



CAHABA RIVER ROAD PROPOSED IMPROVEMENTS

Advanced Planning, Programming and Logical Engineering
(APPLE) Feasibility Study



Prepared For:

Regional Planning Commission of Greater Birmingham

in cooperation with the

Jefferson County Department of Roads and Transportation

April 2018

ENGINEER'S CERTIFICATION

I hereby certify that this study for the Cahaba River Road Advanced Planning, Programming and Logical Engineering (APPLE) Feasibility Study was prepared by Garver under my direct supervision for the Jefferson County Department of Roads and Transportation in cooperation with the Regional Planning Commission of Greater Birmingham.



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Digitally Signed 04/03/2019

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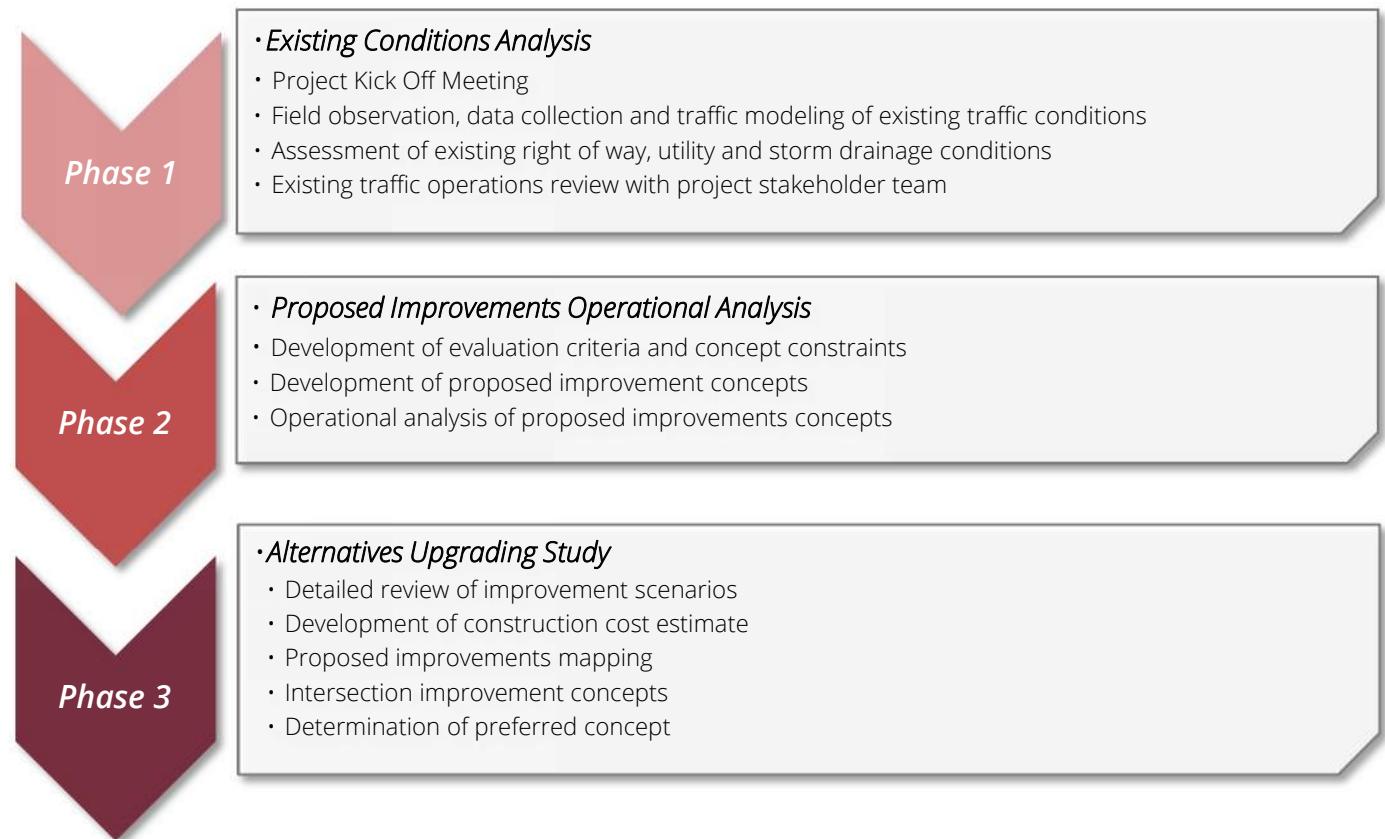
ONE: INTRODUCTION

The Cahaba River Road Feasibility Study evaluates potential improvements to relieve congestion, improve safety and enhance traffic operations throughout the corridor. Recognizing the need for these improvements, the Jefferson County Department of Roads and Transportation teamed with the Regional Planning Commission of Greater Birmingham (RPCGB) via the Advanced Planning, Programming and Logical Engineering program (APPLE) to initiate this study. The final study contents contained herein incorporate traffic, transportation, and environmental screening into one document that cohesively examines the corridor.

The purpose of this study is to present project stakeholders decision-making framework for reasonable alternatives to support the selection of a preferred alternative to be carried forward for further consideration and construction. The project team incorporated input from project stakeholders gathered during the kick-off meeting to identify feasible layouts and the associated impacts and costs for each. Project stakeholders refined concepts developed by the consultant team until a preferred alternative was selected.

APPLE Study Process

The APPLE study process consisted of three primary phases. The following details the work that was undertaken.



TWO: EXISTING CONDITIONS

2.1: Project Background

Cahaba River Road is a major collector approximately 2.8 miles in length (Figure 2.1.1). The roadway is primarily a two-lane facility, with intermittent segments of three lane sections west of Acton Road. Turn lanes are infrequent and inadequate in length where present, such as the Cahaba River Road / Acton Road intersection.

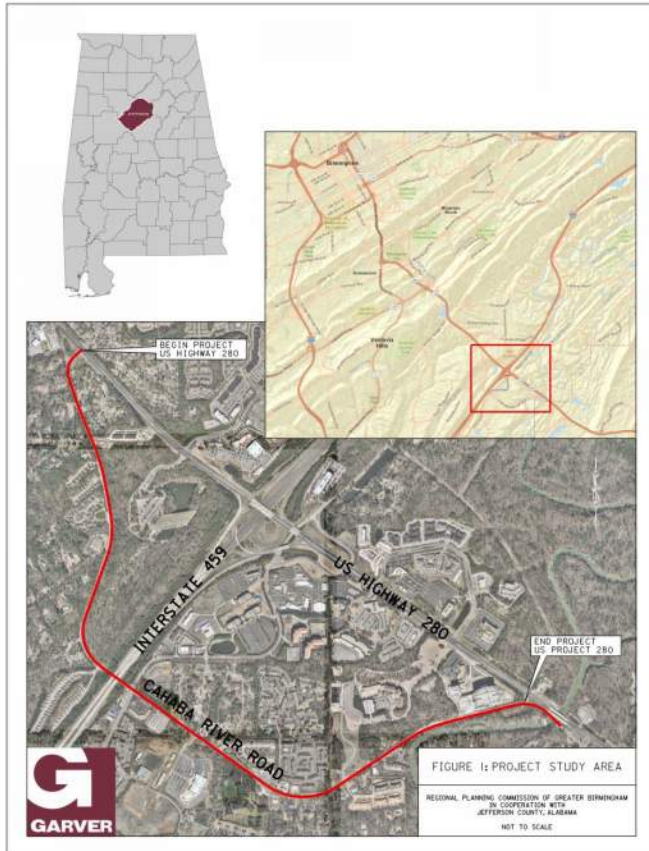


Figure 2.1: Project Study Area

The project study area includes jurisdictions of Jefferson County and the cities of Birmingham, Vestavia Hills and Mountain Brook. The corridor has experienced rapid growth, particularly the segment east of Acton Road, including three (3) major multi-family residential developments, a popular local pizzeria, the Publix-anchored mixed-use Patchwork Farms shopping center and the 402-bed Grandview Medical Center.

The roadway serves as an important route for commuters inbound to the Birmingham City Center from Shelby County and the US Highway 280 corridor. Westbound congestion during morning peak hours stretches greater than a half-mile from US Highway 280 to the Altadena Road intersection; likewise, eastbound traffic during the evening peak may back up to Dolly Ridge Road. Existing turn lanes at Acton Road have insufficient storage and contribute to the congestion.

Cahaba River Road has a posted speed limit of 45 miles per hour throughout the study area, with the exception of the westernmost segment near US Highway 280, which has a posted speed limit of 35 miles per hour. Of the eleven (11) major intersections located within the study

area, five (5) are signal controlled – those at Dolly Ridge Road, Altadena Road, Acton Road, Healthy Way and Old 280 Court/Colony Way.

2.2: Character Areas

Figure 2.2 indicates the four (4) distinct character areas within the Cahaba River Road study area. This data is important to understand the existing land character and the resultant constraints of each segment of the corridor. The influence of these distinct segments are reflected in the traffic studies and their characteristics can impact operational efficiency, suitability, cost and constructability of proposed roadway improvements. A description of each area follows.

1 -US Highway 280 to Dolly Ridge Road

This short, westernmost segment of the roadway represents the only portion of the study area to undergo major improvements in recent years. The project's western terminus was included as part of corridor-wide intersection improvements along US Highway 280 in 2013. The intersection was widened to include three (3) left turn lanes in an attempt to lessen congestion during morning peak hours when inbound commuter traffic is heaviest. Due to the short length between the US Highway 280 and Dolly Ridge intersections, this segment is the most consistently congested in the study area.

2 - Dolly Ridge Road to Acton Road

The approximate 1.10 mile, multijurisdictional stretch of Cahaba River Road from Dolly Ridge Road to Acton Road consists largely of high-density single-family residences to the southwest and rolling, undeveloped property to the northeast. Topography is challenging, with near vertical cut embankments, visible rock outcroppings and relatively steep roadway profile grades. Many residences are located in close proximity to edges of pavement, top of banks and toe of slopes. This segment also contains important utility infrastructure, including a Jefferson County Environmental Services pump station and a large Alabama Power substation.

3 - Acton Road to the Cahaba River

The segment of roadway bound by Acton Road and Old 280 Court/Colony Park is the most densely developed and highly urbanized portion of the study area. Contained primarily within the jurisdiction of the City of Vestavia Hills, this area is an emerging commercial corridor experiencing rapid redevelopment of former single-family homes to retail establishments, office complexes and restaurants. Primary traffic generators include multiple single and multi-family residential developments, the Patchwork Farms mixed use shopping center and the Lifestyle Fitness complex.

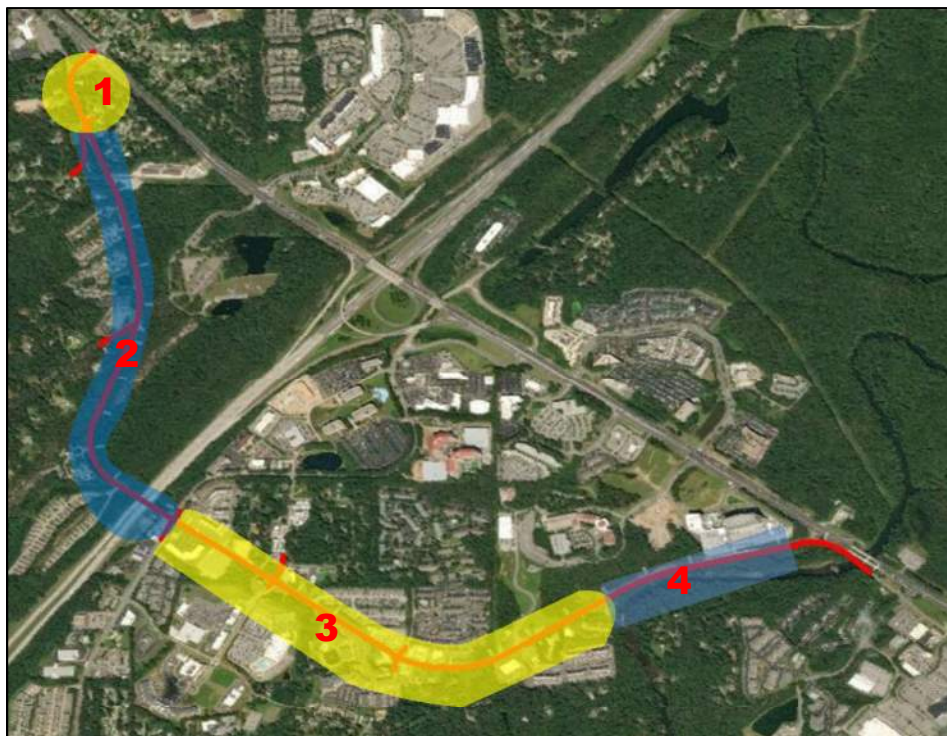


Figure 2.2: Character Areas

4- Cahaba River to US Highway 280

The final segment of the study area is characterized by two seemingly contrasting themes: large-scale medical buildings and sensitive environmental resources. The Grandview Medical Center, a 103-acre campus of medical buildings and hospital facilities, dominates the northern side; to the south is the main channel of the Cahaba River, the primary water source for the Birmingham Water Works board system and the longest free-flowing river remaining in Alabama. These two features make this segment the most constrained of the entire study area.

2.3: Utilities Assessment

The project team conducted a high-level analysis of utility systems within the study area to understand potential conflicts presented by the reasonable alternatives and to gain a preliminary understanding of potential relocation needs. The following narrative indicates utility conditions for the corridor. Available utility data courtesy of Jefferson County, Spire Energy and the Alabama Department of Transportation.

Water

The Birmingham Water Works Board serves the entirety of Cahaba River Road. Detailed mapping of water works lines was unavailable at the time of this study.

Based upon visual inspection of above-ground infrastructure such as meters and hydrants, it is anticipated that water infrastructure west of Healthy Way will require relocation. However, survey data is required to make a definitive determination of the limits of water utility relocation.

Sanitary Sewer

Sanitary service in the study area is intermittent, consisting of both gravity and force main sewers. An 8-inch ductile iron gravity sewer main serves the neighborhoods between Altadena Road and Acton Road. A Jefferson County Environmental Services pump station is located just west of Altadena Road, with force main running approximately to Interstate 459 along the existing shoulder of Cahaba River Road. Based on available data, ductile iron sewer in this area would lie under the proposed multi-use path, but not within the paving limits of proposed travel lanes. Approximately 0.5 miles of force main is within the proposed roadway limits and would likely require relocation.

West of Acton Road, proposed improvements would affect an 8-inch sanitary gravity sewer, constructed of varying materials including ductile iron and clay, running approximately from Timberlake Drive to the Old 280 Court/Colony Park intersection, tying to two (2) 24-inch ductile iron mains that cross Cahaba River Road perpendicularly just east of Healthy Way. Additionally, there is an 84-inch gravity concrete sanitary main located more than 75 feet deep under Cahaba River Road that will not be affected by the improvements proposed herein.

Survey data is required to make a definitive determination of the limits of sanitary sewer relocation.

Natural Gas

Spire Energy gas utility lines are located throughout the study area. Cahaba River Road is serviced by 4-inch medium pressure gas lines throughout the study limits, with smaller 2-inch service lines branching outward to residential and commercial developments. An 8-inch steel high-pressure line is located on the north side of Cahaba River Road between Dolly Ridge Road and Altadena Road.

Existing gas service lies beneath proposed paving limits with limited exceptions throughout the study area and will likely require relocation. Survey data is required to make a definitive determination of the limits of gas utility relocation.

Electric

Electric service within the project corridor is provided primarily via overhead power lines hanging on wooden poles. As a generality, power is located on the north side of Cahaba River Road from the western terminus to Acton Road, at which point it crosses to the south for the remainder of the study area. Short segments have overhead power on both sides of the roadway. Service poles west of Acton Road will require relocation; those further eastward largely lie to the south of anticipated construction limits. No impacts to the Alabama Power substation east of Dolly Ridge Road is expected.

In addition to wood service poles, there are a four (4) concrete distribution poles located in the northeast quadrant of the Cahaba River Road/Acton Road intersection. Survey data is required to make a definitive determination of the impacts of proposed improvements on these poles, as available GIS information is vague.

2.4: Existing Roadway Conditions

Cahaba River Road is a two-lane roadway from its western terminus at US Highway 280 to Acton Road. Lane widths in this segment of roadway vary from 10-11 feet. Shoulders are narrow, with widths of 2-4 feet typical. Storm drainage is conveyed via open roadside ditches.

Two major signalized intersections are present within this segment of the study area: Dolly Ridge Road and Altadena Road. Both exhibit severely skewed approaches to the intersections. The Dolly Ridge Road intersection lacks turn lanes altogether; there is a single left turn lane at the Cahaba River Road intersection with Altadena Road. Cahaba River Road passes under Interstate 459 just prior to the Acton Road intersection, with minimal-length right and left turn lanes. Visual inspection indicates motorists utilize the unpaved shoulder under the interstate to extend the short queue length for the right turn onto southbound Acton Road.

Cahaba River Road remains a two-lane facility to the Healthy Way intersection, where it transitions to a three-lane section with a two-way center turn lane for approximately 2,000 feet. Lane widths in this densely developed segment are 11 feet. Storm drainage conveyance is roadside ditches, with limited exceptions where the closed drainage systems of adjacent developments tie to the Cahaba River Road drainage infrastructure. There is a single barrel, 6x6 concrete box culvert cross drain just east of Healthy Way.

Beyond the intersection with Old 280 Court/Colony Park is an improved, unsignalized intersection for the rear entrance to Grandview Plaza, after which the roadway returns to a two-lane facility with roadside ditches and varying lane widths of 10-11 feet. Significant drainage infrastructure is present in this area, including a 60" reinforced concrete side drain; a single barrel 3x3 concrete box culvert; and a single barrel 6x4 concrete box culvert. Shoulders are minimal and guardrail is prevalent. As Cahaba River Road nears the end of the study area at US Highway 280, it is bound to the north by a shotcrete wall constructed to accommodate an existing left turn lane into Grandview Medical Center. The Cahaba River runs parallel to Cahaba River Road in this vicinity.

There are no pedestrian or bicycle facilities on Cahaba River Road within the study area.

Photographs of representative conditions of Cahaba River Road are presented on page 6. Existing conditions maps are included as Appendix D.



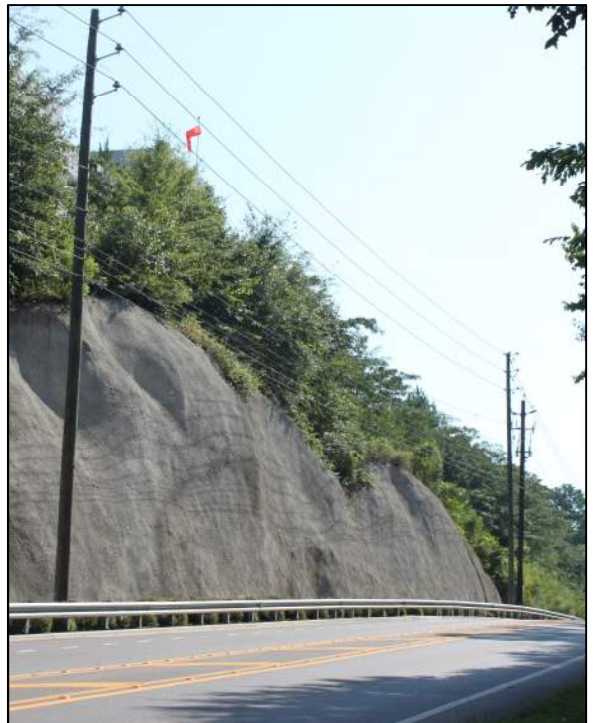
Photograph 2.1: 2-Lane Section West of Acton Road; note steep embankments



Photograph 2.2: 3-Lane Section at Acton Road Intersection



Photograph 2.3: Healthy Way Intersection



Photograph 2.4: Shotcrete Wall near eastern terminus

2.5: Existing Traffic Conditions

An evaluation of existing traffic operations was conducted in the summer of 2018. The purpose of the existing conditions traffic study was to identify mobility issues along Cahaba River Road by analyzing current and future traffic volumes under existing operating conditions.

2.5.1: Traffic Field Observations

Field observations are essential to traffic analysis in order to ensure that the traffic models are properly calibrated and that key issues are identified. Field observations were conducted during the AM and PM peak hours on Tuesday, May 22, 2018 in order to verify driver behavior and identify operational issues or safety concerns that should be considered during the development of build alternatives.



Photos 2.5: Morning peak congestion east of Dolly Ridge Road

During the site visit, it was apparent that congestion and operational issues occur along Cahaba River Road. In the AM peak hour, congestion was observed westbound along Cahaba River Road due to the long cycle lengths at the signalized intersection of US-280 and Cahaba River Road. The westbound queue caused spill back into the upstream signalized intersections along Cahaba River Road at Dolly Ridge Road and at Altadena Road, and these queues often blocked northbound left-turn traffic at the intersections. It was also noted during the site visit that the eastbound and westbound left turn lane storage lengths at the Cahaba River Road and Acton Road intersection are insufficient to accommodate the left turn volumes, thereby

causing vehicles to back up into the thru lane. In the PM peak hour, congestion was observed eastbound along Cahaba River Road from Acton Road to Dolly Ridge Road.

2.5.2: Volume Development

2.5.2.a: Development of the 2018 Existing Volumes

Traffic volume data including peak hour turning movement counts at study intersections and 24-hour tube counts at key locations along the study corridors were collected from May 22, 2018 to May 23, 2018. In addition, the Alabama Department of Transportation (ALDOT) provided traffic counts for the Cahaba River Road and US-280 intersection taken on February 27, 2018. Volume data was processed in order to develop the 2018 Traffic Volumes shown in Figure 2.4 on page 8. Refer to Appendix A – Traffic Data for traffic count data. Volume balancing between study intersections was not necessary due to presence of driveways and cross streets.

2.5.2.b: Development of the 2040 Future Volumes

In order to develop future traffic volumes, an estimated growth rate of 2.06% was determined based on the projected Annual Average Daily Traffic (AADT) volumes for the Cahaba River Road provided by the Regional Planning Commission of Greater Birmingham (RPCGB). Using the regression formula, the growth rate was applied to the turning movement

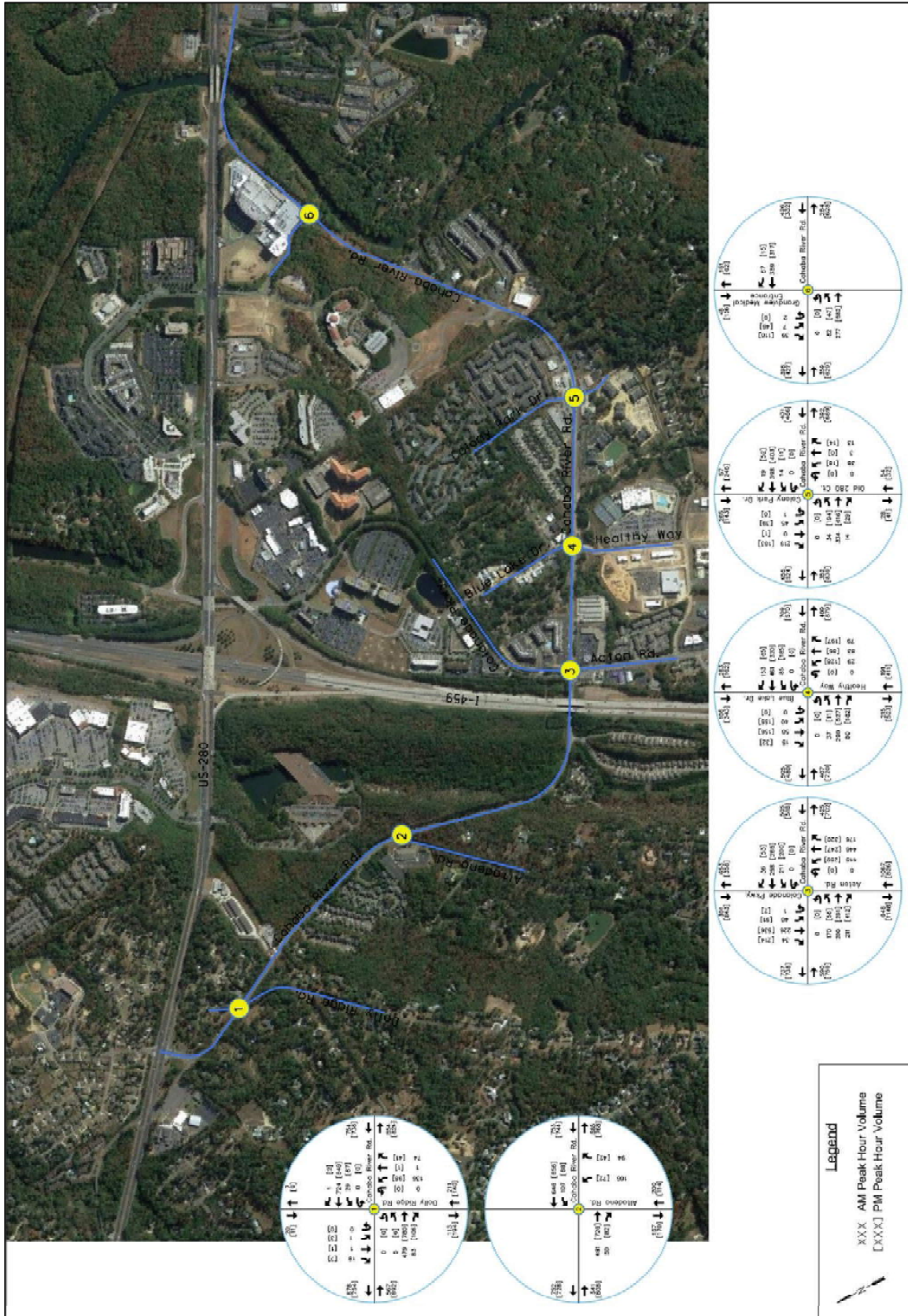


Figure 2.3: 2018 Roadway Volumes

counts to develop 2040 peak hour turning movement volumes. Figure 2.5 exhibits the 2040 Design Traffic Volumes.

2.5.3: Evaluation of Existing Traffic Conditions

The study area was evaluated under 2018 Existing and 2040 No Build conditions in order to identify the locations in greatest need of improvements and to establish a baseline for comparison with the development of build alternatives. Level of Service (LOS) was the key measure of effectiveness (MOE) used for the analysis and was determined along the Cahaba River Road corridor as well as at key intersections within the study area.

LOS is a concept defined by the Highway Capacity Manual (HCM) to qualitatively describe operating conditions within a traffic stream. LOS is typically stratified into six categories (A through F). These range from LOS A indicating free-flow, low density, or nearly negligible delay conditions to LOS F where demand exceeds capacity and large queues are experienced.

2.5.3.a: 2018 Roadway Segment Analysis

The existing Cahaba River Road corridor is comprised of two lanes with no shoulders and no bicycle or pedestrian accommodations. Some pedestrian and bicycle accommodations exist along a few of the new commercial side streets which lack connectivity. A short segment of two-way-left-turn-lane (TWLTL) exists west of the Cahaba River Road and Old 280 Court/ Colony Park Drive intersection. The study corridor contains several signalized intersections and many driveways to subdivisions and businesses which disrupt the flow of traffic and generate conflict points.

Under existing conditions, the segments along Cahaba River Road were analyzed as urban street segments. For segment analysis, the HCM methodology uses travel speed for through vehicles and volume-to-capacity (v/c) ratio as the basis for determining LOS. The results of this analysis are shown in Table 2.1 on page 11. More detailed information is included in Appendix B – Operational Analysis Results.

According to the results of this analysis, in the eastbound direction, the segment between Acton Road and Healthy Way showed LOS E in the PM peak period. In the westbound direction, two segments showed failing LOS E or LOS F for both peak periods: US-280 to Dolly Ridge Road and Acton Road to Healthy Way.

