOUND (1/2"REBAR WITH CAP).
THENCE SOUTH 39 DEGREES 53 MINUTES 23 SECONDS EAST 461.85 FEET TO AN IRON PIN FOUND (1/2"REBAR WITH CAP).
THENCE NORTH 48 DEGREES 45 MINUTES 36 SECONDS EAST 88.83 FEET TO AN IRON PIN FOUND (1/2"REBAR WITH CAP).
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THENCE SOUTH 60 DEGREES 41 MINUTES 51 SECONDS WEST 1,058.76 FEET TO A POINT IN THE CENTERLINE OF A CREEK.
THENCE CONTINUING ALONG SAID CENTERLINE CREEK THE FOLLOWING CALLS NORTH 48 DEGREES 12 MINUTES 09 SECONDS WEST 62.01 FEET TO A POINT.
THENCE NORTH 77 DEGREES 59 MINUTES 02 SECONDS WEST 60.41 FEET TO A POINT.
THENCE NORTH 55 DEGREES 07 MINUTES 38 SECONDS WEST 46.79 FEET TO A POINT.
THENCE NORTH 35 DEGREES 37 MINUTES 18 SECONDS WEST 47.83 FEET TO A POINT
THENCE NORTH 07 DEGREES 14 MINUTES 11 SECONDS EAST 138.82 FEET TO A POINT.
THENCE SOUTH 84 DEGREES 15 MINUTES 58 SECONDS WEST 19.45 FEET TO A POINT.
THENCE NORTH 53 DEGREES 05 MINUTES 32 SECONDS WEST 77.29 FEET TO A POINT.
THENCE NORTH 72 DEGREES 19 MINUTES 13 SECONDS WEST 48.05 FEET TO A POINT.
THENCE NORTH 53 DEGREES 44 MINUTES 00 SECONDS WEST 88.65 FEET TO A POINT.
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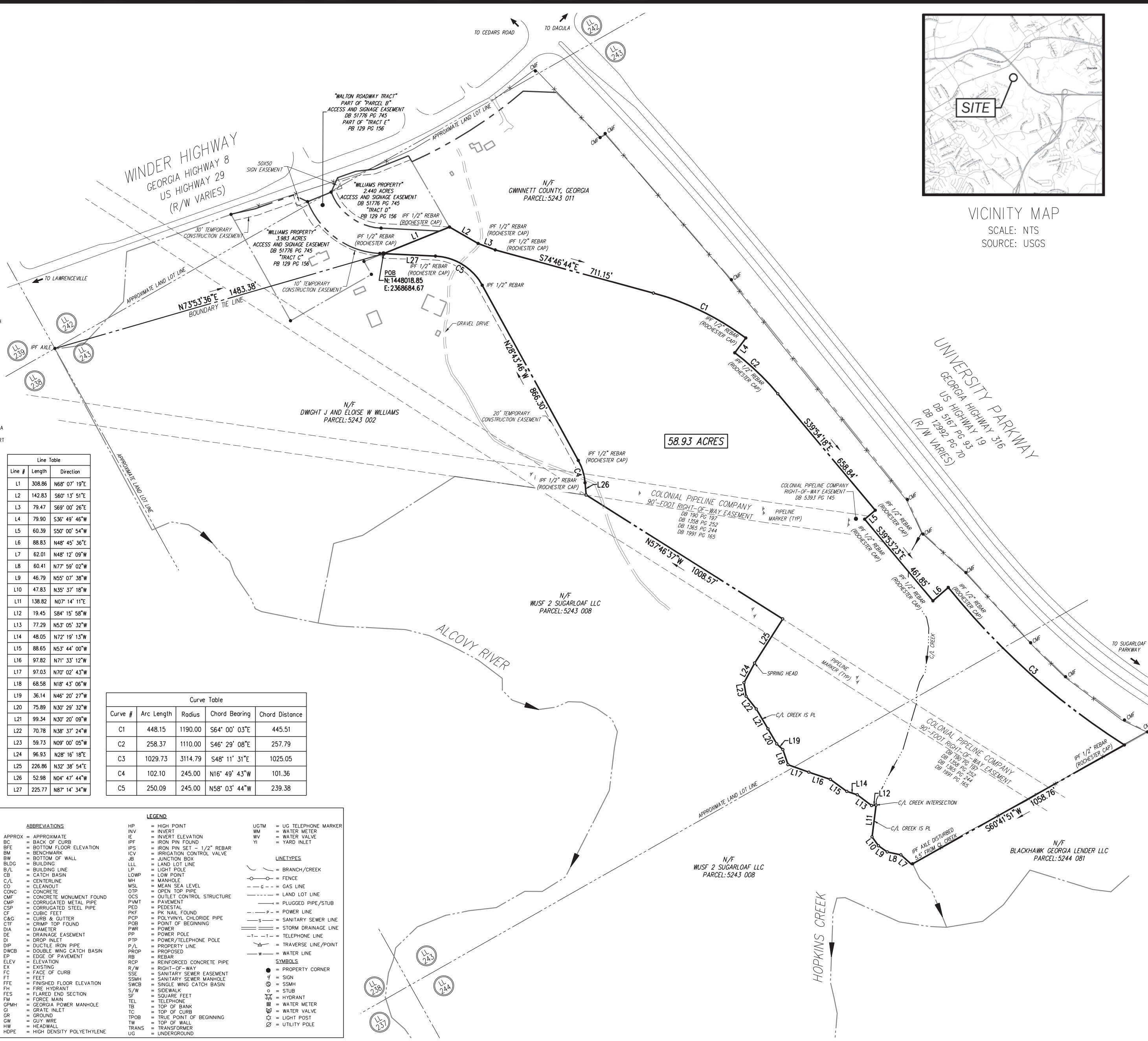
THENCE NORTH 70 DEGREES 02 MINUTES 43 SECONDS WEST 97.03 FEET TO A POINT.
THENCE NORTH 18 DEGREES 43 MINUTES 06 SECONDS WEST 68.58 FEET TO A POINT.
THENCE NORTH 46 DEGREES 20 MINUTES 27 SECONDS WEST 36.14 FEET TO A POINT.
THENCE NORTH 30 DEGREES 29 MINUTES 32 SECONDS WEST 75.89 FEET TO A POINT.
THENCE NORTH 30 DEGREES 20 MINUTES 09 SECONDS WEST 99.34 FEET TO A POINT.
THENCE NORTH 38 DEGREES 37 MINUTES 24 SECONDS WEST 70.78 FEET TO A POINT.
THENCE NORTH 09 DEGREES 00 MINUTES 05 SECONDS WEST 59.73 FEET TO A POINT.
THENCE NORTH 28 DEGREES 16 MINUTES 18 SECONDS EAST 96.93 FEET TO A POINT (SAID POINT BEING AT A SPRING HEAD).
THENCE NORTH 32 DEGREES 38 MINUTES 54 SECONDS EAST 226.86 FEET TO A POINT ON THE NORTHERN MARGIN OF A 90-FOOT EASEMENT TO COLONIAL PIPELINE COMPANY.
THENCE CONTINUING ALONG SAID NORTHERN MARGIN NORTH 57 DEGREES 46 MINUTES 37 SECONDS WEST 1,008.57 FEET TO A POINT ON THE NORTHERN MARGIN OF A 90-FOOT EASEMENT TO COLONIAL PIPELINE COMPANY AND THE SOUTHERN MARGIN OF AN INTERSECTING 90-FOOT EASEMENT TO COLONIAL PIPELINE COMPANY.
THENCE NORTH 04 DEGREES 47 MINUTES 44 SECONDS WEST 52.98 FEE TO AN IRON PIN FOUND (1/2"REBAR WITH CAP).
THENCE 102.10 FEET ALONG THE ARC OF A CURVE TO THE LEFT HAVING A RADIUS OF 245.00 FEET AND A CHORD BEARING AND DISTANCE OF NORTH 16 DEGREES 49 MINUTES 43 SECONDS WEST 101.36 FEET TO AN IRON PIN FOUND (1/2"REBAR WITH CAP).
THENCE NORTH 28 DEGREES 43 MINUTES 46 SECONDS WEST 866.30 FEET TO AN IRON PIN FOUND (1/2"REBAR WITH CAP).
THENCE 250.09 FEET ALONG THE ARC OF A CURVE TO THE LEFT HAVING A RADIUS OF 245.00 FEET AND A CHORD BEARING AND DISTANCE OF NORTH 58 DEGREES 03 MINUTES 44 SECONDS WEST 239.38 FEET TO AN IRON PIN FOUND (1/2"REBAR WITH CAP).
THENCE NORTH 87 DEGREES 14 MINUTES 34 SECONDS WEST 225.77 FEET TO AN IRON PIN FOUND (1/2" REBAR WITH CAP) SAID PIN BEING THE **TRUE POINT OF BEGINNING.**



Line Table		
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L4	79.90	S36° 49' 46"W
L5	60.39	S50° 00' 54"W
L6	88.83	N48° 45' 36"E
L7	62.01	N48° 12' 09"W
L8	60.41	N77° 59' 02"W
L9	46.79	N55° 07' 38"W
L10	47.83	N35° 37' 18"W
L11	138.82	N07° 14' 11"E
L12	19.45	S84° 15' 58"W
L13	77.29	N53° 05' 32"W
L14	48.05	N72° 19' 13"W
L15	88.65	N53° 44' 00"W
L16	97.82	N71° 33' 12"W
L17	97.03	N70° 02' 43"W
L18	68.58	N18° 43' 06"W
L19	36.14	N46° 20' 27"W
L20	75.89	N30° 29' 32"W
L21	99.34	N30° 20' 09"W
L22	70.78	N38° 37' 24"W
L23	59.73	N09° 00' 05"W
L24	96.93	N28° 16' 18"E
L25	226.86	N32° 38' 54"E
L26	52.98	N04° 47' 44"W
L27	225.77	N87° 14' 34"W

Curve Table				
Curve #	Arc Length	Radius	Chord Bearing	Chord Distance
C1	448.15	1190.00	S64° 00' 03"E	445.51
C2	258.37	1110.00	S46° 29' 08"E	257.79
C3	1029.73	3114.79	S48° 11' 31"E	1025.05
C4	102.10	245.00	N16° 49' 43"W	101.36
C5	250.09	245.00	N58° 03' 44"W	239.38

LEGEND

ABBREVIATIONS

APPROX = APPROXIMATE
BC = BACK OF CURB
BFE = BOTTOM FLOOR ELEVATION
BM = BENCHMARK
BW = BOTTOM OF WALL
BLDG = BUILDING
B/L = BUILDING LINE
CB = CATCH BASIN
C/L = CENTERLINE
CO = CLEANOUT
CONC = CONCRETE
CMF = CONCRETE MONUMENT FOUND
CMP = CORRUGATED METAL PIPE
CSP = CORRUGATED STEEL PIPE
CF = CUBIC FEET
C&G = CURB & GUTTER
CTF = CRIMP TOP FOUND
DIA = DIAMETER
DE = DRAINAGE EASEMENT
DI = DROP INLET
DIP = DUCTILE IRON PIPE
DWCB = DOUBLE WING CATCH BASIN
EP = EDGE OF PAVEMENT
ELEV = ELEVATION
EX = EXISTING
FC = FACE OF CURB
FT = FEET
FFE = FINISHED FLOOR ELEVATION
FH = FIRE HYDRANT
FES = FLARED END SECTION
FM = FORCE MAIN
GPMH = GEORGIA POWER MANHOLE
GI = GRATE INLET
GR = GROUND
GW = GUY WIRE
HW = HEADWALL
HDPE = HIGH DENSITY POLYETHYLENE
HP = HIGH POINT
INV = INVERT
IE = INVERT ELEVATION
IPF = IRON PIN FOUND
IPS = IRON PIN SET – 1/2" REBAR
ICV = IRRIGATION CONTROL VALVE
JB = JUNCTION BOX
LLL = LAND LOT LINE
LP = LIGHT POLE
LOWP = LOW POINT
MH = MANHOLE
MSL = MEAN SEA LEVEL
OTP = OPEN TOP PIPE
OCS = OUTLET CONTROL STRUCTURE
PVMT = PAVEMENT
PED = PEDESTAL
PKF = PK NAIL FOUND
PCP = POLYVINYL CHLORIDE PIPE
POB = POINT OF BEGINNING
PWR = POWER
PP = POWER POLE
PTP = POWER/TELEPHONE POLE
P/L = PROPERTY LINE
PROP = PROPOSED
RB = REBAR
RCP = REINFORCED CONCRETE PIPE
R/W = RIGHT-OF-WAY
SSE = SANITARY SEWER EASEMENT
SSMH = SANITARY SEWER MANHOLE
SWCB = SINGLE WING CATCH BASIN
S/W = SIDEWALK
SF = SQUARE FEET
TEL = TELEPHONE
TB = TOP OF BANK
TC = TOP OF CURB
TPOB = TRUE POINT OF BEGINNING
TW = TOP OF WALL
TRANS = TRANSFORMER
UG = UNDERGROUND
UGTM = UG TELEPHONE MARKER
WM = WATER METER
WV = WATER VALVE
YI = YARD INLET

LINETYPES

= BRANCH/CREEK
= FENCE
= GAS LINE
= LAND LOT LINE
= PLUGGED PIPE/STUB
= POWER LINE
= SANITARY SEWER LINE
= STORM DRAINAGE LINE
= TELEPHONE LINE
= TRAVERSE LINE/POINT
= WATER LINE

SYMBOLS

= PROPERTY CORNER
= SIGN
= SSMH
= STUB
= HYDRANT
= WATER METER
= WATER VALVE
= LIGHT POST
= UTILITY POLE

BLUE LANDWORKS
CONSULTING ENGINEERS & SURVEYORS
LICENSE # PEF005518
LICENSE # LSF001044
5019 WEST BROAD STREET
SUITE M230
SUGAR HILL, GEORGIA 30518
TELEPHONE: (678) 804-8586
INFO@BLUELANDWORKS.COM
WWW.BLUELANDWORKS.COM

PREPARED FOR:
DACULA DEVELOPMENT PARTNERS, LLC
C/O MAHAFFEY PICKENS TUCKER, LLP
1550 NORTH BROWN ROAD SUITE 125
LAWRENCEVILLE, GEORGIA 30043

ISSUE #	DATE	REVISIONS
1	04/28/22	SUBMIT FOR REVIEW

SCALE: 1" = 200'
0 200 400 600 feet
scale

1705 HIGHWAY 29
DACULA, GA 30045

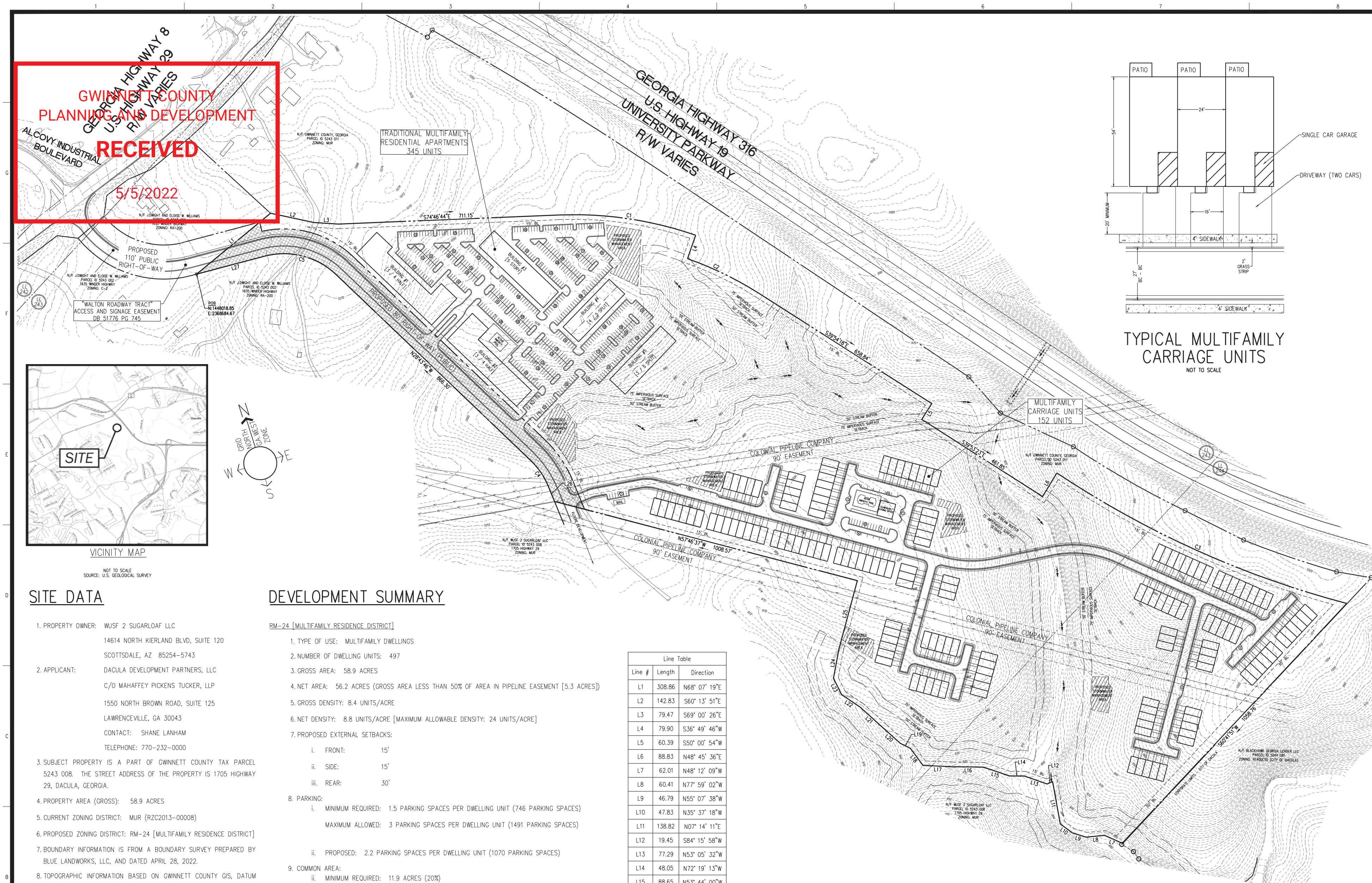
5TH LAND DISTRICT
LAND LOT(S) 243,244
A PORTION OF PARCEL 5243 008
GWINNETT COUNTY, GA
DRAWN: KO
CHECKED: SAM