2.5.3.b: 2018 Roadway Intersection Analysis

For intersections, the HCM methodology uses control delay, measured in average seconds of delay per vehicle, as the basis for determining LOS. Control delay at an intersection is the average stopped time per vehicle traveling through the intersection plus the movements at slower speeds due to the vehicles moving up in the queue or slowing upstream of the approach. Table 2.2, page 11, shows the LOS delay thresholds as stated in *HCM 6th Edition*, pages 19-16 and 20-6.

Synchro 10 software along with its companion *SimTraffic* software were used to determine the expected delays and LOS at each intersection within the study area based on HCM methodology and *SimTraffic* micro-simulation methodology. Micro-simulation allows the user to analyze the intersection operations individually and in the context of the entire roadway network. Additionally, micro-simulation gives the user a powerful visualization tool to trace any sources of vehicle delay and queuing as well as the opportunity to perform multiple simulation runs with varying traffic volumes within the peak hour to account for the expected variability within a system. This variation also accounts for

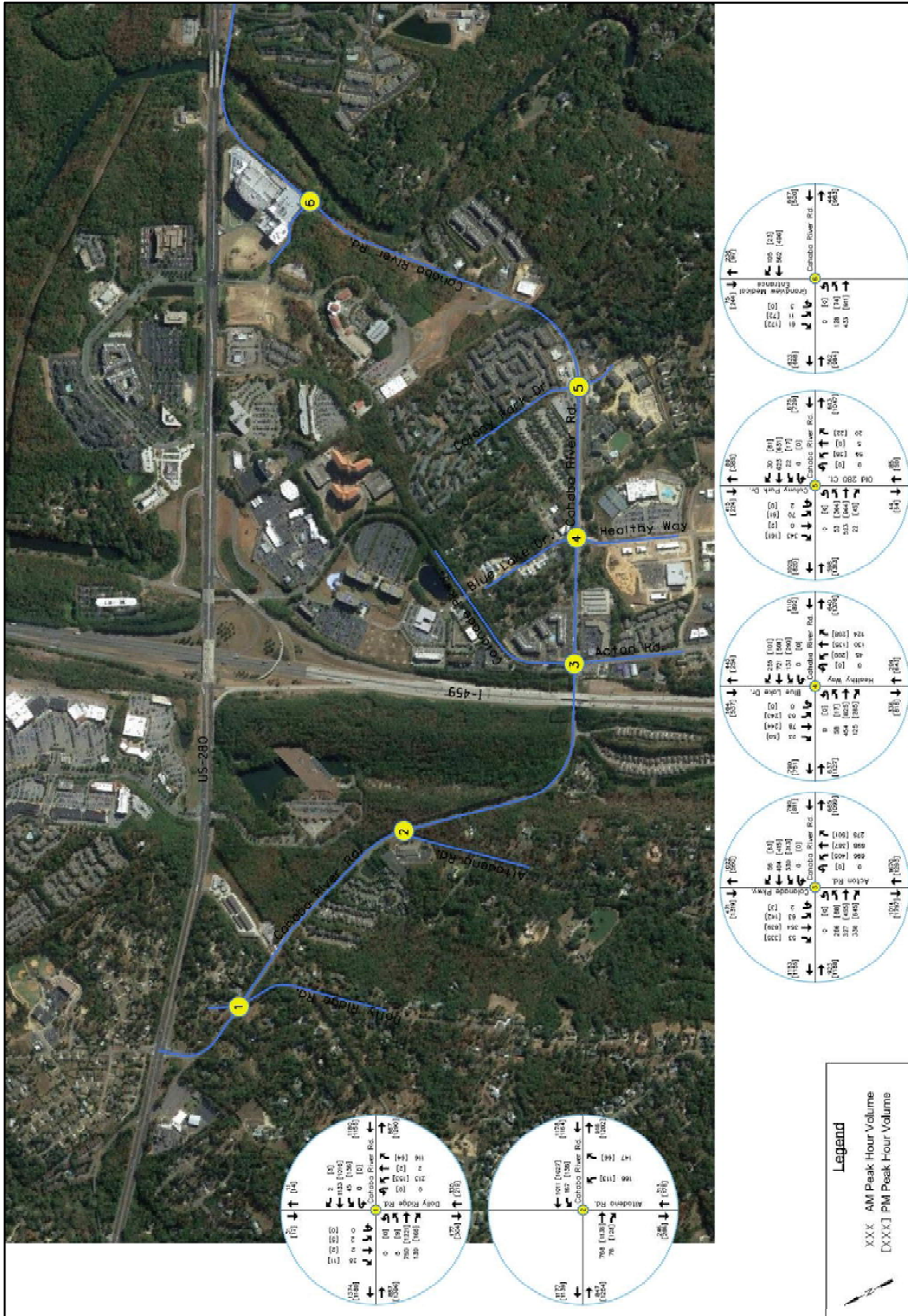


Figure 2.4: 2040 Roadway Volumes

Table 2.1: Roadway Segment Analysis – 2018 Existing Conditions

Segment	Time Period	Control	MOE	Westbound	Eastbound
Between US-280 and Dolly Ridge Road	AM	Signal	LOS	F	D
			Speed	7.8	21.2
	PM		LOS	F	D
			Speed	6.3	18.2
Between Dolly Ridge Road and Altadena Road	AM	Signal	LOS	C	B
			Speed	27.7	33.1
	PM		LOS	C	B
			Speed	26.7	32.3
Between Altadena Road and Acton Road/ Collonade Pkwy	AM	Signal	LOS	B	D
			Speed	33.7	21.0
	PM		LOS	A	D
			Speed	35.3	19.0
Between Acton Road/ Collonade Pkwy and Healthy Way/ Blue Lake Drive	AM	Signal	LOS	F	C
			Speed	11.3	23.5
	PM		LOS	E	E
			Speed	13.3	14.9
Between Healthy Way/ Blue Lake Drive and Old 280 Ct/ Colony Park Drive	AM	Signal	LOS	B	B
			Speed	29.2	29.4
	PM		LOS	C	B
			Speed	25.8	29.1
Old 280 Ct / Colony Park Drive and Grandview Medical Center Access	AM	Signal	LOS	A	n/a ¹
			Speed	35.3	n/a ¹
	PM		LOS	B	n/a ¹
			Speed	34.7	n/a ¹

n/a¹ – free flow eastbound through movement at Grandview Medical Center Access

different types of drivers (aggressiveness, gap acceptance tolerance) and vehicles (performance on grades, general acceleration/ deceleration). Finally, micro-simulation provides the best means to demonstrate the impacts of queues on nearby intersections.

At the Cahaba River Road and US-280 intersection and the Cahaba River Road and Acton Road intersection, current signal timings provided by ALDOT and the City of Birmingham were utilized to model existing conditions. For intersections where existing signal timings were not available, the signal timings were optimized within the model.

The results based on *HCM* methodology and *SimTraffic* methodology are summarized in Tables 2.3 and 2.4. The complete results are provided in Appendix B- Operational Analysis Results. The *HCM* methodology showed all movements Operating at acceptable LOS D or better with one exception: the southbound approach at the Cahaba River Road and Healthy Way intersection showed LOS F conditions during the PM peak period.

Level of Service	Description	Signalized Intersection Control Delay (sec/veh)	Two-Way Stopped Controlled Intersection Control Delay (sec/veh)
A	Most vehicles do not stop	0 to 10	0 to 10
B	Some vehicles stop	> 10 to 20	> 10 to 15
C	Significant number of stops	> 20 to 35	> 15 to 25
D	Many stop, individual cycle failure	> 35 to 55	> 25 to 35
E	Frequent individual cycle failure, at capacity	> 55 to 80	> 35 to 50
F	Arrival rate exceeds capacity	> 80 or	> 50 or

Table 2.2: LOS Thresholds for Intersections (Control Delay)

According to the *SimTraffic* methodology, four of the six study intersections showed at least one movement with failing LOS E or LOS F conditions for one or more peak period. The Cahaba River Road at Dolly Ridge Road intersection showed LOS F for the westbound approach and for the overall during both peak periods. The *SimTraffic* simulation showed the westbound queue in the AM peak hour along Cahaba River Road extending from the US Highway 280

Table 2.3: 2018 Existing Conditions – HCM Results

Intersection	Time Period	Control	MOE	EB Movement			WB Movement			NB Movement			SB Movement			Overall
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Cahaba River Road at Dolly Ridge Road	AM	Signal	LOS	A	A	A	A	A	A	C	A	A	B	A	A	B
			Delay	7.2	0.0	0.0	9.5	0.0	0.0	23.0	0.0	0.0	18.6	0.0	0.0	10.6
	PM		LOS	A	A	A	A	A	A	C	A	A	B	A	A	B
			Delay	9.7	0.0	0.0	8.0	0.0	0.0	22.3	0.0	0.0	19.3	0.0	0.0	10.1
Cahaba River Road at Altadena Road	AM	Signal	LOS		A		A	A		C		A				A
			Delay		6.2		8.5	8.1		21.3		0.0				9.3
	PM		LOS		A		A	A		C		A				A
			Delay		5.8		8.5	5.1		28.8		0.0				7.3
Cahaba River Road at Acton Road / Colonnade Pkwy	AM	Signal	LOS	C	D	D	C	A	D	B	C	C	C	C	C	C
			Delay	29.1	36.7	39.9	27.6	0.0	39.8	19.1	29.0	21.5	22.5	30.3	30.3	29.5
	PM		LOS	C	C	D	C	A	C	C	C	D	C	D	D	D
			Delay	23.7	32.5	49.7	24.5	0.0	29.4	33.3	30.6	37.2	26.5	51.4	52.2	39.0
Cahaba River Road at Healthy Way / Blue Lake Drive	AM	Signal	LOS	A	A	n/a ²	A	A	A	C	A	C	C	A	A	B
			Delay	7.6	7.7	n/a ²	4.5	0.0	6.1	23.5	0.0	23.7	24.5	0.0	0.0	10.3
	PM		LOS	B	C	n/a ²	B	A	B	C	A	C	F	A	A	D
			Delay	15.1	26.6	n/a ²	16.6	0.0	12.1	26.8	0.0	24.4	166.2	0.0	0.0	48.0
Cahaba River Road at Old 280 Ct / Colony Park Drive	AM	Signal	LOS	A	A	A	A	B	A	B	A	A	B	A	B	B
			Delay	6.8	0.0	5.3	7.6	12.9	7.6	13.6	0.0	0.0	13.4	0.0	18.6	11.4
	PM		LOS	A	A	A	A	B	A	B	A	A	B	A	C	A
			Delay	5.9	0.0	4.7	6.9	11.3	7.2	17.0	0.0	0.0	17.1	0.0	21.5	8.5
Cahaba River Road at Grandview Medical Center Access	AM	One-Way Stop	LOS	A	n/a ¹				n/a ¹				C		B	A
			Delay	8.3	n/a ¹				n/a ¹				17.4		10.8	1.5
	PM		LOS	A	n/a ¹				n/a ¹				C		B	A
			Delay	8.1	n/a ¹				n/a ¹				24.7		11.2	2.5

n/a¹ - It is a free movement and hence no delay reported; n/a² - HCM 6th Edition methodology does not calculate delay for yield-controlled channelized right at signalized intersections; n/a³ - LOS F due to v/c > 1

Table 2.4: 2018 Existing Conditions – SimTraffic Results

Intersection	Time Period	Control	MOE	EB Movement			WB Movement			NB Movement			SB Movement			Overall
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Cahaba River Road at Dolly Ridge Road	AM	Signal	LOS	C	B	B	F	F	F	D	D	C	A	A	C	F
			Delay	32.9	16.9	13.7	234.2	249.6	228.1	42.5	35.8	32.3	0.0	0.0	20.6	129.4
	PM		LOS	D	C	B	F	F	F	B	B	B	B	A	A	F
			Delay	42.1	22.5	19.1	370.2	359.3	368.6	19.3	16.8	11.9	14.6	5.8	7.1	154.0
Cahaba River Road at Altadena Road	AM	Signal	LOS		B	A	D	D		B		B				C
			Delay		12.2	8.1	45.6	42.6		16.6		10.2				27.9
	PM		LOS		B	B	F	F		C		B				D
			Delay		16.6	12.5	82.8	91.3		26.2		12.4				48.9
Cahaba River Road at Acton Road / Colonnade Pkwy	AM	Signal	LOS	D	D	B	C	D	C	D	D	A	C	D	B	D
			Delay	38.6	46.1	13.5	30.4	43.2	32.2	45.3	39.6	5.5	28.6	47.9	18.8	36.4
	PM		LOS	D	D	C	C	C	C	D	C	B	D	E	D	D
			Delay	42.3	51.9	29.9	33.3	32.1	24.0	46.3	34.6	11.0	39.0	57.5	50.2	39.3
Cahaba River Road at Healthy Way / Blue Lake Drive	AM	Signal	LOS	C	A	A	B	B	A	C	C	A	C	C	B	B
			Delay	20.2	9.5	4.4	10.5	10.8	7.4	22.4	22.3	5.6	24.2	21.5	10.3	11.2
	PM		LOS	C	C	A	C	B	B	D	D	B	E	E	D	C
			Delay	31.1	28.4	9.3	22.0	15.0	10.4	37.8	37.0	13.6	61.6	64.0	53.7	28.7
Cahaba River Road at Old 280 Ct / Colony Park Drive	AM	Signal	LOS	B	A	A	B	B	A	B	B	A	B		A	A
			Delay	11.2	7.6	4.8	14.0	10.5	5.2	14.1	10.4	5.4	10.9		5.7	8.7
	PM		LOS	B	A	A	B	B	A	B	A	A	B		A	A
			Delay	11.6	8.4	6.3	16.4	12.4	7.5	16.0	0.0	6.5	14.6		5.8	9.9
Cahaba River Road at Grandview Medical Center Access	AM	One-Way Stop	LOS	A	A			A	A				A		A	A
			Delay	7.3	5.4			0.8	1.7				8.9		1.1	3.2
	PM		LOS	A	A			A	A				B		A	A
			Delay	8.2	6.8			0.8	1.5				12.1		1.3	4.9

intersection at Altadena Road as verified during field observations. The results from the *SimTraffic* methodology more closely resembled the westbound queue in the AM peak hour along Cahaba River Road extending from US-280 to reflect the existing conditions observed during the site visit. The *SimTraffic* results are more reliable in this case because *SimTraffic* analyzes each intersection in the context of the roadway network and thus captures the impact of queue spillback from one intersection through the adjacent intersection. The *HCM* methodology does not have the capability to account for such impacts.

2.5.4: 2040 Roadway Segment Analysis

For the 2040 No Build conditions, peak hour factors and peak periods were assumed to remain unchanged from 2018 Existing conditions. The 2040 Design Traffic Volumes were used, and this analysis was performed using the same software and methodologies as the 2018 Existing conditions. A discussion of the results of the operational analysis of the 2040 No Build conditions for the Cahaba River Road corridor and the study intersections follows.

2.5.4.a: 2040 Roadway Segment Analysis

As with 2018 Existing conditions, the Cahaba River Road corridor was analyzed as urban street segments according to the HCM methodology. The results are summarized in Table 2.5. The complete results are provided in Appendix B - Operational Analysis Results.

Table 2.5: Roadway Segment Analysis – 2040 Future No Build Conditions

Segment	Time Period	Control	MOE	Westbound	Eastbound
Between US-280 and Dolly Ridge Road	AM	Signal	LOS	F	D
			Speed	9.1	17.5
	PM		LOS	F	F
			Speed	6.7	10.0
Between Dolly Ridge Road and Altadena Road	AM	Signal	LOS	E	B
			Speed	16.5	30.7
	PM		LOS	F	C
			Speed	8.6	27.9
Between Altadena Road and Acton Road/ Collonade Pkwy	AM	Signal	LOS	B	E
			Speed	29.2	15.0
	PM		LOS	B	F
			Speed	34.2	11.6
Between Acton Road/ Collonade Pkwy and Healthy Way/ Blue Lake Drive	AM	Signal	LOS	F	D
			Speed	6.8	21.2
	PM		LOS	F	F
			Speed	8.0	4.4
Between Healthy Way/ Blue Lake Drive and Old 280 Ct/ Colony Park Drive	AM	Signal	LOS	D	C
			Speed	21.6	27.7
	PM		LOS	D	C
			Speed	17.4	23.8
Old 280 Ct / Colony Park Drive and Grandview Medical Center Access	AM	Signal	LOS	B	n/a ¹
			Speed	33.1	n/a ¹
	PM		LOS	B	n/a ¹
			Speed	32.4	n/a ¹

n/a¹ – free flow eastbound through movement at Grandview Medical Center Access

According to the results of this analysis, the majority of the segments west of Healthy Way showed LOS E or LOS F during one or more peak periods for both directions of travel.

2.5.4.b: 2040 Intersection Analysis

As with 2018 Existing conditions, the study intersections were analyzed using Synchro and its companion SimTraffic software according to HCM and SimTraffic methodologies, and no changes in geometry or intersection control were assumed for 2040 No Build conditions. Signal timings were optimized for all intersections. The delay and LOS results of this analysis are shown in Tables 6 and 7. More detailed information is included in Attachment B – Operational Analysis Results.

Both methodologies showed multiple movements for most of the study intersections experiencing inadequate performance for the 2040 design year. Several intersections experienced failing overall LOS F conditions for one or both peak periods.

Cahaba River Road APPLE Study

Table 2.6: 2040 No Build Conditions – HCM Results

Intersection	Time Period	Control	MOE	EB Movement			WB Movement			NB Movement			SB Movement			Overall
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Cahaba River Road at Dolly Ridge Road	AM	Signal	LOS	B	A	A	F	A	A	F	A	A	D	A	A	D
			Delay	15.2	0.0	0.0	46.4	0.0	0.0	86.8	0.0	0.0	37.7	0.0	0.0	40.4
	PM		LOS	F	A	A	F	A	A	F	A	A	D	A	A	F
			Delay	40.5	0.0	0.0	694.8	0.0	0.0	126.1	0.0	0.0	50.7	0.0	0.0	318.4
Cahaba River Road at Altadena Road	AM	Signal	LOS		B		C	B		F		A			C	
			Delay		10.2		23.5	18.1		82.0		0.0			24.7	
	PM		LOS		B		D	A		F		A			C	
			Delay		10.8		35.9	8.4		153.2		0.0			21.5	
Cahaba River Road at Acton Road / Colonnade Pkwy	AM	Signal	LOS	F	F	F	F	A	F	F	E	C	D	F	F	F
			Delay	128.3	82.3	132.8	84.8	0.0	116.0	98.1	56.4	30.9	52.8	93.8	96.2	89.4
	PM		LOS	D	F	F	F	A	F	F	C	D	C	F	F	F
			Delay	38.9	127.7	452.3	178.6	0.0	91.0	184.1	29.8	43.8	25.3	114.4	119.0	152.6
Cahaba River Road at Healthy Way / Blue Lake Drive	AM	Signal	LOS	C	B	n/a ²	A	A	C	C	A	C	C	A	A	B
			Delay	31.0	12.4	n/a ²	7.4	0.0	20.5	25.1	0.0	24.7	28.0	0.0	0.0	19.4
	PM		LOS	D	F	n/a ²	F	A	C	D	A	C	F	A	A	F
			Delay	46.1	192.0	n/a ²	218.2	0.0	33.0	41.8	0.0	31.7	856.7	0.0	0.0	249.0
Cahaba River Road at Old 280 Ct / Colony Park Drive	AM	Signal	LOS	B	A	A	B	C	A	B	A	A	B	A	D	C
			Delay	11.3	0.0	8.6	12.3	23.7	9.5	17.5	0.0	0.0	16.5	0.0	38.9	20.7
	PM		LOS	B	A	B	B	B	A	C	A	A	C	A	C	B
			Delay	14.3	0.0	12.2	18.3	17.7	8.6	23.3	0.0	0.0	23.4	0.0	29.9	15.7
Cahaba River Road at Grandview Medical Center Access	AM	One-Way Stop	LOS	A	n/a ¹				n/a ¹				D		B	A
			Delay	9.3	n/a ¹				n/a ¹				32.9		13.4	1.8
	PM		LOS	A	n/a ¹				n/a ¹				F		B	A
			Delay	8.8	n/a ¹				n/a ¹				128.2		15.0	7.2

n/a¹ - It is a free movement and hence no delay reported; n/a² - HCM 6th Edition methodology does not calculate delay for yield-controlled channelized right at signalized intersections; n/a³ - LOS F due to v/c >1

Table 2.7: 2040 No Build Conditions – SimTraffic Results

Intersection	Time Period	Control	MOE	EB Movement			WB Movement			NB Movement			SB Movement			Overall
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Cahaba River Road at Dolly Ridge Road	AM	Signal	LOS	C	C	B	F	F	F	F	F	F	C	C	C	F
			Delay	32.9	20.7	17.6	301.9	315.1	331.8	158.5	179.0	149.0	32.9	24.7	25.7	173.0
	PM		LOS	E	C	C	F	F	F	F	F	F	D	E	B	F
			Delay	58.3	32.0	29.1	614.4	562.5	598.1	101.2	101.9	95.2	46.1	59.8	11.4	206.2
Cahaba River Road at Altadena Road	AM	Signal	LOS		B	B	F	F		F		F			F	
			Delay		15.8	11.4	161.6	185.2		152.0		135.4			114.0	
	PM		LOS		C	B	F	F		F		F			F	
			Delay		23.2	19.5	451.7	457.0		723.5		655.9			238.4	
Cahaba River Road at Acton Road / Colonnade Pkwy	AM	Signal	LOS	F	F	F	F	F	F	F	F	B	D	E	D	F
			Delay	162.0	149.3	105.8	147.0	155.1	152.3	112.6	84.2	15.0	36.8	60.2	38.2	109.7
	PM		LOS	F	F	F	F	F	F	F	F	C	F	F	F	F
			Delay	209.8	205.5	191.6	274.0	319.6	289.5	306.5	164.5	30.7	102.9	124.4	252.6	252.6
Cahaba River Road at Healthy Way / Blue Lake Drive	AM	Signal	LOS	F	D	C	E	E	E	C	C	A	D	C	C	D
			Delay	276.5	47.4	31.8	56.7	65.2	60.1	26.8	28.8	7.2	36.7	33.9	29.3	55.0
	PM		LOS	F	F	E	F	F	F	F	F	F	F	F	F	F
			Delay	108.9	90.9	61.5	297.0	300.9	278.8	150.3	135.7	84.5	96.3	96.7	115.4	153.0
Cahaba River Road at Old 280 Ct / Colony Park Drive	AM	Signal	LOS	B	B	A	C	C	A	C	C	B		B	B	B
			Delay	16.4	10.4	8.2	23.6	20.5	9.5	35.0	27.7	18.5		14.9	15.1	16.6
	PM		LOS	B	B	A	F	F	F	F	F	D		F	F	F
			Delay	19.7	12.6	9.8	380.7	377.1	321.7	247.9	168.2	45.0		91.3	100.1	151.9
Cahaba River Road at Grandview Medical Center Access	AM	One-Way Stop	LOS	A	A				A	A			B		A	A
			Delay	9.8	6.3				1.5	2.4			12.9		1.2	4.0
	PM		LOS	A	A				F	F			C		C	D
			Delay	9.7	7.7				66.0	56.8			16.5		16.8	28.5

2.5.5: Evaluation of Existing Pedestrian and Bicycle Facilities

Pedestrian and bicycle facilities along Cahaba River Road are minimal. Sidewalks within the project area are primarily limited to side roads in areas of new commercial development and lack connectivity along Cahaba River Road. Existing shoulders are minimal and too narrow for pedestrian use. No bike lanes are present.

Strava, a popular fitness tracker, was utilized to evaluate pedestrian and bicyclist activity within the study area. Figures 2.5 and 2.6 present aggregated, crowd-sourced heat maps of pedestrians and bicyclists from Strava. As these figures show, the commercial area between Acton Road and Grandview Parkway is heavily used by both pedestrians and bicyclists, although use is limited along Cahaba River Road due to lack of sidewalks. It is likely that the heavy pedestrian and bicycle use would extend along Cahaba River Road with suitable pedestrian and bicycle facilities.

Project stakeholders have exhibited a strong commitment to pedestrian and cycling populations, including the City of Vestavia's Sidewalk Master Plan (2016) and the City of Birmingham's adoption of a Complete Streets policy (2018). To this end, proposed improvements should include bicycle and pedestrian facilities where feasible.

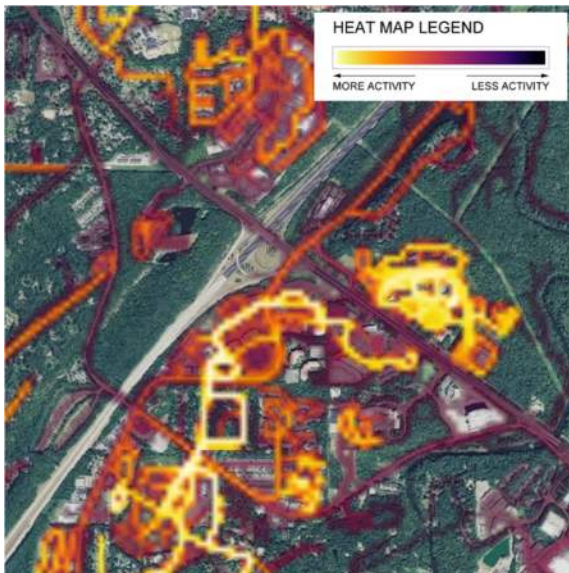


Figure 2.5: Pedestrian Use Heat Map

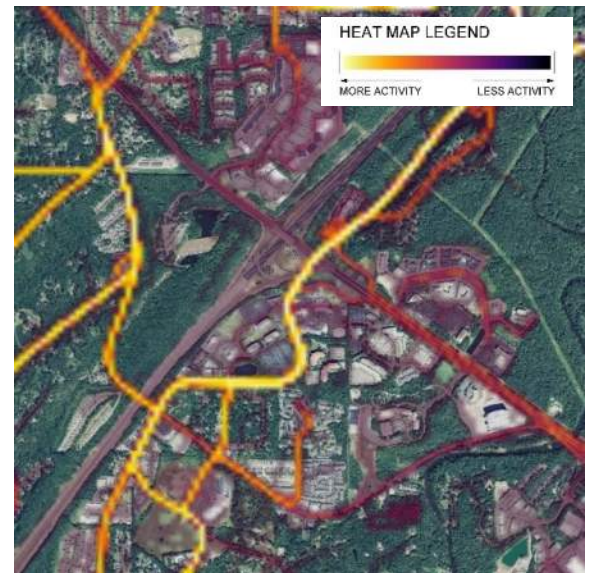


Figure 2.6: Bicyclist Use Heat Map

2.5.6: Existing Traffic Conditions Summary

Traffic analyses showed poor operating conditions for several segments and intersection movements in 2018. By the 2040 design year, without any improvements, most of the roadway segments and intersections throughout the study area will experience severe congestion.

This study demonstrates a clear need for improvements along the corridor in order to add capacity. Additionally, signal timing improvements are needed to improve operations throughout the entire study area. Significant expansion of pedestrian and bike facilities is necessary to provide for existing and future pedestrians and bicyclists activity.

THREE: PROPOSED IMPROVEMENTS ALTERNATIVES

3.1: Evaluation Criteria and Concept Constraints

In order to objectively evaluate potential improvement alternatives, a number of design-related criteria have been identified. The criteria was established before any detailed alternatives were developed to ensure each possible improvement concept was examined consistently. Evaluation criteria for Cahaba River Road included:

- Enhancement of east-west mobility
- Providing pedestrian and bicycle facilities
- Incorporation of City of Birmingham Complete Streets standards
- Minimizing disruption to traffic during construction
- Development of logical segments to phase construction, if necessary
- Implementation of access management strategies west of Acton Road
- Limitation of impacts to existing property, residences & businesses
- Cost effectiveness

The unique character areas identified within the study area presented design constraints to proposed improvements that limit the range of potential design solutions. In addition to the evaluation criteria, reasonable improvement alternatives must also conform to these constraints. Existing constraints identified along Cahaba River Road include:

- Steep roadway embankments immediately adjacent to single family residential homes
- Existing rock outcroppings
- Single family residences close to existing edge of pavements
- Existing subdivision infrastructure
- Signal timing of the Cahaba River Road/US Highway 280 and resultant queues

3.2: Reasonable Proposed Improvement Alternatives

Conversations with project stakeholders, paired with roadway improvement experience on similar projects yielded a set of possible improvement scenarios for analysis and evaluation. Preliminary alignments were developed using GIS and LiDAR data provided by the RPCGB. Each alternative alignment was evaluated for construction impacts, ROW requirements and connectivity to existing infrastructure.

Study intersections were analyzed using 2040 Design Traffic Volumes and compared to the 2040 No Build scenario to determine operational improvements for each alternative. Operational analyses were performed using the same software and methodologies as the Existing Conditions evaluation.

Preliminary cost estimates for alternatives analyses were developed using the Alabama Department of Transportation (ALDOT) Location Preliminary Cost Estimate methodology. This method predicts total project cost as a function of primary items of work, such as asphalt, drainage structures, bridge and retaining wall structures and intersections. Cost estimate worksheets for each alternative are available in Appendix E.

A total of seven (7) improvement scenarios were assessed. Three (3) scenarios met evaluation criteria and were upgraded for further assessment. Summarized descriptions of the three reasonable proposed improvement alternatives follows.

3.2.1: Alternative No. 1 – Three Lanes with Center Two-Way Left Turn Lane

Alternative No. 1 consists of a single eastbound travel lane, a single westbound travel lane and a center two-way center left turn lane from the eastern terminus at US Highway 280 to the existing roadway taper immediately east of the Grandview Medical Center rear entrance. Pedestrian and bicycle facilities include a 10' wide shared use path west of the Acton Road intersection, and 4' bike lanes with 5' sidewalks east of Acton Road. Additional turn lane improvements are recommended at the Acton Road and Healthy Way intersections.

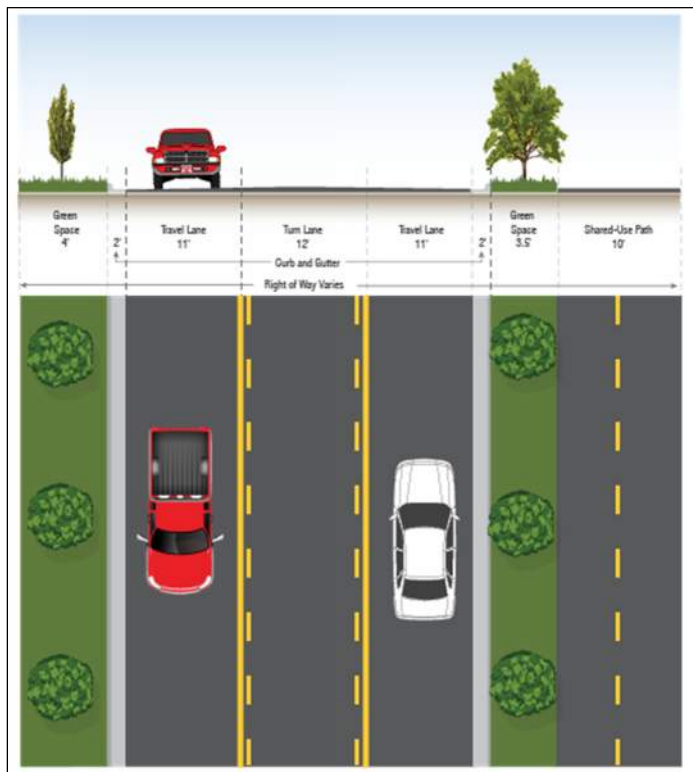


Figure 3.1 – Representative Typical Section, Alternative No. 1

widening for the segment west of Acton Road is suggested to the north, limiting fill slopes to undeveloped properties; the remainder of widening activities is proposed to be symmetrical in nature throughout the heavily commercialized segment east of the Acton Road intersection.

Due to the steep topography and location of existing homes south of Dolly Ridge Road, it is anticipated that a series of short retaining walls, approximately 4-6' high, would be required to prevent embankment slopes from undercutting residential homes.

Affected utilities within the project corridor include overhead power, water, sanitary sewer, and gas. Major utility infrastructure, such as the lift station west of Altadena Road and large overhead power lines in the northeast quadrant of the Cahaba River Road/Acton Road intersection remain unaffected by this alternative.

Based on preliminary evaluations, moderate amounts of right-of-way are expected for this alternate, primarily limited to the segment west of Acton Road. Based on available information, right-of-way acreage can be expected to be less than 10 acres.

Bike lanes and sidewalks could also be considered a feasible concept for Alternative No. 1 west of Acton Road, although this option will require a wider construction footprint, resulting in potentially higher right-of-way impacts, retaining wall heights and construction costs. For these reasons, a shared use path is recommended.

According to the results of the operational analysis for Alternative No. 1, a number of the study intersections exhibit a failing LOS "F" condition for one or both of the peak periods, most notably those located at Dolly Ridge Road, Acton Road and Healthy Way. The segment of the study area from Altadena Road to Healthy Way would continue to experience congestion under this 2040 build condition, particularly during the morning peak period. Delay and LOS tables for Alternative No. 1 are included as Appendix C.

Constructability and phasing for Alternative No. 1 is positive. Impacts to existing residences and businesses would primarily be limited to traffic disruptions and minor earthwork along the construction limits. Roadway

The estimated preliminary construction cost for Alternative No. 1 is \$8.8MM. Projected totals inclusive of utilities and right of way estimates totals \$13.6MM.

3.2.2: Alternative No. 2 – Single Eastbound, Dual Westbound Lanes with Two-Way Center Left Turn Lane

Existing conditions analysis indicates the morning peak westbound delay at Dolly Ridge Road is a function of the location of the intersection relative to queueing lengths for left turn movements onto US Highway 280, for which signal modifications are out of the scope of this project. To alleviate these delays, the second proposed alternative improves upon the first via the addition of a second westbound lane.

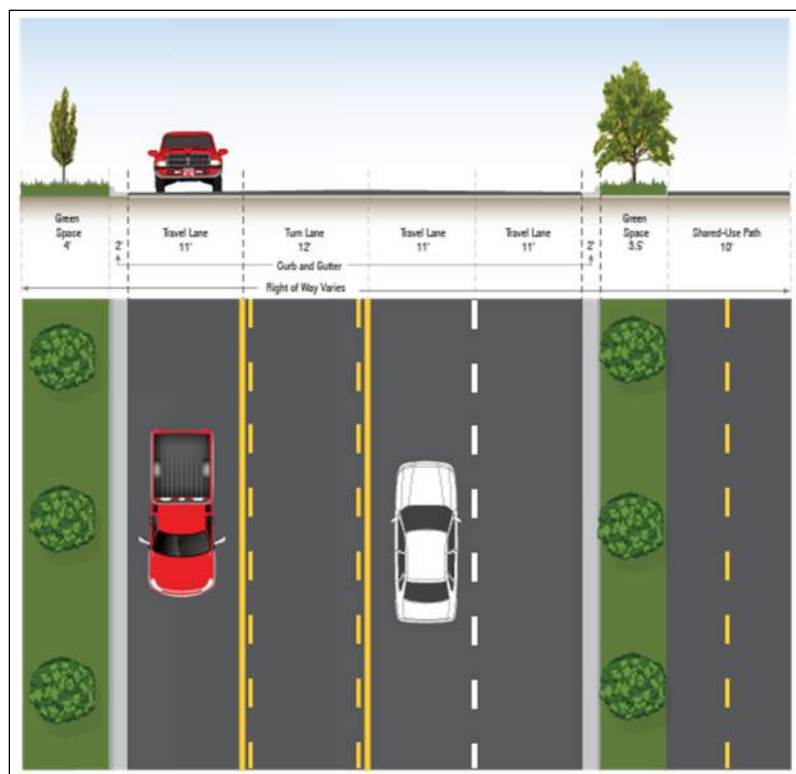


Figure 3.2 – Representative Typical Section, Alternative No. 2

Road/Dolly Ridge Road intersection. The additional capacity of the second westbound lane reduces delay for westbound movements during morning peak hours (i.e. inbound commuter traffic) and improves LOS for the segment from Acton Road to Healthy Way. Delay and LOS tables for Alternative No. 2 are included in Appendix C.

Constructability and phasing for Alternative No. 2 are also positive. Roadway improvements are proposed to be completed via a “best-fit” combination of left, right and symmetrical widening in order to minimize impacts to residential and commercial properties. Wherever possible, roadway widening between Altadena Road and Acton Road is recommended to be to the north, resulting in fill slopes on undeveloped properties; the remainder of widening activities east of Acton Road is mostly symmetrical in nature.

It is recommended to taper Alternative No. 2 down to a three-lane section, consisting of one (1) eastbound lane and two (2) westbound lanes, for approximately 700’ through a segment of steep rock embankments south of Dolly Ridge Road. As this area is fully built-out by single-family residences atop the embankments, no future development will suffer from the lack of a center turn lane. It is anticipated a series of short retaining walls, approximately 4-6’ high, will also be required in this segment of the improvements.

To alleviate these delays, the second proposed alternative improves upon the first via the addition of a second westbound lane. Alternative No. 2 consists of a single eastbound travel lane, two (2) westbound travel lanes and a center two-way center left turn lane from the eastern terminus at US Highway 280 to Healthy Way and a three lane section consisting of a single eastbound travel lane, a single westbound travel lane and a center two-way center left turn the remainder of the project corridor.

Pedestrian and bicycle facilities include a 10’ wide shared use path west of the Acton Road intersection, and 4’ bike lanes with 5’ sidewalks east of Acton Road. Additional turn lane improvements are recommended at the Acton Road and Healthy Way intersections.

Operational analyses for Alternative No. 2 indicate acceptable LOS throughout the project corridor with the exception of the Cahaba River

Affected utilities within the project corridor include overhead power, water, sanitary sewer and gas. Although Alternative No. 2 avoids impacting the lift station west of Altadena Road, it could require the relocation of the overhead power lines in the northeast quadrant of the Cahaba River Road/Acton Road intersection.

Based on preliminary evaluations, it is expected that moderate to large acreages of right-of-way will be required for Alternative No. 2, with significant acquisitions required between Altadena Road and Acton Road. Based on available information, right-of-way acreage required can be expected to be in excess of 10 acres.

The estimated preliminary construction cost for Alternative No. 1 is \$10.6MM. Projected totals inclusive of utilities and right of way estimates totals \$15.4MM.

3.2.3: Alternative No. 3 – Two Eastbound, Two Westbound with Two-Way Center Left Turn Lane

The final alternative evaluated is a five lane section with two (2) eastbound travel lanes, two (2) westbound travel lanes and a center two-way center left turn lane from the eastern terminus at US Highway 280 to Healthy Way, and a three lane section consisting of a single eastbound travel lane, a single westbound travel lane and a center two-way center left turn for the the remainder of the project corridor.

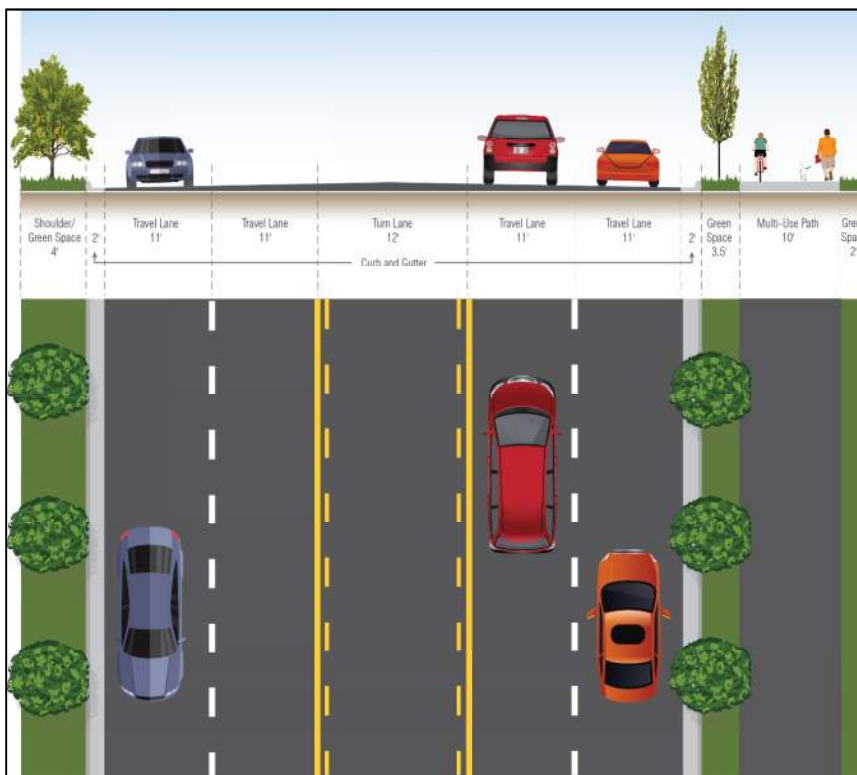


Figure 3.3 – Representative Typical Section, Alternative No. 3

A shared use path from US Highway 280 to Healthy Way is recommended for Alternative No. 3 for the reasons previously stated for Alternatives Nos. 1 & 2; the remainder of the project accommodates bicyclists and pedestrians via 4' bike lanes and 5' sidewalks.

Levels of service for Alternative No. 3 indicates suitable operation for 2040 build conditions for all intersections south of Dolly Ridge Road.

Construction impacts and temporary traffic control requirements are more complex than those associated with the previous alternatives. Road work is proposed to be completed via a “best fit” combination of left, right and symmetrical widening in order to minimize impacts to residential and commercial properties. As previously discussed, whenever possible

roadway widening between Altadena Road and Acton Road is recommended to be widened to the north, resulting in fill slopes on undeveloped properties; the remainder of widening activities east of Acton Road is symmetrical in nature. In order to preserve existing development through the corridor, retaining walls are expected to be required, particularly in the segments just east of Dolly Ridge Road, and immediately adjacent to the Acton Road intersection at the Altadena Square shopping center parking lot. Temporary traffic control will require a multi-phased approach with lane shifts to maintain traffic through the study area during construction.

Affected utilities within the project corridor include overhead power, water, sanitary sewer and gas. Although Alternative No. 3 avoids impacting the lift station west of Altadena Road, it could require the relocation of the overhead power lines in the northeast quadrant of the Cahaba River Road/Acton Road intersection.

Based on preliminary evaluations, it is expected that moderate to large acreages of right-of-way will be required for Alternative No. 3, with significant acquisitions required between Altadena Road and Acton Road. Based on available information, right-of-way acreage required can be expected to be in excess of 10 acres.

The estimated preliminary location construction cost for Alternative No. 3 is \$13.3MM. Projected totals inclusive of utilities and right of way estimates totals \$18.1MM.

3.3: Preliminary Preferred Alternative Selection

Reasonable proposed improvements alternatives were presented to the project stakeholders for consideration. During subsequent review of the reasonable alternates, two (2) major factors were considered prior to the determination of a preliminary preferred alternative: suitability for future development within the study area and cost effectiveness of the proposed solution.

The long-term benefits of improved eastbound mobility and greater accommodations for future development through the study area outweigh the increased impacts of construction and marginal cost difference between Alternatives Nos. 1 and 2. Therefore, in order to provide additional capacity, improve traffic flow, and provide bicycle and pedestrian accommodations, Alternative No. 3 was selected as the preliminary preferred alternative. Proposed improvements should include a four-lane with a two-way-left-turn-lane (TWLTL) from US-280 to Healthy Way and a two-lane with a TWCTL from Colony Park to end of project. The corridor will have curb and gutter, multiuse path (US Highway 280 to Healthy Way) and sidewalks with bike lanes along both sides (Healthy Way to Grandview Medical Center). Along with these improvements, intersection improvements are recommended as outlined below.

Proposed improvements figures are included as Appendix E.

3.3.1: Recommended Intersection Improvements

Intersection improvements are proposed to achieve acceptable Levels of Service throughout the study area. Generally, the improvements consist of the addition of left turn lanes to the mainline and side streets at signalized intersections. Significant improvements are proposed for the preferred alternative at two major intersections – the Acton Road and Healthy Way Intersections.

3.3.1.a: Intersection Improvements

Intersection improvements, notable additional turn lanes, at several intersections throughout the study area are required to achieve desired LOS. Proposed intersection improvements include:

- Free flowing left turn from EB US Highway 280 onto EB Cahaba River Road at western terminus
- Addition of right turn lane from Cahaba River Road onto EB US Highway 280 at western terminus
- Addition of right and left turn lanes on Altadena Road
- Modification of northbound Acton Road to reflect dual left turn lanes onto westbound Cahaba River Road and a shared thru/right onto Cahaba River Road (Acton Road intersection)
- Addition to right turn lane on southbound Colonnade Parkway to westbound Cahaba River Road (Acton Road intersection)

- Addition of a second left turn lane on northbound Healthy Way onto westbound Cahaba River Road (Healthy Way intersection)
- Addition of right and left turn lanes on southbound Blue Lake Parkway (Healthy Way intersection)
- Shared thru/right turn lane from westbound Cahaba River Road onto northbound Blue Lake Drive (Healthy Way intersection)

Construction impacts associated with the Acton Road intersection improvements should be noted. A $\pm 4'$ retaining wall and guardrail on the south side of Cahaba River Road would be necessary to prevent impacts to Altadena Square shopping center parking. Commercial signage would require relocation, as would BJCTA bus stop 2923. Potential impacts to the large overhead power line infrastructure require further evaluation for definitive relocation status, but it should be assumed some level of conflict for conservancy sake. The addition of a second left turn lane to northbound Healthy Way would require removal of the existing raised median and potential relocation of large Patchwork Farms pedestal signage.

Intersection improvements are shown on the proposed improvements figures in Appendix E.

3.3.1.b: Dolly Ridge Road Relocation

Dolly Ridge Road approaches Cahaba River Road from the west at an extreme skew and is slightly offset at the Cahaba River Road intersection. Residential homes and existing grades make realignment to a 90° intersection infeasible. At the request of the project stakeholders, a conceptual layout to reduce skew and align travel lanes with those to the east of Cahaba River Road was developed. The realignment would require increasing the approach radius and realignment of approximately 250' of Dolly Ridge Road. Minimal amounts of right-of-way would be required for this intersection. A conceptual layout of the realignment of Dolly Ridge Road is included as Figure 3.5.

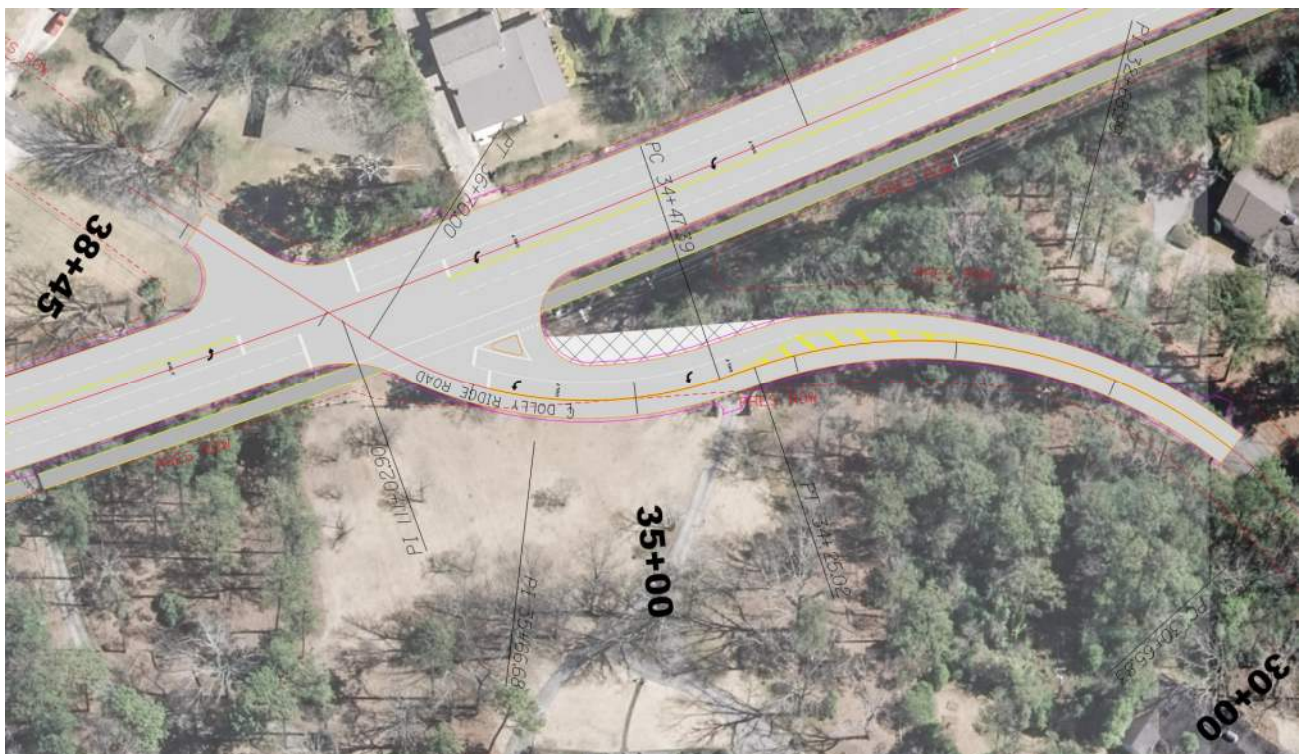


Figure 3.4 – Dolly Ridge Road Realignment Concept

3.3.1.c: Altadena Road Relocation

Presently, Altadena Road intersects Cahaba River Road at a severe skew ($\pm 41^\circ$). It is recommended that realigning Altadena Road to a 90° intersection be considered for this project. Realignment would require relocation of approximately 300' of roadway and extending the existing side entrance to the Church of Jesus Christ of Latter Day Saints. The realignment would have minimal impact to known utilities in the vicinity. It would require approximately 0.50 acres of additional right-of-way acquisition. The acquisition property is currently vacant and undeveloped. A conceptual layout for the realignment of Altadena Road is included as Figure 3.5.



Figure 3.5 – Altadena Road Realignment Concept

3.4: Operational Analysis – Build Conditions

Operational analyses were conducted for the 2040 Build conditions for the preferred alternative to ensure that the proposed improvements will function as desired. The build conditions were analyzed using the same approach as for the existing and 2040 no build analyses.

The build analysis was an iterative process in order to identify what lane configurations would be necessary at each of the study intersections in order to provide acceptable performance for all movements with the anticipated 2040 Build volumes. The Synchro 10 and SimTraffic software were utilized according to HCM methodology and SimTraffic methodology. The results of this operational analysis are shown in Tables 3.1 and 3.2 on page 23. Complete results are located in Appendix B – Operational Analysis Results.

Results of this analysis demonstrate that all intersections show overall LOS D or better according to both methodologies with the exception of the intersection of Cahaba River Road and Dolly Ridge Road, which show failing

Intersection	Time Period	Control	MOE	EB Movement			WB Movement			NB Movement			SB Movement			Overall
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Cahaba River Road at Dolly Ridge Road	AM	Signal	LOS	A	B	B	A	B	B	C	A	C	C	A	C	B
			Delay	8.7	13.3	13.4	7.9	14.6	14.4	24.4	0.0	21.9	21.8	0.0	23.6	15.3
	PM		LOS	A	B	B	B	A	A	C	A	C	C	A	C	B
			Delay	7.1	18.0	18.3	13.1	9.5	9.4	28.3	0.0	27.2	27.7	0.0	29.1	15.5
Cahaba River Road at Altadena Road	AM	Signal	LOS		B		A	A		B		C				A
			Delay		10.3		6.4	5.5		19.8		20.1				9.2
	PM		LOS		B		A	A		B		B				A
			Delay		12.7		7.7	4.6		19.5		17.6				9.5
Cahaba River Road at Acton Road / Colonnade Pkwy	AM	Signal	LOS	D	D	n/a ²	D	D	D	C	D	n/a ²	C	C	n/a ²	D
			Delay	46.8	37.4	n/a ²	48.5	49.0	49.8	35.0	55.0	n/a ²	23.7	29.2	n/a ²	43.2
	PM		LOS	D	C	n/a ²	D	C	C	D	C	n/a ²	B	C	n/a ²	C
			Delay	36.4	33.5	n/a ²	41.5	31.2	31.4	43.5	27.1	n/a ²	18.2	33.9	n/a ²	33.9
Cahaba River Road at Healthy Way / Blue Lake Drive	AM	Signal	LOS	A	B	n/a ²	A	B	B	C	C	n/a ²	C	A	C	B
			Delay	8.9	10.6	n/a ²	7.7	13.3	13.4	23.8	30.6	n/a ²	23.9	0.0	27.7	14.7
	PM		LOS	B	C	n/a ²	C	B	B	C	C	n/a ²	C	A	D	C
			Delay	18.4	28.6	n/a ²	25.5	16.4	16.5	35.0	33.0	n/a ²	29.5	0.0	50.8	28.7
Cahaba River Road at Old 280 Ct / Colony Park Drive	AM	Signal	LOS	B	B	A	A	C	A	B	A	A	B	A	D	C
			Delay	11.6	13.0	8.2	9.8	23.7	9.5	17.5	0.0	0.0	16.5	0.0	38.9	22.0
	PM		LOS	B	B	A	B	B	A	C	A	A	C	A	D	B
			Delay	11.6	14.0	4.5	10.9	14.0	7.8	31.5	0.0	0.0	31.3	0.0	42.2	16.1
Cahaba River Road at Grandview Medical Center Access	AM	One-Way Stop	LOS	A	n/a ¹				n/a ¹				D		B	A
			Delay	9.3	n/a ¹				n/a ¹				32.9		13.4	1.8
	PM		LOS	A	n/a ¹				n/a ¹				F		B	A
			Delay	8.8	n/a ¹				n/a ¹				128.2		15.0	7.2

Table 3.1: Intersections Analysis – 2040 Build Condition – HCM Results

Intersection	Time Period	Control	MOE	EB Movement			WB Movement			NB Movement			SB Movement			Overall
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Cahaba River Road at Dolly Ridge Road	AM	Signal	LOS	B	B	B	F	F	F	F	C	C	B	C	B	F
			Delay	13.9	12.6	11.1	292.1	276.8	272.1	184.0	23.3	22.2	16.8	26.7	11.9	169.3
	PM		LOS	B	B	B	F	F	F	F	D	C	C	B	F	
			Delay	18.1	14.3	13.1	201.3	184.0	178.3	232.8	52.3	23.9	25.3	33.1	15.8	106.8
Cahaba River Road at Altadena Road	AM	Signal	LOS		B	A	C	C		B		A				B
			Delay		11.9	6.7	22.0	25.6		16.9		5.7				19.0
	PM		LOS		B	A	B	B		B		A				B
			Delay		13.1	9.7	17.0	11.4		15.7		7.7				12.4
Cahaba River Road at Acton Road / Colonnade Pkwy	AM	Signal	LOS	D	D	A	D	D	C	D	D	A	C	D	A	D
			Delay	46.8	37.2	8.9	50.7	40.2	30.8	46.3	38.4	5.7	26.6	35.1	2.8	35.8
	PM		LOS	D	D	D	D	C	B	D	C	A	C	D	A	C
			Delay	46.2	36.3	40.5	45.0	27.4	18.7	52.4	31.4	6.5	30.2	49.6	8.2	34.2
Cahaba River Road at Healthy Way / Blue Lake Drive	AM	Signal	LOS	B	B	A	B	B	A	B	C	A	C	C	A	B
			Delay	17.9	13.5	6.9	12.1	11.3	9.1	19.8	24.4	2.6	22.5	21.2	8.8	12.6
	PM		LOS	C	D	B	C	B	B	D	D	A	D	D	C	C
			Delay	28.3	37.9	11.8	33.1	15.8	10.7	50.5	35.6	4.3	36.0	43.2	28.5	28.5
Cahaba River Road at Old 280 Ct / Colony Park Drive	AM	Signal	LOS	B	B	A	B	B	A	B	B	A	B			A
			Delay	16.6	11.2	3.6	15.1	14.2	7.9	16.4	16.6	6.8	15.3			7.6
	PM		LOS	C	B	A	C	B	B	C	B	C	D			A
			Delay	29.5	18.2	6.1	21.4	17.3	11.4	34.3	16.2	31.4	40.6			7.3
Cahaba River Road at Grandview Medical Center Access	AM	One-Way Stop	LOS	A	A				A	A			A		A	A
			Delay	9.3	6.1				1.5	2.3			9.8		1.3	4.0
	PM		LOS	B	A				A	A			D		A	A
			Delay	10.4	8.3				1.4	1.7			34.1		2.0	6.9

Table 3.2: Intersections Analysis – 2040 Build Condition – SimTraffic Results

LOS F conditions according to the *SimTraffic* methodology. The *SimTraffic* simulation exhibit severe bottleneck at the Cahaba River Road and US-280 intersection which resulted in a westbound queue along Cahaba River Road extending from US-280 to east of the Dolly Ridge Road intersection for both peak hours. When analyzed in isolation (without the intersection of Cahaba River Road and US-280), the westbound approach at Dolly Ridge Road intersection operates sufficiently. Improvements to the intersection of Cahaba River Road and US-280 will be needed to resolve this issue.