BOUNDARY SURVEY

PROJECT# 2021.040

SHEET 1 OF 1

V:\2021-040 - Sugarloaf Crossing - Dacula\1000 - AutoCAD\20 - Survey\2021.040 BOUN.dwg, BOUN 4/28/2022 11:37 AM by Kyle O'Neal



VICINITY MAP

NOT TO SCALE
SOURCE: U.S. GEOLOGICAL SURVEY

TYPICAL MULTIFAMILY CARRIAGE UNITS

NOT TO SCALE

SITE DATA

1. PROPERTY OWNER: WUSF 2 SUGARLOAF LLC
   14614 NORTH KIERLAND BLVD, SUITE 120
   SCOTTSDALE, AZ 85254-5743
2. APPLICANT: DACULA DEVELOPMENT PARTNERS, LLC
   C/O MAHAFFEY PICKENS TUCKER, LLP
   1550 NORTH BROWN ROAD, SUITE 125
   LAWRENCEVILLE, GA 30043
   CONTACT: SHANE LANHAM
   TELEPHONE: 770-232-0000
3. SUBJECT PROPERTY IS A PART OF GWINNETT COUNTY TAX PARCEL 5243 008. THE STREET ADDRESS OF THE PROPERTY IS 1705 HIGHWAY 29, DACULA, GEORGIA.
4. PROPERTY AREA (GROSS): 58.9 ACRES
5. CURRENT ZONING DISTRICT: MUR (RZC2013-00008)
6. PROPOSED ZONING DISTRICT: RM-24 [MULTIFAMILY RESIDENCE DISTRICT]
7. BOUNDARY INFORMATION IS FROM A BOUNDARY SURVEY PREPARED BY BLUE LANDWORKS, LLC, AND DATED APRIL 28, 2022.
8. TOPOGRAPHIC INFORMATION BASED ON GWINNETT COUNTY GIS, DATUM REFERENCE NGVD 1989.
9. NO PORTION OF THIS PROPERTY IS LOCATED WITHIN A DESIGNATED FLOOD HAZARD AREA PER FLOOD INSURANCE RATE MAP COMMUNITY PANEL NO 13135C0076F, EFFECTIVE DATE OF SEPTEMBER 29, 2006.
10. WATER AND SANITARY SEWER SERVICE TO BE PROVIDED BY GWINNETT COUNTY.
11. A 50-FOOT UNDISTURBED BUFFER WILL BE MAINTAINED ADJACENT TO ALL STATE WATERS, EXCEPT FOR APPROVED TRANSPORTATION AND UTILITY CROSSINGS.
12. THIS SITE PLAN IS CONCEPTUAL IN NATURE AND IS SUBJECT TO CHANGE.

DEVELOPMENT SUMMARY

RM-24 [MULTIFAMILY RESIDENCE DISTRICT]

1. TYPE OF USE: MULTIFAMILY DWELLINGS
2. NUMBER OF DWELLING UNITS: 497
3. GROSS AREA: 58.9 ACRES
4. NET AREA: 56.2 ACRES (GROSS AREA LESS THAN 50% OF AREA IN PIPELINE EASEMENT [5.3 ACRES])
5. GROSS DENSITY: 8.4 UNITS/ACRE
6. NET DENSITY: 8.8 UNITS/ACRE [MAXIMUM ALLOWABLE DENSITY: 24 UNITS/ACRE]
7. PROPOSED EXTERNAL SETBACKS:
   i. FRONT: 15'
   ii. SIDE: 15'
   iii. REAR: 30'
8. PARKING:
   i. MINIMUM REQUIRED: 1.5 PARKING SPACES PER DWELLING UNIT (746 PARKING SPACES)
   MAXIMUM ALLOWED: 3 PARKING SPACES PER DWELLING UNIT (1491 PARKING SPACES)
   ii. PROPOSED: 2.2 PARKING SPACES PER DWELLING UNIT (1070 PARKING SPACES)
9. COMMON AREA:
   ii. MINIMUM REQUIRED: 11.9 ACRES (20%)
   iii. PROVIDED: 12.3 ACRES (21%)

Line Table

Line #	Length	Direction
L1	308.86	N68° 07' 19"E
L2	142.83	S60° 13' 51"E
L3	79.47	S69° 00' 26"E
L4	79.90	S36° 49' 46"W
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CONSULTING ENGINEERS & SURVEYORS
5019 WEST BROAD STREET
SUGAR HILL, GEORGIA 30518
WWW.BLUELANDWORKS.COM

SCALE: 1" = 100'

SUGARLOAF CROSSING
1705 HIGHWAY 29, DACULA, GEORGIA

REZONING EXHIBIT

PROJECT# 2021.040

REZ

REZONING APPLICANT'S RESPONSE

STANDARDS GOVERNING THE EXERCISE OF THE ZONING POWER

PURSUANT TO REQUIREMENTS OF THE UNIFIED DEVELOPMENT ORDINANCE, THE BOARD OF COMMISSIONERS FINDS THAT THE FOLLOWING STANDARDS ARE RELEVANT IN BALANCING THE INTEREST IN PROMOTING THE PUBLIC HEALTH, SAFETY, MORALITY OR GENERAL WELFARE AGAINST THE RIGHT TO THE UNRESTRICTED USE OF PROPERTY AND SHALL GOVERN THE EXERCISE OF THE ZONING POWER.

PLEASE RESPOND TO THE FOLLOWING STANDARDS IN THE SPACE PROVIDED OR USE AN ATTACHMENT AS NECESSARY:

(A) WHETHER A PROPOSED REZONING WILL PERMIT A USE THAT IS SUITABLE IN VIEW OF THE USE AND DEVELOPMENT OF ADJACENT AND NEARBY PROPERTY:

Please see attached

(B) WHETHER A PROPOSED REZONING WILL ADVERSELY AFFECT THE EXISTING USE OR USABILITY OF ADJACENT OR NEARBY PROPERTY:

Please see attached

(C) WHETHER THE PROPERTY TO BE AFFECTED BY A PROPOSED REZONING HAS REASONABLE ECONOMIC USE AS CURRENTLY ZONED:

Please see attached

(D) WHETHER THE PROPOSED REZONING WILL RESULT IN A USE WHICH WILL OR COULD CAUSE AN EXCESSIVE OR BURDENSOME USE OF EXISTING STREETS, TRANSPORTATION FACILITIES, UTILITIES, OR SCHOOLS:

Please see attached

(E) WHETHER THE PROPOSED REZONING IS IN CONFORMITY WITH THE POLICY AND INTENT OF THE LAND USE PLAN:

Please see attached

(F) WHETHER THERE ARE OTHER EXISTING OR CHANGING CONDITIONS AFFECTING THE USE AND DEVELOPMENT OF THE PROPERTY WHICH GIVE SUPPORTING GROUNDS FOR EITHER APPROVAL OR DISAPPROVAL OF THE PROPOSED REZONING:

Please see attached

REZONING APPLICANT'S RESPONSE

STANDARDS GOVERNING THE EXERCISE OF THE ZONING POWER

(A) Yes, approval of the Application will permit a use that is suitable in view of the use and development of adjacent and nearby property. The Property is located in close proximity to land zoned for commercial, industrial, and residential uses.

(B) No, approval of the Application will not adversely affect the existing use or usability of any of the nearby properties. Rather, the proposed development will complement the diverse mix of land uses in the surrounding area and provide an appropriate transition of land uses from more intense commercial and industrial uses located along the University Parkway corridor towards less intense single-family detached uses to the south.

(C) Due to the size, location, layout, and dimensions of the subject property, the Applicant submits that the Property does not have reasonable economic use as currently zoned.

(D) No, approval of the Application will not result in an excessive or burdensome use of the infrastructure systems. The Property has convenient access to major transportation corridors such as University Parkway (State Route 316) and Winder Highway (U.S. Route 29) with utilities available nearby.

(E) Yes, approval of the Application would be in conformity with the policy and intent of the Gwinnett County 2040 Unified Plan. The Property is located within the Innovation District Character area which specifically encourages "townhomes and apartments as potential development types. Moreover, the proposed development would advance general housing policies and goals outlined in the 2040 Unified Plan and the Gwinnett County Comprehensive Housing Study.

(F) The Applicant submits that current market conditions and the subject Property's severe physical challenges preclude development of the Property as currently zoned which provides additional supporting grounds for approval of the Application.

Mahaffey Pickens Tucker, LLP
ATTORNEYS AT LAW

Matthew P. Benson
G. Tyler Boyd
Catherine W. Davidson
Gerald Davidson, Jr.*
Rebecca B. Gober
Brian T. Easley
Christopher D. Holbrook

Shane M. Lanham
Jeffrey R. Mahaffey
Jessica R. Pickens
Steven A. Pickens
Andrew D. Stancil
R. Lee Tucker, Jr.

*Of Counsel

LETTER OF INTENT FOR REZONING APPLICATION OF DACULA DEVELOPMENT PARTNERS, LLC

Mahaffey Pickens Tucker, LLP submits this Letter of Intent and attached rezoning application (the "Application") on behalf of Dacula Development Partners, LLC, (the "Applicant"), for the purpose of requesting the rezoning of an approximately 58.93-acre tract of land (the "Property") situated along University Parkway (State Route 316) near its intersection with Winder Highway (U.S. Route 29). The Property is a component of Gwinnett County tax parcel number R5243 008. The surrounding area is characterized by a mix of land uses including commercial, industrial, and residential. The Property is currently zoned MU-R.

The Applicant is requesting to rezone the Property to the RM-24 zoning classification in order to develop the Property as a multifamily residential community including multifamily carriage units and traditional apartment residences. The proposed development would be accessed by a new public right-of-way which would also provide access to the balance of the parent tax parcel located to the south. The proposed new road would intersect with Winder Highway aligned with Alcovy Industrial Boulevard. The proposed development includes a total of 497 residential units with 354 traditional apartment-style units and 152 multi-family carriage units. The carriage units would be provided with three to eight units per building and single-car garages. Both two- and three-bedroom configurations are provided with two-bedroom units having a minimum heated floor area of 935 square feet and the three-bedroom units having a minimum of 1,250 square feet. In addition to the single-car garage, each unit would also have two surface parking spaces in front of the unit on a private driveway. The apartment-style homes would be provided in five buildings with parking provided in an interior surface parking lot. One-bedroom units would have a minimum of 700 square feet of heated floor area. Two-bedroom units would have a minimum of 1,000 square feet, and three-bedroom units would have a minimum of 1,250 square feet. As

depicted on the site plan submitted with the Application, Building 1 and Building 2 are set back fifteen feet from the proposed right-of-way to create an attractive streetscape and encourage walkability among the overall community. Active amenities are provided for each component of the proposed development including a pool and patio area for the use and enjoyment of residents. Large areas of green space would also serve as a passive amenity for residents and could be activated with walking trails, pocket parks, and dog-walking areas.

The proposed development is compatible with surrounding land uses and is in line with the policies of the Gwinnett County 2040 Unified Plan (the "2040 Plan"). More intense commercial and industrial land uses located at the intersection of University Parkway and Winder Highway would step down to the proposed medium-density residential development before stepping down further to less dense single-family detached land uses and zoning classifications to the south, including land zoned R-ZT in unincorporated Gwinnett County and R-1400 CSO in the City of Dacula. The 2040 Plan designates the Property as within the Innovation District Character Area which specifically identifies "townhomes and apartments" as potential development types. While industrial and office uses are encouraged for much of the Innovation District Character Area, the 2040 Plan provides that these land uses "should be supported where appropriate by opportunities for uses including residential and multi-use commercial uses." The proposed development would utilize a site that is extremely challenging to challenging to develop due to streams and steep topography for an appropriate land use while also complementing existing and future industrial and commercial land uses. Residents of the proposed community would have convenient access to nearby employment uses as well as regional employment centers located in the Gwinnett Progress Center and along the University Parkway corridor including the upcoming Rowen Development.

The recently-published Gwinnett County Comprehensive Housing Study (the "Housing Study") outlines in great detail the current housing inventory of Gwinnett County and analyzes the current and future demand for housing in the County. The Housing Study also addresses evolving demand for more diverse housing and provides that "[c]hanging housing trends, particularly smaller households and lower-income households point toward demand for an increasingly diverse assortment of housing types." In addition to evolving housing preferences, the Housing Study highlights a strong baseline demand for new housing, generally. The Housing Study's "demand model predicts that current and future Gwinnett residents would buy or rent over 15,000 new

housing units each year if they were provided at attainable prices for those buyers and renters. Over the past ten years, Gwinnett's housing market has delivered an average of just 3,560 new housing units each year, meeting just 24% of demand." Accordingly, the Housing Study concludes that "Gwinnett is showing a significant mismatch between demand for housing and the supply of new housing units delivered."

Accordingly, the proposed development is compatible with surrounding land uses and zoning classifications, is in line with the policy and intent of the 2040 Plan, and would meet extremely strong demand for housing units and diversity of housing as outlined in the Housing Study. The Applicant and its representatives welcome the opportunity to meet with staff of the Gwinnett County Department of Planning & Development to answer any questions or to address any concerns relating to the matters set forth in this letter or in the Rezoning Application filed herewith. The Applicant respectfully requests your approval of the Application.

Respectfully submitted this 5th day of May, 2022.

MAHAFFEY PICKENS TUCKER, LLP

Shane Lanham

Shane M. Lanham
Attorneys for the Applicant

AMENDMENT TO AN APPLICATION TO AMEND THE OFFICIAL ZONING MAP OF GWINNETT COUNTY, GEORGIA

APPLICANT:	Dacula Development Partners, LLC c/o Mahaffey Pickens Tucker, LLP
ZONING CASE NUMBER:	RZM2022-00030
PRESENT ZONING DISTRICT(S):	MU-R
REQUESTED ZONING DISTRICT(S):	RM-24
PROPERTY:	1705 Highway 29
SIZE:	+/- 58.93 Acres
PROPOSED DEVELOPMENT:	Multi-Family Residential Development

The Applicant, hereby amends its application to amend the official zoning map of Gwinnett County, Georgia heretofore filed with the Planning Division of Gwinnett County, Georgia by the addition of the attached Exhibit to the original application.

This 22nd day of June, 2022.

MAHAFFEY PICKENS TUCKER, LLP

Shane M. Lanham

Attorneys for Applicant

JUSTIFICATION FOR REZONING

The portions of the Gwinnett County Unified Development Ordinance (the "UDO") which classify or may classify the property which is the subject of this Application (the "Property") into any less intensive zoning classification other than as requested by the Applicant, are or would be unconstitutional in that they would destroy the Applicant's property rights without first paying fair, adequate and just compensation for such rights, in violation of Article I, Section I, Paragraph II of the Constitution of the State of Georgia of 1983, and the Due Process Clause of the Fourteenth Amendment to the Constitution of the United States.

The application of the UDO as applied to the subject Property, which restricts its use to the present zoning classification, is unconstitutional, illegal, null and void, constituting a taking of the Applicant's and the Owner's property in violation of the Just Compensation Clause of the Fifth Amendment and the Due Process Clause of the Fourteenth Amendment to the Constitution of the United States, Article I, Section I, Paragraph I, and Article I, Section I, Paragraph II of the Constitution of the State of Georgia of 1983, and the Equal Protection Clause of the Fourteenth Amendment to the Constitution of the United States denying the Applicant an economically viable use of its land while not substantially advancing legitimate state interests.

The Property is presently suitable for development under the RM-24 classification as requested by the Applicant, and is not economically suitable for development under the present MU-R zoning classification of Gwinnett County. A denial of this Application would constitute an arbitrary and capricious act by the Gwinnett County Board of Commissioners without any rational basis therefore, constituting an abuse of discretion in violation of Article I, Section I, Paragraph I and Article I, Section I, Paragraph II of the Constitution of the State of Georgia of 1983, and the Due Process Clause of the Fourteenth Amendment to the Constitution of the United States.

A refusal by the Gwinnett County Board of Commissioners to rezone the Property to the RM-24 classification with such conditions as agreed to by the Applicant, so as to permit the only feasible economic use of the Property, would be unconstitutional and discriminate in an arbitrary, capricious and unreasonable manner between the Applicant and owners of similarly situated

property in violation of Article I, Section I, Paragraph II of the Constitution of the State of Georgia of 1983 and the Equal Protection Clause of the Fourteenth Amendment to the Constitution of the United States. Any rezoning of the subject Property to the RM-24 classification, subject to conditions which are different from the conditions by which the Applicant may amend its application, to the extent such different conditions would have the effect of further restricting the Applicant's and the Owner's utilization of the subject Property, would also constitute an arbitrary, capricious and discriminatory act in zoning the Property to an unconstitutional classification and would likewise violate each of the provisions of the State and Federal Constitutions set forth hereinabove.

Opponents to the request set forth in the Application, or in any amendments to the Application, have waived their rights to appeal any decision of the Gwinnett County Board of Commissioners because they lack standing, have failed to exhaust administrative remedies, and/or because they failed to assert any legal or constitutional objections.

Accordingly, the Applicant respectfully requests that the rezoning application submitted by the Applicant relative to the Property be granted and that the Property be rezoned to the zoning classification as shown on the respective application.

This 22nd day of June, 2022.

Respectfully submitted,

MAHAFFEY PICKENS TUCKER, LLP

Shane M. Lanham
Attorneys for Applicant

1550 North Brown Road
Suite 125
Lawrenceville, Georgia 30043
(770) 232-0000

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SIZE:	+/- 58.93 Acres
PROPOSED DEVELOPMENT:	Multi-Family Residential Development

The Applicant, hereby amends its application to amend the official zoning map of Gwinnett County, Georgia heretofore filed with the Planning Division of Gwinnett County, Georgia by the addition of the attached Exhibit to the original application.

This 22nd day of July, 2022.

MAHAFFEY PICKENS TUCKER, LLP

Shane M. Lanham

Attorneys for Applicant

JUSTIFICATION FOR REZONING

The portions of the Gwinnett County Unified Development Ordinance (the "UDO") which classify or may classify the property which is the subject of this Application (the "Property") into any less intensive zoning classification other than as requested by the Applicant, are or would be unconstitutional in that they would destroy the Applicant's property rights without first paying fair, adequate and just compensation for such rights, in violation of Article I, Section I, Paragraph II of the Constitution of the State of Georgia of 1983, and the Due Process Clause of the Fourteenth Amendment to the Constitution of the United States.

The application of the UDO as applied to the subject Property, which restricts its use to the present zoning classification, is unconstitutional, illegal, null and void, constituting a taking of the Applicant's and the Owner's property in violation of the Just Compensation Clause of the Fifth Amendment and the Due Process Clause of the Fourteenth Amendment to the Constitution of the United States, Article I, Section I, Paragraph I, and Article I, Section I, Paragraph II of the Constitution of the State of Georgia of 1983, and the Equal Protection Clause of the Fourteenth Amendment to the Constitution of the United States denying the Applicant an economically viable use of its land while not substantially advancing legitimate state interests.

The Property is presently suitable for development under the RM-24 classification as requested by the Applicant, and is not economically suitable for development under the present MU-R zoning classification of Gwinnett County. A denial of this Application would constitute an arbitrary and capricious act by the Gwinnett County Board of Commissioners without any rational basis therefore, constituting an abuse of discretion in violation of Article I, Section I, Paragraph I and Article I, Section I, Paragraph II of the Constitution of the State of Georgia of 1983, and the Due Process Clause of the Fourteenth Amendment to the Constitution of the United States.

A refusal by the Gwinnett County Board of Commissioners to rezone the Property to the RM-24 classification with such conditions as agreed to by the Applicant, so as to permit the only feasible economic use of the Property, would be unconstitutional and discriminate in an arbitrary, capricious and unreasonable manner between the Applicant and owners of similarly situated property in violation of Article I, Section I, Paragraph II of the Constitution of the State of Georgia

of 1983 and the Equal Protection Clause of the Fourteenth Amendment to the Constitution of the United States. Any rezoning of the subject Property to the RM-24 classification, subject to conditions which are different from the conditions by which the Applicant may amend its application, to the extent such different conditions would have the effect of further restricting the Applicant's and the Owner's utilization of the subject Property, would also constitute an arbitrary, capricious and discriminatory act in zoning the Property to an unconstitutional classification and would likewise violate each of the provisions of the State and Federal Constitutions set forth hereinabove.

Opponents to the request set forth in the Application, or in any amendments to the Application, have waived their rights to appeal any decision of the Gwinnett County Board of Commissioners because they lack standing, have failed to exhaust administrative remedies, and/or because they failed to assert any legal or constitutional objections.

Accordingly, the Applicant respectfully requests that the rezoning application submitted by the Applicant relative to the Property be granted and that the Property be rezoned to the zoning classification as shown on the respective application.

This 22nd day of July, 2022.

Respectfully submitted,

MAHAFFEY PICKENS TUCKER, LLP

Shane M. Lanham
Attorneys for Applicant

1550 North Brown Road
Suite 125
Lawrenceville, Georgia 30043
(770) 232-0000

AMENDMENT TO AN APPLICATION TO AMEND THE OFFICIAL ZONING MAP OF GWINNETT COUNTY, GEORGIA

APPLICANT:	Dacula Development Partners, LLC c/o Mahaffey Pickens Tucker, LLP
ZONING CASE NUMBER:	RZM2022-00030
PRESENT ZONING DISTRICT(S):	MU-R
REQUESTED ZONING DISTRICT(S):	RM-24
PROPERTY:	1705 Highway 29
SIZE:	+/- 58.93 Acres
PROPOSED DEVELOPMENT:	Multi-Family Residential Development

The Applicant, hereby amends its application to amend the official zoning map of Gwinnett County, Georgia heretofore filed with the Planning Division of Gwinnett County, Georgia by the addition of the attached Exhibit to the original application.

This 22nd day of July, 2022.

MAHAFFEY PICKENS TUCKER, LLP

Shane M. Lanham

Attorneys for Applicant

JUSTIFICATION FOR REZONING

The portions of the Gwinnett County Unified Development Ordinance (the "UDO") which classify or may classify the property which is the subject of this Application (the "Property") into any less intensive zoning classification other than as requested by the Applicant, are or would be unconstitutional in that they would destroy the Applicant's property rights without first paying fair, adequate and just compensation for such rights, in violation of Article I, Section I, Paragraph II of the Constitution of the State of Georgia of 1983, and the Due Process Clause of the Fourteenth Amendment to the Constitution of the United States.

The application of the UDO as applied to the subject Property, which restricts its use to the present zoning classification, is unconstitutional, illegal, null and void, constituting a taking of the Applicant's and the Owner's property in violation of the Just Compensation Clause of the Fifth Amendment and the Due Process Clause of the Fourteenth Amendment to the Constitution of the United States, Article I, Section I, Paragraph I, and Article I, Section I, Paragraph II of the Constitution of the State of Georgia of 1983, and the Equal Protection Clause of the Fourteenth Amendment to the Constitution of the United States denying the Applicant an economically viable use of its land while not substantially advancing legitimate state interests.

The Property is presently suitable for development under the RM-24 classification as requested by the Applicant, and is not economically suitable for development under the present MU-R zoning classification of Gwinnett County. A denial of this Application would constitute an arbitrary and capricious act by the Gwinnett County Board of Commissioners without any rational basis therefore, constituting an abuse of discretion in violation of Article I, Section I, Paragraph I and Article I, Section I, Paragraph II of the Constitution of the State of Georgia of 1983, and the Due Process Clause of the Fourteenth Amendment to the Constitution of the United States.

A refusal by the Gwinnett County Board of Commissioners to rezone the Property to the RM-24 classification with such conditions as agreed to by the Applicant, so as to permit the only feasible economic use of the Property, would be unconstitutional and discriminate in an arbitrary, capricious and unreasonable manner between the Applicant and owners of similarly situated property in violation of Article I, Section I, Paragraph II of the Constitution of the State of Georgia

of 1983 and the Equal Protection Clause of the Fourteenth Amendment to the Constitution of the United States. Any rezoning of the subject Property to the RM-24 classification, subject to conditions which are different from the conditions by which the Applicant may amend its application, to the extent such different conditions would have the effect of further restricting the Applicant's and the Owner's utilization of the subject Property, would also constitute an arbitrary, capricious and discriminatory act in zoning the Property to an unconstitutional classification and would likewise violate each of the provisions of the State and Federal Constitutions set forth hereinabove.

Opponents to the request set forth in the Application, or in any amendments to the Application, have waived their rights to appeal any decision of the Gwinnett County Board of Commissioners because they lack standing, have failed to exhaust administrative remedies, and/or because they failed to assert any legal or constitutional objections.

Accordingly, the Applicant respectfully requests that the rezoning application submitted by the Applicant relative to the Property be granted and that the Property be rezoned to the zoning classification as shown on the respective application.

This 22nd day of July, 2022.

Respectfully submitted,

MAHAFFEY PICKENS TUCKER, LLP

Shane M. Lanham
Attorneys for Applicant

1550 North Brown Road
Suite 125
Lawrenceville, Georgia 30043
(770) 232-0000

REZONING APPLICANT'S CERTIFICATION

THE UNDERSIGNED BELOW IS AUTHORIZED TO MAKE THIS APPLICATION. THE UNDERSIGNED IS AWARE THAT NO APPLICATION OR REAPPLICATION AFFECTING THE SAME LAND SHALL BE ACTED UPON WITHIN 12 MONTHS FROM THE DATE OF LAST ACTION BY THE BOARD OF COMMISSIONERS UNLESS WAIVED BY THE BOARD OF COMMISSIONERS. IN NO CASE SHALL AN APPLICATION OR REAPPLICATION BE ACTED UPON IN LESS THAN SIX (6) MONTHS FROM THE DATE OF LAST ACTION BY THE BOARD OF COMMISSIONERS.

Signature of Applicant — 5/3/22 Date

Shane Lanham, attorney for the Applicant
Type or Print Name and Title

Signature of Notary Public — 5/3/22 Date

Notary Seal

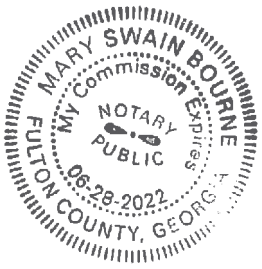
REZONING APPLICANT'S CERTIFICATION

THE UNDERSIGNED BELOW IS AUTHORIZED TO MAKE THIS APPLICATION. THE UNDERSIGNED IS AWARE THAT NO APPLICATION OR REAPPLICATION AFFECTING THE SAME LAND SHALL BE ACTED UPON WITHIN 12 MONTHS FROM THE DATE OF LAST ACTION BY THE BOARD OF COMMISSIONERS UNLESS WAIVED BY THE BOARD OF COMMISSIONERS. IN NO CASE SHALL AN APPLICATION OR REAPPLICATION BE ACTED UPON IN LESS THAN SIX (6) MONTHS FROM THE DATE OF LAST ACTION BY THE BOARD OF COMMISSIONERS.

Signature of Applicant — Date: 04/28/22

Charles Moore - Development
Type or Print Name and Title

Signature of Notary Public — Date: 4/28/22 — Notary Seal



REZONING PROPERTY OWNER'S CERTIFICATION

THE UNDERSIGNED BELOW, OR AS ATTACHED, IS THE OWNER OF THE PROPERTY CONSIDERED IN THIS APPLICATION. THE UNDERSIGNED IS AWARE THAT NO APPLICATION OR REAPPLICATION AFFECTING THE SAME LAND SHALL BE ACTED UPON WITHIN 12 MONTHS FROM THE DATE OF LAST ACTION BY THE BOARD OF COMMISSIONERS UNLESS WAIVED BY THE BOARD OF COMMISSIONERS. IN NO CASE SHALL AN APPLICATION OR REAPPLICATION BE ACTED UPON IN LESS THAN SIX (6) MONTHS FROM THE DATE OF LAST ACTION BY THE BOARD OF COMMISSIONERS.

SEE FOLLOWING SIGNATURE PAGE — May 06, 2022
Signature of Property Owner — Date

Ed Hadley as Authorized Signatory
Type or Print Name and Title

SEE FOLLOWING SIGNATURE PAGE — MAY 06, 2022 — SEE FOLLOWING SIGNATURE PAGE
Signature of Notary Public — Date — Notary Seal

Signed, Sealed and Delivered in the Presence of:

Unofficial Witness

Notary Public – Michelle E. Razcon
My Commission Expires: 07/18/2024

[AFFIX NOTARY SEAL

Notary Public State of Arizona
Maricopa County
Michelle Elizabeth Razcon
My Commission Expires 07/18/2024
Commission Number 587233

Walton Georgia, LLC, a Georgia limited liability company, on behalf of itself in its capacity as owner and on behalf of all other owners in its capacity as manager, operator or agent, as applicable

By: Walton International Group, Inc., a Nevada corporation
Its: Manager

By:
Name: Ed Hadley
Title: Authorized Signatory
Date: May 06, 2022

Signed, Sealed and Delivered in the Presence of:

Unofficial Witness

Notary Public – Michelle E. Razcon
My Commission Expires: 07/18/2024

[AFFIX NOTARY SEAL

Notary Public State of Arizona
Maricopa County
Michelle Elizabeth Razcon
My Commission Expires 07/18/2024
Commission Number 587233

WUSF 2 Sugarloaf, LLC, a Georgia limited liability company

By: Walton U.S. Land Fund 2, LP, a Delaware limited partnership
Its: Sole Member

By: WUSF 2 GP, LLC, a Delaware limited liability company
Its: General Partner

By: Walton Land Management (USA), Inc., a Delaware corporation
Its: Manager

By:
Name: Ed Hadley
Title: Authorized Signatory
Date: May 06, 2022

CONFLICT OF INTEREST CERTIFICATION FOR REZONING

The undersigned below, making application for a Rezoning, has complied with the Official Code of Georgia Section 36-67A-1, et. seq, Conflict of Interest in Zoning Actions, and has submitted or attached the required information on the forms provided.

SIGNATURE OF APPLICANT	DATE	TYPE OR PRINT NAME AND TITLE
	5/3/22	Shane Lanham, attorney for the Applicant
SIGNATURE OF APPLICANT'S ATTORNEY OR REPRESENTATIVE	DATE	TYPE OR PRINT NAME AND TITLE
SIGNATURE OF NOTARY PUBLIC	DATE	NOTARY SEAL

NICOLE GILMORE NOTARY PUBLIC GWINNETT COUNTY, GA EXP. Nov. 8, 2025

DISCLOSURE OF CAMPAIGN CONTRIBUTIONS

Have you, within the two years immediately preceding the filing of this application, made campaign contributions aggregating $250.00 or more to a member of the Board of Commissioners or a member of the Gwinnett County Planning Commission?

☑ YES ☐ NO Mahaffey Pickens Tucker, LLP
YOUR NAME

If the answer is yes, please complete the following section:

NAME AND OFFICAL POSITION OF GOVERNMENT OFFICIAL	CONTRIBUTIONS (List all which aggregate to $250 or More)	DATE CONTRIBUTION WAS MADE (Within last two years)
Kirkland Carden	$2,800	

Attach additional sheets if necessary to disclose or describe all contributions.

CONFLICT OF INTEREST CERTIFICATION FOR REZONING

The undersigned below, making application for a Rezoning, has complied with the Official Code of Georgia Section 36-67A-1, et. seq, Conflict of Interest in Zoning Actions, and has submitted or attached the required information on the forms provided.

	4/28/22	Charles Moore - Development
SIGNATURE OF APPLICANT	DATE	TYPE OR PRINT NAME AND TITLE

SIGNATURE OF APPLICANT'S ATTORNEY OR REPRESENTATIVE	DATE	TYPE OR PRINT NAME AND TITLE

	4/28/22	
SIGNATURE OF NOTARY PUBLIC	DATE	NOTARY SEAL

MARY SWAIN BOURNE
NOTARY PUBLIC
FULTON COUNTY, GEORGIA
My Commission Expires 06-28-2022

DISCLOSURE OF CAMPAIGN CONTRIBUTIONS

Have you, within the two years immediately preceding the filing of this application, made campaign contributions aggregating $250.00 or more to a member of the Board of Commissioners or a member of the Gwinnett County Planning Commission?

☐ YES ■ NO Charles Moore

YOUR NAME

If the answer is yes, please complete the following section:

NAME AND OFFICAL POSITION OF GOVERNMENT OFFICIAL	CONTRIBUTIONS (List all which aggregate to $250 or More)	DATE CONTRIBUTION WAS MADE (Within last two years)

Attach additional sheets if necessary to disclose or describe all contributions.

Dacula Crossing

VERIFICATION OF CURRENT PAID PROPERTY TAXES FOR REZONING

THE UNDERSIGNED BELOW IS AUTHORIZED TO MAKE THIS APPLICATION. THE UNDERSIGNED CERTIFIES THAT ALL GWINNETT COUNTY PROPERTY TAXES BILLED TO DATE FOR THE PARCEL LISTED BELOW HAVE BEEN PAID IN FULL TO THE TAX COMMISSIONER OF GWINNETT COUNTY, GEORGIA. IN NO CASE SHALL AN APPLICATION OR REAPPLICATION FOR REZONING BE PROCESSED WITHOUT SUCH PROPERTY VERIFICATION.

***Note**: **A SEPARATE VERIFICATION FORM MUST BE COMPLETED FOR EACH TAX PARCEL INCLUDED IN THE REZONING REQUEST.**

PARCEL I.D. NUMBER: 5 - 243 - 008
(Map Reference Number) District Land Lot Parcel

Signature of Applicant — 4/29/22 Date

Shane Lanham, attorney for the Applicant
Type or Print Name and Title

PLEASE TAKE THIS FORM TO THE TAX COMMISSIONERS OFFICE AT THE GWINNETT JUSTICE AND ADMINISTRATION CENTER, 75 LANGLEY DRIVE, FOR THEIR APPROVAL BELOW.

TAX COMMISSIONERS USE ONLY

(PAYMENT OF ALL PROPERTY TAXES BILLED TO DATE FOR THE ABOVE REFERENCED PARCEL HAVE BEEN VERIFIED AS PAID CURRENT AND CONFIRMED BY THE SIGNATURE BELOW)

Tonia Harmon — NAME
TSA — TITLE
5.4.2022 — DATE

Traffic Impact Study

Dacula Crossing Residential Subdivision
Gwinnett County, Georgia

May 2, 2022

MARC R. ACAMPORA, PE, LLC
TRAFFIC ENGINEERING

Traffic Impact Study

Proposed Dacula Crossing Residential Subdivision
Gwinnett County, Georgia

study prepared for:

TPA Residential
1776 Peachtree Street, NW
Atlanta, Georgia 30309

May 2, 2022

MARC R. ACAMPORA, PE, LLC
TRAFFIC ENGINEERING

858 Myrtle Street, NE
Atlanta, Georgia 30308
(678) 637-1763

e-mail: acamporatraffic@comcast.net

Contents

Tables

Figures

Introduction

This study assesses the traffic impact of a proposed residential subdivision in Gwinnett County, Georgia. The site is located on the southeast side of Georgia Highway 8 at Alcovy Industrial Boulevard, as shown in Figure 1. The site will be developed with 345 apartment units and 152 multifamily carriage units. Vehicular access will be provided at one access on GA 8, aligning with Alcovy Industrial Boulevard.

The purpose of this traffic impact study is to determine existing traffic operating conditions in the vicinity of the proposed subdivision, project future traffic volumes, assess the impact of the subject development, then develop conclusions and recommendations to mitigate the project traffic impact and ensure safe and efficient existing and future traffic conditions in the vicinity of the project.