3.5: Proposed Improvements Cost Estimate

Funding is an important aspect of planning a transportation improvement project. Project sponsors must seek appropriate funding and finance options for transportation projects. According to the Alabama Department of Transportation's Office Engineer website, the preliminary engineering (PE) and right-of-way (ROW) phases for this project are already programmed in the 5-year Statewide Transportation Improvement Program (STIP) dated 2016 (Table 3.3) utilizing surface transportation funds as project number STPBH-3716 (252).

Surface transportation (STP) funds are the most flexible of all Federal-Aid highway programs, allowing for States and localities to improve and preserve a number of transportation facilities. STP funds are split between Federal Aid and the local sponsoring agency at the ratio of 80% Federal / 20% local.

Route CR-NA		Project Description	ROADWAY AND INTERSECTION IMPROVEMENTS ON CAHABA RIVER ROAD FROM SR-38 (US-280) TO KEY DRIVE				
Project Length in Miles		Type of Work	INTERSECTION IMPROVEMENTS				
6.700		Urban Area	BIRMINGHAM				
		<i>COST IN THOUSANDS</i>					
Project Reference Nbr	FA Number	Scope of Work	Type of Work	Fiscal Year	Federal	State-Other	TOTAL
100063244	STPBH 3716 (252)	PRELIMINARY ENGINEERING	INTERSECTION IMPROVEMENTS	2016	\$519	\$130	\$648
100063245	STPBH 3716 (252)	RIGHT OF WAY	INTERSECTION IMPROVEMENTS	2020	\$800	\$200	\$1,000
TOTAL COST:					\$1,319	\$330	\$1,648

Table 3.3: ALDOT STIP Programming

To assist the project team in programming further phases under existing STP funding, detailed preliminary construction cost estimates by project phase and associated local agency funding requirements were prepared as a part of this study. Table 3.4 summarizes anticipated project costs by phase for the preliminary preferred alternative.

It is recommended that the programmed funding amount for the utility phase be based upon field survey to determine accurate limits of relocation. Available information suggests portions of water, sanitary sewer, natural gas and power infrastructure will require relocation. Timing of utility phase estimates should coincide with a 30% construction plans milestone.

Table 3.4: Estimated Project Costs

<u>Scope of Work</u>	<u>Total Cost</u>	<u>Federal Share</u>	<u>Local Share</u>	<u>Notes</u>
* Preliminary Engineering	\$648,000.00	\$518,400.00	\$129,600.00	Previously Programmed
* Right of Way	\$1,000,000.00	\$800,000.00	\$200,000.00	Previously Programmed
Construction	\$12,746,752.37	\$10,197,401.85	\$2,549,350.52	Appendix G
Total Cost	\$14,394,752.37	\$11,515,802.90	\$2,878,950.47	

* NOTE: PE and ROW costs reflective of currently programmed funds and require reevaluation

On March 12, 2019, Alabama Governor Kay Ivey signed the “Rebuild Alabama” legislation into law to increase funding for roadway and bridge projects statewide. This bipartisan effort raises the Alabama fuel tax 10 cents over the next three years, starting with a six-cent increase effective October 2019. The additional tax will ultimately raise an estimated \$320 million a year for transportation infrastructure construction and maintenance. 25% of the net tax proceeds shall be allocated to counties and 8.33% to municipalities based upon distribution models that include a population component. As the most populated county in the state, Jefferson County will benefit from the tax increases. This new option provides an alternate funding method, subject to agreement with the stakeholder team, to accelerate the completion of Cahaba River Road improvements utilizing 100% local funds and/or utilizing gas tax proceeds as a potential match to the above-described Federal funding.

Note the final projected cost for roadway construction is less than that originally estimated by the location worksheets (Appendix F). Final estimated project costs are based upon a line-item estimate of anticipated quantities for construction and are much more refined than estimated during reasonable alternatives evaluation. The detailed line-item construction cost estimate is available in Appendix G.

FOUR: ENVIRONMENTAL SCREENING

4.1: Introduction

The consultant team performed a high-level desktop environmental screening for the Cahaba River Road APPLE feasibility study. In addition, a windshield site visit of the project study area was conducted to field verify the environmental screening information.

Detailed environmental studies and subsequent avoidance, minimization and mitigation of environmental impacts would be conducted during preliminary engineering and National Environmental Policy Act documentation activities.

4.2: Natural Resources

Streams and Wetlands

According to the US Fish and Wildlife (USFWS) National Wetlands Inventory, there are four wetland features within or adjacent to the project limits. There is a freshwater pond adjacent to the project limits on the southern side of Cahaba River Road, just south of the right-of-way (ROW) in the Ashford Place residential development. A series of connected riverine channels cross the study area twice, once just west of Interstate 459 and a second time at the Healthy Way intersection. Classification of this riverine system varies from intermittent to perennial.

The final wetland feature within the study area is the Cahaba River. This is the longest free-flowing river in Alabama and serves as the source of drinking water for the metropolitan Birmingham area, as well as a popular recreation destination. According to Alabama Department of Environmental Management, the stream is listed as a priority watershed for siltation and habitat alteration. However, this stream does not cross through the project limits. It runs parallel to the roadway alignment for a length of approximately 2,600 feet.

FEMA Floodplains

The study area is covered by Flood Insurance Rate Maps (FIRM) Panel Numbers 01073C0578H (effective date 9/3/10), 01073C0586G (effective date 9/29/06), and 01073C0587G (effective date 9/29/06). According to the National Flood Insurance Program (NFIP) there is 100-year floodplain located within the Cahaba River near the eastern terminus of the study area.

Threatened and Endangered Species

According to USFWS, 26 species are listed as threatened or endangered in Jefferson County as of December 2018. Listed species are provided as table 4.1.

Although no known critical habitat falls within the study area, it is important to note that the Cahaba River is known to support 10 fish and freshwater mussel species listed under the US Endangered Species Act. Additional studies

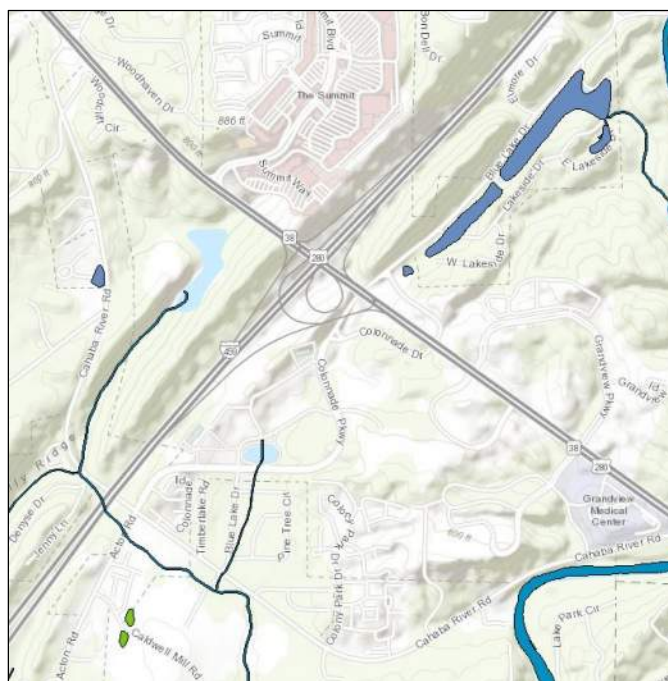


Figure 4.1: Study Area Wetlands Inventory

may be necessary during NEPA environmental documentation to ensure no threatened or endangered species are affected by proposed construction impacts.

Species	Name	Status
Amphibians	Black Warrior waterdog	Candidate
Clams	Orangeacre mucket	Threatened
	Southern acornshell	Endangered
	Upland combshell	Endangered
	Finelined pocketbook	Threatened
	Ovate clubshell	Endangered
	Triangular kidneyshell	Endangered
	Alabama moccasinshell	Threatened
	Dark pigtoe	Endangered
	Southern pigtoe	Endangered
Fish	Watercress darter	Endangered
	Cahaba shiner	Endangered
	Goldline darter	Threatened
	Vermillion darter	Endangered
	Rush darter	Endangered
Flowering Plants	Georgia rockcress	Candidate
	Mohr's Barbara button	Threatened
	Gentian pinkroot	Endangered
	Tennessee yellow-eyed grass	Endangered
	Georgia aster	Candidate
Mammals	Indiana bat	Endangered
	Gray bat	Endangered
Reptiles	Flattened musk turtle	Threatened
Snails	Cylindrical lioplax	Endangered
	Plicate rocksnail	Endangered
	Round rocksnail	Threatened

Table 4.1 – Threatened and Endangered Species of Jefferson County

4.3: Hazardous Materials

A windshield review was conducted to determine potential hazardous materials sites within the study area. No water wells or oil and gas wells were observed within or near the project limits. Results of the windshield survey are included in table 4.2.

Type	Description	Address	Notes
Dry Cleaner	Selcon Cleaners	4704 Cahaba River Road	No monitoring wells observed
Gas Station	Old 280 Chevron	4901 Cahaba River Road	No records found in ADEM UST Release Incident List
Dry Cleaner	Park Place Cleaners	4911 Cahaba River Road	No monitoring wells observed

Table 4.2 – Potential Hazardous Materials Sites

4.4: Historical and Cultural Resources

According to the National Register of Historical Places there are no historical properties within or adjacent to the project area.

4.5: Land Use

Land use along Cahaba River Road to the west of Acton Road is predominantly residential with large tracts of undeveloped parcels to the north. East of Acton Road, there is a mix of land uses including offices, restaurants, high-density residential, multi-family residential, institutional/public and some vacant land

Community Facilities

Two churches are located within the study area: the Mountain Brook Community Church, at the intersection of Cahaba River Road and US Highway 280, near the western terminus of the project; and the Church of Jesus Christ of Latter-Day Saints, located at the intersection of Cahaba River Road and Altadena Road.

There are four (4) Birmingham-Jefferson County Transit Authority MAX Bus stops within the study area:

- Stop 2923, intersection of Cahaba River Road and Acton Road
- Stop 2907, Altadena Square Shopping Center
- Stop 2907, Rocky Ridge Fire & Rescue (see below for more)
- Stop 2922, intersection of Cahaba River Road and Colony Park Drive

The Rocky Ridge Fire and Rescue Station no. 2 facility is located at the intersection of Cahaba River Road and Old 280 Court.

Grandview Medical Center's campus, including emergency room facilities, is located near the eastern terminus of the project, at the intersection of Cahaba River Road and US Highway 280.

APPENDIX A: TRAFFIC DATA

TOTALS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Cahaba River Rd.
and: Dolly Ridge Rd.
Location: Birmingham AL

Counted by: VCU
Date: May 23, 2018
Weather: Sun/Rain mix
Entered by: GK

Wednesday



TM1

TIME	TRAFFIC FROM NORTH on: Cahaba River Rd.					TRAFFIC FROM SOUTH on: Cahaba River Rd.					TRAFFIC FROM EAST on: Dolly Ridge Rd.					TRAFFIC FROM WEST on: Dolly Ridge Rd.					TOTAL N + S + E + W
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	
AM																					
7:00 - 7:15	17	80	1	0	98	0	206	10	0	216	4	0	0	0	4	12	0	24	0	36	354
7:15 - 7:30	23	119	1	0	143	1	201	5	0	207	7	1	0	0	8	15	1	34	0	50	408
7:30 - 7:45	22	100	1	0	123	0	190	7	0	197	5	0	0	0	5	18	0	44	0	62	387
7:45 - 8:00	21	144	2	0	167	0	172	12	0	184	2	0	0	0	2	23	0	35	0	58	411
8:00 - 8:15	17	116	1	0	134	0	161	5	0	166	4	0	1	0	5	18	0	23	0	41	346
8:15 - 8:30	12	121	1	0	134	1	163	8	0	172	1	1	0	0	2	17	0	33	0	50	358
8:30 - 8:45	19	85	0	0	104	0	170	8	0	178	0	0	1	0	1	14	0	27	0	41	324
8:45 - 9:00	17	107	1	0	125	0	159	9	0	168	2	0	0	0	2	20	0	25	0	45	340
2 Hr Totals	148	872	8	0	1028	2	1422	64	0	1488	25	2	2	0	29	137	1	245	0	383	2928
1 Hr Totals																					
7:00 - 8:00	83	443	5	0	531	1	769	34	0	804	18	1	0	0	19	68	1	137	0	206	1560
7:15 - 8:15	83	479	5	0	567	1	724	29	0	754	18	1	1	0	20	74	1	136	0	211	1552
7:30 - 8:30	72	481	5	0	558	1	686	32	0	719	12	1	1	0	14	76	0	135	0	211	1502
7:45 - 8:45	69	466	4	0	539	1	666	33	0	700	7	1	2	0	10	72	0	118	0	190	1439
8:00 - 9:00	65	429	3	0	497	1	653	30	0	684	7	1	2	0	10	69	0	108	0	177	1368
PEAK HOUR																					
7:00 - 8:00	83	443	5	0	531	1	769	34	0	804	18	1	0	0	19	68	1	137	0	206	1560

TOTALS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Cahaba River Rd.
and: Dolly Ridge Rd.
Location: Birmingham AL

Counted by: VCU
Date: May 22, 2018
Weather: Sun/Rain mix
Entered by: GK

Tuesday



TM1

TIME	TRAFFIC FROM NORTH on: Cahaba River Rd.					TRAFFIC FROM SOUTH on: Cahaba River Rd.					TRAFFIC FROM EAST on: Dolly Ridge Rd.					TRAFFIC FROM WEST on: Dolly Ridge Rd.					TOTAL N + S + E + W
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	
PM																					
4:00 - 4:15	29	184	4	0	217	2	119	15	0	136	1	0	0	0	1	20	0	18	0	38	392
4:15 - 4:30	35	177	2	0	214	1	130	19	0	150	1	0	0	0	1	14	0	19	0	33	398
4:30 - 4:45	35	207	3	1	246	1	123	21	0	145	1	0	0	0	1	11	1	20	0	32	424
4:45 - 5:00	22	188	0	0	210	1	159	16	0	176	4	1	2	0	7	8	1	26	0	35	428
5:00 - 5:15	31	180	1	0	212	0	174	26	0	200	1	0	0	0	1	12	0	26	0	38	451
5:15 - 5:30	34	205	2	0	241	0	146	23	0	169	1	0	0	0	1	10	0	23	0	33	444
5:30 - 5:45	19	207	3	0	229	1	170	22	0	193	1	0	1	0	2	11	0	23	0	34	458
5:45 - 6:00	15	198	2	0	215	0	103	8	0	111	4	0	0	0	4	16	0	28	0	44	374
2 Hr Totals	220	1546	17	1	1784	6	1124	150	0	1280	14	1	3	0	18	102	2	183	0	287	3369
1 Hr Totals																					
4:00 - 5:00	121	756	9	1	887	5	531	71	0	607	7	1	2	0	10	53	2	83	0	138	1642
4:15 - 5:15	123	752	6	1	882	3	586	82	0	671	7	1	2	0	10	45	2	91	0	138	1701
4:30 - 5:30	122	780	6	1	909	2	602	86	0	690	7	1	2	0	10	41	2	95	0	138	1747
4:45 - 5:45	106	780	6	0	892	2	649	87	0	738	7	1	3	0	11	41	1	98	0	140	1781
5:00 - 6:00	99	790	8	0	897	1	593	79	0	673	7	0	1	0	8	49	0	100	0	149	1727
PEAK HOUR																					
4:45 - 5:45	106	780	6	0	892	2	649	87	0	738	7	1	3	0	11	41	1	98	0	140	1781

TOTALS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Cahaba River Rd.
and: Altadena Rd.
Location: Birmingham AL

Counted by: VCU
Date: May 23, 2018
Weather: Sun/Rain mix
Entered by: GK

Wednesday



TM2

TIME	TRAFFIC FROM NORTH on: Cahaba River Rd.					TRAFFIC FROM SOUTH on: Cahaba River Rd.					TRAFFIC FROM EAST on:					TRAFFIC FROM WEST on: Altadena Rd.					TOTAL N + S + E + W
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	
AM																					
7:00 - 7:15	10	82	0	0	92	0	197	8	0	205	0	0	0	0	0	10	0	25	0	35	332
7:15 - 7:30	11	111	0	0	122	0	197	14	0	211	0	0	0	0	0	13	0	23	0	36	369
7:30 - 7:45	15	111	0	0	126	0	154	43	0	197	0	0	0	0	0	24	0	26	0	50	373
7:45 - 8:00	15	140	0	0	155	0	148	45	0	193	0	0	0	0	0	33	0	31	0	64	412
8:00 - 8:15	9	129	0	0	138	0	147	5	0	152	0	0	0	0	0	24	0	26	0	50	340
8:15 - 8:30	11	139	0	0	150	0	163	10	0	173	0	0	0	0	0	17	0	12	0	29	352
8:30 - 8:45	12	85	0	0	97	0	166	14	0	180	0	0	0	0	0	10	0	10	0	20	297
8:45 - 9:00	14	111	0	0	125	0	148	10	0	158	0	0	0	0	0	9	0	21	0	30	313
2 Hr Totals	97	908	0	0	1005	0	1320	149	0	1469	0	0	0	0	0	140	0	174	0	314	2788
1 Hr Totals																					
7:00 - 8:00	51	444	0	0	495	0	696	110	0	806	0	0	0	0	0	80	0	105	0	185	1486
7:15 - 8:15	50	491	0	0	541	0	646	107	0	753	0	0	0	0	0	94	0	106	0	200	1494
7:30 - 8:30	50	519	0	0	569	0	612	103	0	715	0	0	0	0	0	98	0	95	0	193	1477
7:45 - 8:45	47	493	0	0	540	0	624	74	0	698	0	0	0	0	0	84	0	79	0	163	1401
8:00 - 9:00	46	464	0	0	510	0	624	39	0	663	0	0	0	0	0	60	0	69	0	129	1302
PEAK HOUR																					
7:15 - 8:15	50	491	0	0	541	0	646	107	0	753	0	0	0	0	0	94	0	106	0	200	1494

TOTALS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Cahaba River Rd.
and: Altadena Rd.

Counted by: VCU

Date: May 22, 2018

Tuesday



Weather: Sun/Rain mix

Entered by: GK

TM2

TIME	TRAFFIC FROM NORTH on: Cahaba River Rd.					TRAFFIC FROM SOUTH on: Cahaba River Rd.					TRAFFIC FROM EAST on:					TRAFFIC FROM WEST on: Altadena Rd.					TOTAL N + S + E + W
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	
PM																					
4:00 - 4:15	24	180	0	0	204	0	133	16	0	149	0	0	0	0	0	9	0	20	0	29	382
4:15 - 4:30	13	185	0	0	198	0	113	23	0	136	0	0	0	0	0	10	0	20	0	30	364
4:30 - 4:45	18	159	0	0	177	0	126	19	0	145	0	0	0	0	0	8	0	21	0	29	351
4:45 - 5:00	17	161	0	0	178	0	155	23	0	178	0	0	0	0	0	16	0	19	0	35	391
5:00 - 5:15	22	190	0	0	212	0	189	18	0	207	0	0	0	0	0	9	0	14	0	23	442
5:15 - 5:30	31	214	0	0	245	0	173	23	0	196	0	0	0	0	0	9	0	18	0	27	468
5:30 - 5:45	12	161	0	0	173	0	139	24	0	163	0	0	0	0	0	8	0	21	0	29	365
5:45 - 6:00	15	192	0	0	207	0	96	15	0	111	0	0	0	0	0	10	0	16	0	26	344
2 Hr Totals	152	1442	0	0	1594	0	1124	161	0	1285	0	0	0	0	0	79	0	149	0	228	3107
1 Hr Totals																					
4:00 - 5:00	72	685	0	0	757	0	527	81	0	608	0	0	0	0	0	43	0	80	0	123	1488
4:15 - 5:15	70	695	0	0	765	0	583	83	0	666	0	0	0	0	0	43	0	74	0	117	1548
4:30 - 5:30	88	724	0	0	812	0	643	83	0	726	0	0	0	0	0	42	0	72	0	114	1652
4:45 - 5:45	82	726	0	0	808	0	656	88	0	744	0	0	0	0	0	42	0	72	0	114	1666
5:00 - 6:00	80	757	0	0	837	0	597	80	0	677	0	0	0	0	0	36	0	69	0	105	1619
PEAK HOUR																					
4:45 - 5:45	82	726	0	0	808	0	656	88	0	744	0	0	0	0	0	42	0	72	0	114	1666

TOTALS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Cahaba River Rd.
and: Colonade Parkway - Acton Rd
Location: Birmingham AL

Counted by: VCU
Date: May 23, 2018
Weather: Sun/Rain mix
Entered by: GK

Wednesday



TM3

TIME	TRAFFIC FROM NORTH on: Cahaba River Rd.					TRAFFIC FROM SOUTH on: Cahaba River Rd.					TRAFFIC FROM EAST on: Colonade Parkway					TRAFFIC FROM WEST on: Acton Rd					TOTAL N + S + E + W
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	
AM																					
7:00 - 7:15	46	30	25	0	101	4	78	47	0	129	10	27	4	0	41	38	82	115	0	235	506
7:15 - 7:30	51	39	24	0	114	9	72	48	0	129	5	49	5	0	59	26	123	135	0	284	586
7:30 - 7:45	50	40	52	0	142	8	72	56	0	136	14	68	10	0	92	43	114	105	0	262	632
7:45 - 8:00	55	75	48	0	178	10	72	53	0	135	7	57	13	0	77	49	111	111	0	271	661
8:00 - 8:15	55	55	46	0	156	9	42	54	0	105	8	52	12	1	73	58	98	94	0	250	584
8:15 - 8:30	52	48	53	0	153	10	38	50	0	98	9	54	8	0	71	51	98	126	0	275	597
8:30 - 8:45	40	51	28	0	119	12	63	38	0	113	9	45	6	0	60	48	61	99	0	208	500
8:45 - 9:00	39	42	18	0	99	6	45	34	0	85	8	55	9	0	72	56	42	107	0	205	461
2 Hr Totals	388	380	294	0	1062	68	482	380	0	930	70	407	67	1	545	369	729	892	0	1990	4527
1 Hr Totals																					
7:00 - 8:00	202	184	149	0	535	31	294	204	0	529	36	201	32	0	269	156	430	466	0	1052	2385
7:15 - 8:15	211	209	170	0	590	36	258	211	0	505	34	226	40	1	301	176	446	445	0	1067	2463
7:30 - 8:30	212	218	199	0	629	37	224	213	0	474	38	231	43	1	313	201	421	436	0	1058	2474
7:45 - 8:45	202	229	175	0	606	41	215	195	0	451	33	208	39	1	281	206	368	430	0	1004	2342
8:00 - 9:00	186	196	145	0	527	37	188	176	0	401	34	206	35	1	276	213	299	426	0	938	2142
PEAK HOUR																					
7:30 - 8:30	212	218	199	0	629	37	224	213	0	474	38	231	43	1	313	201	421	436	0	1058	2474

TOTALS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Cahaba River Rd.
and: Colonade Parkway - Acton Rd
Location: Birmingham AL

Counted by: VCU
Date: May 22, 2018
Weather: Sun/Rain mix
Entered by: GK

Tuesday



TM3

TIME	TRAFFIC FROM NORTH on: Cahaba River Rd.					TRAFFIC FROM SOUTH on: Cahaba River Rd.					TRAFFIC FROM EAST on: Colonade Parkway					TRAFFIC FROM WEST on: Acton Rd					TOTAL N + S + E + W
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	
PM																					
4:00 - 4:15	62	69	12	0	143	10	43	44	0	97	44	111	21	0	176	69	52	59	0	180	596
4:15 - 4:30	87	80	16	0	183	7	43	50	0	100	42	130	26	0	198	58	73	53	0	184	665
4:30 - 4:45	85	70	15	0	170	9	56	56	0	121	44	161	11	0	216	93	67	51	0	211	718
4:45 - 5:00	99	65	13	0	177	11	57	58	0	126	62	140	24	0	226	77	60	56	0	193	722
5:00 - 5:15	110	74	17	0	201	10	64	37	0	111	59	125	15	2	201	85	60	82	0	227	740
5:15 - 5:30	121	79	18	0	218	13	85	57	0	155	57	139	14	0	210	90	58	57	0	205	788
5:30 - 5:45	82	73	8	0	163	19	59	48	0	126	36	132	38	0	206	68	69	64	0	201	696
5:45 - 6:00	96	96	19	0	211	7	37	50	0	94	24	86	23	0	133	84	58	50	0	192	630
2 Hr Totals	742	606	118	0	1466	86	444	400	0	930	368	1024	172	2	1566	624	497	472	0	1593	5555
1 Hr Totals																					
4:00 - 5:00	333	284	56	0	673	37	199	208	0	444	192	542	82	0	816	297	252	219	0	768	2701
4:15 - 5:15	381	289	61	0	731	37	220	201	0	458	207	556	76	2	841	313	260	242	0	815	2845
4:30 - 5:30	415	288	63	0	766	43	262	208	0	513	222	565	64	2	853	345	245	246	0	836	2968
4:45 - 5:45	412	291	56	0	759	53	265	200	0	518	214	536	91	2	843	320	247	259	0	826	2946
5:00 - 6:00	409	322	62	0	793	49	245	192	0	486	176	482	90	2	750	327	245	253	0	825	2854
PEAK HOUR																					
4:30 - 5:30	415	288	63	0	766	43	262	208	0	513	222	565	64	2	853	345	245	246	0	836	2968

TOTALS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Cahaba River Rd.
and: Blue Lake Dr - Healthy Way
Location: Birmingham AL