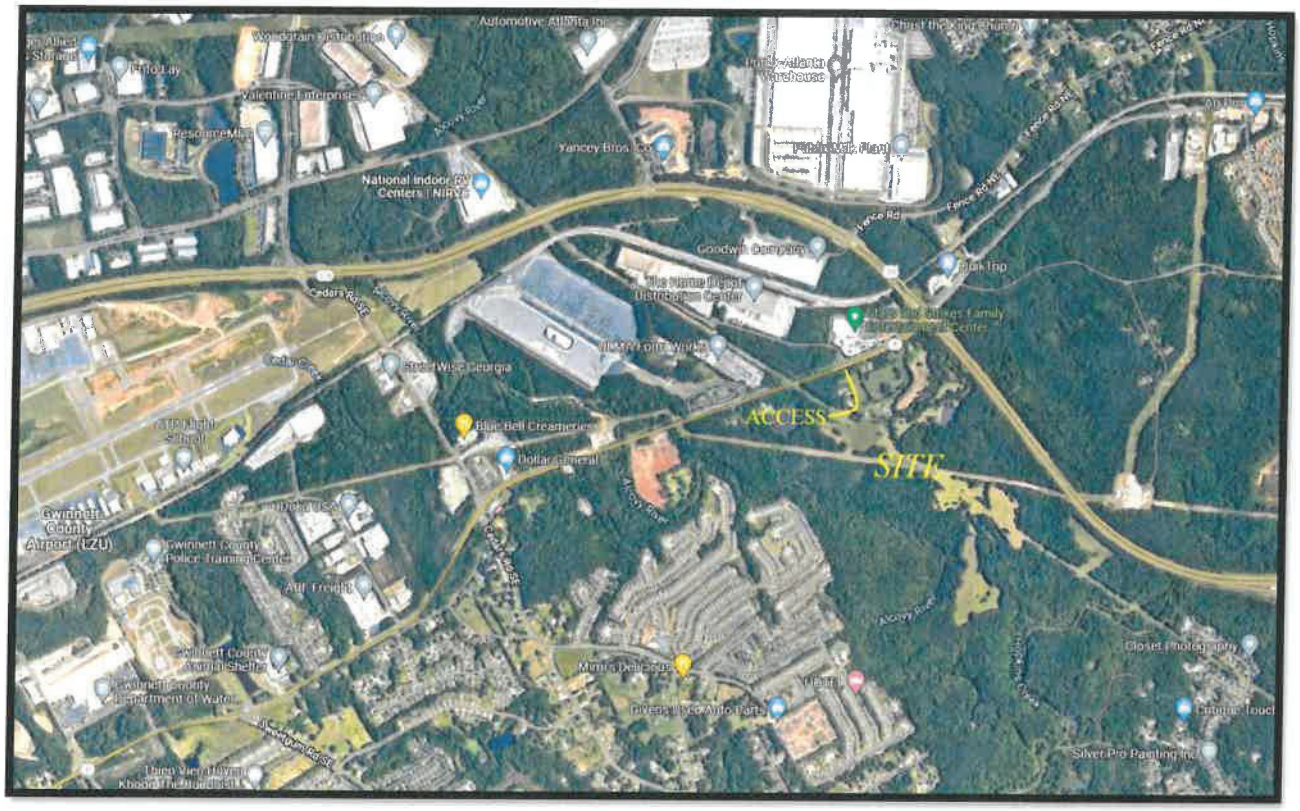


Figure 1 – Site Location Map

Existing Traffic Conditions

Existing traffic operating conditions in the vicinity of the proposed subdivision were assessed. The following is a description of existing transportation facilities, traffic volumes, and intersection operations.

Description of Existing Roadways

Georgia State Route 8 is a southwest – northeast urban minor arterial (Georgia DOT designation) with one through lane in each directions and left and right turn lanes at major intersections including at the signalized intersections at Cedars Road and GA 316. A westbound right turn lane is also provided at Alcovy Industrial Boulevard, which is side street stop sign controlled at GA 8. The terrain along the road is gently rolling and the posted speed limit is 45 mph.

In 2019 (pre-pandemic) the Georgia Department of Transportation (Georgia DOT) recorded an Annual Average Daily Traffic (AADT) volume of 13,300 vehicles per day (vpd) on GA 8 west of Alcovy Industrial Boulevard, while in 2020 (during the pandemic) the count was 9,080 vpd. A 24-hour bi-directional traffic volume count collected for this study on GA 8 at the proposed project access location showed an eastbound volume of 5,714 vehicles and a westbound volume of 5,495 vehicles, for a two-way volume of 11,209 vehicles, which is higher than 2020 but lower than pre-pandemic levels.

Pedestrian, Bicycle, and Transit Accessibility

There is sidewalk along the north side of GA 8 from Alcovy Industrial Boulevard almost to GA 316, but none on the south side of GA 8 in this vicinity. There are no dedicated bicycle lanes in the vicinity of the proposed development. Gwinnett County Transit serves most of the County, but there is no regularly scheduled mass transit service in the immediate vicinity of the site.

Existing Traffic Volumes

Existing full turning movement peak hour traffic volume counts were collected at the following intersections in the vicinity of the site:

1. GA 8 at Cedars Road
2. GA 8 at Alcovy Industrial Boulevard
3. GA 316 at GA 8

The counts were collected on Wednesday, April 20, 2022, from 7:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 6:00 p.m. Area schools were in session on the day on which the counts were recorded.

In addition, a 24-hour bi-directional count, which was presented above, was collected on the same day on GA 8 at the project access location.

The locations of the traffic counts are presented in Figure 2.

Figure 2 – Traffic Volume Count Locations

From the intersection turning movement count data, the highest four consecutive 15-minute interval volumes at each intersection, during each time period, were determined. These volumes make up the existing weekday a.m. and p.m. peak hour traffic volumes at each intersection and are shown in Figure 3. The raw count data is found in Appendix A.

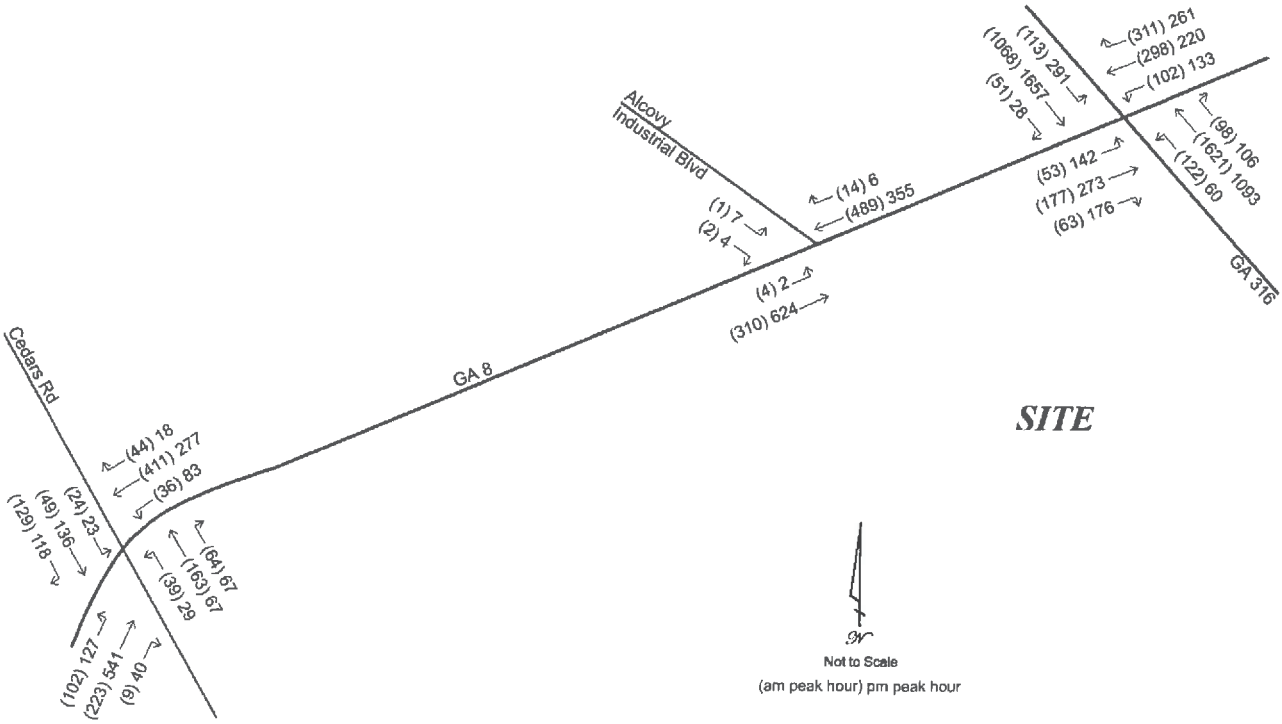


Figure 3 – Existing Weekday A.M. and P.M. Peak Hour Traffic Volumes

Existing Intersection Operations

Existing traffic operations were analyzed at the counted intersections using Synchro software, version 10, in accordance with the methodology presented in the Transportation Research Board's 2016 *Highway Capacity Manual* (*HCM 6*). This methodology is presented in Appendix B. The results of the analysis are shown in Table 1. Computer printouts containing detailed results of the existing analysis are located in Appendix C. Levels of service and delays are provided for each overall intersection and for each controlled approach or movement. Locations that operate unacceptably (LOS E or LOS F) are presented in bold type.

Table 1 – Existing Intersection Operations

Intersection / Approach	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay (s/veh)	LOS	Delay (s/veh)
1. GA 8 at Cedars Road (signal)	B	17.3	B	15.2
northbound approach	B	14.2	B	11.8
southbound approach	B	12.4	B	11.9
eastbound approach	B	13.6	B	15.0
westbound approach	C	24.1	C	20.1
2. GA 8 at Alcovy Industrial Boulevard (side street stop)	A	0.1	A	0.2
southbound left turn	C	17.6	C	22.0
southbound right turn	B	11.7	B	10.6
eastbound left turn	A	8.6	A	8.2
3. GA 316 at GA 8 (signal)	D	35.2	D	39.6
northbound approach (GA 316 westbound)	C	32.2	C	26.0
southbound approach (GA 316 eastbound)	C	25.5	D	38.1
eastbound approach (GA 8)	D	47.0	***E***	***69.7***
westbound approach (GA 8)	***E***	***68.4***	***E***	***56.4***

The existing analysis reveals acceptable operating conditions at the Cedars Road and Alcovy Industrial Boulevard intersections, and generally acceptable operations at the GA 316 intersection. However, due to the very heavy volumes on GA 316, the signal timing favors those approaches, which results in higher delays on the GA 8 approaches. Adjusting the greetime allocation on the signal would reduce the delays on the GA 8 approaches, but would increase the delays for many more vehicles on GA 316. Therefore, this is not recommended. This intersection is scheduled to be converted to an interchange in the near future (this is discussed in the next section of this report). It would not be feasible to implement any changes in lane configurations or widenings, which would only be in place for a short time. Given this imminent roadway project, and the fact that the overall intersection operates acceptably, no mitigation is recommended for this intersection.

No-Build Traffic Conditions

A 2027 no-build condition was developed. This represents the traffic conditions that will exist in the future at the anticipated date of the build-out of the subdivision, but not including the subdivision's trips. The purpose of the analysis of this condition is to isolate the traffic impacts of the proposed development from background growth in volumes that are expected to occur in the area while the subdivision is under construction.

In order to develop no-build volumes, a background growth factor was developed using historic Georgia DOT 24-hour traffic counts that were collected in this area for the years 2016 through 2020 (the latest year for which data was available at the time of this study), as shown in Table 2.

Table 2 – Historic Georgia DOT Traffic Volume Counts and Annual Growth Rates

Year	GA 8 W of Alcovy Ind	Annual Growth	GA 316 E of Cedars	Annual Growth	Winder Hwy E of Village Broad	Annual Growth
Station ID	135-0038		135-0252		135-0040	
2016	8,970		48,800		11,100	
2017	9,500	5.9%	51,700	5.9%	10,700	-3.6%
2018	13,200	38.9%	58,800	13.7%	10,500	-1.9%
2019	13,300	0.8%	59,200	0.7%	10,600	1.0%
2020	9,080	-31.7%	50,300	-15.0%	9,740	-8.1%
avg growth		*0.2%*		*0.6%*		*-2.6%*

Growth in the area has been generally positive and low-to-moderate. Each location experienced a decrease from 2019 to 2020, which is considered an anomaly due to the pandemic. The location on GA 8 closest to the site, experienced a dramatic increase in volumes in a one year period, and a dramatic drop (more than typical) during covid, so that overall growth was almost flat. GA 316 likewise saw almost flat growth, but, removing the pandemic, saw a moderate positive. Winder Highway saw a decrease in all but one year. Based on the growth trends identified in Table 2, and taking the pandemic into consideration, a 2.0% annual growth factor was applied to the existing volumes when projecting the future no-build volumes. The growth factor was applied for five years, for a total of 10.4% growth that will occur while the proposed subdivision is under construction. The existing traffic volumes were increased by the 10.4% growth factor. The results are the 2027 no-build traffic volumes that will be on the roadway network in the future when the proposed subdivision is completely developed, but excluding the subdivision's trips.

Programmed Transportation Infrastructure Improvements

A Gwinnett County Comprehensive Transportation Plan is in progress. The Atlanta Regional Commission's (ARC) interactive projects map and the Georgia DOT Projects website were reviewed for programmed (scheduled and funded) and planned (anticipated) transportation infrastructure projects in the vicinity of the proposed development. The following projects were identified:

GW-394 – This project will create a grade-separated diamond interchange at the intersection of GA 316 at GA 8. The project is expected to begin construction in 2024.

GW-184D – This project includes the closure of the existing Fence Road intersection with SR 316 and construction of Fence Road Connector between existing Fence Road to the west and the ramp terminus of SR 316 ramps with US 29/SR 8 Winder Hwy to the east. Fence Road Connector aligns with the existing QT driveway access to US 29/SR 8 Winder Hwy. The Fence Road Connector Bridge will span over existing CSX Railroad tracks.

The no-build and future intersection analysis at GA 316 / GA 8 was modeled as the current signalized configuration, recognizing that in the near future, the intersection will be completely reconfigured. Appendix F contains the project information sheets for these projects.

No-Build Intersection Operations

The no-build condition includes the no-build traffic volumes, as described above. These were entered into the Synchro model and the 2027 no-build traffic operations were analyzed at the study intersections using Synchro 10 software in accordance with the HCM 6 methodology. The results of the no-build analysis are shown in Table 3. Computer printouts containing detailed results of the no-build analysis are located in Appendix D. Levels of service and delays are provided for each overall intersection and for each controlled approach or movement. Locations that operate unacceptably (LOS E or LOS F) are presented in bold type.

Table 3 – No-Build Intersection Operations

Intersection / Approach	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay (s/veh)	LOS	Delay (s/veh)
1. GA 8 at Cedars Road (signal)	C	20.4	B	15.7
northbound approach	C	26.2	B	14.0
southbound approach	B	15.1	B	14.2
eastbound approach	B	13.6	B	14.6
westbound approach	C	24.3	B	19.9
2. GA 8 at Alcovy Industrial Boulevard (side street stop)	A	0.1	A	0.2
southbound left turn	C	19.3	D	25.3
southbound right turn	B	12.1	B	10.9
eastbound left turn	A	8.8	A	8.3
3. GA 316 at GA 8 (signal)	D	51.6	D	54.3
northbound approach (GA 316 westbound)	***E***	***61.2***	C	29.9
southbound approach (GA 316 eastbound)	C	30.1	D	54.9
eastbound approach (GA 8)	D	47.9	***F***	***89.7***
westbound approach (GA 8)	***E***	***75.4***	***F***	***88.2***

The no-build analysis shows a moderate deterioration in operations due to anticipated growth in this area. As with the existing condition, the only failure is occurring on approaches, but not the overall intersection, at the GA 316 / GA 8 intersection. By the 2027 future analysis condition, this intersection is anticipated to have been rebuilt as a grade-separated diamond interchange. Recognizing this imminent project, and the fact that the overall intersection will still be operating acceptably, no mitigation is identified for this intersection for the no-build condition.

Project Traffic Characteristics

This section describes the anticipated traffic characteristics of the proposed subdivision, including a site description, how much traffic the project will generate, and where that traffic will travel.

Project Description

The site will be developed with 345 apartment units and 152 multifamily carriage units. Vehicular access will be provided at one access on GA 8 aligning with Alcovy Industrial Boulevard. The site plan is presented in Figure 4.

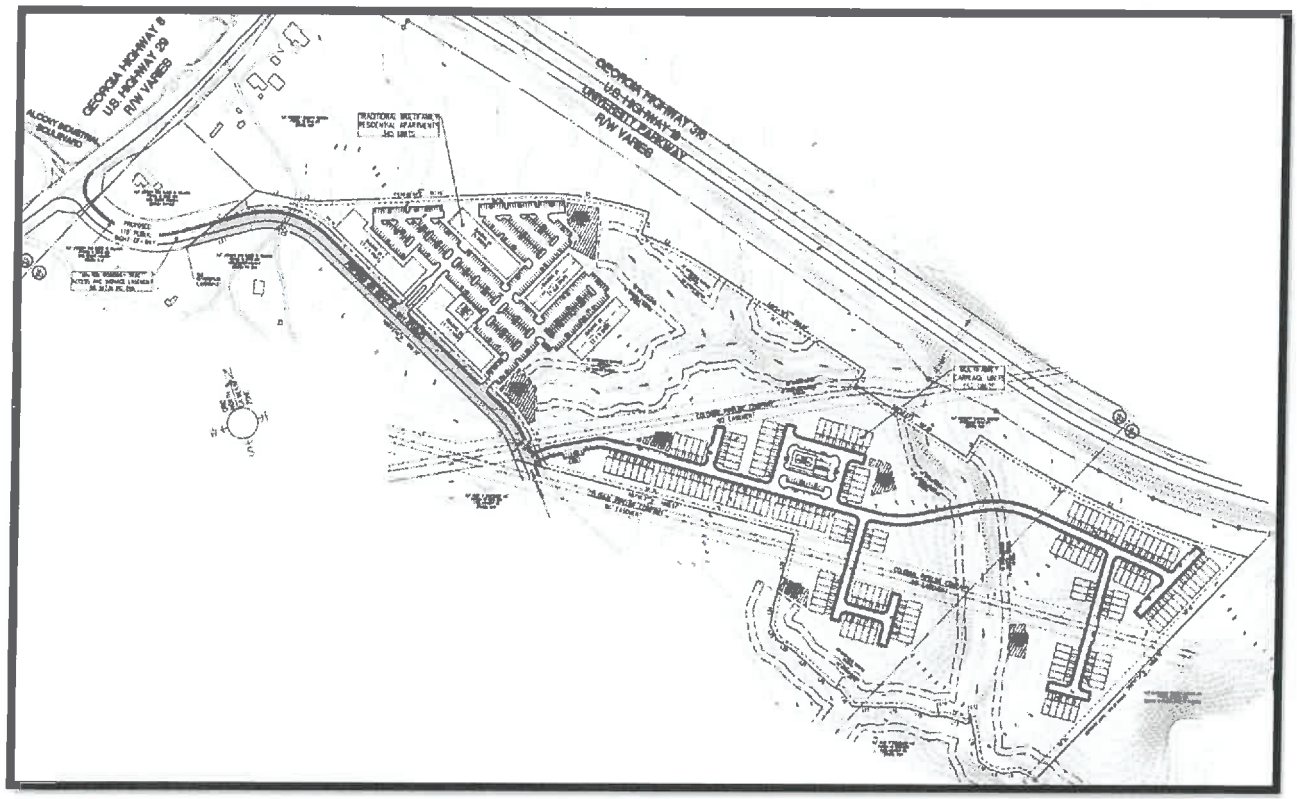


Figure 4 – Site Plan for Proposed Sugarloaf Crossing Subdivision

Trip Generation

Trip generation is an estimate of the number of entering and exiting vehicular trips that will be generated by the proposed development. The volume of traffic that will be generated by the subdivision was calculated using the equations in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11th Edition (the current edition). ITE Land Use 220 – Multi-Family Housing (Low-Rise) was chosen for the apartments and ITE Land Use 215 – Single-Family Attached Housing was chosen as representative of the multifamily carriage units. The trip generation for the subdivision is presented in Table 4.

Table 4 – Sugarloaf Crossing Subdivision Trip Generation

Land Use	ITE Code	Size	A.M. Peak Hour			P.M. Peak Hour			24-Hour
			In	Out	Total	In	Out	Total	2-Way
Apartments	220	345 units	31	99	130	106	63	169	2,288
Multifamily Carriage Units	215	152 units	22	51	73	49	38	87	1,108
Project Totals		*497 units*	*53*	*150*	*203*	*155*	*101*	*256*	*3,396*

The proposed subdivision will generate 203 a.m. peak hour trips, 256 p.m. peak hour trips, and 3,396 weekday trips.

Trip Distribution and Assignment

The trip distribution percentages indicate what proportion of the project's trips will travel to and from various directions. The trip distribution percentages for the subdivision were developed based on the locations and proximity of likely trip origins and destinations including regional employment centers, retail and offices in the area, nearby schools, other regional trip attractors, and the major routes of travel in the area, most notably GA 316. The new project trips, shown in Table 4, were assigned to the roadway network based on the distribution percentages. The trip distribution percentages and the a.m. and p.m. peak hour trips expected to be generated by the proposed subdivision are shown in Figure 5.

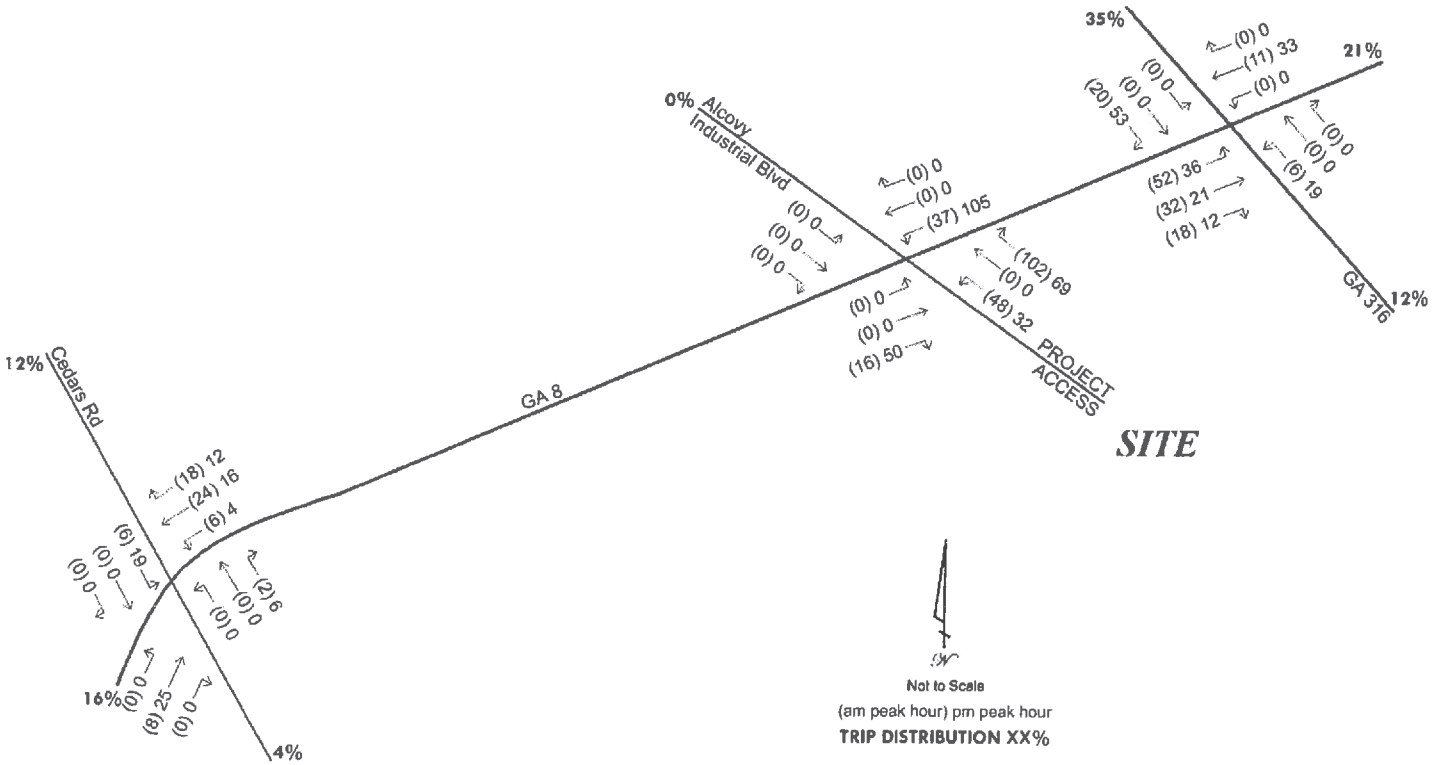


Figure 5 – Weekday A.M. and P.M. Peak Hour Project Trips and Distribution Percentages

Future Traffic Conditions

The future volumes consist of the no-build volumes plus the trips that will be generated by the proposed subdivision. The future volumes are shown in Figure 6.

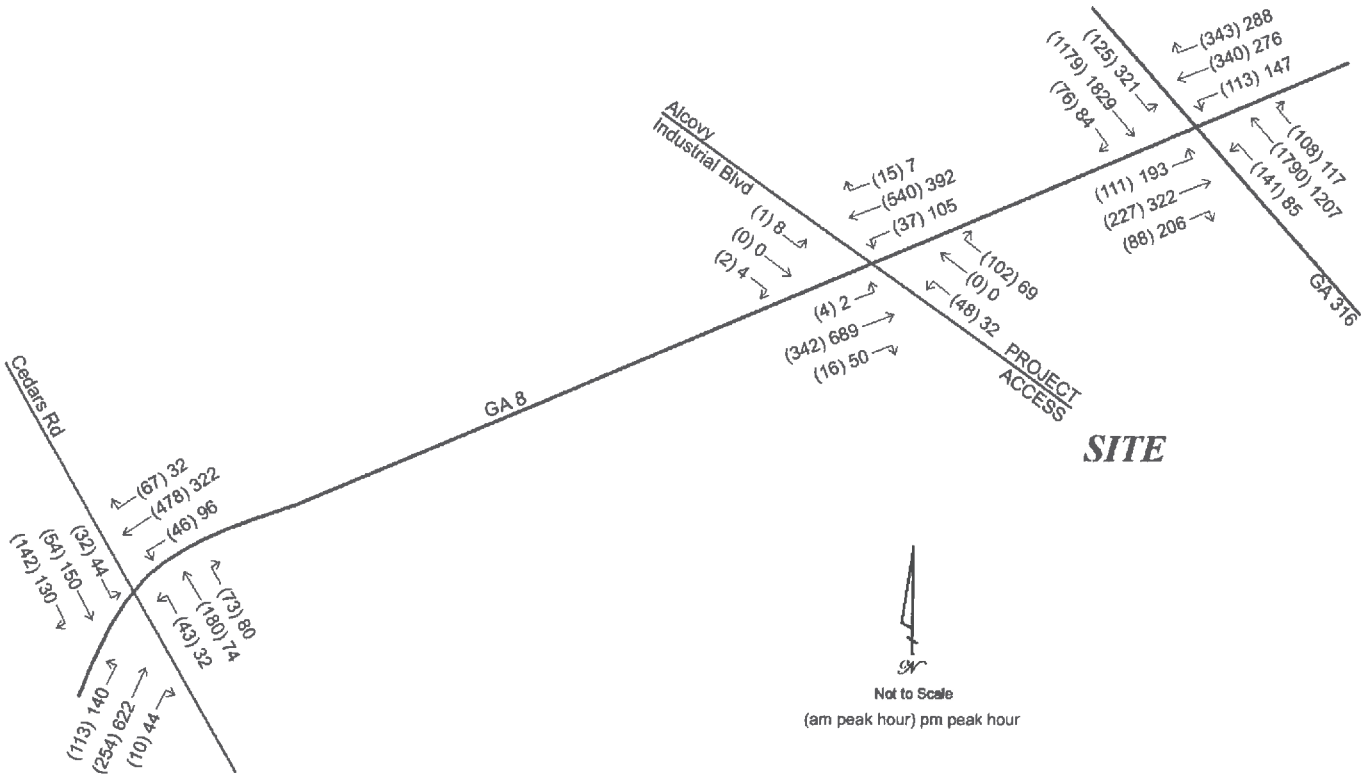


Figure 6 – Future Weekday A.M. and P.M. Peak Hour Volumes

Auxiliary Lane Requirements at Site Access

Georgia Highway 8 falls under the jurisdiction of the Georgia DOT. Therefore, in order to determine if an eastbound right turn lane or westbound left turn lane are required at the project accesses on GA 8, the Georgia DOT standards for determining the need for these auxiliary lanes, as set forth in their *Regulations for Driveway and Encroachment Control (Driveway Manual)*, revision 5.0 dated 7/3/2019, were reviewed.

The right turn lane analysis was based on *Driveway Manual* Table 4-6, Minimum Volumes Requiring Right Turn Lanes, which is shown below as Table 5.

Table 5 – Georgia DOT Right Turn Lane Standards

Posted Speed	2 Lane Routes		More than 2 Lanes on Main Road	
	AADT		AADT	
	< 6000	>=6000	<10000	>=10000
35 MPH or Less	200 RTV a day	100 RTV a day	200 RTV a day	100 RTV a day
40 to 50 MPH	150 RTV a day	75 RTV a day	150 RTV a day	75 RTV a day
55 to 60 MPH	100 RTV a day	50 RTV a day	100 RTV a day	50 RTV a day
>= 65 MPH	Always	Always	Always	Always

Table 4-6 Minimum Volumes Requiring Right Turn Lanes

The AADT on GA 8 was 13,300 vpd in 2019 (pre-pandemic) and counted at 11,209 vehicles for this study, both of which are above the 6,000 vpd threshold for a road with two lanes. For a 45 mph speed limit, above 6,000 vpd, the right turn volume (RTV) above which a right turn lane is required is 75 right turn vehicles (RTV) per day. The daily eastbound right turn volume for the proposed development is calculated at 543 RTV. This volume is higher than the 75 RTV threshold and, therefore, an eastbound right turn lane is required at the project access.

The left turn lane analysis at each access was based on *Driveway Manual* Table 4-7a, Minimum Volumes Requiring Left Turn Lanes, which is shown below as Table 6.

Table 6 – Georgia DOT Left Turn Lane Standards

LEFT TURN REQUIREMENTS-FULL CONSTRUCTION				
Posted Speed	2 Lane Routes		More than 2 Lanes on Main Road	
	ADT		ADT	
	<6000	>=6000	<10000	>=10000
35 MPH or Less	300 LTV a day	200 LTV a day	400 LTV a day	300 LTV a day
40 to 50 MPH	250 LTV a day	175 LTV a day	325 LTV a day	250 LTV a day
>= 55 MPH	200 LTV a day	150 LTV a day	250 LTV a day	200 LTV a day

Table 4-7a Minimum Volumes Requiring Left Turn Lanes

The AADT on GA 8 was 13,300 vpd in 2019 (pre-pandemic) and counted at 11,209 vehicles for this study, both of which are above the 6,000 vpd threshold for a road with two lanes. For a 45 mph speed limit, above 6,000 vpd, the left turn volume (LTV) above which a left turn lane is required is 175 left turn vehicles (LTV) per day. The daily westbound left turn volume for the proposed development is calculated at 1,155 LTV. This volume is substantially higher than the 175 LTV threshold and, therefore, a westbound left turn lane is required at the project access.

Exiting the site, a separate left turn lane and right turn lane should be provided. The exiting approach should be controlled by side street stop sign and accompanying stop bar.

Future Intersection Operations

An operational analysis was performed for the anticipated future project build-out at the study intersections and the project access aligning with Alcovy Industrial Boulevard. The analysis assumes that an eastbound right turn lane and a westbound left turn lane will be constructed on GA 8 at the subdivision access. The analysis also assumes separate left and right turn lanes will be provided exiting the site and that the northbound exiting approach will be controlled by side street stop sign and accompanying stop bar. Table 7 presents the results of the future analysis. Computer printouts containing detailed results of the future analysis are located in Appendix E. Levels of service and delays are provided for each overall intersection and for each controlled approach or movement. Locations that operate unacceptably (LOS E or LOS F) are presented in bold type.

Table 7 – Future Intersection Operations

Intersection / Approach	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay (s/veh)	LOS	Delay (s/veh)
1. GA 8 at Cedars Road (signal)	C	26.2	B	18.5
northbound approach	D	49.5	C	22.7
southbound approach	B	18.5	C	24.1
eastbound approach	B	13.4	B	14.4
westbound approach	C	24.5	B	19.7
2. GA 8 at Alcovy Industrial Boulevard (side street stop)	A	3.0	A	4.1
northbound left turn / through (exiting project)	D	31.6	***F***	***66.4***
northbound right turn (exiting project)	B	11.9	C	16.9
southbound left turn / through	D	32.8	***F***	***72.3***
southbound right turn	B	12.1	B	10.9
eastbound left turn	A	8.8	A	8.3
westbound left turn (entering project)	A	8.3	B	10.3
3. GA 316 at GA 8 (signal)	D	54.0	***E***	***63.5***
northbound approach (GA 316 westbound)	***E***	***57.8***	C	32.1
southbound approach (GA 316 eastbound)	C	30.1	***E***	***62.4***
eastbound approach (GA 8)	***E***	***69.0***	***F***	***105.9***
westbound approach (GA 8)	***F***	***94.3***	***F***	***111.7***

The future analysis with the addition of the proposed subdivision's trips reveals a moderate deterioration in operations. The Cedars Road intersection will continue to operate acceptably. The GA 316 / GA 8 intersection will continue to have failing approaches, as identified in the existing and no-build analysis. As stated previously, because this intersection will be improved shortly, no mitigation is recommended. Therefore, no off-site mitigation is identified for the future build condition.

The analysis shows that the subdivision access will work well with the recommended lanes and control in the a.m. peak hour. However, the side street left turns will incur high delays in the p.m. peak hour. This is not unusual on

side street stop sign controlled approaches at busy highways such as GA 8. The left turns from Alcovy Industrial Boulevard that incur the LOS F are minimal, with eight (8) vehicles making this turn in the p.m. peak hour. The left turns from the proposed subdivision that will incur the LOS F will be more substantial, but still moderate compared with the volumes on GA 8. Mitigating these delays would require a change in control, most typically to a signal. However, the side street volumes are not sufficient to satisfy volume-based warrants for signalization according to Georgia DOT standards. As an alternative, a roundabout would typically not be considered appropriate in this context of a busy state route at a minor local street and a private subdivision driveway. Therefore, no feasible mitigation is identified for this intersection.

The project civil/site engineer should comply with all applicable design standards including sight distances, turn radii, turn lane storage and taper lengths, driveway widths, islands, angles with the adjacent roadways, and grades.

Conclusions and Recommendations

This traffic impact study evaluates the impact of a proposed residential subdivision in Gwinnett County. The site is located on the southeast side of Georgia Highway 8 at Alcovy Industrial Boulevard. The site will be developed with 345 apartment units and 152 multifamily carriage units. Vehicular access will be provided at one access on GA 8, aligning with Alcovy Industrial Boulevard. The following are the findings and recommendations of this study:

1. The existing analysis reveals acceptable operating conditions at the Cedars Road and Alcovy Industrial Boulevard intersections, and generally acceptable operations at the GA 316 intersection, with some approaches failing.

2. A programmed improvement scheduled for construction in 2024 will reconfigure the GA 316 / GA 8 intersection as a grade-separated diamond interchange. Because of this imminent improvement, no mitigation is recommended for this intersection.

3. Traffic volume growth in this area has been positive and moderate and this is expected to continue into the future.

4. With the growth in background traffic volumes, the Cedars Road and Alcovy Industrial Boulevard intersections will continue to operate acceptably in the no-build condition and no mitigation is identified.