Counted by: VCU
Date: May 23, 2018
Weather: Sun/Rain mix
Entered by: GK

Wednesday



TM4

TIME	TRAFFIC FROM NORTH on: Cahaba River Rd.					TRAFFIC FROM SOUTH on: Cahaba River Rd.					TRAFFIC FROM EAST on: Blue Lake Dr					TRAFFIC FROM WEST on: Healthy Way					TOTAL N + S + E + W
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	
AM																					
7:00 - 7:15	10	52	4	0	66	32	107	17	0	156	1	13	3	0	17	22	12	14	0	48	287
7:15 - 7:30	18	52	4	0	74	44	130	17	0	191	4	10	3	0	17	24	29	7	0	60	342
7:30 - 7:45	11	75	9	0	95	52	118	18	0	188	5	8	12	0	25	18	24	10	0	52	360
7:45 - 8:00	28	86	9	0	123	38	114	19	0	171	4	15	11	0	30	22	16	9	0	47	371
8:00 - 8:15	23	77	15	0	115	29	99	31	0	159	2	17	14	0	33	15	14	3	0	32	339
8:15 - 8:30	30	73	9	0	112	18	78	27	0	123	4	16	9	0	29	19	20	10	0	49	313
8:30 - 8:45	19	71	6	0	96	20	84	22	0	126	1	10	5	0	16	18	12	15	0	45	283
8:45 - 9:00	31	63	6	0	100	18	81	20	0	119	5	15	6	0	26	14	17	7	0	38	283
2 Hr Totals	170	549	62	0	781	251	811	171	0	1233	26	104	63	0	193	152	144	75	0	371	2578
1 Hr Totals																					
7:00 - 8:00	67	265	26	0	358	166	469	71	0	706	14	46	29	0	89	86	81	40	0	207	1360
7:15 - 8:15	80	290	37	0	407	163	461	85	0	709	15	50	40	0	105	79	83	29	0	191	1412
7:30 - 8:30	92	311	42	0	445	137	409	95	0	641	15	56	46	0	117	74	74	32	0	180	1383
7:45 - 8:45	100	307	39	0	446	105	375	99	0	579	11	58	39	0	108	74	62	37	0	173	1306
8:00 - 9:00	103	284	36	0	423	85	342	100	0	527	12	58	34	0	104	66	63	35	0	164	1218
PEAK HOUR																					
7:15 - 8:15	80	290	37	0	407	163	461	85	0	709	15	50	40	0	105	79	83	29	0	191	1412

TOTALS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Cahaba River Rd.
and: Blue Lake Dr - Healthy Way
Location: Birmingham AL

Counted by: VCU
Date: May 22, 2018
Weather: Sun/Rain mix
Entered by: GK

Tuesday



TM4

TIME	TRAFFIC FROM NORTH on: Cahaba River Rd.					TRAFFIC FROM SOUTH on: Cahaba River Rd.					TRAFFIC FROM EAST on: Blue Lake Dr					TRAFFIC FROM WEST on: Healthy Way					TOTAL N + S + E + W
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	
PM																					
4:00 - 4:15	47	104	3	0	154	12	86	35	0	133	3	24	17	0	44	36	21	21	0	78	409
4:15 - 4:30	44	104	4	0	152	8	62	25	0	95	5	38	32	0	75	32	20	17	0	69	391
4:30 - 4:45	45	131	4	0	180	16	114	38	0	168	4	36	35	0	75	30	18	31	0	79	502
4:45 - 5:00	38	135	1	0	174	14	73	50	0	137	6	43	23	0	72	43	18	28	0	89	472
5:00 - 5:15	46	127	4	0	177	21	89	42	0	152	6	50	42	0	98	48	23	34	0	105	532
5:15 - 5:30	48	136	2	0	186	17	72	42	0	131	8	33	49	0	90	43	17	33	0	93	500
5:30 - 5:45	50	129	4	0	183	13	86	51	0	150	12	30	41	0	83	63	28	33	0	124	540
5:45 - 6:00	63	138	3	0	204	20	58	46	0	124	5	40	36	0	81	48	25	24	0	97	506
2 Hr Totals	381	1004	25	0	1410	121	640	329	0	1090	49	294	275	0	618	343	170	221	0	734	3852
1 Hr Totals																					
4:00 - 5:00	174	474	12	0	660	50	335	148	0	533	18	141	107	0	266	141	77	97	0	315	1774
4:15 - 5:15	173	497	13	0	683	59	338	155	0	552	21	167	132	0	320	153	79	110	0	342	1897
4:30 - 5:30	177	529	11	0	717	68	348	172	0	588	24	162	149	0	335	164	76	126	0	366	2006
4:45 - 5:45	182	527	11	0	720	65	320	185	0	570	32	156	155	0	343	197	86	128	0	411	2044
5:00 - 6:00	207	530	13	0	750	71	305	181	0	557	31	153	168	0	352	202	93	124	0	419	2078
PEAK HOUR																					
5:00 - 6:00	207	530	13	0	750	71	305	181	0	557	31	153	168	0	352	202	93	124	0	419	2078

TOTALS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Cahaba River Rd.
and: Colony Park Dr - Old 280 Ct
Location: Birmingham AL

Counted by: VCU
Date: May 23, 2018
Weather: Sun/Rain mix
Entered by: GK

Wednesday



TM5

TIME	TRAFFIC FROM NORTH on: Cahaba River Rd.					TRAFFIC FROM SOUTH on: Cahaba River Rd.					TRAFFIC FROM EAST on: Colony Park Dr					TRAFFIC FROM WEST on: Old 280 Ct					TOTAL N + S + E + W
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	
AM																					
7:00 - 7:15	1	71	7	0	79	3	78	1	0	82	71	2	12	0	85	4	1	6	0	11	257
7:15 - 7:30	0	66	5	0	71	5	96	2	0	103	66	0	8	0	74	1	0	11	0	12	260
7:30 - 7:45	6	74	12	0	92	6	114	3	0	123	58	0	11	0	69	6	1	10	0	17	301
7:45 - 8:00	6	104	6	0	116	4	90	6	0	100	56	0	16	1	73	3	2	9	0	14	303
8:00 - 8:15	2	90	11	0	103	4	98	3	0	105	39	0	10	0	49	3	0	8	0	11	268
8:15 - 8:30	3	77	10	0	90	7	84	1	0	92	31	0	7	0	38	4	1	3	0	8	228
8:30 - 8:45	4	68	13	0	85	5	62	2	0	69	53	0	9	0	62	2	0	5	0	7	223
8:45 - 9:00	3	60	11	0	74	7	70	0	0	77	34	1	8	0	43	0	1	3	0	4	198
2 Hr Totals	25	610	75	0	710	41	692	18	0	751	408	3	81	1	493	23	6	55	0	84	2038
1 Hr Totals																					
7:00 - 8:00	13	315	30	0	358	18	378	12	0	408	251	2	47	1	301	14	4	36	0	54	1121
7:15 - 8:15	14	334	34	0	382	19	398	14	0	431	219	0	45	1	265	13	3	38	0	54	1132
7:30 - 8:30	17	345	39	0	401	21	386	13	0	420	184	0	44	1	229	16	4	30	0	50	1100
7:45 - 8:45	15	339	40	0	394	20	334	12	0	366	179	0	42	1	222	12	3	25	0	40	1022
8:00 - 9:00	12	295	45	0	352	23	314	6	0	343	157	1	34	0	192	9	2	19	0	30	917
PEAK HOUR																					
7:15 - 8:15	14	334	34	0	382	19	398	14	0	431	219	0	45	1	265	13	3	38	0	54	1132

TOTALS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Cahaba River Rd.
 and: Colony Park Dr - Old 280 Ct
 Location: Birmingham AL

Counted by: VCU
 Date: May 22, 2018
 Weather: Sun/Rain mix
 Entered by: EM

Tuesday



TM5

TIME	TRAFFIC FROM NORTH on: Cahaba River Rd.					TRAFFIC FROM SOUTH on: Cahaba River Rd.					TRAFFIC FROM EAST on: Colony Park Dr					TRAFFIC FROM WEST on: Old 280 Ct					TOTAL N + S + E + W
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	
PM																					
4:00 - 4:15	7	106	30	0	143	9	107	2	0	118	13	0	7	0	20	2	0	6	0	8	289
4:15 - 4:30	5	126	30	0	161	10	83	2	0	95	11	1	6	0	18	2	0	6	0	8	282
4:30 - 4:45	6	138	35	0	179	12	120	2	0	134	27	0	7	0	34	5	0	4	0	9	356
4:45 - 5:00	2	156	36	0	194	12	100	2	0	114	21	1	10	0	32	1	0	8	0	9	349
5:00 - 5:15	5	154	48	0	207	17	107	4	0	128	22	0	9	0	31	4	0	3	0	7	373
5:15 - 5:30	9	161	51	0	221	12	100	2	0	114	29	0	11	0	40	7	0	2	0	9	384
5:30 - 5:45	13	145	59	0	217	11	96	3	0	110	31	0	9	0	40	2	0	5	0	7	374
5:45 - 6:00	7	152	64	0	223	10	85	6	0	101	29	1	8	0	38	7	0	6	0	13	375
2 Hr Totals	54	1138	353	0	1545	93	798	23	0	914	183	3	67	0	253	30	0	40	0	70	2782
1 Hr Totals																					
4:00 - 5:00	20	526	131	0	677	43	410	8	0	461	72	2	30	0	104	10	0	24	0	34	1276
4:15 - 5:15	18	574	149	0	741	51	410	10	0	471	81	2	32	0	115	12	0	21	0	33	1360
4:30 - 5:30	22	609	170	0	801	53	427	10	0	490	99	1	37	0	137	17	0	17	0	34	1462
4:45 - 5:45	29	616	194	0	839	52	403	11	0	466	103	1	39	0	143	14	0	18	0	32	1480
5:00 - 6:00	34	612	222	0	868	50	388	15	0	453	111	1	37	0	149	20	0	16	0	36	1506
PEAK HOUR																					
5:00 - 6:00	34	612	222	0	868	50	388	15	0	453	111	1	37	0	149	20	0	16	0	36	1506

TOTALS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Grandview Med Center
and: Cahaba River Rd
Location: Birmingham AL

Counted by: VCU
Date: May 23, 2018
Weather: Sun/Rain mix
Entered by: GK

Wednesday



TM6

TIME	TRAFFIC FROM NORTH on: Grandview Med Center					TRAFFIC FROM SOUTH on:					TRAFFIC FROM EAST on: Cahaba River Rd					TRAFFIC FROM WEST on: Cahaba River Rd					TOTAL N + S + E + W
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	
AM																					
7:00 - 7:15	15	0	11	0	26	0	0	0	0	0	16	39	0	0	55	0	53	15	0	68	149
7:15 - 7:30	11	0	3	0	14	0	0	0	0	0	15	78	0	0	93	0	57	18	0	75	182
7:30 - 7:45	13	0	2	0	15	0	0	0	0	0	13	100	0	0	113	0	67	16	0	83	211
7:45 - 8:00	7	0	1	1	9	0	0	0	0	0	22	93	0	0	115	0	86	24	0	110	234
8:00 - 8:15	8	0	1	1	10	0	0	0	0	0	17	88	0	0	105	0	67	24	0	91	206
8:15 - 8:30	10	0	3	0	13	0	0	0	0	0	10	85	0	0	95	0	56	26	0	82	190
8:30 - 8:45	4	0	0	0	4	0	0	0	0	0	10	65	0	0	75	0	50	21	0	71	150
8:45 - 9:00	5	0	3	1	9	0	0	0	0	0	4	51	0	2	57	0	57	8	0	65	131
2 Hr Totals	73	0	24	3	100	0	0	0	0	0	107	599	0	2	708	0	493	152	0	645	1453
1 Hr Totals																					
7:00 - 8:00	46	0	17	1	64	0	0	0	0	0	66	310	0	0	376	0	263	73	0	336	776
7:15 - 8:15	39	0	7	2	48	0	0	0	0	0	67	359	0	0	426	0	277	82	0	359	833
7:30 - 8:30	38	0	7	2	47	0	0	0	0	0	62	366	0	0	428	0	276	90	0	366	841
7:45 - 8:45	29	0	5	2	36	0	0	0	0	0	59	331	0	0	390	0	259	95	0	354	780
8:00 - 9:00	27	0	7	2	36	0	0	0	0	0	41	289	0	2	332	0	230	79	0	309	677
PEAK HOUR																					
7:30 - 8:30	38	0	7	2	47	0	0	0	0	0	62	366	0	0	428	0	276	90	0	366	841

TOTALS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Grandview Med Center
and: Cahaba River Rd
Location: Birmingham AL

Counted by: VCU
Date: May 22, 2018
Weather: Sun/Rain mix
Entered by: GK

Tuesday



TM6

TIME	TRAFFIC FROM NORTH on: Grandview Med Center					TRAFFIC FROM SOUTH on:					TRAFFIC FROM EAST on: Cahaba River Rd					TRAFFIC FROM WEST on: Cahaba River Rd					TOTAL N + S + E + W
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	
PM																					
4:00 - 4:15	27	0	18	0	45	0	0	0	0	0	1	74	0	0	75	0	106	3	0	109	229
4:15 - 4:30	30	0	9	0	39	0	0	0	0	0	3	62	0	0	65	0	116	11	0	127	231
4:30 - 4:45	47	0	8	0	55	0	0	0	0	0	1	86	0	0	87	0	123	14	1	138	280
4:45 - 5:00	23	0	14	0	37	0	0	0	0	0	5	84	0	0	89	0	141	9	0	150	276
5:00 - 5:15	33	0	18	0	51	0	0	0	0	0	4	78	0	0	82	0	150	16	0	166	299
5:15 - 5:30	27	0	5	0	32	0	0	0	0	0	2	82	0	0	84	0	151	12	0	163	279
5:30 - 5:45	28	0	9	0	37	0	0	0	0	0	4	73	0	0	77	0	140	10	0	150	264
5:45 - 6:00	16	0	5	1	22	0	0	0	0	0	2	75	0	0	77	0	137	11	0	148	247
2 Hr Totals	231	0	86	1	318	0	0	0	0	0	22	614	0	0	636	0	1064	86	1	1151	2105
1 Hr Totals																					
4:00 - 5:00	127	0	49	0	176	0	0	0	0	0	10	306	0	0	316	0	486	37	1	524	1016
4:15 - 5:15	133	0	49	0	182	0	0	0	0	0	13	310	0	0	323	0	530	50	1	581	1086
4:30 - 5:30	130	0	45	0	175	0	0	0	0	0	12	330	0	0	342	0	565	51	1	617	1134
4:45 - 5:45	111	0	46	0	157	0	0	0	0	0	15	317	0	0	332	0	582	47	0	629	1118
5:00 - 6:00	104	0	37	1	142	0	0	0	0	0	12	308	0	0	320	0	578	49	0	627	1089
PEAK HOUR																					
4:30 - 5:30	130	0	45	0	175	0	0	0	0	0	12	330	0	0	342	0	565	51	1	617	1134

APPENDIX B: OPERATIONAL ANALYSIS

 Arterial Level of Service: NW Cahaba River Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Colony Park	II	40	90.3	12.1	102.4	1.00	35.3	A
Healthy Way	II	40	32.1	6.6	38.7	0.31	29.2	B
Acton Rd	II	40	29.1	55.3	84.4	0.26	11.3	F
Altadena Rd	II	40	51.5	9.7	61.2	0.57	33.7	B
Dolly Ridge Rd	II	35	51.8	13.7	65.5	0.50	27.7	C
US-280	II	35	24.7	66.8	91.5	0.20	7.8	F
Total	II		279.5	164.2	443.7	2.86	23.2	C

 Arterial Level of Service: SE Cahaba River Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Dolly Ridge Rd	II	35	24.7	8.9	33.6	0.20	21.2	D
Altadena Rd	II	40	46.8	8.0	54.8	0.50	33.1	B
Acton Rd	II	40	51.5	46.6	98.1	0.57	21.0	D
Healthy Way	II	40	29.1	11.3	40.4	0.26	23.5	C
Colony Park	II	40	32.1	6.4	38.5	0.31	29.4	B
Total	II		184.2	81.2	265.4	1.85	25.1	C

HCM 6th Signalized Intersection Summary

1: Cahaba River Rd & Dolly Ridge Rd

07/26/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	136	1	74	1	1	18	29	724	1	5	479	83
Future Volume (veh/h)	136	1	74	1	1	18	29	724	1	5	479	83
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	148	1	80	1	1	20	32	787	1	5	521	90
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	278	11	98	71	24	278	89	1139	1	67	985	169
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.63	0.63	0.63	0.63	0.63	0.63
Sat Flow, veh/h	909	58	519	19	129	1476	34	1805	2	3	1561	268
Grp Volume(v), veh/h	229	0	0	22	0	0	820	0	0	616	0	0
Grp Sat Flow(s),veh/h/ln	1485	0	0	1623	0	0	1841	0	0	1832	0	0
Q Serve(g_s), s	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	8.2	0.0	0.0	0.6	0.0	0.0	15.7	0.0	0.0	10.3	0.0	0.0
Prop In Lane	0.65		0.35	0.05		0.91	0.04		0.00	0.01		0.15
Lane Grp Cap(c), veh/h	387	0	0	374	0	0	1229	0	0	1222	0	0
V/C Ratio(X)	0.59	0.00	0.00	0.06	0.00	0.00	0.67	0.00	0.00	0.50	0.00	0.00
Avail Cap(c_a), veh/h	507	0	0	505	0	0	1229	0	0	1222	0	0
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	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.5	0.0	0.0	18.5	0.0	0.0	6.7	0.0	0.0	5.7	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	0.0	0.1	0.0	0.0	2.9	0.0	0.0	1.5	0.0	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	2.7	0.0	0.0	0.2	0.0	0.0	4.7	0.0	0.0	2.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.0	0.0	0.0	18.6	0.0	0.0	9.5	0.0	0.0	7.2	0.0	0.0
LnGrp LOS	C	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		229			22			820				616
Approach Delay, s/veh		23.0			18.6			9.5				7.2
Approach LOS		C			B			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		40.0		15.4		40.0		15.4				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		35.0		15.0		35.0		15.0				
Max Q Clear Time (g_c+I1), s		17.7		10.2		12.3		2.6				
Green Ext Time (p_c), s		5.7		0.5		4.2		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				10.6								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary
 4: Cahaba River Rd/Dolly Ridge Rd & US-280

07/26/2018



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑	↗	↖↗	↖		↖↗	↖	
Traffic Volume (veh/h)	37	2497	487	51	2300	149	767	39	72	154	29	64
Future Volume (veh/h)	37	2497	487	51	2300	149	767	39	72	154	29	64
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		No		No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	39	2601	0	53	2396	0	834	42	0	167	32	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	1	1	1	1	1	1
Cap, veh/h	50	3288		67	3335		894	274		201	49	
Arrive On Green	0.03	0.64	0.00	0.04	0.65	0.00	0.18	0.15	0.00	0.06	0.03	0.00
Sat Flow, veh/h	1781	5106	1585	1781	5106	1585	5063	1885	0	3483	1885	0
Grp Volume(v), veh/h	39	2601	0	53	2396	0	834	42	0	167	32	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1585	1688	1885	0	1742	1885	0
Q Serve(g_s), s	4.7	79.8	0.0	6.4	66.2	0.0	35.0	4.2	0.0	10.2	3.6	0.0
Cycle Q Clear(g_c), s	4.7	79.8	0.0	6.4	66.2	0.0	35.0	4.2	0.0	10.2	3.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	50	3288		67	3335		894	274		201	49	
V/C Ratio(X)	0.78	0.79		0.80	0.72		0.93	0.15		0.83	0.65	
Avail Cap(c_a), veh/h	99	3288		165	3335		938	297		290	105	
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	104.2	27.9	0.0	103.1	24.5	0.0	87.6	80.7	0.0	100.6	104.1	0.0
Incr Delay (d2), s/veh	22.4	2.0	0.0	18.8	1.4	0.0	15.3	0.3	0.0	12.5	13.3	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	2.5	31.3	0.0	3.3	25.7	0.0	16.7	2.1	0.0	5.0	2.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	126.6	29.9	0.0	121.9	25.8	0.0	102.9	80.9	0.0	113.1	117.4	0.0
LnGrp LOS	F	C		F	C		F	F		F	F	
Approach Vol, veh/h		2640	A		2449	A		876	A		199	A
Approach Delay, s/veh		31.4			27.9			101.8			113.8	
Approach LOS		C			C			F			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.1	148.0	44.1	11.7	14.1	146.0	18.5	37.3				
Change Period (Y+Rc), s	6.0	7.0	6.0	6.0	6.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	12.0	141.0	40.0	12.0	20.0	133.0	18.0	34.0				
Max Q Clear Time (g_c+10), s	10.7	68.2	37.0	5.6	8.4	81.8	12.2	6.2				
Green Ext Time (p_c), s	0.0	36.2	1.1	0.0	0.1	34.5	0.2	0.1				

Intersection Summary

HCM 6th Ctrl Delay	42.7
HCM 6th LOS	D

Notes

Unsignalized Delay for [NER, NWR, SER, SWR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

5: Cahaba River Rd & Altadena Rd

07/26/2018



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	106	94	107	646	491	50
Future Volume (veh/h)	106	94	107	646	491	50
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1885	1885	1885	1885
Adj Flow Rate, veh/h	115	102	116	702	534	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	1	1	1	1
Cap, veh/h	148	132	554	1124	1124	
Arrive On Green	0.17	0.17	0.60	0.60	0.60	0.00
Sat Flow, veh/h	895	794	877	1885	1885	0
Grp Volume(v), veh/h	218	0	116	702	534	0
Grp Sat Flow(s),veh/h/ln	1697	0	877	1885	1885	0
Q Serve(g_s), s	5.2	0.0	3.6	10.1	6.7	0.0
Cycle Q Clear(g_c), s	5.2	0.0	10.3	10.1	6.7	0.0
Prop In Lane	0.53	0.47	1.00			0.00
Lane Grp Cap(c), veh/h	281	0	554	1124	1124	
V/C Ratio(X)	0.78	0.00	0.21	0.62	0.48	
Avail Cap(c_a), veh/h	607	0	554	1124	1124	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.8	0.0	7.7	5.5	4.8	0.0
Incr Delay (d2), s/veh	4.6	0.0	0.9	2.6	1.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	0.6	2.3	1.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.3	0.0	8.5	8.1	6.2	0.0
LnGrp LOS	C	A	A	A	A	
Approach Vol, veh/h	218			818	534	A
Approach Delay, s/veh	21.3			8.1	6.2	
Approach LOS	C			A	A	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		30.0		11.9		30.0
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		25.0		15.0		25.0
Max Q Clear Time (g_c+I1), s		12.3		7.2		8.7
Green Ext Time (p_c), s		4.3		0.4		2.9

Intersection Summary

HCM 6th Ctrl Delay		9.3	
HCM 6th LOS		A	

Notes

User approved volume balancing among the lanes for turning movement.

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

HCM 6th Signalized Intersection Summary

7: Acton Rd & Cahaba River Rd

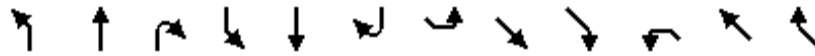
07/26/2018



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	170	209	211	211	258	36	445	446	176	40	226	34
Future Volume (veh/h)	170	209	211	211	258	36	445	446	176	40	226	34
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	185	227	229	229	280	39	484	485	191	43	246	37
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	318	351	297	382	336	47	685	716	607	361	714	106
Arrive On Green	0.11	0.19	0.19	0.13	0.21	0.21	0.24	0.38	0.38	0.09	0.23	0.23
Sat Flow, veh/h	1795	1885	1598	1795	1619	226	1795	1885	1598	1795	3128	464
Grp Volume(v), veh/h	185	227	229	229	0	319	484	485	191	43	139	144
Grp Sat Flow(s),veh/h/ln	1795	1885	1598	1795	0	1845	1795	1885	1598	1795	1791	1802
Q Serve(g_s), s	7.5	10.3	12.6	9.2	0.0	15.3	17.4	19.8	7.8	1.5	6.0	6.2
Cycle Q Clear(g_c), s	7.5	10.3	12.6	9.2	0.0	15.3	17.4	19.8	7.8	1.5	6.0	6.2
Prop In Lane	1.00		1.00	1.00		0.12	1.00		1.00	1.00		0.26
Lane Grp Cap(c), veh/h	318	351	297	382	0	382	685	716	607	361	409	411
V/C Ratio(X)	0.58	0.65	0.77	0.60	0.00	0.83	0.71	0.68	0.31	0.12	0.34	0.35
Avail Cap(c_a), veh/h	610	921	780	635	0	901	1133	716	607	497	680	684
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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.7	34.7	35.6	25.4	0.0	35.0	17.2	23.9	20.1	22.3	29.8	29.8
Incr Delay (d2), s/veh	2.4	2.0	4.2	2.1	0.0	4.8	1.9	5.1	1.4	0.1	0.5	0.5
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	3.2	4.7	5.0	3.9	0.0	7.0	6.7	9.0	2.9	0.6	2.5	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.1	36.7	39.9	27.6	0.0	39.8	19.1	29.0	21.5	22.5	30.3	30.3
LnGrp LOS	C	D	D	C	A	D	B	C	C	C	C	C
Approach Vol, veh/h		641			548			1160			326	
Approach Delay, s/veh		35.6			34.7			23.6			29.3	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	3.0	40.0	17.0	22.1	27.0	26.0	15.0	24.1				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	35.0	25.0	45.0	45.0	35.0	25.0	45.0				
Max Q Clear Time (g_c+13), s	5.0	21.8	11.2	14.6	19.4	8.2	9.5	17.3				
Green Ext Time (p_c), s	0.0	4.0	0.8	2.0	2.6	1.4	0.7	1.8				
Intersection Summary												
HCM 6th Ctrl Delay											29.5	
HCM 6th LOS											C	

HCM 6th Signalized Intersection Summary
 9: Colony Park & Cahaba River Rd

07/26/2018



Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕			↕	↕	↕	↕		↕	↕	↕
Traffic Volume (veh/h)	38	3	13	45	0	219	34	334	14	14	398	19
Future Volume (veh/h)	38	3	13	45	0	219	34	334	14	14	398	19
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	41	3	14	49	0	238	37	363	15	15	433	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	310	39	63	472	0	320	442	993	41	578	745	632
Arrive On Green	0.20	0.20	0.20	0.20	0.00	0.20	0.03	0.55	0.55	0.40	0.40	0.40
Sat Flow, veh/h	792	197	315	1468	0	1598	1795	1798	74	1013	1885	1598
Grp Volume(v), veh/h	58	0	0	49	0	238	37	0	378	15	433	21
Grp Sat Flow(s),veh/h/ln	1304	0	0	1468	0	1598	1795	0	1872	1013	1885	1598
Q Serve(g_s), s	0.4	0.0	0.0	0.0	0.0	5.7	0.4	0.0	4.6	0.4	7.3	0.3
Cycle Q Clear(g_c), s	1.3	0.0	0.0	0.9	0.0	5.7	0.4	0.0	4.6	0.4	7.3	0.3
Prop In Lane	0.71		0.24	1.00		1.00	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	413	0	0	472	0	320	442	0	1034	578	745	632
V/C Ratio(X)	0.14	0.00	0.00	0.10	0.00	0.74	0.08	0.00	0.37	0.03	0.58	0.03
Avail Cap(c_a), veh/h	628	0	0	712	0	592	559	0	1157	578	745	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	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.4	0.0	0.0	13.3	0.0	15.2	6.7	0.0	5.1	7.5	9.6	7.5
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	3.4	0.1	0.0	0.2	0.1	3.3	0.1
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	0.4	0.0	0.0	0.3	0.0	2.0	0.1	0.0	0.9	0.1	2.6	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.6	0.0	0.0	13.4	0.0	18.6	6.8	0.0	5.3	7.6	12.9	7.6
LnGrp LOS	B	A	A	B	A	B	A	A	A	A	B	A
Approach Vol, veh/h		58			287			415			469	
Approach Delay, s/veh		13.6			17.7			5.4			12.5	
Approach LOS		B			B			A			B	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.4	21.0		13.1		27.4		13.1				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	16.0	16.0		15.0		25.0		15.0				
Max Q Clear Time (g_c+1/2), s	9.3	9.3		7.7		6.6		3.3				
Green Ext Time (p_c), s	0.0	1.4		0.6		2.0		0.2				
Intersection Summary												
HCM 6th Ctrl Delay				11.4								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary

11: Healthy Way & Cahaba River Rd

07/26/2018



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	37	290	80	85	461	163	29	83	79	40	50	15
Future Volume (veh/h)	37	290	80	85	461	163	29	83	79	40	50	15
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	40	315	0	92	501	177	32	90	86	43	54	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	514	1033		715	919	325	123	199	212	130	104	24
Arrive On Green	0.55	0.55	0.00	0.05	0.69	0.69	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	768	1885	1598	1795	1331	470	321	1500	1598	317	782	181
Grp Volume(v), veh/h	40	315	0	92	0	678	122	0	86	113	0	0
Grp Sat Flow(s),veh/h/ln	768	1885	1598	1795	0	1801	1821	0	1598	1280	0	0
Q Serve(g_s), s	1.5	5.1	0.0	1.1	0.0	10.6	0.0	0.0	2.8	1.8	0.0	0.0
Cycle Q Clear(g_c), s	4.0	5.1	0.0	1.1	0.0	10.6	3.4	0.0	2.8	5.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.26	0.26		1.00	0.38		0.14
Lane Grp Cap(c), veh/h	514	1033		715	0	1243	322	0	212	257	0	0
V/C Ratio(X)	0.08	0.30		0.13	0.00	0.55	0.38	0.00	0.41	0.44	0.00	0.00
Avail Cap(c_a), veh/h	514	1033		1127	0	1243	579	0	453	488	0	0
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.3	6.9	0.0	4.4	0.0	4.3	22.7	0.0	22.5	23.4	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.8	0.0	0.1	0.0	1.7	0.7	0.0	1.3	1.2	0.0	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	0.2	1.6	0.0	0.2	0.0	2.2	1.4	0.0	1.0	1.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.6	7.7	0.0	4.5	0.0	6.1	23.5	0.0	23.7	24.5	0.0	0.0
LnGrp LOS	A	A		A	A	A	C	A	C	C	A	A
Approach Vol, veh/h		355	A		770			208			113	
Approach Delay, s/veh		7.7			5.9			23.6			24.5	
Approach LOS		A			A			C			C	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		44.0		12.5	8.1	35.9		12.5				
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s		39.0		16.0	16.0	18.0		16.0				
Max Q Clear Time (g_c+I1), s		12.6		5.4	3.1	7.1		7.2				
Green Ext Time (p_c), s		4.8		0.6	0.1	1.4		0.3				

Intersection Summary

HCM 6th Ctrl Delay	10.3
HCM 6th LOS	B

Notes

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

HCM 6th TWSC
 14: Cahaba River Rd & Grandview Medical Drwy

07/26/2018

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↗	↗	↘	↘	↘
Traffic Vol, veh/h	82	277	359	67	7	39
Future Vol, veh/h	82	277	359	67	7	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	165	-	-	225	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	89	301	390	73	8	42

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	390	0	-	0	869 390
Stage 1	-	-	-	-	390 -
Stage 2	-	-	-	-	479 -
Critical Hdwy	4.11	-	-	-	6.41 6.21
Critical Hdwy Stg 1	-	-	-	-	5.41 -
Critical Hdwy Stg 2	-	-	-	-	5.41 -
Follow-up Hdwy	2.209	-	-	-	3.509 3.309
Pot Cap-1 Maneuver	1174	-	-	-	324 661
Stage 1	-	-	-	-	686 -
Stage 2	-	-	-	-	625 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1174	-	-	-	299 661
Mov Cap-2 Maneuver	-	-	-	-	299 -
Stage 1	-	-	-	-	634 -
Stage 2	-	-	-	-	625 -

Approach	EB	WB	SB
HCM Control Delay, s	1.9	0	11.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1174	-	-	-	299	661
HCM Lane V/C Ratio	0.076	-	-	-	0.025	0.064
HCM Control Delay (s)	8.3	-	-	-	17.4	10.8
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.2

1: Cahaba River Rd & Dolly Ridge Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.1	0.2			0.1	0.0	1.8	0.0	0.0	0.0	0.0
Total Delay (hr)	1.7	0.0	0.6	0.0	0.0	0.1	2.0	48.5	0.1	0.0	2.4	0.3
Total Del/Veh (s)	42.5	35.8	32.3			20.6	234.2	249.6	228.1	32.9	16.9	13.7
Stop Delay (hr)	1.5	0.0	0.6	0.0	0.0	0.1	1.9	46.8	0.1	0.0	0.9	0.1
Stop Del/Veh (s)	38.1	29.7	29.2			20.5	225.5	240.8	227.6	25.0	6.7	5.7
Total Stops	125	1	65	0	0	16	44	822	2	3	229	39
Stop/Veh	0.89	1.00	0.93			0.89	1.47	1.18	1.00	0.75	0.46	0.47
Travel Dist (mi)	9.8	0.1	4.9	0.0	0.0	1.2	14.0	322.9	0.9	0.7	95.7	15.9
Travel Time (hr)	2.0	0.0	0.8	0.0	0.0	0.2	2.4	58.2	0.2	0.1	5.8	1.0
Avg Speed (mph)	5	5	6	6	8	8	6	6	6	11	17	17
Vehicles Entered	140	1	70	0	0	18	30	685	2	4	497	82
Vehicles Exited	137	1	69	0	0	18	26	595	2	3	494	81
Hourly Exit Rate	137	1	69	0	0	18	26	595	2	3	494	81
Input Volume	136	1	74	1	1	18	29	724	1	5	486	83
% of Volume	101	100	93	0	0	101	90	82	200	60	102	97
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	1	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	2	0	1	0	0	0	2	58	0	0	6	1

1: Cahaba River Rd & Dolly Ridge Rd Performance by movement

Movement	All
Denied Delay (hr)	0.4
Denied Del/Veh (s)	0.8
Total Delay (hr)	55.7
Total Del/Veh (s)	129.4
Stop Delay (hr)	52.0
Stop Del/Veh (s)	121.0
Total Stops	1346
Stop/Veh	0.87
Travel Dist (mi)	466.2
Travel Time (hr)	70.6
Avg Speed (mph)	7
Vehicles Entered	1529
Vehicles Exited	1426
Hourly Exit Rate	1426
Input Volume	1558
% of Volume	91
Denied Entry Before	0
Denied Entry After	1
Density (ft/veh)	64
Occupancy (veh)	70

4: Cahaba River Rd/Dolly Ridge Rd & US-280 Performance by movement

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Denied Delay (hr)	0.0	0.4	0.3	0.0	0.2	0.1	0.0	0.0	0.0	0.2	0.0	0.0
Denied Del/Veh (s)	1.7	0.5	1.9	1.8	0.3	1.7	0.1	0.0	0.0	3.8	0.5	0.5
Total Delay (hr)	1.1	21.9	1.2	1.7	18.6	0.3	34.5	1.6	1.4	3.9	1.1	0.1
Total Del/Veh (s)	111.7	31.9	8.9	120.3	28.5	7.3	180.7	182.5	83.0	84.3	114.7	6.8
Stop Delay (hr)	1.0	11.7	0.0	1.6	10.2	0.0	30.9	1.4	1.1	3.7	1.0	0.0
Stop Del/Veh (s)	100.4	17.1	0.3	111.3	15.7	0.8	161.6	162.5	64.8	79.5	108.3	2.6
Total Stops	43	1171	33	59	1054	13	1023	44	49	164	33	12
Stop/Veh	1.16	0.47	0.07	1.16	0.45	0.09	1.49	1.42	0.83	0.98	1.00	0.18
Travel Dist (mi)	6.0	409.8	74.9	7.5	353.1	20.1	126.5	5.7	10.3	26.3	5.2	9.8
Travel Time (hr)	1.3	29.8	3.4	1.9	25.2	0.9	38.7	1.7	1.7	4.9	1.2	0.4
Avg Speed (mph)	5	14	24	4	14	24	3	3	6	6	4	23
Vehicles Entered	36	2460	494	50	2334	149	662	30	59	158	31	65
Vehicles Exited	36	2417	492	50	2300	149	659	30	57	164	32	65
Hourly Exit Rate	36	2417	492	50	2300	149	659	30	57	164	32	65
Input Volume	37	2497	487	51	2300	149	767	39	72	154	29	64
% of Volume	98	97	101	99	100	100	86	76	79	106	110	102
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	1	29	3	2	25	1	39	2	2	5	1	0

4: Cahaba River Rd/Dolly Ridge Rd & US-280 Performance by movement

Movement	All
Denied Delay (hr)	1.1
Denied Del/Veh (s)	0.6
Total Delay (hr)	87.4
Total Del/Veh (s)	47.7
Stop Delay (hr)	62.7
Stop Del/Veh (s)	34.2
Total Stops	3698
Stop/Veh	0.56
Travel Dist (mi)	1055.1
Travel Time (hr)	111.4
Avg Speed (mph)	10
Vehicles Entered	6528
Vehicles Exited	6451
Hourly Exit Rate	6451
Input Volume	6646
% of Volume	97
Denied Entry Before	0
Denied Entry After	0
Density (ft/veh)	135
Occupancy (veh)	110

5: Cahaba River Rd & Altadena Rd Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.2	0.1	0.0	0.0	0.0	0.0
Total Delay (hr)	0.4	0.3	1.4	7.9	1.7	0.1	11.9
Total Del/Veh (s)	16.6	10.2	45.6	42.6	12.2	8.1	27.9
Stop Delay (hr)	0.4	0.2	1.1	5.9	0.4	0.0	8.1
Stop Del/Veh (s)	13.6	8.3	35.8	31.9	3.1	0.9	18.9
Total Stops	75	83	106	339	163	6	772
Stop/Veh	0.79	0.81	0.94	0.51	0.32	0.12	0.50
Travel Dist (mi)	16.3	17.7	62.4	369.2	248.8	25.7	740.1
Travel Time (hr)	1.0	0.9	3.2	17.8	8.1	0.8	31.7
Avg Speed (mph)	17	20	20	21	31	32	23
Vehicles Entered	94	101	111	660	503	52	1521
Vehicles Exited	92	101	108	624	500	52	1477
Hourly Exit Rate	92	101	108	624	500	52	1477
Input Volume	106	94	107	646	504	50	1506
% of Volume	87	108	101	97	99	103	98
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0
Density (ft/veh)							300
Occupancy (veh)	1	1	3	18	8	1	32

7: Acton Rd & Cahaba River Rd Performance by movement

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3	0.1	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	3.7	2.1	1.2	3.8	0.1	0.1
Total Delay (hr)	1.9	2.7	0.8	1.7	3.2	0.4	6.0	4.9	0.3	0.3	3.0	0.2
Total Del/Veh (s)	38.6	46.1	13.5	30.4	43.2	32.2	45.3	39.6	5.5	28.6	47.9	18.8
Stop Delay (hr)	1.4	2.0	0.4	1.3	2.4	0.3	4.5	3.2	0.2	0.3	2.5	0.1
Stop Del/Veh (s)	28.4	33.8	7.0	22.8	32.5	25.6	34.2	26.2	4.1	23.9	39.7	16.5
Total Stops	165	163	226	160	203	30	467	330	99	37	192	25
Stop/Veh	0.91	0.77	1.08	0.80	0.76	0.73	0.99	0.74	0.55	0.88	0.84	0.81
Travel Dist (mi)	101.0	118.1	116.9	51.3	68.1	10.6	59.6	56.4	23.1	5.0	27.1	3.6
Travel Time (hr)	4.7	5.7	4.2	3.2	5.0	0.7	8.3	6.4	1.1	0.5	3.7	0.3
Avg Speed (mph)	22	21	28	16	14	15	8	9	23	10	7	13
Vehicles Entered	178	209	206	199	264	41	468	440	179	41	224	30
Vehicles Exited	177	208	207	195	264	41	463	437	180	41	226	31
Hourly Exit Rate	177	208	207	195	264	41	463	437	180	41	226	31
Input Volume	170	209	211	211	259	36	445	446	176	40	226	34
% of Volume	104	100	98	92	102	114	104	98	102	102	100	91
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	1	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	5	6	4	3	5	1	8	6	1	0	4	0

7: Acton Rd & Cahaba River Rd Performance by movement

Movement	All
Denied Delay (hr)	0.8
Denied Del/Veh (s)	1.2
Total Delay (hr)	25.4
Total Del/Veh (s)	36.4
Stop Delay (hr)	18.7
Stop Del/Veh (s)	26.8
Total Stops	2097
Stop/Veh	0.83
Travel Dist (mi)	641.0
Travel Time (hr)	43.6
Avg Speed (mph)	15
Vehicles Entered	2479
Vehicles Exited	2470
Hourly Exit Rate	2470
Input Volume	2463
% of Volume	100
Denied Entry Before	0
Denied Entry After	1
Density (ft/veh)	361
Occupancy (veh)	43

9: Colony Park & Cahaba River Rd Performance by movement

Movement	NBL	NBT	NBR	SBL	SBR	SEL	SET	SER	NWL	NWT	NWR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Denied Del/Veh (s)	0.1	0.2	0.1	0.6	3.8	0.0	0.0	0.0	0.1	0.0	0.2	0.7
Total Delay (hr)	0.1	0.0	0.0	0.1	0.3	0.1	0.8	0.0	0.1	1.2	0.0	2.9
Total Del/Veh (s)	14.1	10.4	5.4	10.9	5.7	11.2	7.6	4.8	14.0	10.5	5.2	8.7
Stop Delay (hr)	0.1	0.0	0.0	0.1	0.3	0.1	0.2	0.0	0.0	0.4	0.0	1.3
Stop Del/Veh (s)	12.0	6.3	5.0	8.7	5.0	6.8	2.4	2.0	8.7	3.5	1.2	4.0
Total Stops	30	2	12	29	157	25	98	5	10	162	8	538
Stop/Veh	0.81	0.67	0.80	0.71	0.72	0.74	0.26	0.33	0.67	0.39	0.35	0.45
Travel Dist (mi)	2.7	0.2	1.1	2.1	11.5	10.5	110.0	4.5	10.3	285.9	15.8	454.6
Travel Time (hr)	0.2	0.0	0.1	0.2	1.1	0.4	3.7	0.2	0.3	8.5	0.5	15.2
Avg Speed (mph)	11	15	16	10	13	26	30	29	31	34	34	30
Vehicles Entered	37	3	15	40	216	34	369	14	15	406	22	1171
Vehicles Exited	37	3	15	40	216	34	367	15	15	407	22	1171
Hourly Exit Rate	37	3	15	40	216	34	367	15	15	407	22	1171
Input Volume	38	3	13	45	219	34	361	14	14	398	19	1159
% of Volume	97	100	113	88	99	100	102	105	105	102	117	101
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												1045
Occupancy (veh)	0	0	0	0	1	0	4	0	0	8	0	15

11: Healthy Way & Cahaba River Rd Performance by movement

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.4	0.1	0.1	0.4	0.5	3.8	0.2	0.1	0.1
Total Delay (hr)	0.2	0.8	0.1	0.3	1.4	0.4	0.2	0.5	0.1	0.2	0.3	0.0
Total Del/Veh (s)	20.2	9.5	4.4	10.5	10.8	7.4	22.4	22.3	5.6	24.2	21.5	10.3
Stop Delay (hr)	0.2	0.4	0.0	0.1	0.4	0.1	0.1	0.4	0.1	0.2	0.2	0.0
Stop Del/Veh (s)	15.5	4.1	0.3	4.8	3.1	2.8	19.5	17.6	4.3	22.0	17.6	9.2
Total Stops	29	98	1	49	129	58	19	58	70	30	38	12
Stop/Veh	0.78	0.31	0.01	0.56	0.28	0.34	0.73	0.72	0.80	0.88	0.78	0.80
Travel Dist (mi)	9.6	79.9	20.3	25.7	138.3	50.2	2.8	8.7	9.6	1.3	1.8	0.6
Travel Time (hr)	0.5	3.1	0.7	1.0	5.1	1.9	0.3	0.8	0.6	0.3	0.3	0.1
Avg Speed (mph)	19	26	28	25	27	26	11	12	19	5	5	8
Vehicles Entered	37	313	79	86	462	167	26	79	87	34	49	15
Vehicles Exited	37	314	79	87	462	168	26	79	88	34	48	15
Hourly Exit Rate	37	314	79	87	462	168	26	79	88	34	48	15
Input Volume	37	308	80	85	461	163	29	83	79	40	50	15
% of Volume	100	102	98	102	100	103	90	95	111	85	96	98
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	0	3	1	1	5	2	0	1	0	0	0	0

11: Healthy Way & Cahaba River Rd Performance by movement

Movement	All
Denied Delay (hr)	0.1
Denied Del/Veh (s)	0.3
Total Delay (hr)	4.5
Total Del/Veh (s)	11.2
Stop Delay (hr)	2.3
Stop Del/Veh (s)	5.7
Total Stops	591
Stop/Veh	0.41
Travel Dist (mi)	348.7
Travel Time (hr)	14.7
Avg Speed (mph)	24
Vehicles Entered	1434
Vehicles Exited	1437
Hourly Exit Rate	1437
Input Volume	1431
% of Volume	100
Denied Entry Before	0
Denied Entry After	0
Density (ft/veh)	590
Occupancy (veh)	15

14: Cahaba River Rd & Grandview Medical Drwy Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.0	0.0	0.4	2.8	0.1	0.1	0.4
Total Delay (hr)	0.2	0.5	0.1	0.0	0.0	0.0	0.8
Total Del/Veh (s)	7.3	5.4	0.8	1.7	8.9	1.1	3.2
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	1.1	0.1	0.0	0.0	7.6	0.0	0.2
Total Stops	25	0	0	0	7	0	32
Stop/Veh	0.30	0.00	0.00	0.00	1.00	0.00	0.04
Travel Dist (mi)	58.7	217.4	99.4	16.7	0.4	1.7	394.4
Travel Time (hr)	1.7	6.0	2.6	0.6	0.0	0.1	11.0
Avg Speed (mph)	34	36	38	33	11	20	36
Vehicles Entered	81	312	371	64	7	35	870
Vehicles Exited	81	312	372	64	7	35	871
Hourly Exit Rate	81	312	372	64	7	35	871
Input Volume	82	311	359	67	7	39	866
% of Volume	98	100	104	96	97	90	101
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0
Density (ft/veh)							1013
Occupancy (veh)	2	6	3	1	0	0	11

Total Network Performance

Denied Delay (hr)	2.8
Denied Del/Veh (s)	1.1
Total Delay (hr)	194.6
Total Del/Veh (s)	77.7
Stop Delay (hr)	146.4
Stop Del/Veh (s)	58.5
Total Stops	9219
Stop/Veh	1.02
Travel Dist (mi)	5494.3
Travel Time (hr)	353.7
Avg Speed (mph)	16
Vehicles Entered	8781
Vehicles Exited	8565
Hourly Exit Rate	8565
Input Volume	24302
% of Volume	35
Denied Entry Before	0
Denied Entry After	2
Density (ft/veh)	227
Occupancy (veh)	351

Arterial Level of Service: NW Cahaba River Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Colony Park	II	40	90.3	13.7	104.0	1.00	34.7	B
Healthy Way	II	40	32.1	11.7	43.8	0.31	25.8	C
Acton Rd	II	40	29.1	42.3	71.4	0.26	13.3	E
Altadena Rd	II	40	51.5	6.9	58.4	0.57	35.3	A
Dolly Ridge Rd	II	35	51.8	16.1	67.9	0.50	26.7	C
US-280	II	35	24.7	88.8	113.5	0.20	6.3	F
Total	II		279.5	179.5	459.0	2.86	22.4	C

Arterial Level of Service: SE Cahaba River Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Dolly Ridge Rd	II	35	24.7	14.4	39.1	0.20	18.2	D
Altadena Rd	II	40	46.8	9.3	56.1	0.50	32.3	B
Acton Rd	II	40	51.5	57.0	108.5	0.57	19.0	D
Healthy Way	II	40	29.1	34.7	63.8	0.26	14.9	E
Colony Park	II	40	32.1	6.8	38.9	0.31	29.1	B
Total	II		184.2	122.2	306.4	1.85	21.8	D

HCM 6th Signalized Intersection Summary

1: Cahaba River Rd & Dolly Ridge Rd

07/26/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	98	1	41	3	1	7	87	649	2	6	780	106
Future Volume (veh/h)	98	1	41	3	1	7	87	649	2	6	780	106
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	107	1	45	3	1	8	95	705	2	7	848	115
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	253	7	58	114	50	150	165	1012	3	74	1085	146
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.67	0.67	0.67	0.67	0.67	0.67
Sat Flow, veh/h	997	50	436	189	373	1123	128	1511	4	3	1620	218
Grp Volume(v), veh/h	153	0	0	12	0	0	802	0	0	970	0	0
Grp Sat Flow(s),veh/h/ln	1484	0	0	1685	0	0	1643	0	0	1841	0	0
Q Serve(g_s), s	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.0	0.0	0.0	0.3	0.0	0.0	13.1	0.0	0.0	18.6	0.0	0.0
Prop In Lane	0.70		0.29	0.25		0.67	0.12		0.00	0.01		0.12
Lane Grp Cap(c), veh/h	318	0	0	313	0	0	1180	0	0	1305	0	0
V/C Ratio(X)	0.48	0.00	0.00	0.04	0.00	0.00	0.68	0.00	0.00	0.74	0.00	0.00
Avail Cap(c_a), veh/h	585	0	0	596	0	0	1180	0	0	1305	0	0
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	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.2	0.0	0.0	19.2	0.0	0.0	4.8	0.0	0.0	5.8	0.0	0.0
Incr Delay (d2), s/veh	1.1	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0	3.9	0.0	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(95%),veh/ln	3.0	0.0	0.0	0.2	0.0	0.0	5.8	0.0	0.0	8.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.3	0.0	0.0	19.3	0.0	0.0	8.0	0.0	0.0	9.7	0.0	0.0
LnGrp LOS	C	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		153			12			802				970
Approach Delay, s/veh		22.3			19.3			8.0				9.7
Approach LOS		C			B			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		39.0		11.8		39.0		11.8				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		34.0		16.0		34.0		16.0				
Max Q Clear Time (g_c+I1), s		15.1		7.0		20.6		2.3				
Green Ext Time (p_c), s		6.5		0.5		6.2		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				10.1								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary
 4: Cahaba River Rd/Dolly Ridge Road & US-280

07/26/2018



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑	↗	↖↗	↖		↖↗	↖	
Traffic Volume (veh/h)	90	2377	734	93	2298	149	590	74	89	143	66	64
Future Volume (veh/h)	90	2377	734	93	2298	149	590	74	89	143	66	64
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		No		No
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	94	2476	0	97	2394	0	641	80	0	155	72	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	110	3249		114	3258		691	244		192	91	
Arrive On Green	0.06	0.63	0.00	0.06	0.63	0.00	0.14	0.13	0.00	0.06	0.05	0.00
Sat Flow, veh/h	1795	5147	1598	1795	5147	1598	5063	1885	0	3483	1885	0
Grp Volume(v), veh/h	94	2476	0	97	2394	0	641	80	0	155	72	0
Grp Sat Flow(s),veh/h/ln	1795	1716	1598	1795	1716	1598	1688	1885	0	1742	1885	0
Q Serve(g_s), s	10.7	70.7	0.0	11.1	66.0	0.0	25.9	8.0	0.0	9.1	7.8	0.0
Cycle Q Clear(g_c), s	10.7	70.7	0.0	11.1	66.0	0.0	25.9	8.0	0.0	9.1	7.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	110	3249		114	3258		691	244		192	91	
V/C Ratio(X)	0.85	0.76		0.85	0.73		0.93	0.33		0.81	0.79	
Avail Cap(c_a), veh/h	139	3249		156	3258		710	246		353	173	
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	96.2	27.1	0.0	96.0	26.0	0.0	88.3	81.9	0.0	96.7	97.5	0.0
Incr Delay (d2), s/veh	31.4	1.7	0.0	26.7	1.5	0.0	18.2	0.8	0.0	7.8	14.2	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(95%),veh/ln	9.9	36.5	0.0	10.0	34.3	0.0	18.3	7.2	0.0	7.8	7.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	127.6	28.9	0.0	122.7	27.6	0.0	106.5	82.7	0.0	104.4	111.7	0.0
LnGrp LOS	F	C		F	C		F	F		F	F	
Approach Vol, veh/h		2570	A		2491	A		721	A		227	A
Approach Delay, s/veh		32.5			31.3			103.9			106.7	
Approach LOS		C			C			F			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	48.7	138.0	34.2	16.0	19.1	137.6	17.4	32.8				
Change Period (Y+Rc), s	6.0	7.0	6.0	6.0	6.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	131.0	131.0	29.0	19.0	18.0	129.0	21.0	27.0				
Max Q Clear Time (g_c+1), s	68.0	68.0	27.9	9.8	13.1	72.7	11.1	10.0				
Green Ext Time (p_c), s	0.0	33.7	0.3	0.2	0.1	33.7	0.3	0.3				

Intersection Summary

HCM 6th Ctrl Delay	43.3
HCM 6th LOS	D

Notes

Unsignalized Delay for [NER, NWR, SER, SWR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

5: Cahaba River Rd & Altadena Rd

07/26/2018



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	72	42	88	656	726	82
Future Volume (veh/h)	72	42	88	656	726	82
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1885	1885	1885	1885
Adj Flow Rate, veh/h	78	46	96	713	789	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	1	1	1	1
Cap, veh/h	102	60	482	1318	1318	
Arrive On Green	0.09	0.09	0.70	0.70	0.70	0.00
Sat Flow, veh/h	1072	632	692	1885	1885	0
Grp Volume(v), veh/h	125	0	96	713	789	0
Grp Sat Flow(s),veh/h/ln	1718	0	692	1885	1885	0
Q Serve(g_s), s	3.5	0.0	4.0	8.9	10.5	0.0
Cycle Q Clear(g_c), s	3.5	0.0	14.6	8.9	10.5	0.0
Prop In Lane	0.62	0.37	1.00			0.00
Lane Grp Cap(c), veh/h	163	0	482	1318	1318	
V/C Ratio(X)	0.77	0.00	0.20	0.54	0.60	
Avail Cap(c_a), veh/h	565	0	482	1318	1318	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	21.5	0.0	7.5	3.5	3.8	0.0
Incr Delay (d2), s/veh	7.3	0.0	0.9	1.6	2.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.8	0.0	1.0	2.5	3.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	28.8	0.0	8.5	5.1	5.8	0.0
LnGrp LOS	C	A	A	A	A	
Approach Vol, veh/h	125			809	789	A
Approach Delay, s/veh	28.8			5.5	5.8	
Approach LOS	C			A	A	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		39.0		9.6		39.0
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		34.0		16.0		34.0
Max Q Clear Time (g_c+I1), s		16.6		5.5		12.5
Green Ext Time (p_c), s		5.1		0.2		5.5

Intersection Summary

HCM 6th Ctrl Delay	7.3
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.
 Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

7: Acton Rd & Cahaba River Rd

07/26/2018



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	56	291	412	200	265	53	259	247	320	91	536	214
Future Volume (veh/h)	56	291	412	200	265	53	259	247	320	91	536	214
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	61	316	448	217	288	58	282	268	348	99	583	233
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	386	588	498	373	540	109	342	636	539	372	669	267
Arrive On Green	0.06	0.31	0.31	0.10	0.35	0.35	0.14	0.34	0.34	0.07	0.27	0.27
Sat Flow, veh/h	1795	1885	1598	1795	1523	307	1795	1885	1598	1795	2499	997
Grp Volume(v), veh/h	61	316	448	217	0	346	282	268	348	99	417	399
Grp Sat Flow(s),veh/h/ln	1795	1885	1598	1795	0	1830	1795	1885	1598	1795	1791	1706
Q Serve(g_s), s	2.5	15.5	29.9	8.7	0.0	16.8	12.0	12.3	20.6	4.3	24.8	24.9
Cycle Q Clear(g_c), s	2.5	15.5	29.9	8.7	0.0	16.8	12.0	12.3	20.6	4.3	24.8	24.9
Prop In Lane	1.00		1.00	1.00		0.17	1.00		1.00	1.00		0.58
Lane Grp Cap(c), veh/h	386	588	498	373	0	648	342	636	539	372	480	457
V/C Ratio(X)	0.16	0.54	0.90	0.58	0.00	0.53	0.82	0.42	0.65	0.27	0.87	0.87
Avail Cap(c_a), veh/h	679	761	645	590	0	738	819	636	539	491	562	535
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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.4	31.7	36.7	22.5	0.0	28.7	26.3	28.6	31.3	26.1	39.0	39.0
Incr Delay (d2), s/veh	0.3	0.8	13.0	2.1	0.0	0.7	7.0	2.0	5.9	0.4	12.4	13.1
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(95%),veh/ln	1.9	11.3	18.9	6.7	0.0	11.6	9.3	9.6	13.3	3.3	17.7	17.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.7	32.5	49.7	24.5	0.0	29.4	33.3	30.6	37.2	26.5	51.4	52.2
LnGrp LOS	C	C	D	C	A	C	C	C	D	C	D	D
Approach Vol, veh/h		825			563			898			915	
Approach Delay, s/veh		41.2			27.5			34.0			49.0	
Approach LOS		D			C			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	2.6	42.6	16.5	39.8	20.4	34.9	11.8	44.5				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	35.0	25.0	45.0	45.0	35.0	25.0	45.0				
Max Q Clear Time (g_c+10), s	5.0	22.6	10.7	31.9	14.0	26.9	4.5	18.8				
Green Ext Time (p_c), s	0.1	3.1	0.8	2.9	1.4	3.0	0.2	2.0				

Intersection Summary

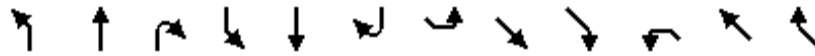
HCM 6th Ctrl Delay	39.0
HCM 6th LOS	D

Notes

User approved changes to right turn type.