5. The proposed subdivision will generate 203 a.m. peak hour trips, 256 p.m. peak hour trips, and 3,396 weekday trips.

6. The future analysis with the addition of the proposed subdivision's trips reveals a moderate deterioration in operations. The Cedars Road intersection will continue to operate acceptably. The GA 316 / GA 8 intersection will continue to have failing approaches, as identified in the existing and no-build analysis, but, because this intersection will be improved shortly, no mitigation is recommended. Therefore, no off-site mitigation is identified for the future build condition.

7. The auxiliary turn lane analysis revealed that an eastbound right turn lane and a westbound left turn lane are required on GA 8 at the subdivision access.

8. Exiting the site, a separate left turn lane and right turn lane should be provided. The exiting approach should be controlled by side street stop sign and accompanying stop bar.

9. The analysis shows that the subdivision access will work well with the recommended lanes and control in the a.m. peak hour. However, the side street left turns will incur high delays in the p.m. peak hour. No feasible mitigation is identified for this intersection.

10. The programmed new interchange at GA 316 / GA 8 can be expected to impact GA 8 and may impact the subject property. It is recommended that the proposed Sugarloaf Crossing site plan take any programmed changes in roadway alignment or widening into consideration.

11. The project civil/site engineer should comply with all applicable design standards including sight distances, turn radii, turn lane storage and taper lengths, driveway widths, islands, angles with the adjacent roadways, and grades.

Appendix A

Traffic Count Data and Volume Worksheets

Dacula Crossing Subdivision Traffic Impact Study
Gwinnett County, Georgia

May 2022

Intersection: 1. Georgia Highway 8 at Cedars Road

Weekday A.M. Peak Hour

	Northbound Cedars Road				Southbound Cedars Road				Eastbound GA 8				Westbound GA 8			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, April 20, 2022 7:15-8:15)	39	163	64	266	24	49	129	202	102	223	9	334	36	411	44	491
Total Annual Background Growth	10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%	
2027 No-Build Volumes	43	180	71	294	26	54	142	223	113	246	10	369	40	454	49	542
Proposed Sugarloaf Crossing Subdivision Trips	0	0	2	2	6	0	0	6	0	8	0	8	6	24	18	48
Build Volumes	43	180	73	296	32	54	142	229	113	254	10	377	46	478	67	590

Weekday P.M. Peak Hour

	Northbound Cedars Road				Southbound Cedars Road				Eastbound GA 8				Westbound GA 8			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, April 20, 2022 4:00-5:00)	29	67	67	163	23	136	118	277	127	541	40	708	83	277	18	378
Total Annual Background Growth	10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%	
2027 No-Build Volumes	32	74	74	180	25	150	130	306	140	597	44	782	92	306	20	417
Proposed Sugarloaf Crossing Subdivision Trips	0	0	6	6	19	0	0	19	0	25	0	25	4	16	12	32
Build Volumes	32	74	80	186	44	150	130	325	140	622	44	807	96	322	32	449

Dacula Crossing Subdivision Traffic Impact Study
Gwinnett County, Georgia

May 2022

Intersection: 2. Georgia Highway 8 at Alcovy Industrial Boulevard

Weekday A.M. Peak Hour

	Northbound Sugarloaf Crossing Access				Southbound Alcovy Industrial Boulevard				Eastbound GA 8				Westbound GA 8			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, April 20, 2022 7:15-8:15)					1		2	3	4	310		314		489	14	503
Total Annual Background Growth					10.4%		10.4%		10.4%	10.4%				10.4%	10.4%	
2027 No-Build Volumes					1		2	3	4	342		347		540	15	555
Proposed Sugarloaf Crossing Subdivision Trips	48	0	102	150	0	0	0	0	0	0	16	16	37	0	0	37
Build Volumes	48	0	102	150	1	0	2	3	4	342	16	363	37	540	15	592

Weekday P.M. Peak Hour

	Northbound Sugarloaf Crossing Access				Southbound Alcovy Industrial Boulevard				Eastbound GA 8				Westbound GA 8			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, April 20, 2022 4:00-5:00)					7		4	11	2	624		626		355	6	361
Total Annual Background Growth					10.4%		10.4%		10.4%	10.4%				10.4%	10.4%	
2027 No-Build Volumes					8		4	12	2	689		691		392	7	399
Proposed Sugarloaf Crossing Subdivision Trips	32	0	69	101	0	0	0	0	0	0	50	50	105	0	0	105
Build Volumes	32	0	69	101	8	0	4	12	2	689	50	741	105	392	7	504

Dacula Crossing Subdivision Traffic Impact Study
Gwinnett County, Georgia

May 2022

Intersection: 3. Georgia Highway 316 at Georgia Highway 8

Weekday A.M. Peak Hour

	Northbound GA 316 (westbound)				Southbound GA 316 (eastbound)				Eastbound GA 8				Westbound GA 8			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, April 20, 2022 7:00-8:00)	122	1621	98	1841	113	1068	51	1232	53	177	63	293	102	298	311	711
Total Annual Background Growth	10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%	
2027 No-Build Volumes	135	1790	108	2032	125	1179	56	1360	59	195	70	323	113	329	343	785
Proposed Sugarloaf Crossing Subdivision Trips	6	0	0	6	0	0	20	20	52	32	18	102	0	11	0	11
Build Volumes	141	1790	108	2038	125	1179	76	1380	111	227	88	425	113	340	343	796

Weekday P.M. Peak Hour

	Northbound GA 316 (westbound)				Southbound GA 316 (eastbound)				Eastbound GA 8				Westbound GA 8			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, April 20, 2022 5:00-6:00)	60	1093	106	1259	291	1657	28	1976	142	273	176	591	133	220	261	614
Total Annual Background Growth	10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%	
2027 No-Build Volumes	66	1207	117	1390	321	1829	31	2182	157	301	194	652	147	243	288	678
Proposed Sugarloaf Crossing Subdivision Trips	19	0	0	19	0	0	53	53	36	21	12	69	0	33	0	33
Build Volumes	85	1207	117	1409	321	1829	84	2235	193	322	206	721	147	276	288	711

MARC R. ACAMPORA, PE, LLC

Appendix B

Intersection Analysis Methodology

Intersection Analysis Methodology

The methodology used for evaluating traffic operations at intersections is presented in the Transportation Research Board's *Highway Capacity Manual*, 2016 edition (HCM 6). Synchro 10 software, which emulates the HCM 6 methodology, was used for all analyses. The following is an overview of the methodology employed for the analysis of signalized intersections and roundabouts and stop-sign controlled (unsignalized) intersections. Levels of service (LOS) are assigned letters A through F. LOS A indicates operations with very low control delay while LOS F describes operations with high control delay. LOS F is considered to be unacceptable by most drivers, while LOS E is typically considered to be the limit of acceptable delay.

Signalized Intersections and Roundabouts – Level of service for a signalized intersection and a roundabout is defined in terms of control delay per vehicle. For signalized intersections and roundabouts, a composite intersection level of service is determined. The thresholds for each level of service are higher for signalized intersections and roundabouts than for unsignalized intersections. This is attributable to a variety of factors including expectation and acceptance of higher delays at signals/roundabouts, and the fact that drivers can relax when waiting at a signal as opposed to having to remain attentive as they proceed through the unsignalized intersection. The level of service criteria for signalized intersections and roundabouts are shown in Table A.

Table A – Level of Service Criteria for Signalized Intersections and Roundabouts

Control Delay (s/veh)	LOS
≤ 10	A
> 10 and ≤ 20	B
> 20 and ≤ 35	C
> 35 and ≤ 55	D
> 55 and ≤ 80	E
> 80	F

Source: Highway Capacity Manual 6

Unsignalized Intersections – Level of service for an unsignalized intersection is defined in terms of control delay per vehicle. Control delay is that portion of delay attributable to the control device and includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The delays at unsignalized intersections are based on gap acceptance theory, factoring in availability of gaps, usefulness of the gaps, and the priority of right-of-way given to each traffic stream. The level of service criteria for unsignalized intersections are presented in Table B.

Table B – Level of Service Criteria for Unsignalized Intersections

Control Delay (s/veh)	LOS
0 – 10	A
> 10 and ≤ 15	B
> 15 and ≤ 25	C
> 25 and ≤ 35	D
> 35 and ≤ 50	E
> 50	F

Source: Highway Capacity Manual 6

Appendix C

Existing Intersection Operational Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	223	9	36	411	44	39	163	64	24	49	129
Future Volume (veh/h)	102	223	9	36	411	44	39	163	64	24	49	129
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1796	1856	1856	1796	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	110	240	0	40	452	0	46	192	75	29	58	154
Peak Hour Factor	0.93	0.93	0.93	0.91	0.91	0.91	0.85	0.85	0.85	0.84	0.84	0.84
Percent Heavy Veh, %	3	7	3	3	7	3	3	3	3	3	3	3
Cap, veh/h	289	785		452	547		126	480	673	167	302	673
Arrive On Green	0.07	0.44	0.00	0.30	0.30	0.00	0.43	0.43	0.43	0.43	0.43	0.43
Sat Flow, veh/h	1767	1796	1572	1131	1796	1572	145	1123	1572	223	705	1572
Grp Volume(v), veh/h	110	240	0	40	452	0	238	0	75	87	0	154
Grp Sat Flow(s),veh/h/ln	1767	1796	1572	1131	1796	1572	1268	0	1572	928	0	1572
Q Serve(g_s), s	2.7	5.8	0.0	1.7	15.6	0.0	1.3	0.0	1.9	0.7	0.0	4.1
Cycle Q Clear(g_c), s	2.7	5.8	0.0	1.7	15.6	0.0	16.9	0.0	1.9	16.6	0.0	4.1
Prop In Lane	1.00		1.00	1.00		1.00	0.19		1.00	0.33		1.00
Lane Grp Cap(c), veh/h	289	785		452	547		607	0	673	469	0	673
V/C Ratio(X)	0.38	0.31		0.09	0.83		0.39	0.00	0.11	0.19	0.00	0.23
Avail Cap(c_a), veh/h	373	1415		796	1092		607	0	673	469	0	673
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.4	12.2	0.0	16.7	21.5	0.0	13.0	0.0	11.5	12.6	0.0	12.1
Incr Delay (d2), s/veh	0.8	0.2	0.0	0.1	3.3	0.0	1.9	0.0	0.3	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.9	0.0	0.4	6.1	0.0	2.3	0.0	0.6	0.7	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.3	12.4	0.0	16.8	24.8	0.0	14.9	0.0	11.8	12.8	0.0	12.3
LnGrp LOS	B	B		B	C		B	A	B	B	A	B
Approach Vol, veh/h		350	A		492	A		313			241	
Approach Delay, s/veh		13.6			24.1			14.2			12.4	
Approach LOS		B			C			B			B	

Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		33.0		33.6		33.0	8.8	24.8				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		28.5		52.5		28.5	7.5	40.5				
Max Q Clear Time (g_c+I1), s		18.9		7.8		18.6	4.7	17.6				
Green Ext Time (p_c), s		1.0		1.3		0.6	0.1	2.7				

Intersection Summary	
HCM 6th Ctrl Delay	17.3
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	310	489	14	1	2
Future Vol, veh/h	4	310	489	14	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	400	0	200
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	95	95	75	75
Heavy Vehicles, %	10	7	7	20	20	10
Mvmt Flow	5	369	515	15	1	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	530	0	-	0	894	515
Stage 1	-	-	-	-	515	-
Stage 2	-	-	-	-	379	-
Critical Hdwy	4.2	-	-	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	5.6	-
Follow-up Hdwy	2.29	-	-	-	3.68	3.39
Pot Cap-1 Maneuver	998	-	-	-	290	544
Stage 1	-	-	-	-	565	-
Stage 2	-	-	-	-	654	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	998	-	-	-	288	544
Mov Cap-2 Maneuver	-	-	-	-	288	-
Stage 1	-	-	-	-	562	-
Stage 2	-	-	-	-	654	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	13.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	998	-	-	-	288	544
HCM Lane V/C Ratio	0.005	-	-	-	0.005	0.005
HCM Control Delay (s)	8.6	0	-	-	17.6	11.7
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0	-	-	-	0	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	177	63	102	298	311	122	1621	98	113	1068	51
Future Volume (veh/h)	53	177	63	102	298	311	122	1621	98	113	1068	51
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1796	1707	1796	1796	1796	1707	1707	1796	1796	1707	1707
Adj Flow Rate, veh/h	63	211	0	112	327	0	128	1706	0	122	1148	0
Peak Hour Factor	0.84	0.84	0.84	0.91	0.91	0.91	0.95	0.95	0.95	0.93	0.93	0.93
Percent Heavy Veh, %	13	7	13	7	7	7	13	13	7	7	13	13
Cap, veh/h	144	335		235	352		286	1839		152	1825	
Arrive On Green	0.04	0.19	0.00	0.05	0.20	0.00	0.05	0.57	0.00	0.05	0.56	0.00
Sat Flow, veh/h	1626	1796	1447	1711	1796	1522	1626	3244	1522	3319	3244	1447
Grp Volume(v), veh/h	63	211	0	112	327	0	128	1706	0	122	1148	0
Grp Sat Flow(s),veh/h/ln	1626	1796	1447	1711	1796	1522	1626	1622	1522	1659	1622	1447
Q Serve(g_s), s	3.7	13.0	0.0	6.1	21.5	0.0	4.0	57.7	0.0	4.4	28.8	0.0
Cycle Q Clear(g_c), s	3.7	13.0	0.0	6.1	21.5	0.0	4.0	57.7	0.0	4.4	28.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	144	335		235	352		286	1839		152	1825	
V/C Ratio(X)	0.44	0.63		0.48	0.93		0.45	0.93		0.80	0.63	
Avail Cap(c_a), veh/h	144	335		235	352		355	1839		152	1825	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.0	45.0	0.0	38.7	47.4	0.0	14.6	23.8	0.0	56.7	17.8	0.0
Incr Delay (d2), s/veh	2.1	3.7	0.0	1.5	30.7	0.0	1.1	9.7	0.0	25.6	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	6.1	0.0	2.8	12.6	0.0	1.5	23.3	0.0	2.4	10.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.1	48.7	0.0	40.1	78.1	0.0	15.7	33.5	0.0	82.3	19.4	0.0
LnGrp LOS	D	D		D	E		B	C		F	B	
Approach Vol, veh/h		274	A		439	A		1834	A		1270	A
Approach Delay, s/veh		47.0			68.4			32.2			25.5	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	72.5	10.6	26.9	10.5	72.0	9.5	28.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	68.0	6.1	22.4	11.1	62.4	5.0	23.5
Max Q Clear Time (g_c+I1), s	6.4	59.7	8.1	15.0	6.0	30.8	5.7	23.5
Green Ext Time (p_c), s	0.0	6.7	0.0	0.6	0.1	10.6	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	35.2
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	127	541	40	83	277	18	29	67	67	23	136	118
Future Volume (veh/h)	127	541	40	83	277	18	29	67	67	23	136	118
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1796	1856	1856	1796	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	141	601	0	86	286	0	34	79	79	25	148	128
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.85	0.85	0.85	0.92	0.92	0.92
Percent Heavy Veh, %	3	7	3	3	7	3	3	3	3	3	3	3
Cap, veh/h	430	800		255	526		230	494	638	128	662	638
Arrive On Green	0.08	0.45	0.00	0.29	0.29	0.00	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1767	1796	1572	812	1796	1572	375	1219	1572	147	1632	1572
Grp Volume(v), veh/h	141	601	0	86	286	0	113	0	79	173	0	128
Grp Sat Flow(s),veh/h/ln	1767	1796	1572	812	1796	1572	1595	0	1572	1779	0	1572
Q Serve(g_s), s	3.1	16.8	0.0	6.0	8.1	0.0	0.0	0.0	1.9	0.0	0.0	3.2
Cycle Q Clear(g_c), s	3.1	16.8	0.0	13.6	8.1	0.0	2.3	0.0	1.9	3.7	0.0	3.2
Prop In Lane	1.00		1.00	1.00		1.00	0.30		1.00	0.14		1.00
Lane Grp Cap(c), veh/h	430	800		255	526		724	0	638	789	0	638
V/C Ratio(X)	0.33	0.75		0.34	0.54		0.16	0.00	0.12	0.22	0.00	0.20
Avail Cap(c_a), veh/h	540	1679		601	1293		724	0	638	789	0	638
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.6	14.0	0.0	23.5	18.0	0.0	11.4	0.0	11.2	11.8	0.0	11.6
Incr Delay (d2), s/veh	0.4	1.4	0.0	0.8	0.9	0.0	0.5	0.0	0.4	0.1	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	5.5	0.0	1.1	2.9	0.0	0.9	0.0	0.6	1.3	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.1	15.4	0.0	24.2	18.8	0.0	11.8	0.0	11.6	11.9	0.0	11.8
LnGrp LOS	B	B		C	B		B	A	B	B	A	B
Approach Vol, veh/h		742	A		372	A		192			301	
Approach Delay, s/veh		15.0			20.1			11.8			11.9	
Approach LOS		B			C			B			B	

Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		29.0		31.4		29.0	9.2	22.2				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		24.5		56.5		24.5	8.5	43.5				
Max Q Clear Time (g_c+I1), s		4.3		18.8		5.7	5.1	15.6				
Green Ext Time (p_c), s		0.8		4.0		1.2	0.1	2.1				

Intersection Summary	
HCM 6th Ctrl Delay	15.2
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	624	355	6	7	4
Future Vol, veh/h	2	624	355	6	7	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	400	0	200
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	94	94	92	92
Heavy Vehicles, %	10	7	7	20	20	10
Mvmt Flow	2	709	378	6	8	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	384	0	-	0	1091	378
Stage 1	-	-	-	-	378	-
Stage 2	-	-	-	-	713	-
Critical Hdwy	4.2	-	-	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	5.6	-
Follow-up Hdwy	2.29	-	-	-	3.68	3.39
Pot Cap-1 Maneuver	1132	-	-	-	220	651
Stage 1	-	-	-	-	655	-
Stage 2	-	-	-	-	454	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1132	-	-	-	219	651
Mov Cap-2 Maneuver	-	-	-	-	219	-
Stage 1	-	-	-	-	653	-
Stage 2	-	-	-	-	454	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	17.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1132	-	-	-	219	651
HCM Lane V/C Ratio	0.002	-	-	-	0.035	0.007
HCM Control Delay (s)	8.2	0	-	-	22	10.6
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	273	176	133	220	261	60	1093	106	291	1657	28
Future Volume (veh/h)	142	273	176	133	220	261	60	1093	106	291	1657	28
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1796	1707	1796	1796	1796	1707	1707	1796	1796	1707	1707
Adj Flow Rate, veh/h	154	297	0	141	234	0	64	1163	0	303	1726	0
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.94	0.94	0.94	0.96	0.96	0.96
Percent Heavy Veh, %	13	7	13	7	7	7	13	13	7	7	13	13
Cap, veh/h	218	322		181	322		142	1627		358	1857	
Arrive On Green	0.06	0.18	0.00	0.06	0.18	0.00	0.04	0.50	0.00	0.11	0.57	0.00
Sat Flow, veh/h	1626	1796	1447	1711	1796	1522	1626	3244	1522	3319	3244	1447
Grp Volume(v), veh/h	154	297	0	141	234	0	64	1163	0	303	1726	0
Grp Sat Flow(s),veh/h/ln	1626	1796	1447	1711	1796	1522	1626	1622	1522	1659	1622	1447
Q Serve(g_s), s	7.2	19.4	0.0	7.2	14.7	0.0	2.3	33.2	0.0	10.7	58.0	0.0
Cycle Q Clear(g_c), s	7.2	19.4	0.0	7.2	14.7	0.0	2.3	33.2	0.0	10.7	58.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	218	322		181	322		142	1627		358	1857	
V/C Ratio(X)	0.71	0.92		0.78	0.73		0.45	0.71		0.85	0.93	
Avail Cap(c_a), veh/h	218	324		181	324		151	1627		395	1857	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	42.4	48.1	0.0	41.2	46.2	0.0	26.5	23.1	0.0	52.3	23.3	0.0
Incr Delay (d2), s/veh	10.1	30.6	0.0	19.1	7.9	0.0	2.2	2.7	0.0	14.5	9.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	11.4	0.0	1.8	7.2	0.0	1.0	13.0	0.0	5.2	23.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.5	78.7	0.0	60.3	54.0	0.0	28.7	25.8	0.0	66.8	33.1	0.0
LnGrp LOS	D	E		E	D		C	C		E	C	
Approach Vol, veh/h		451	A		375	A		1227	A		2029	A
Approach Delay, s/veh		69.7			56.4			26.0			38.1	
Approach LOS		E			E			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.4	64.3	11.7	25.9	8.9	72.8	11.7	25.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.2	59.1	7.2	21.5	5.0	68.3	7.2	21.5
Max Q Clear Time (g_c+I1), s	12.7	35.2	9.2	21.4	4.3	60.0	9.2	16.7
Green Ext Time (p_c), s	0.2	9.6	0.0	0.0	0.0	6.7	0.0	0.5

Intersection Summary	
HCM 6th Ctrl Delay	39.6
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Appendix D

No-Build Intersection Operational Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	113	246	10	40	454	49	43	180	71	26	54	142
Future Volume (veh/h)	113	246	10	40	454	49	43	180	71	26	54	142
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1796	1856	1856	1796	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	122	265	0	44	499	0	51	212	84	31	64	169
Peak Hour Factor	0.93	0.93	0.93	0.91	0.91	0.91	0.85	0.85	0.85	0.84	0.84	0.84
Percent Heavy Veh, %	3	7	3	3	7	3	3	3	3	3	3	3
Cap, veh/h	283	826		468	592		77	274	645	86	145	645
Arrive On Green	0.07	0.46	0.00	0.33	0.33	0.00	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1767	1796	1572	1106	1796	1572	36	667	1572	41	353	1572
Grp Volume(v), veh/h	122	265	0	44	499	0	263	0	84	95	0	169
Grp Sat Flow(s),veh/h/ln	1767	1796	1572	1106	1796	1572	704	0	1572	394	0	1572
Q Serve(g_s), s	3.0	6.5	0.0	1.9	17.9	0.0	3.2	0.0	2.3	1.5	0.0	4.9
Cycle Q Clear(g_c), s	3.0	6.5	0.0	1.9	17.9	0.0	28.5	0.0	2.3	27.6	0.0	4.9
Prop In Lane	1.00		1.00	1.00		1.00	0.19		1.00	0.33		1.00
Lane Grp Cap(c), veh/h	283	826		468	592		351	0	645	231	0	645
V/C Ratio(X)	0.43	0.32		0.09	0.84		0.75	0.00	0.13	0.41	0.00	0.26
Avail Cap(c_a), veh/h	359	1358		749	1048		351	0	645	231	0	645
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.7	11.9	0.0	16.3	21.6	0.0	16.6	0.0	12.7	16.4	0.0	13.5
Incr Delay (d2), s/veh	1.0	0.2	0.0	0.1	3.4	0.0	13.7	0.0	0.4	1.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	2.2	0.0	0.4	7.0	0.0	3.8	0.0	0.8	0.9	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.7	12.1	0.0	16.3	25.0	0.0	30.3	0.0	13.2	17.6	0.0	13.7
LnGrp LOS	B	B		B	C		C	A	B	B	A	B
Approach Vol, veh/h		387	A		543	A		347			264	
Approach Delay, s/veh		13.6			24.3			26.2			15.1	
Approach LOS		B			C			C			B	

Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		33.0		36.4		33.0	9.0	27.4				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		28.5		52.5		28.5	7.5	40.5				
Max Q Clear Time (g_c+I1), s		30.5		8.5		29.6	5.0	19.9				
Green Ext Time (p_c), s		0.0		1.5		0.0	0.1	3.0				

Intersection Summary	
HCM 6th Ctrl Delay	20.4
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	342	540	15	1	2
Future Vol, veh/h	4	342	540	15	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	400	0	200
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	95	95	75	75
Heavy Vehicles, %	10	7	7	20	20	10
Mvmt Flow	5	407	568	16	1	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	584	0	-	0	985	568
Stage 1	-	-	-	-	568	-
Stage 2	-	-	-	-	417	-
Critical Hdwy	4.2	-	-	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	5.6	-
Follow-up Hdwy	2.29	-	-	-	3.68	3.39
Pot Cap-1 Maneuver	952	-	-	-	255	507
Stage 1	-	-	-	-	533	-
Stage 2	-	-	-	-	628	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	952	-	-	-	253	507
Mov Cap-2 Maneuver	-	-	-	-	253	-
Stage 1	-	-	-	-	529	-
Stage 2	-	-	-	-	628	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	14.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	952	-	-	-	253	507
HCM Lane V/C Ratio	0.005	-	-	-	0.005	0.005
HCM Control Delay (s)	8.8	0	-	-	19.3	12.1
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0	-	-	-	0	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	195	70	113	329	343	135	1790	108	125	1179	56
Future Volume (veh/h)	59	195	70	113	329	343	135	1790	108	125	1179	56
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1796	1707	1796	1796	1796	1707	1707	1796	1796	1707	1707
Adj Flow Rate, veh/h	70	232	0	124	362	0	142	1884	0	134	1268	0
Peak Hour Factor	0.84	0.84	0.84	0.91	0.91	0.91	0.95	0.95	0.95	0.93	0.93	0.93
Percent Heavy Veh, %	13	7	13	7	7	7	13	13	7	7	13	13
Cap, veh/h	141	340		244	370		250	1786		153	1754	
Arrive On Green	0.05	0.19	0.00	0.06	0.21	0.00	0.06	0.55	0.00	0.05	0.54	0.00
Sat Flow, veh/h	1626	1796	1447	1711	1796	1522	1626	3244	1522	3319	3244	1447
Grp Volume(v), veh/h	70	232	0	124	362	0	142	1884	0	134	1268	0
Grp Sat Flow(s),veh/h/ln	1626	1796	1447	1711	1796	1522	1626	1622	1522	1659	1622	1447
Q Serve(g_s), s	4.1	14.3	0.0	7.0	23.9	0.0	4.6	65.5	0.0	4.8	35.1	0.0
Cycle Q Clear(g_c), s	4.1	14.3	0.0	7.0	23.9	0.0	4.6	65.5	0.0	4.8	35.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	141	340		244	370		250	1786		153	1754	
V/C Ratio(X)	0.50	0.68		0.51	0.98		0.57	1.06		0.87	0.72	
Avail Cap(c_a), veh/h	154	355		244	370		310	1786		153	1754	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.5	44.9	0.0	36.9	47.0	0.0	18.6	26.7	0.0	56.4	20.6	0.0
Incr Delay (d2), s/veh	2.7	5.1	0.0	1.7	41.0	0.0	2.0	37.5	0.0	38.7	2.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	6.8	0.0	3.0	14.8	0.0	1.8	33.1	0.0	2.8	13.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.2	50.0	0.0	38.6	88.0	0.0	20.7	64.3	0.0	95.1	23.2	0.0
LnGrp LOS	D	D		D	F		C	F		F	C	
Approach Vol, veh/h		302	A		486	A		2026	A		1402	A
Approach Delay, s/veh		47.9			75.4			61.2			30.1	
Approach LOS		D			E			E			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	70.0	12.0	27.0	11.2	68.8	10.0	29.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	65.5	7.5	23.5	11.1	59.9	6.5	24.5
Max Q Clear Time (g_c+I1), s	6.8	67.5	9.0	16.3	6.6	37.1	6.1	25.9
Green Ext Time (p_c), s	0.0	0.0	0.0	0.7	0.1	10.5	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	51.6
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↰↑	↱		↰↑	↱
Traffic Volume (veh/h)	140	597	44	92	306	20	32	74	74	25	150	130
Future Volume (veh/h)	140	597	44	92	306	20	32	74	74	25	150	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1796	1856	1856	1796	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	156	663	0	95	315	0	38	87	87	27	163	141
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.85	0.85	0.85	0.92	0.92	0.92
Percent Heavy Veh, %	3	7	3	3	7	3	3	3	3	3	3	3
Cap, veh/h	457	870		251	600		213	452	593	117	617	593
Arrive On Green	0.08	0.48	0.00	0.33	0.33	0.00	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	1767	1796	1572	766	1796	1572	374	1198	1572	143	1635	1572
Grp Volume(v), veh/h	156	663	0	95	315	0	125	0	87	190	0	141
Grp Sat Flow(s),veh/h/ln	1767	1796	1572	766	1796	1572	1572	0	1572	1778	0	1572
Q Serve(g_s), s	3.5	19.6	0.0	7.5	9.2	0.0	0.0	0.0	2.4	0.0	0.0	4.0
Cycle Q Clear(g_c), s	3.5	19.6	0.0	17.4	9.2	0.0	4.6	0.0	2.4	4.6	0.0	4.0
Prop In Lane	1.00		1.00	1.00		1.00	0.30		1.00	0.14		1.00
Lane Grp Cap(c), veh/h	457	870		251	600		665	0	593	734	0	593
V/C Ratio(X)	0.34	0.76		0.38	0.52		0.19	0.00	0.15	0.26	0.00	0.24
Avail Cap(c_a), veh/h	546	1562		508	1203		665	0	593	734	0	593
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.1	13.7	0.0	24.8	17.5	0.0	13.5	0.0	13.3	14.0	0.0	13.8
Incr Delay (d2), s/veh	0.4	1.4	0.0	0.9	0.7	0.0	0.6	0.0	0.5	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	6.4	0.0	1.3	3.3	0.0	1.2	0.0	0.8	1.7	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.5	15.1	0.0	25.7	18.2	0.0	14.1	0.0	13.9	14.2	0.0	14.1
LnGrp LOS	B	B		C	B		B	A	B	B	A	B
Approach Vol, veh/h		819	A		410	A		212			331	
Approach Delay, s/veh		14.6			19.9			14.0			14.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	2	4	6	7	8
Phs Duration (G+Y+Rc), s	29.0	36.0	29.0	9.8	26.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	24.5	56.5	24.5	8.5	43.5
Max Q Clear Time (g_c+I1), s	6.6	21.6	6.6	5.5	19.4
Green Ext Time (p_c), s	0.8	4.6	1.3	0.1	2.4

Intersection Summary	
HCM 6th Ctrl Delay	15.7
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	689	392	7	8	4
Future Vol, veh/h	2	689	392	7	8	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	400	0	200
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	94	94	92	92
Heavy Vehicles, %	10	7	7	20	20	10
Mvmt Flow	2	783	417	7	9	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	424	0	-	0	1204	417
Stage 1	-	-	-	-	417	-
Stage 2	-	-	-	-	787	-
Critical Hdwy	4.2	-	-	-	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	5.6	-
Follow-up Hdwy	2.29	-	-	-	3.68	3.39
Pot Cap-1 Maneuver	1094	-	-	-	187	619
Stage 1	-	-	-	-	628	-
Stage 2	-	-	-	-	419	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1094	-	-	-	186	619
Mov Cap-2 Maneuver	-	-	-	-	186	-
Stage 1	-	-	-	-	626	-
Stage 2	-	-	-	-	419	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	20.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1094	-	-	-	186	619
HCM Lane V/C Ratio	0.002	-	-	-	0.047	0.007
HCM Control Delay (s)	8.3	0	-	-	25.3	10.9
HCM Lane LOS	A	A	-	-	D	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	157	301	194	147	243	288	66	1207	117	321	1829	31
Future Volume (veh/h)	157	301	194	147	243	288	66	1207	117	321	1829	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1796	1707	1796	1796	1796	1707	1707	1796	1796	1707	1707
Adj Flow Rate, veh/h	171	327	0	156	259	0	70	1284	0	334	1905	0
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.94	0.94	0.94	0.96	0.96	0.96
Percent Heavy Veh, %	13	7	13	7	7	7	13	13	7	7	13	13
Cap, veh/h	206	323		160	290		122	1601		389	1859	
Arrive On Green	0.08	0.18	0.00	0.06	0.16	0.00	0.04	0.49	0.00	0.12	0.57	0.00
Sat Flow, veh/h	1626	1796	1447	1711	1796	1522	1626	3244	1522	3319	3244	1447
Grp Volume(v), veh/h	171	327	0	156	259	0	70	1284	0	334	1905	0
Grp Sat Flow(s),veh/h/ln	1626	1796	1447	1711	1796	1522	1626	1622	1522	1659	1622	1447
Q Serve(g_s), s	9.2	21.5	0.0	7.0	16.9	0.0	2.5	39.6	0.0	11.8	68.5	0.0
Cycle Q Clear(g_c), s	9.2	21.5	0.0	7.0	16.9	0.0	2.5	39.6	0.0	11.8	68.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	206	323		160	290		122	1601		389	1859	
V/C Ratio(X)	0.83	1.01		0.97	0.89		0.58	0.80		0.86	1.02	
Avail Cap(c_a), veh/h	206	323		160	290		128	1601		428	1859	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	42.1	49.0	0.0	45.1	49.1	0.0	28.3	25.4	0.0	51.8	25.5	0.0
Incr Delay (d2), s/veh	23.8	53.1	0.0	62.6	27.4	0.0	5.6	4.3	0.0	14.9	27.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	14.4	0.0	4.2	9.8	0.0	1.1	15.8	0.0	5.7	31.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.9	102.1	0.0	107.7	76.5	0.0	33.9	29.7	0.0	66.7	52.9	0.0
LnGrp LOS	E	F		F	E		C	C		E	F	
Approach Vol, veh/h		498	A		415	A		1354	A		2239	A
Approach Delay, s/veh		89.7			88.2			29.9			54.9	
Approach LOS		F			F			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.5	63.5	11.5	26.0	9.0	73.0	13.7	23.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.4	58.1	7.0	21.5	5.0	68.5	9.2	19.3
Max Q Clear Time (g_c+I1), s	13.8	41.6	9.0	23.5	4.5	70.5	11.2	18.9
Green Ext Time (p_c), s	0.2	8.8	0.0	0.0	0.0	0.0	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	54.3
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Appendix E

Future Intersection Operational Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↰↑	↱		↰↑	↱
Traffic Volume (veh/h)	113	254	10	46	478	67	43	180	73	32	54	142
Future Volume (veh/h)	113	254	10	46	478	67	43	180	73	32	54	142
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1796	1856	1856	1796	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	122	273	0	51	525	0	51	212	86	38	64	169
Peak Hour Factor	0.93	0.93	0.93	0.91	0.91	0.91	0.85	0.85	0.85	0.84	0.84	0.84
Percent Heavy Veh, %	3	7	3	3	7	3	3	3	3	3	3	3
Cap, veh/h	278	847		478	617		62	215	632	72	91	632
Arrive On Green	0.06	0.47	0.00	0.34	0.34	0.00	0.40	0.40	0.40	0.40	0.40	0.40
Sat Flow, veh/h	1767	1796	1572	1097	1796	1572	5	535	1572	5	227	1572
Grp Volume(v), veh/h	122	273	0	51	525	0	263	0	86	102	0	169
Grp Sat Flow(s),veh/h/ln	1767	1796	1572	1097	1796	1572	540	0	1572	233	0	1572
Q Serve(g_s), s	3.0	6.7	0.0	2.3	19.2	0.0	0.4	0.0	2.5	0.3	0.0	5.1
Cycle Q Clear(g_c), s	3.0	6.7	0.0	2.3	19.2	0.0	28.5	0.0	2.5	28.5	0.0	5.1
Prop In Lane	1.00		1.00	1.00		1.00	0.19		1.00	0.37		1.00
Lane Grp Cap(c), veh/h	278	847		478	617		277	0	632	163	0	632
V/C Ratio(X)	0.44	0.32		0.11	0.85		0.95	0.00	0.14	0.63	0.00	0.27
Avail Cap(c_a), veh/h	351	1329		728	1026		277	0	632	163	0	632
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.8	11.7	0.0	16.0	21.6	0.0	18.9	0.0	13.4	17.9	0.0	14.2
Incr Delay (d2), s/veh	1.1	0.2	0.0	0.1	3.7	0.0	42.2	0.0	0.4	7.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	2.3	0.0	0.5	7.6	0.0	6.0	0.0	0.8	1.2	0.0	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.9	11.9	0.0	16.1	25.3	0.0	61.1	0.0	13.9	25.2	0.0	14.4
LnGrp LOS	B	B		B	C		E	A	B	C	A	B
Approach Vol, veh/h		395	A		576	A		349			271	
Approach Delay, s/veh		13.4			24.5			49.5			18.5	
Approach LOS		B			C			D			B	