HCM 6th Signalized Intersection Summary
 9: Colony Park & Cahaba River Rd

07/26/2018



Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕			↕	↕	↕	↕		↕	↕	↕
Traffic Volume (veh/h)	18	0	14	39	1	103	194	616	29	11	403	52
Future Volume (veh/h)	18	0	14	39	1	103	194	616	29	11	403	52
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	20	0	15	42	1	112	211	670	32	12	438	57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	200	30	71	328	6	176	584	1159	55	497	815	691
Arrive On Green	0.11	0.00	0.11	0.11	0.11	0.11	0.10	0.65	0.65	0.43	0.43	0.43
Sat Flow, veh/h	583	274	643	1428	54	1598	1795	1785	85	751	1885	1598
Grp Volume(v), veh/h	35	0	0	43	0	112	211	0	702	12	438	57
Grp Sat Flow(s),veh/h/ln1500	0	0	0	1481	0	1598	1795	0	1870	751	1885	1598
Q Serve(g_s), s	0.0	0.0	0.0	0.2	0.0	2.8	2.3	0.0	8.8	0.4	7.2	0.9
Cycle Q Clear(g_c), s	0.8	0.0	0.0	0.9	0.0	2.8	2.3	0.0	8.8	0.4	7.2	0.9
Prop In Lane	0.57		0.43	0.98		1.00	1.00		0.05	1.00		1.00
Lane Grp Cap(c), veh/h	301	0	0	334	0	176	584	0	1215	497	815	691
V/C Ratio(X)	0.12	0.00	0.00	0.13	0.00	0.64	0.36	0.00	0.58	0.02	0.54	0.08
Avail Cap(c_a), veh/h	686	0	0	723	0	614	668	0	1302	497	815	691
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	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.8	0.0	0.0	16.9	0.0	17.7	5.5	0.0	4.1	6.8	8.7	7.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.2	0.0	3.8	0.4	0.0	0.6	0.1	2.5	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(95%),veh/ln0.5	0.0	0.0	0.0	0.6	0.0	1.9	0.8	0.0	1.7	0.1	4.3	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.0	0.0	0.0	17.1	0.0	21.5	5.9	0.0	4.7	6.9	11.3	7.2
LnGrp LOS	B	A	A	B	A	C	A	A	A	A	B	A
Approach Vol, veh/h		35			155			913			507	
Approach Delay, s/veh		17.0			20.3			4.9			10.7	
Approach LOS		B			C			A			B	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.1	23.0		9.6		32.1		9.6				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	18.0	18.0		16.0		29.0		16.0				
Max Q Clear Time (g_c+1/4), s	9.2	9.2		4.8		10.8		2.8				
Green Ext Time (p_c), s	0.1	1.9		0.4		4.4		0.1				

Intersection Summary

HCM 6th Ctrl Delay	8.5
HCM 6th LOS	A

HCM 6th Signalized Intersection Summary

11: Healthy Way & Cahaba River Rd

07/26/2018



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	11	527	182	185	320	65	128	86	197	155	156	32
Future Volume (veh/h)	11	527	182	185	320	65	128	86	197	155	156	32
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	12	573	0	201	348	71	139	93	214	168	170	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	496	805		381	861	176	266	163	515	155	125	23
Arrive On Green	0.43	0.43	0.00	0.08	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	975	1885	1598	1795	1519	310	627	507	1598	300	389	71
Grp Volume(v), veh/h	12	573	0	201	0	419	232	0	214	373	0	0
Grp Sat Flow(s),veh/h/ln	975	1885	1598	1795	0	1829	1134	0	1598	761	0	0
Q Serve(g_s), s	0.6	22.5	0.0	5.3	0.0	11.6	0.0	0.0	9.4	13.9	0.0	0.0
Cycle Q Clear(g_c), s	0.6	22.5	0.0	5.3	0.0	11.6	15.1	0.0	9.4	29.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.17	0.60		1.00	0.45		0.09
Lane Grp Cap(c), veh/h	496	805		381	0	1037	429	0	515	303	0	0
V/C Ratio(X)	0.02	0.71		0.53	0.00	0.40	0.54	0.00	0.42	1.23	0.00	0.00
Avail Cap(c_a), veh/h	496	805		549	0	1037	429	0	515	303	0	0
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	15.0	21.2	0.0	15.4	0.0	11.0	25.5	0.0	23.9	37.3	0.0	0.0
Incr Delay (d2), s/veh	0.1	5.3	0.0	1.1	0.0	1.2	1.4	0.0	0.5	128.9	0.0	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(95%),veh/ln	0.3	15.5	0.0	3.6	0.0	7.8	7.5	0.0	6.3	27.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.1	26.6	0.0	16.6	0.0	12.1	26.8	0.0	24.4	166.2	0.0	0.0
LnGrp LOS	B	C		B	A	B	C	A	C	F	A	A
Approach Vol, veh/h		585	A		620			446			373	
Approach Delay, s/veh		26.3			13.6			25.7			166.2	
Approach LOS		C			B			C			F	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		56.0		34.0	12.6	43.4		34.0				
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s		51.0		29.0	16.0	30.0		29.0				
Max Q Clear Time (g_c+I1), s		13.6		17.1	7.3	24.5		31.0				
Green Ext Time (p_c), s		2.7		1.7	0.3	1.7		0.0				

Intersection Summary

HCM 6th Ctrl Delay	48.0
HCM 6th LOS	D

Notes

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

HCM 6th TWSC
 14: Cahaba River Rd & Grandview Medical Drwy

07/26/2018

Intersection						
Int Delay, s/veh	2.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↗	↗	↘	↘	↘
Traffic Vol, veh/h	47	582	317	15	46	110
Future Vol, veh/h	47	582	317	15	46	110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	165	-	-	225	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	51	633	345	16	50	120

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	345	0	-	0	1080 345
Stage 1	-	-	-	-	345 -
Stage 2	-	-	-	-	735 -
Critical Hdwy	4.11	-	-	-	6.41 6.21
Critical Hdwy Stg 1	-	-	-	-	5.41 -
Critical Hdwy Stg 2	-	-	-	-	5.41 -
Follow-up Hdwy	2.209	-	-	-	3.509 3.309
Pot Cap-1 Maneuver	1220	-	-	-	242 700
Stage 1	-	-	-	-	719 -
Stage 2	-	-	-	-	476 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1220	-	-	-	232 700
Mov Cap-2 Maneuver	-	-	-	-	232 -
Stage 1	-	-	-	-	689 -
Stage 2	-	-	-	-	476 -

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	15.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1220	-	-	-	232	700
HCM Lane V/C Ratio	0.042	-	-	-	0.216	0.171
HCM Control Delay (s)	8.1	-	-	-	24.7	11.2
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.8	0.6

1: Cahaba River Rd & Dolly Ridge Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.7	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.3	0.2	0.1	0.1	0.1	19.0	10.6	0.0	0.0	0.0	0.0
Total Delay (hr)	0.5	0.0	0.1	0.0	0.0	0.0	8.4	59.3	0.3	0.1	4.9	0.6
Total Del/Veh (s)	19.3	16.8	11.9	14.6	5.8	7.1	370.2	359.3	368.6	42.1	22.5	19.1
Stop Delay (hr)	0.4	0.0	0.1	0.0	0.0	0.0	8.3	57.8	0.3	0.1	2.0	0.3
Stop Del/Veh (s)	16.2	13.4	10.4	13.1	3.7	7.0	363.6	350.0	364.0	31.3	9.0	8.7
Total Stops	78	1	33	3	0	7	149	847	5	6	419	64
Stop/Veh	0.82	1.00	0.80	0.60	0.00	0.88	1.82	1.43	1.67	1.00	0.53	0.60
Travel Dist (mi)	6.6	0.1	2.8	0.3	0.1	0.5	38.0	274.4	1.4	1.2	152.2	20.6
Travel Time (hr)	0.8	0.0	0.3	0.0	0.0	0.0	10.0	69.0	0.4	0.1	10.3	1.4
Avg Speed (mph)	9	10	11	10	17	14	4	4	4	10	15	15
Vehicles Entered	94	1	40	5	1	8	81	580	3	6	783	106
Vehicles Exited	94	1	40	5	1	8	70	512	2	6	782	105
Hourly Exit Rate	94	1	40	5	1	8	70	512	2	6	782	105
Input Volume	98	1	41	3	1	7	87	649	2	6	790	106
% of Volume	96	100	97	167	100	110	81	79	100	96	99	99
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	1	5	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	1	0	0	0	0	0	10	67	0	0	10	1

1: Cahaba River Rd & Dolly Ridge Rd Performance by movement

Movement	All
Denied Delay (hr)	2.2
Denied Del/Veh (s)	4.5
Total Delay (hr)	74.3
Total Del/Veh (s)	154.0
Stop Delay (hr)	69.2
Stop Del/Veh (s)	143.5
Total Stops	1612
Stop/Veh	0.93
Travel Dist (mi)	498.2
Travel Time (hr)	92.3
Avg Speed (mph)	6
Vehicles Entered	1708
Vehicles Exited	1626
Hourly Exit Rate	1626
Input Volume	1792
% of Volume	91
Denied Entry Before	0
Denied Entry After	6
Density (ft/veh)	50
Occupancy (veh)	90

4: Cahaba River Rd/Dolly Ridge Road & US-280 Performance by movement

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Denied Delay (hr)	0.2	3.2	1.2	0.1	0.6	0.1	0.0	0.0	0.0	0.2	0.0	0.0
Denied Del/Veh (s)	7.0	4.8	5.7	2.8	0.9	2.3	0.1	0.0	0.5	4.5	1.4	1.7
Total Delay (hr)	2.6	17.2	1.6	3.0	17.5	0.2	17.6	1.9	0.7	4.1	2.0	0.4
Total Del/Veh (s)	108.7	25.8	7.6	120.6	27.2	4.9	128.6	112.9	32.0	98.7	107.4	21.8
Stop Delay (hr)	2.4	11.1	0.3	2.8	10.8	0.0	15.8	1.7	0.4	3.9	1.9	0.3
Stop Del/Veh (s)	103.3	16.7	1.4	113.3	16.7	0.6	115.5	99.3	20.7	92.9	99.5	17.0
Total Stops	88	853	75	102	942	11	623	67	39	169	70	24
Stop/Veh	1.04	0.36	0.10	1.13	0.41	0.07	1.26	1.12	0.50	1.12	1.04	0.36
Travel Dist (mi)	6.7	192.4	48.5	8.4	220.8	14.0	91.0	10.9	13.3	12.5	5.6	4.7
Travel Time (hr)	3.0	23.9	4.4	3.4	22.2	0.8	20.6	2.2	1.1	4.8	2.2	0.6
Avg Speed (mph)	2	9	15	3	10	20	4	5	12	3	3	8
Vehicles Entered	83	2389	736	88	2320	158	479	59	76	146	65	67
Vehicles Exited	83	2387	736	87	2314	158	459	55	75	143	64	67
Hourly Exit Rate	83	2387	736	87	2314	158	459	55	75	143	64	67
Input Volume	90	2377	734	93	2298	149	590	76	89	143	66	64
% of Volume	92	100	100	93	101	106	78	72	85	100	97	105
Denied Entry Before	0	1	1	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	1	0	0
Density (ft/veh)												
Occupancy (veh)	3	21	3	3	22	1	21	2	1	5	2	1

4: Cahaba River Rd/Dolly Ridge Road & US-280 Performance by movement

Movement	All
Denied Delay (hr)	5.5
Denied Del/Veh (s)	3.0
Total Delay (hr)	68.8
Total Del/Veh (s)	36.9
Stop Delay (hr)	51.5
Stop Del/Veh (s)	27.6
Total Stops	3063
Stop/Veh	0.46
Travel Dist (mi)	628.7
Travel Time (hr)	89.0
Avg Speed (mph)	8
Vehicles Entered	6666
Vehicles Exited	6628
Hourly Exit Rate	6628
Input Volume	6770
% of Volume	98
Denied Entry Before	2
Denied Entry After	1
Density (ft/veh)	118
Occupancy (veh)	84

5: Cahaba River Rd & Altadena Rd Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Denied Del/Veh (s)	0.2	0.2	0.0	0.5	0.0	0.0	0.2
Total Delay (hr)	0.5	0.1	2.0	16.4	3.5	0.3	22.7
Total Del/Veh (s)	26.2	12.4	82.8	91.3	16.6	12.5	48.9
Stop Delay (hr)	0.5	0.1	1.8	14.7	0.8	0.0	18.0
Stop Del/Veh (s)	23.6	11.1	73.8	82.3	4.1	1.9	38.7
Total Stops	64	34	95	394	260	18	865
Stop/Veh	0.88	0.81	1.10	0.61	0.35	0.21	0.52
Travel Dist (mi)	12.5	7.2	47.0	352.9	365.2	41.0	825.8
Travel Time (hr)	0.9	0.4	3.3	25.9	12.8	1.4	44.6
Avg Speed (mph)	13	18	14	14	29	29	19
Vehicles Entered	72	41	84	638	733	83	1651
Vehicles Exited	71	41	80	590	735	83	1600
Hourly Exit Rate	71	41	80	590	735	83	1600
Input Volume	72	42	88	657	742	82	1683
% of Volume	99	97	91	90	99	101	95
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	1	0	0	1
Density (ft/veh)							214
Occupancy (veh)	1	0	3	26	13	1	45

7: Acton Rd & Cahaba River Rd Performance by movement

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.1	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.4	0.0	0.1	2.9	0.8	0.4	2.8	0.2	0.4
Total Delay (hr)	0.6	4.6	3.4	1.9	2.3	0.3	3.4	2.4	1.0	1.0	8.7	2.8
Total Del/Veh (s)	42.3	51.9	29.9	33.3	32.1	24.0	46.3	34.6	11.0	39.0	57.5	50.2
Stop Delay (hr)	0.4	3.2	2.4	1.5	1.7	0.3	2.9	1.8	0.8	0.8	7.0	2.4
Stop Del/Veh (s)	29.0	36.5	21.4	26.7	23.6	18.7	39.7	25.4	8.7	31.3	46.0	42.1
Total Stops	52	246	478	165	155	34	233	172	194	94	462	183
Stop/Veh	1.02	0.77	1.17	0.82	0.60	0.68	0.89	0.68	0.61	1.06	0.85	0.91
Travel Dist (mi)	28.3	175.2	228.6	49.2	63.7	12.2	33.0	32.3	40.8	10.5	64.5	23.9
Travel Time (hr)	1.4	9.0	10.0	3.3	4.0	0.7	4.6	3.2	2.4	1.4	10.2	3.6
Avg Speed (mph)	21	19	23	15	16	17	8	10	17	8	6	7
Vehicles Entered	50	312	401	197	255	49	258	251	317	87	534	198
Vehicles Exited	50	311	402	198	255	49	260	251	317	88	538	199
Hourly Exit Rate	50	311	402	198	255	49	260	251	317	88	538	199
Input Volume	56	301	412	200	265	53	259	247	320	91	536	214
% of Volume	90	103	98	99	96	93	100	102	99	97	100	93
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	1	9	10	3	4	1	4	3	2	1	10	4

7: Acton Rd & Cahaba River Rd Performance by movement

Movement	All
Denied Delay (hr)	0.4
Denied Del/Veh (s)	0.6
Total Delay (hr)	32.4
Total Del/Veh (s)	39.3
Stop Delay (hr)	25.1
Stop Del/Veh (s)	30.5
Total Stops	2468
Stop/Veh	0.83
Travel Dist (mi)	762.4
Travel Time (hr)	53.9
Avg Speed (mph)	14
Vehicles Entered	2909
Vehicles Exited	2918
Hourly Exit Rate	2918
Input Volume	2953
% of Volume	99
Denied Entry Before	0
Denied Entry After	0
Density (ft/veh)	289
Occupancy (veh)	53

9: Colony Park & Cahaba River Rd Performance by movement

Movement	NBL	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.1	0.1	0.3		3.9	0.0	0.0	0.0	0.2	0.0	0.3	0.3
Total Delay (hr)	0.1	0.0	0.2	0.0	0.2	0.6	1.6	0.1	0.0	1.4	0.1	4.2
Total Del/Veh (s)	16.0	6.5	14.6		5.8	11.6	8.4	6.3	16.4	12.4	7.5	9.9
Stop Delay (hr)	0.1	0.0	0.1	0.0	0.2	0.3	0.3	0.0	0.0	0.5	0.0	1.5
Stop Del/Veh (s)	14.2	6.1	12.5		5.4	5.3	1.5	1.2	11.8	4.6	2.8	3.6
Total Stops	14	10	33	0	91	117	111	7	7	183	30	603
Stop/Veh	0.82	0.83	0.85		0.86	0.62	0.17	0.23	0.70	0.46	0.53	0.40
Travel Dist (mi)	1.3	0.9	2.0	0.0	5.6	58.3	199.8	9.3	6.4	270.6	38.4	592.6
Travel Time (hr)	0.1	0.1	0.2	0.0	0.6	2.3	6.9	0.3	0.2	8.3	1.2	20.2
Avg Speed (mph)	10	15	8	10	13	25	29	28	29	33	33	29
Vehicles Entered	17	12	38	0	105	188	663	30	9	387	55	1504
Vehicles Exited	17	12	38	0	105	187	663	29	9	387	55	1502
Hourly Exit Rate	17	12	38	0	105	187	663	29	9	387	55	1502
Input Volume	18	14	39	1	103	194	656	29	11	403	52	1520
% of Volume	96	84	97	0	102	97	101	100	80	96	106	99
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												777
Occupancy (veh)	0	0	0	0	0	2	7	0	0	8	1	20

11: Healthy Way & Cahaba River Rd Performance by movement

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	3.7	3.3	0.7
Denied Del/Veh (s)	0.2	0.0	0.1	0.4	0.1	0.1	0.7	0.7	3.6	82.7	74.9	73.9
Total Delay (hr)	0.1	4.2	0.5	1.1	1.3	0.2	1.3	0.9	0.7	2.8	2.8	0.5
Total Del/Veh (s)	31.1	28.4	9.3	22.0	15.0	10.4	37.8	37.0	13.6	61.6	64.0	53.7
Stop Delay (hr)	0.1	2.6	0.1	0.8	0.7	0.1	1.2	0.7	0.6	2.7	2.6	0.5
Stop Del/Veh (s)	21.6	17.6	2.2	16.1	7.5	5.8	33.1	30.7	10.5	59.8	60.3	53.0
Total Stops	11	340	40	150	123	27	111	70	143	101	92	18
Stop/Veh	1.10	0.63	0.22	0.80	0.39	0.43	0.88	0.81	0.73	0.63	0.58	0.58
Travel Dist (mi)	2.5	137.8	45.7	55.0	92.6	18.6	13.6	9.3	21.3	6.0	5.8	1.2
Travel Time (hr)	0.2	8.1	1.9	2.8	3.7	0.7	1.8	1.2	1.7	6.7	6.3	1.2
Avg Speed (mph)	15	17	24	20	25	25	8	8	14	2	2	2
Vehicles Entered	10	535	182	185	309	63	124	85	194	158	155	31
Vehicles Exited	10	528	181	185	308	62	124	85	195	158	154	31
Hourly Exit Rate	10	528	181	185	308	62	124	85	195	158	154	31
Input Volume	11	527	182	185	320	65	128	86	197	155	156	32
% of Volume	89	100	99	100	96	95	97	99	99	102	99	97
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	2	3	1
Density (ft/veh)												
Occupancy (veh)	0	8	2	3	4	1	2	1	2	3	3	1

11: Healthy Way & Cahaba River Rd Performance by movement

Movement	All
Denied Delay (hr)	7.9
Denied Del/Veh (s)	13.9
Total Delay (hr)	16.4
Total Del/Veh (s)	28.7
Stop Delay (hr)	12.7
Stop Del/Veh (s)	22.2
Total Stops	1226
Stop/Veh	0.60
Travel Dist (mi)	409.3
Travel Time (hr)	36.3
Avg Speed (mph)	14
Vehicles Entered	2031
Vehicles Exited	2021
Hourly Exit Rate	2021
Input Volume	2045
% of Volume	99
Denied Entry Before	0
Denied Entry After	6
Density (ft/veh)	302
Occupancy (veh)	28

14: Cahaba River Rd & Grandview Medical Drwy Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.3	2.9	0.1	0.2	0.1
Total Delay (hr)	0.1	1.2	0.1	0.0	0.2	0.0	1.6
Total Del/Veh (s)	8.2	6.8	0.8	1.5	12.1	1.3	4.9
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.2
Stop Del/Veh (s)	0.9	0.1	0.0	0.0	10.6	0.0	0.5
Total Stops	14	0	0	0	50	2	66
Stop/Veh	0.27	0.00	0.00	0.00	1.00	0.02	0.06
Travel Dist (mi)	36.3	441.0	82.9	4.4	2.8	5.0	572.5
Travel Time (hr)	1.1	12.4	2.2	0.1	0.3	0.3	16.3
Avg Speed (mph)	34	36	38	33	10	19	35
Vehicles Entered	50	621	310	17	49	101	1148
Vehicles Exited	49	622	309	17	50	100	1147
Hourly Exit Rate	49	622	309	17	50	100	1147
Input Volume	47	622	317	15	46	110	1158
% of Volume	104	100	97	111	108	91	99
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0
Density (ft/veh)							681
Occupancy (veh)	1	12	2	0	0	0	16

Total Network Performance

Denied Delay (hr)	16.3
Denied Del/Veh (s)	6.1
Total Delay (hr)	226.7
Total Del/Veh (s)	83.5
Stop Delay (hr)	180.2
Stop Del/Veh (s)	66.4
Total Stops	10118
Stop/Veh	1.04
Travel Dist (mi)	5407.4
Travel Time (hr)	399.3
Avg Speed (mph)	14
Vehicles Entered	9522
Vehicles Exited	9347
Hourly Exit Rate	9347
Input Volume	27334
% of Volume	34
Denied Entry Before	2
Denied Entry After	14
Density (ft/veh)	195
Occupancy (veh)	383

 Arterial Level of Service: NW Cahaba River Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Colony Park	II	40	90.3	18.9	109.2	1.00	33.1	B
Healthy Way	II	40	32.1	20.4	52.5	0.31	21.6	D
Acton Rd	II	40	29.1	110.5	139.6	0.26	6.8	F
Altadena Rd	II	40	51.5	19.2	70.7	0.57	29.2	B
Dolly Ridge Rd	II	35	51.8	57.9	109.7	0.50	16.5	E
US-280	II	35	24.7	54.0	78.7	0.20	9.1	F
Total	II		279.5	280.9	560.4	2.86	18.3	D

 Arterial Level of Service: SE Cahaba River Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Dolly Ridge Rd	II	35	24.7	16.1	40.8	0.20	17.5	D
Altadena Rd	II	40	46.8	12.3	59.1	0.50	30.7	B
Acton Rd	II	40	51.5	86.0	137.5	0.57	15.0	E
Healthy Way	II	40	29.1	15.7	44.8	0.26	21.2	D
Colony Park	II	40	32.1	8.7	40.8	0.31	27.7	C
Total	II		184.2	138.8	323.0	1.85	20.6	D

HCM 6th Signalized Intersection Summary

1: Cahaba River Rd & Dolly Ridge Rd

07/26/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	213	2	116	2	2	28	45	1133	2	8	750	130
Future Volume (veh/h)	213	2	116	2	2	28	45	1133	2	8	750	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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	232	2	126	2	2	30	49	1232	2	9	815	141
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	257	2	113	39	36	324	64	1203	2	34	1082	186
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.70	0.70	0.70	0.70	0.70	0.70
Sat Flow, veh/h	957	8	520	36	164	1497	47	1719	3	6	1546	266
Grp Volume(v), veh/h	360	0	0	34	0	0	1283	0	0	965	0	0
Grp Sat Flow(s),veh/h/ln	1486	0	0	1697	0	0	1769	0	0	1817	0	0
Q Serve(g_s), s	24.0	0.0	0.0	0.0	0.0	0.0	44.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	26.0	0.0	0.0	2.0	0.0	0.0	84.0	0.0	0.0	39.8	0.0	0.0
Prop In Lane	0.64		0.35	0.06		0.88	0.04		0.00	0.01		0.15
Lane Grp Cap(c), veh/h	371	0	0	399	0	0	1269	0	0	1302	0	0
V/C Ratio(X)	0.97	0.00	0.00	0.09	0.00	0.00	1.01	0.00	0.00	0.74	0.00	0.00
Avail Cap(c_a), veh/h	371	0	0	399	0	0	1269	0	0	1302	0	0
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(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	48.2	0.0	0.0	37.6	0.0	0.0	18.4	0.0	0.0	11.4	0.0	0.0
Incr Delay (d2), s/veh	38.6	0.0	0.0	0.1	0.0	0.0	28.0	0.0	0.0	3.8	0.0	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	14.9	0.0	0.0	0.8	0.0	0.0	40.4	0.0	0.0	15.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	86.8	0.0	0.0	37.7	0.0	0.0	46.4	0.0	0.0	15.2	0.0	0.0
LnGrp LOS	F	A	A	D	A	A	F	A	A	B	A	A
Approach Vol, veh/h		360			34			1283			965	
Approach Delay, s/veh		86.8			37.7			46.4			15.2	
Approach LOS		F			D			D			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		89.0		31.0		89.0		31.0				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		84.0		26.0		84.0		26.0				
Max Q Clear Time (g_c+I1), s		86.0		28.0		41.8		4.0				
Green Ext Time (p_c), s		0.0		0.0		10.1		0.1				
Intersection Summary												
HCM 6th Ctrl Delay				40.4								
HCM 6th LOS				D								

HCM 6th Signalized Intersection Summary
 4: Cahaba River Rd/Dolly Ridge Rd & US-280