Timer - Assigned Phs	2	4	6	7	8
Phs Duration (G+Y+Rc), s	33.0	37.9	33.0	9.1	28.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	28.5	52.5	28.5	7.5	40.5
Max Q Clear Time (g_c+I1), s	30.5	8.7	30.5	5.0	21.2
Green Ext Time (p_c), s	0.0	1.5	0.0	0.1	3.1

Intersection Summary	
HCM 6th Ctrl Delay	26.2
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱	↰	↑	↱		↰↑	↱		↰↑	↱
Traffic Vol, veh/h	4	342	16	37	540	15	48	0	102	1	0	2
Future Vol, veh/h	4	342	16	37	540	15	48	0	102	1	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	150	150	-	400	-	-	0	-	-	200
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	95	95	95	85	85	85	75	75	75
Heavy Vehicles, %	10	7	2	2	7	20	2	2	2	20	2	10
Mvmt Flow	5	407	19	39	568	16	56	0	120	1	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	584	0	0	426	0	0	1071	1079	407	1133	1082	568
Stage 1	-	-	-	-	-	-	417	417	-	646	646	-
Stage 2	-	-	-	-	-	-	654	662	-	487	436	-
Critical Hdwy	4.2	-	-	4.12	-	-	7.12	6.52	6.22	7.3	6.52	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.3	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.3	5.52	-
Follow-up Hdwy	2.29	-	-	2.218	-	-	3.518	4.018	3.318	3.68	4.018	3.39
Pot Cap-1 Maneuver	952	-	-	1133	-	-	198	218	644	166	217	507
Stage 1	-	-	-	-	-	-	613	591	-	432	467	-
Stage 2	-	-	-	-	-	-	456	459	-	530	580	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	952	-	-	1133	-	-	191	209	644	131	208	507
Mov Cap-2 Maneuver	-	-	-	-	-	-	191	209	-	131	208	-
Stage 1	-	-	-	-	-	-	609	587	-	429	451	-
Stage 2	-	-	-	-	-	-	438	443	-	428	576	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.5	18.2	19
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	191	644	952	-	-	1133	-	-	131	507
HCM Lane V/C Ratio	0.296	0.186	0.005	-	-	0.034	-	-	0.01	0.005
HCM Control Delay (s)	31.6	11.9	8.8	0	-	8.3	-	-	32.8	12.1
HCM Lane LOS	D	B	A	A	-	A	-	-	D	B
HCM 95th %tile Q(veh)	1.2	0.7	0	-	-	0.1	-	-	0	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	111	227	88	113	340	343	141	1790	108	125	1179	76
Future Volume (veh/h)	111	227	88	113	340	343	141	1790	108	125	1179	76
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1796	1707	1796	1796	1796	1707	1707	1796	1796	1707	1707
Adj Flow Rate, veh/h	132	270	0	124	374	0	148	1884	0	134	1268	0
Peak Hour Factor	0.84	0.84	0.84	0.91	0.91	0.91	0.95	0.95	0.95	0.93	0.93	0.93
Percent Heavy Veh, %	13	7	13	7	7	7	13	13	7	7	13	13
Cap, veh/h	143	352		207	355		253	1803		152	1768	
Arrive On Green	0.05	0.20	0.00	0.05	0.20	0.00	0.06	0.56	0.00	0.05	0.54	0.00
Sat Flow, veh/h	1626	1796	1447	1711	1796	1522	1626	3244	1522	3319	3244	1447
Grp Volume(v), veh/h	132	270	0	124	374	0	148	1884	0	134	1268	0
Grp Sat Flow(s),veh/h/ln	1626	1796	1447	1711	1796	1522	1626	1622	1522	1659	1622	1447
Q Serve(g_s), s	6.1	17.1	0.0	6.3	23.7	0.0	4.8	66.7	0.0	4.8	35.0	0.0
Cycle Q Clear(g_c), s	6.1	17.1	0.0	6.3	23.7	0.0	4.8	66.7	0.0	4.8	35.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	143	352		207	355		253	1803		152	1768	
V/C Ratio(X)	0.93	0.77		0.60	1.05		0.58	1.04		0.88	0.72	
Avail Cap(c_a), veh/h	143	352		207	355		281	1803		152	1768	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	43.4	45.7	0.0	39.5	48.2	0.0	18.6	26.7	0.0	56.9	20.4	0.0
Incr Delay (d2), s/veh	53.3	9.8	0.0	4.7	62.8	0.0	2.5	34.0	0.0	40.5	2.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	8.6	0.0	3.2	16.7	0.0	1.9	32.8	0.0	2.9	13.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	96.7	55.5	0.0	44.2	110.9	0.0	21.1	60.6	0.0	97.5	22.9	0.0
LnGrp LOS	F	E		D	F		C	F		F	C	
Approach Vol, veh/h		402	A		498	A		2032	A		1402	A
Approach Delay, s/veh		69.0			94.3			57.8			30.1	
Approach LOS		E			F			E			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	71.2	10.8	28.0	11.3	69.9	10.6	28.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	66.7	6.3	23.5	8.9	63.3	6.1	23.7
Max Q Clear Time (g_c+I1), s	6.8	68.7	8.3	19.1	6.8	37.0	8.1	25.7
Green Ext Time (p_c), s	0.0	0.0	0.0	0.6	0.1	11.2	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	54.0
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	622	44	96	322	32	32	74	80	44	150	130
Future Volume (veh/h)	140	622	44	96	322	32	32	74	80	44	150	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1796	1856	1856	1796	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	156	691	0	99	332	0	38	87	94	48	163	141
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.85	0.85	0.85	0.92	0.92	0.92
Percent Heavy Veh, %	3	7	3	3	7	3	3	3	3	3	3	3
Cap, veh/h	465	902		249	641		76	139	573	72	202	573
Arrive On Green	0.08	0.50	0.00	0.36	0.36	0.00	0.36	0.36	0.36	0.36	0.36	0.36
Sat Flow, veh/h	1767	1796	1572	746	1796	1572	17	382	1572	18	555	1572
Grp Volume(v), veh/h	156	691	0	99	332	0	125	0	94	211	0	141
Grp Sat Flow(s),veh/h/ln	1767	1796	1572	746	1796	1572	400	0	1572	573	0	1572
Q Serve(g_s), s	3.5	20.9	0.0	8.3	9.8	0.0	0.9	0.0	2.7	1.2	0.0	4.2
Cycle Q Clear(g_c), s	3.5	20.9	0.0	19.5	9.8	0.0	24.5	0.0	2.7	24.5	0.0	4.2
Prop In Lane	1.00		1.00	1.00		1.00	0.30		1.00	0.23		1.00
Lane Grp Cap(c), veh/h	465	902		249	641		215	0	573	274	0	573
V/C Ratio(X)	0.34	0.77		0.40	0.52		0.58	0.00	0.16	0.77	0.00	0.25
Avail Cap(c_a), veh/h	524	1509		477	1188		215	0	573	274	0	573
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.8	13.6	0.0	25.4	17.1	0.0	17.5	0.0	14.5	17.7	0.0	14.9
Incr Delay (d2), s/veh	0.4	1.4	0.0	1.0	0.6	0.0	10.9	0.0	0.6	12.4	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	6.8	0.0	1.4	3.6	0.0	1.8	0.0	1.0	3.0	0.0	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.2	15.0	0.0	26.4	17.7	0.0	28.4	0.0	15.1	30.1	0.0	15.2
LnGrp LOS	B	B		C	B		C	A	B	C	A	B
Approach Vol, veh/h		847	A		431	A		219			352	
Approach Delay, s/veh		14.4			19.7			22.7			24.1	
Approach LOS		B			B			C			C	

Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		29.0		38.3		29.0	9.8	28.5				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		24.5		56.5		24.5	7.5	44.5				
Max Q Clear Time (g_c+I1), s		26.5		22.9		26.5	5.5	21.5				
Green Ext Time (p_c), s		0.0		4.8		0.0	0.1	2.5				

Intersection Summary	
HCM 6th Ctrl Delay	18.5
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↱	↰	↑	↱		↕	↱		↕	↱
Traffic Vol, veh/h	2	689	50	105	392	7	32	0	69	8	0	4
Future Vol, veh/h	2	689	50	105	392	7	32	0	69	8	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	150	150	-	400	-	-	0	-	-	200
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	94	94	94	75	75	75	92	92	92
Heavy Vehicles, %	10	7	2	2	7	20	2	2	2	20	2	10
Mvmt Flow	2	783	57	112	417	7	43	0	92	9	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	424	0	0	840	0	0	1432	1435	783	1503	1485	417
Stage 1	-	-	-	-	-	-	787	787	-	641	641	-
Stage 2	-	-	-	-	-	-	645	648	-	862	844	-
Critical Hdwy	4.2	-	-	4.12	-	-	7.12	6.52	6.22	7.3	6.52	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.3	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.3	5.52	-
Follow-up Hdwy	2.29	-	-	2.218	-	-	3.518	4.018	3.318	3.68	4.018	3.39
Pot Cap-1 Maneuver	1094	-	-	795	-	-	112	134	394	91	125	619
Stage 1	-	-	-	-	-	-	385	403	-	434	469	-
Stage 2	-	-	-	-	-	-	461	466	-	326	379	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1094	-	-	795	-	-	99	115	394	62	107	619
Mov Cap-2 Maneuver	-	-	-	-	-	-	99	115	-	62	107	-
Stage 1	-	-	-	-	-	-	384	402	-	433	403	-
Stage 2	-	-	-	-	-	-	393	400	-	249	378	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.1	32.6	51.8
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	99	394	1094	-	-	795	-	-	62	619
HCM Lane V/C Ratio	0.431	0.234	0.002	-	-	0.141	-	-	0.14	0.007
HCM Control Delay (s)	66.4	16.9	8.3	0	-	10.3	-	-	72.3	10.9
HCM Lane LOS	F	C	A	A	-	B	-	-	F	B
HCM 95th %tile Q(veh)	1.8	0.9	0	-	-	0.5	-	-	0.5	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	193	322	206	147	276	288	85	1207	117	321	1829	84
Future Volume (veh/h)	193	322	206	147	276	288	85	1207	117	321	1829	84
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1796	1707	1796	1796	1796	1707	1707	1796	1796	1707	1707
Adj Flow Rate, veh/h	210	350	0	156	294	0	90	1284	0	334	1905	0
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.94	0.94	0.94	0.96	0.96	0.96
Percent Heavy Veh, %	13	7	13	7	7	7	13	13	7	7	13	13
Cap, veh/h	206	341		160	284		128	1572		389	1817	
Arrive On Green	0.09	0.19	0.00	0.06	0.16	0.00	0.04	0.48	0.00	0.12	0.56	0.00
Sat Flow, veh/h	1626	1796	1447	1711	1796	1522	1626	3244	1522	3319	3244	1447
Grp Volume(v), veh/h	210	350	0	156	294	0	90	1284	0	334	1905	0
Grp Sat Flow(s),veh/h/ln	1626	1796	1447	1711	1796	1522	1626	1622	1522	1659	1622	1447
Q Serve(g_s), s	10.8	22.8	0.0	7.0	19.0	0.0	3.3	40.5	0.0	11.9	67.2	0.0
Cycle Q Clear(g_c), s	10.8	22.8	0.0	7.0	19.0	0.0	3.3	40.5	0.0	11.9	67.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	206	341		160	284		128	1572		389	1817	
V/C Ratio(X)	1.02	1.03		0.98	1.03		0.70	0.82		0.86	1.05	
Avail Cap(c_a), veh/h	206	341		160	284		128	1572		426	1817	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	41.8	48.6	0.0	45.6	50.5	0.0	28.3	26.4	0.0	52.0	26.4	0.0
Incr Delay (d2), s/veh	67.3	55.4	0.0	63.9	62.4	0.0	16.1	4.8	0.0	15.1	35.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	15.4	0.0	4.3	13.4	0.0	1.8	16.2	0.0	5.7	33.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	109.1	104.0	0.0	109.5	112.9	0.0	44.4	31.2	0.0	67.1	61.6	0.0
LnGrp LOS	F	F		F	F		D	C		E	F	
Approach Vol, veh/h		560	A		450	A		1374	A		2239	A
Approach Delay, s/veh		105.9			111.7			32.1			62.4	
Approach LOS		F			F			C			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.6	62.6	11.5	27.3	9.5	71.7	15.3	23.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.4	56.8	7.0	22.8	5.0	67.2	10.8	19.0
Max Q Clear Time (g_c+I1), s	13.9	42.5	9.0	24.8	5.3	69.2	12.8	21.0
Green Ext Time (p_c), s	0.2	8.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	63.5
HCM 6th LOS	E

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Appendix F

Programmed Improvements Information Sheets

Atlanta Region's Plan RTP (2020) PROJECT FACT SHEET

Short Title	SR 316 INTERCHANGE AT US 29
GDOT Project No.	0013897
Federal ID No.	N/A
Status	Programmed
Service Type	Roadway / Interchange Capacity
Sponsor	Gwinnett County
Jurisdiction	Regional - Northeast
Analysis Level	In the Region's Air Quality Conformity Analysis

Existing Thru Lane	N/A	**LCI**		**Network Year**	2030
Planned Thru Lane	N/A	**Flex**		**Corridor Length**	0.8 miles

Detailed Description and Justification

This is a grade-seperated diamond interchange project along SR 316 at US 29.

Phase Status & Funding Information		Status	FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
					FEDERAL	STATE	BONDS	LOCAL/PRIVATE
PE	Transportation Funding Act (HB 170)	AUTH	2017	**$1,016,000**	~~$0,000~~	~~$1,016,000~~	~~$0,000~~	~~$0,000~~
PE	Transportation Funding Act (HB 170)	AUTH	2020	**$1,750,000**	~~$0,000~~	~~$1,750,000~~	~~$0,000~~	~~$0,000~~
PE	Transportation Funding Act (HB 170)	AUTH	2021	**$10,159,568**	~~$0,000~~	~~$10,159,568~~	~~$0,000~~	~~$0,000~~
ROW	Transportation Funding Act (HB 170)		2022	**$18,000,000**	$0,000	$18,000,000	$0,000	$0,000
UTL	Transportation Funding Act (HB 170)		2024	**$4,000,000**	$0,000	$4,000,000	$0,000	$0,000
CST	Transportation Funding Act (HB 170)		2024	**$47,000,000**	$0,000	$47,000,000	$0,000	$0,000
				$81,925,568	**$0,000**	**$81,925,568**	**$0,000**	**$0,000**

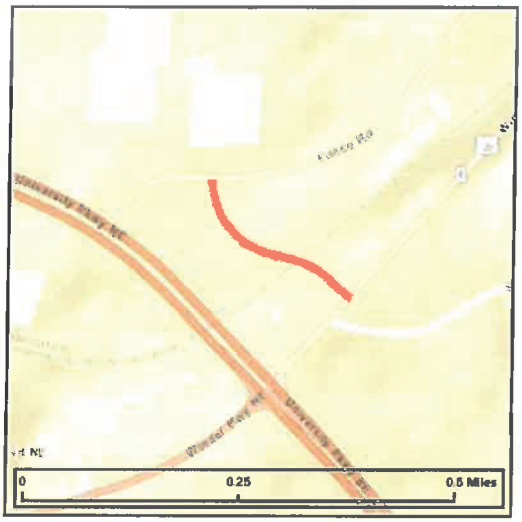
SCP: Scoping PE: Preliminary engineering / engineering / design / planning PE-OV: GDOT oversight services for engineering ROW: Right-of-way Acquistion
UTL: Utility relocation CST: Construction / Implementation ALL: Total estimated cost, inclusive of all phases

? For additional information about this project, please call (404) 463-3100 or email transportation@atlantaregional.com.

Report Generated: 3/21/2022

Atlanta Region's Plan RTP (2020) PROJECT FACT SHEET

Short Title	FENCE ROAD CONNECTOR - NEW ALIGNMENT FROM FENCE ROAD TO US 29 (WINDER HIGHWAY) APPROXIMATELY 0.25 MILES NORTH OF SR 316
GDOT Project No.	0013896
Federal ID No.	N/A
Status	Programmed
Service Type	Roadway / Operations & Safety
Sponsor	Gwinnett County
Jurisdiction	Gwinnett County
Analysis Level	In the Region's Air Quality Conformity Analysis



Existing Thru Lane	0	**LCI**		**Network Year**	2030
Planned Thru Lane	2	**Flex**		**Corridor Length**	0.5 miles

Detailed Description and Justification

This project includes the closure of the existing Fence Road intersection with SR 316 and construction of Fence Road Connector between existing Fence Road to the west and the ramp terminus of SR 316 ramps with US 29/SR 8 Winder Hwy to the east. Fence Road Connector aligns with the existing QT driveway access to US 29/SR 8 Winder Hwy. The Fence Road Connector Bridge will span over existing CSX Railroad. MSE walls will be used at both bridge approaches due to the alignment proximity to the existing cemetery and businesses. The project length is approximately 0.2 mile.

Phase Status & Funding Information		Status	FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
					FEDERAL	STATE	BONDS	LOCAL/PRIVATE
PE	Transportation Funding Act (HB 170)	AUTH	2017	**$168,000**	~~$0,000~~	~~$168,000~~	~~$0,000~~	~~$0,000~~
PE	Transportation Funding Act (HB 170)	AUTH	2021	**$448,477**	~~$0,000~~	~~$448,477~~	~~$0,000~~	~~$0,000~~
ROW	Transportation Funding Act (HB 170)		2022	**$3,000,000**	$0,000	$3,000,000	$0,000	$0,000
UTL	Transportation Funding Act (HB 170)		2024	**$400,000**	$0,000	$400,000	$0,000	$0,000
CST	Transportation Funding Act (HB 170)		2024	**$5,000,000**	$0,000	$5,000,000	$0,000	$0,000
				$9,016,477	**$0,000**	**$9,016,477**	**$0,000**	**$0,000**

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UTL: Utility relocation CST: Construction / Implementation ALL: Total estimated cost, inclusive of all phases