07/26/2018



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑	↗	↖↗	↖		↖↗	↖	
Traffic Volume (veh/h)	58	3908	762	80	3599	233	1201	61	112	241	46	100
Future Volume (veh/h)	58	3908	762	80	3599	233	1201	61	112	241	46	100
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		No		No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	60	4071	0	83	3749	0	1305	66	0	262	50	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	1	1	1	1	1	1
Cap, veh/h	50	2947		62	2982		880	236		310	76	
Arrive On Green	0.03	0.58	0.00	0.03	0.58	0.00	0.17	0.13	0.00	0.09	0.04	0.00
Sat Flow, veh/h	1781	5106	1585	1781	5106	1585	5063	1885	0	3483	1885	0
Grp Volume(v), veh/h	60	4071	0	83	3749	0	1305	66	0	262	50	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1585	1688	1885	0	1742	1885	0
Q Serve(g_s), s	4.0	83.0	0.0	5.0	84.0	0.0	25.0	4.6	0.0	10.7	3.8	0.0
Cycle Q Clear(g_c), s	4.0	83.0	0.0	5.0	84.0	0.0	25.0	4.6	0.0	10.7	3.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	50	2947		62	2982		880	236		310	76	
V/C Ratio(X)	1.21	1.38		1.34	1.26		1.48	0.28		0.85	0.66	
Avail Cap(c_a), veh/h	50	2947		62	2982		880	301		339	157	
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	69.9	30.4	0.0	69.4	29.9	0.0	59.4	57.0	0.0	64.6	68.0	0.0
Incr Delay (d2), s/veh	196.0	173.9	0.0	229.5	118.6	0.0	223.4	0.6	0.0	16.6	9.1	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	4.5	77.4	0.0	6.2	62.9	0.0	28.8	2.2	0.0	5.4	2.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	265.9	204.3	0.0	298.9	148.5	0.0	282.8	57.6	0.0	81.2	77.2	0.0
LnGrp LOS	F	F		F	F		F	E		F	E	
Approach Vol, veh/h		4131	A		3832	A		1371	A		312	A
Approach Delay, s/veh		205.2			151.7			271.9			80.5	
Approach LOS		F			F			F			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	0.0	91.0	31.0	11.8	11.0	90.0	18.8	24.0				
Change Period (Y+Rc), s	6.0	7.0	6.0	6.0	6.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	4.0	84.0	25.0	12.0	5.0	83.0	14.0	23.0				
Max Q Clear Time (g_c+1/6), s	4.0	86.0	27.0	5.8	7.0	85.0	12.7	6.6				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.2				

Intersection Summary

HCM 6th Ctrl Delay	189.4
HCM 6th LOS	F

Notes

Unsignalized Delay for [NER, NWR, SER, SWR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

5: Cahaba River Rd & Altadena Rd

07/26/2018



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	166	147	167	1011	768	78
Future Volume (veh/h)	166	147	167	1011	768	78
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1885	1885	1885	1885
Adj Flow Rate, veh/h	180	160	182	1099	835	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	1	1	1	1
Cap, veh/h	179	159	366	1272	1272	
Arrive On Green	0.20	0.20	0.68	0.68	0.68	0.00
Sat Flow, veh/h	896	796	663	1885	1885	0
Grp Volume(v), veh/h	341	0	182	1099	835	0
Grp Sat Flow(s),veh/h/ln	1697	0	663	1885	1885	0
Q Serve(g_s), s	16.0	0.0	17.7	36.3	20.7	0.0
Cycle Q Clear(g_c), s	16.0	0.0	38.3	36.3	20.7	0.0
Prop In Lane	0.53	0.47	1.00			0.00
Lane Grp Cap(c), veh/h	339	0	366	1272	1272	
V/C Ratio(X)	1.00	0.00	0.50	0.86	0.66	
Avail Cap(c_a), veh/h	339	0	366	1272	1272	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.0	0.0	18.8	10.1	7.6	0.0
Incr Delay (d2), s/veh	50.0	0.0	4.8	7.9	2.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	2.9	13.0	6.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	82.0	0.0	23.5	18.1	10.2	0.0
LnGrp LOS	F	A	C	B	B	
Approach Vol, veh/h	341			1281	835	A
Approach Delay, s/veh	82.0			18.8	10.2	
Approach LOS	F			B	B	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		59.0		21.0		59.0
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		54.0		16.0		54.0
Max Q Clear Time (g_c+I1), s		40.3		18.0		22.7
Green Ext Time (p_c), s		8.2		0.0		6.7

Intersection Summary

HCM 6th Ctrl Delay	24.7
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

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

HCM 6th Signalized Intersection Summary
 7: Acton Rd & Cahaba River Rd

07/26/2018



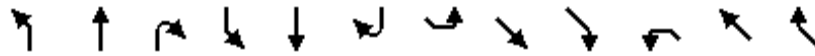
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	266	327	330	330	404	56	696	698	275	63	354	53
Future Volume (veh/h)	266	327	330	330	404	56	696	698	275	63	354	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	289	355	359	359	439	61	757	759	299	68	385	58
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	264	391	331	366	412	57	699	826	700	176	428	64
Arrive On Green	0.12	0.21	0.21	0.17	0.25	0.25	0.35	0.44	0.44	0.05	0.14	0.14
Sat Flow, veh/h	1795	1885	1598	1795	1620	225	1795	1885	1598	1795	3125	467
Grp Volume(v), veh/h	289	355	359	359	0	500	757	759	299	68	219	224
Grp Sat Flow(s),veh/h/ln	1795	1885	1598	1795	0	1845	1795	1885	1598	1795	1791	1801
Q Serve(g_s), s	18.0	27.5	31.0	24.3	0.0	38.0	53.0	56.6	19.3	4.8	18.0	18.3
Cycle Q Clear(g_c), s	18.0	27.5	31.0	24.3	0.0	38.0	53.0	56.6	19.3	4.8	18.0	18.3
Prop In Lane	1.00		1.00	1.00		0.12	1.00		1.00	1.00		0.26
Lane Grp Cap(c), veh/h	264	391	331	366	0	469	699	826	700	176	245	247
V/C Ratio(X)	1.09	0.91	1.08	0.98	0.00	1.07	1.08	0.92	0.43	0.39	0.89	0.91
Avail Cap(c_a), veh/h	264	391	331	366	0	469	699	826	700	272	252	253
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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.8	57.8	59.2	42.9	0.0	55.7	39.3	39.5	29.0	51.4	63.4	63.6
Incr Delay (d2), s/veh	82.5	24.4	73.6	41.9	0.0	60.3	58.9	16.9	1.9	1.4	30.3	32.6
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	4.0	15.6	19.1	14.1	0.0	25.2	33.8	29.0	7.7	2.2	10.1	10.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	128.3	82.3	132.8	84.8	0.0	116.0	98.1	56.4	30.9	52.8	93.8	96.2
LnGrp LOS	F	F	F	F	A	F	F	E	C	D	F	F
Approach Vol, veh/h		1003			859			1815			511	
Approach Delay, s/veh		113.6			103.0			69.6			89.4	
Approach LOS		F			F			E			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	30.0	70.5	30.0	36.0	58.0	25.5	23.0	43.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	30.0	58.0	25.0	31.0	53.0	21.0	18.0	38.0				
Max Q Clear Time (g_c+10), s	30.0	58.6	26.3	33.0	55.0	20.3	20.0	40.0				
Green Ext Time (p_c), s	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay		89.4										
HCM 6th LOS			F									

HCM 6th Signalized Intersection Summary
 9: Colony Park & Cahaba River Rd

07/26/2018



Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕			↕	↕	↕	↕		↕	↕	↕
Traffic Volume (veh/h)	59	5	20	70	0	343	53	523	22	22	623	30
Future Volume (veh/h)	59	5	20	70	0	343	53	523	22	22	623	30
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	64	5	22	76	0	373	58	568	24	24	677	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	291	35	70	517	0	420	288	1011	43	425	819	694
Arrive On Green	0.26	0.26	0.26	0.26	0.00	0.26	0.04	0.56	0.56	0.43	0.43	0.43
Sat Flow, veh/h	703	131	266	1489	0	1598	1795	1796	76	831	1885	1598
Grp Volume(v), veh/h	91	0	0	76	0	373	58	0	592	24	677	33
Grp Sat Flow(s),veh/h/ln1100	0	0	0	1489	0	1598	1795	0	1872	831	1885	1598
Q Serve(g_s), s	2.4	0.0	0.0	0.0	0.0	12.9	0.9	0.0	11.6	1.1	18.2	0.7
Cycle Q Clear(g_c), s	4.3	0.0	0.0	2.0	0.0	12.9	0.9	0.0	11.6	5.3	18.2	0.7
Prop In Lane	0.70		0.24	1.00		1.00	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	396	0	0	517	0	420	288	0	1054	425	819	694
V/C Ratio(X)	0.23	0.00	0.00	0.15	0.00	0.89	0.20	0.00	0.56	0.06	0.83	0.05
Avail Cap(c_a), veh/h	413	0	0	538	0	444	337	0	1106	425	819	694
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	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.2	0.0	0.0	16.3	0.0	20.4	11.0	0.0	8.0	12.1	14.4	9.4
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.1	0.0	18.5	0.3	0.0	0.6	0.3	9.4	0.1
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/ln0.9	0.0	0.0	0.0	0.7	0.0	6.4	0.3	0.0	3.3	0.2	8.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.5	0.0	0.0	16.5	0.0	38.9	11.3	0.0	8.6	12.3	23.7	9.5
LnGrp LOS	B	A	A	B	A	D	B	A	A	B	C	A
Approach Vol, veh/h		91			449			650			734	
Approach Delay, s/veh		17.5			35.1			8.9			22.7	
Approach LOS		B			D			A			C	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s7.4	30.0			20.1		37.4		20.1				
Change Period (Y+Rc), s 5.0	5.0			5.0		5.0		5.0				
Max Green Setting (Gmax), s 4.0	25.0			16.0		34.0		16.0				
Max Q Clear Time (g_c+112, s 4.0	20.2			14.9		13.6		6.3				
Green Ext Time (p_c), s 0.0	0.0	1.9		0.2		3.6		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				20.7								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary
 11: Healthy Way & Cahaba River Rd

07/26/2018



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	58	454	125	133	721	255	45	130	124	63	78	23
Future Volume (veh/h)	58	454	125	133	721	255	45	130	124	63	78	23
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	63	493	0	145	784	277	49	141	135	68	85	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	194	977		538	873	308	127	275	311	129	135	31
Arrive On Green	0.52	0.52	0.00	0.06	0.66	0.66	0.19	0.19	0.19	0.19	0.19	0.19
Sat Flow, veh/h	536	1885	1598	1795	1330	470	303	1410	1598	282	693	159
Grp Volume(v), veh/h	63	493	0	145	0	1061	190	0	135	178	0	0
Grp Sat Flow(s),veh/h/ln	536	1885	1598	1795	0	1801	1713	0	1598	1135	0	0
Q Serve(g_s), s	7.5	11.4	0.0	2.3	0.0	33.1	0.0	0.0	5.0	4.4	0.0	0.0
Cycle Q Clear(g_c), s	31.3	11.4	0.0	2.3	0.0	33.1	6.5	0.0	5.0	10.8	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.26	0.26		1.00	0.38		0.14
Lane Grp Cap(c), veh/h	194	977		538	0	1181	401	0	311	295	0	0
V/C Ratio(X)	0.32	0.50		0.27	0.00	0.90	0.47	0.00	0.43	0.60	0.00	0.00
Avail Cap(c_a), veh/h	194	977		852	0	1181	475	0	381	359	0	0
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	26.7	10.5	0.0	7.1	0.0	9.7	24.2	0.0	23.7	26.1	0.0	0.0
Incr Delay (d2), s/veh	4.4	1.9	0.0	0.3	0.0	10.9	0.9	0.0	1.0	2.0	0.0	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	1.1	4.3	0.0	0.7	0.0	11.5	2.6	0.0	1.8	2.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.0	12.4	0.0	7.4	0.0	20.5	25.1	0.0	24.7	28.0	0.0	0.0
LnGrp LOS	C	B		A	A	C	C	A	C	C	A	A
Approach Vol, veh/h		556	A		1206			325			178	
Approach Delay, s/veh		14.5			19.0			24.9			28.0	
Approach LOS		B			B			C			C	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		49.0		18.1	9.2	39.8		18.1				
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s		44.0		16.0	16.0	23.0		16.0				
Max Q Clear Time (g_c+I1), s		35.1		8.5	4.3	33.3		12.8				
Green Ext Time (p_c), s		5.2		0.9	0.3	0.0		0.3				

Intersection Summary

HCM 6th Ctrl Delay	19.4
HCM 6th LOS	B

Notes

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

HCM 6th TWSC
 14: Cahaba River Rd & Grandview Medical Drwy

07/26/2018

Intersection						
Int Delay, s/veh	1.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↑	↗	↘	↗
Traffic Vol, veh/h	128	433	562	105	11	61
Future Vol, veh/h	128	433	562	105	11	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	165	-	-	225	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	139	471	611	114	12	66

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	611	0	-	0	1360 611
Stage 1	-	-	-	-	611 -
Stage 2	-	-	-	-	749 -
Critical Hdwy	4.11	-	-	-	6.41 6.21
Critical Hdwy Stg 1	-	-	-	-	5.41 -
Critical Hdwy Stg 2	-	-	-	-	5.41 -
Follow-up Hdwy	2.209	-	-	-	3.509 3.309
Pot Cap-1 Maneuver	973	-	-	-	164 496
Stage 1	-	-	-	-	544 -
Stage 2	-	-	-	-	469 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	973	-	-	-	141 496
Mov Cap-2 Maneuver	-	-	-	-	141 -
Stage 1	-	-	-	-	466 -
Stage 2	-	-	-	-	469 -

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	16.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	973	-	-	-	141	496
HCM Lane V/C Ratio	0.143	-	-	-	0.085	0.134
HCM Control Delay (s)	9.3	-	-	-	32.9	13.4
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0.5	-	-	-	0.3	0.5

1: Cahaba River Rd & Dolly Ridge Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	11.9	0.1	6.1	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	192.3	182.4	188.0	0.1	0.1	0.1	0.7	2.5	0.0	0.0	0.0	0.0
Total Delay (hr)	8.8	0.0	4.4	0.0	0.0	0.2	2.4	68.8	0.2	0.1	3.4	0.5
Total Del/Veh (s)	158.5	179.0	149.0	32.9	24.7	25.7	301.9	315.1	331.8	32.9	20.7	17.6
Stop Delay (hr)	8.5	0.0	4.3	0.0	0.0	0.2	2.3	65.6	0.2	0.0	1.6	0.2
Stop Del/Veh (s)	153.3	167.5	145.5	30.8	21.9	25.2	289.1	300.7	319.1	22.0	9.6	8.8
Total Stops	114	1	62	1	1	25	46	1033	2	6	277	52
Stop/Veh	0.57	1.00	0.58	0.50	1.00	0.83	1.59	1.31	1.00	1.00	0.47	0.54
Travel Dist (mi)	13.3	0.1	7.2	0.1	0.0	2.0	13.3	365.1	0.9	1.2	112.2	18.5
Travel Time (hr)	21.1	0.1	10.8	0.0	0.0	0.3	2.8	80.0	0.2	0.1	7.4	1.2
Avg Speed (mph)	1	2	2	5	5	7	5	5	4	12	15	15
Vehicles Entered	194	1	105	2	1	30	28	768	2	6	584	95
Vehicles Exited	187	1	101	2	1	30	26	681	1	6	582	96
Hourly Exit Rate	187	1	101	2	1	30	26	681	1	6	582	96
Input Volume	213	2	116	2	2	28	45	1134	2	8	762	130
% of Volume	88	50	87	100	50	108	57	60	50	73	76	74
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	28	0	11	0	0	0	0	2	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	9	0	5	0	0	0	3	79	0	0	7	1

1: Cahaba River Rd & Dolly Ridge Rd Performance by movement

Movement	All
Denied Delay (hr)	18.5
Denied Del/Veh (s)	35.9
Total Delay (hr)	88.8
Total Del/Veh (s)	173.0
Stop Delay (hr)	83.0
Stop Del/Veh (s)	161.8
Total Stops	1620
Stop/Veh	0.88
Travel Dist (mi)	534.1
Travel Time (hr)	124.0
Avg Speed (mph)	5
Vehicles Entered	1816
Vehicles Exited	1714
Hourly Exit Rate	1714
Input Volume	2444
% of Volume	70
Denied Entry Before	0
Denied Entry After	41
Density (ft/veh)	42
Occupancy (veh)	106

4: Cahaba River Rd/Dolly Ridge Rd & US-280 Performance by movement

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Denied Delay (hr)	6.7	511.7	100.5	6.2	296.5	19.7	0.0	0.0	0.0	0.2	0.0	0.0
Denied Del/Veh (s)	454.3	472.5	464.5	290.7	296.8	301.5	0.0	0.5	0.0	3.5	0.8	0.8
Total Delay (hr)	1.7	61.0	7.0	3.9	63.4	2.7	34.5	1.8	1.5	4.9	1.5	0.6
Total Del/Veh (s)	155.2	73.5	43.9	213.4	74.6	48.0	155.4	143.7	74.7	72.3	109.7	20.2
Stop Delay (hr)	1.5	36.3	2.9	3.5	38.6	1.4	29.6	1.5	1.1	4.5	1.4	0.4
Stop Del/Veh (s)	133.5	43.7	18.4	191.4	45.4	25.2	133.4	121.9	53.7	66.1	101.6	14.9
Total Stops	59	2862	327	101	2709	122	1522	77	83	269	54	46
Stop/Veh	1.48	0.96	0.57	1.53	0.89	0.60	1.90	1.75	1.14	1.11	1.08	0.46
Travel Dist (mi)	6.5	486.6	85.4	9.8	452.9	26.6	149.5	7.9	12.8	39.3	8.1	14.9
Travel Time (hr)	8.6	581.7	109.7	10.4	368.2	23.1	39.5	2.0	1.9	6.4	1.8	1.0
Avg Speed (mph)	3	7	9	2	6	8	4	4	7	6	5	15
Vehicles Entered	39	2918	563	65	2991	198	782	42	72	236	49	99
Vehicles Exited	39	2893	562	62	2971	197	765	42	71	240	48	98
Hourly Exit Rate	39	2893	562	62	2971	197	765	42	71	240	48	98
Input Volume	58	3908	762	80	3599	233	1201	62	112	241	46	100
% of Volume	68	74	74	78	83	84	64	68	63	100	104	98
Denied Entry Before	0	17	4	0	2	0	0	0	0	0	0	0
Denied Entry After	14	981	216	12	605	37	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	2	70	9	4	72	3	39	2	2	6	2	1

4: Cahaba River Rd/Dolly Ridge Rd & US-280 Performance by movement

Movement	All
Denied Delay (hr)	941.6
Denied Del/Veh (s)	341.7
Total Delay (hr)	184.5
Total Del/Veh (s)	80.6
Stop Delay (hr)	122.6
Stop Del/Veh (s)	53.6
Total Stops	8231
Stop/Veh	1.00
Travel Dist (mi)	1300.4
Travel Time (hr)	1154.2
Avg Speed (mph)	6
Vehicles Entered	8054
Vehicles Exited	7988
Hourly Exit Rate	7988
Input Volume	10402
% of Volume	77
Denied Entry Before	23
Denied Entry After	1865
Density (ft/veh)	70
Occupancy (veh)	213

5: Cahaba River Rd & Altadena Rd Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Delay (hr)	0.4	0.3	0.1	2.0	0.0	0.0	2.8
Denied Del/Veh (s)	7.6	6.8	4.2	9.6	0.0	0.0	5.4
Total Delay (hr)	7.2	5.2	5.3	38.5	2.7	0.2	59.1
Total Del/Veh (s)	152.0	135.4	161.6	185.2	15.8	11.4	114.0
Stop Delay (hr)	7.0	5.1	5.0	37.5	0.9	0.0	55.5
Stop Del/Veh (s)	147.7	132.1	154.9	180.6	4.9	2.6	107.2
Total Stops	150	123	146	547	231	17	1214
Stop/Veh	0.88	0.88	1.25	0.73	0.37	0.27	0.65
Travel Dist (mi)	28.3	23.2	61.7	392.1	304.4	30.8	840.5
Travel Time (hr)	8.4	6.3	7.1	50.9	10.6	1.1	84.3
Avg Speed (mph)	3	4	9	8	29	29	10
Vehicles Entered	168	137	115	737	612	62	1831
Vehicles Exited	154	127	103	642	617	64	1707
Hourly Exit Rate	154	127	103	642	617	64	1707
Input Volume	166	147	167	1011	790	78	2359
% of Volume	93	86	62	63	78	82	72
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	2	2	1	10	0	0	15
Density (ft/veh)							117
Occupancy (veh)	8	6	7	49	11	1	82

7: Acton Rd & Cahaba River Rd Performance by movement

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Denied Delay (hr)	0.0	0.0	0.0	0.1	0.0	0.0	123.9	122.1	49.2	0.1	0.0	0.0
Denied Del/Veh (s)	0.9	0.2	0.6	0.7	0.1	0.0	637.9	628.8	628.0	3.4	0.1	0.2
Total Delay (hr)	9.5	11.1	8.0	13.3	16.8	2.7	14.0	10.5	0.7	0.6	6.1	0.5
Total Del/Veh (s)	162.0	149.3	105.8	147.0	155.1	152.3	112.6	84.2	15.0	36.8	60.2	38.2
Stop Delay (hr)	8.0	9.0	6.3	10.9	13.7	2.2	12.0	8.1	0.6	0.5	5.1	0.5
Stop Del/Veh (s)	136.5	121.2	83.6	120.9	126.4	126.5	96.4	65.5	11.7	30.6	50.3	34.0
Total Stops	398	431	514	624	645	107	585	506	138	59	317	43
Stop/Veh	1.89	1.61	1.89	1.92	1.65	1.70	1.30	1.13	0.77	0.98	0.88	0.86
Travel Dist (mi)	114.4	146.6	149.5	80.4	95.2	15.8	55.3	55.8	22.8	7.1	43.2	6.0
Travel Time (hr)	12.6	14.9	12.4	15.6	19.3	3.1	139.6	133.8	50.7	0.9	7.0	0.7
Avg Speed (mph)	9	10	12	5	5	5	4	5	15	8	6	8
Vehicles Entered	207	261	268	319	379	63	433	437	177	58	358	49
Vehicles Exited	191	251	254	304	357	59	430	435	177	59	354	50
Hourly Exit Rate	191	251	254	304	357	59	430	435	177	59	354	50
Input Volume	266	327	330	330	404	56	696	698	275	63	354	53
% of Volume	72	77	77	92	88	106	62	62	64	94	100	95
Denied Entry Before	0	0	0	0	0	0	4	5	2	0	0	0
Denied Entry After	0	0	0	0	0	0	266	262	105	0	0	0
Density (ft/veh)												
Occupancy (veh)	13	15	12	16	19	3	16	12	2	1	7	1

7: Acton Rd & Cahaba River Rd Performance by movement

Movement	All
Denied Delay (hr)	295.4
Denied Del/Veh (s)	292.0
Total Delay (hr)	93.8
Total Del/Veh (s)	109.7
Stop Delay (hr)	76.9
Stop Del/Veh (s)	90.0
Total Stops	4367
Stop/Veh	1.42
Travel Dist (mi)	792.0
Travel Time (hr)	410.7
Avg Speed (mph)	7
Vehicles Entered	3009
Vehicles Exited	2921
Hourly Exit Rate	2921
Input Volume	3852
% of Volume	76
Denied Entry Before	11
Denied Entry After	633
Density (ft/veh)	134
Occupancy (veh)	115

9: Colony Park & Cahaba River Rd Performance by movement

Movement	NBL	NBT	NBR	SBL	SBR	SEL	SET	SER	NWL	NWT	NWR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Denied Del/Veh (s)	0.2	0.3	0.2	1.5	3.7	0.0	0.0	0.0	0.2	0.1	0.1	0.9
Total Delay (hr)	0.6	0.0	0.1	0.3	1.5	0.2	1.3	0.0	0.2	3.6	0.1	7.9
Total Del/Veh (s)	35.0	27.7	18.5	14.9	15.1	16.4	10.4	8.2	23.6	20.5	9.5	16.6
Stop Delay (hr)	0.5	0.0	0.1	0.2	1.3	0.1	0.5	0.0	0.1	1.6	0.0	4.5
Stop Del/Veh (s)	32.1	24.0	17.1	12.2	13.5	11.1	3.7	4.0	14.3	8.9	3.2	9.5
Total Stops	51	3	19	47	274	39	145	8	18	375	16	995
Stop/Veh	0.88	0.75	0.86	0.69	0.77	0.85	0.32	0.50	0.78	0.59	0.55	0.58
Travel Dist (mi)	4.2	0.3	1.6	3.5	18.8	13.9	135.9	4.8	15.5	437.1	20.5	656.3
Travel Time (hr)	0.7	0.0	0.2	0.5	2.8	0.6	5.0	0.2	0.6	14.8	0.6	25.9
Avg Speed (mph)	6	7	9	8	8	22	27	26	28	30	32	26
Vehicles Entered	57	4	22	67	354	45	455	15	22	621	29	1691
Vehicles Exited	57	4	22	67	351	45	454	15	22	618	29	1684
Hourly Exit Rate	57	4	22	67	351	45	454	15	22	618	29	1684
Input Volume	59	5	20	70	343	53	566	22	22	623	30	1812
% of Volume	97	80	111	96	102	85	80	69	101	99	97	93
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	1	0	0	0	0	0	0	1
Density (ft/veh)												613
Occupancy (veh)	1	0	0	0	2	1	5	0	1	15	1	25

11: Healthy Way & Cahaba River Rd Performance by movement

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Denied Delay (hr)	0.0	0.0	0.0	0.3	2.6	0.5	0.0	0.0	0.1	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	9.1	13.0	7.0	0.5	0.5	3.7	0.3	0.4	0.3
Total Delay (hr)	3.5	4.7	0.8	2.1	13.2	4.3	0.3	1.0	0.3	0.6	0.8	0.2
Total Del/Veh (s)	276.5	47.4	31.8	56.7	65.2	60.1	26.8	28.8	7.2	36.7	33.9	29.3
Stop Delay (hr)	3.4	3.7	0.6	1.3	7.6	2.7	0.3	0.8	0.2	0.6	0.7	0.2
Stop Del/Veh (s)	269.3	37.1	23.5	33.4	37.8	36.9	23.0	23.1	5.0	34.2	29.5	28.0
Total Stops	51	241	26	185	812	293	34	101	96	57	67	20
Stop/Veh	1.13	0.67	0.29	1.36	1.12	1.13	0.81	0.78	0.75	0.92	0.84	0.87
Travel Dist (mi)	11.6	89.6	22.5	39.8	211.6	75.6	4.6	14.3	13.9	2.3	3.0	0.9
Travel Time (hr)	3.8	7.2	1.5	3.7	21.5	7.2	0.5	1.5	0.9	0.7	0.8	0.2
Avg Speed (mph)	3	12	15	12	11	11	10	10	18	3	4	4
Vehicles Entered	44	353	89	135	717	255	42	130	127	62	79	23
Vehicles Exited	42	348	87	132	696	249	40	130	126	62	79	23
Hourly Exit Rate	42	348	87	132	696	249	40	130	126	62	79	23
Input Volume	58	482	125	133	721	255	45	130	124	63	78	23
% of Volume	73	72	70	99	97	98	88	100	102	99	101	101
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	1	5	1	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	4	7	1	3	19	7	0	1	1	1	1	0

11: Healthy Way & Cahaba River Rd Performance by movement

Movement	All
Denied Delay (hr)	3.6
Denied Del/Veh (s)	6.3
Total Delay (hr)	31.8
Total Del/Veh (s)	55.0
Stop Delay (hr)	21.9
Stop Del/Veh (s)	38.0
Total Stops	1983
Stop/Veh	0.95
Travel Dist (mi)	489.7
Travel Time (hr)	49.5
Avg Speed (mph)	11
Vehicles Entered	2056
Vehicles Exited	2014
Hourly Exit Rate	2014
Input Volume	2237
% of Volume	90
Denied Entry Before	0
Denied Entry After	7
Density (ft/veh)	187
Occupancy (veh)	46

14: Cahaba River Rd & Grandview Medical Drwy Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.1	0.1	0.0	0.0	0.2
Denied Del/Veh (s)	0.0	0.0	0.7	2.7	0.1	0.1	0.6
Total Delay (hr)	0.3	0.7	0.2	0.1	0.0	0.0	1.4
Total Del/Veh (s)	9.8	6.3	1.5	2.4	12.9	1.2	4.0
Stop Delay (hr)	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	2.3	0.1	0.0	0.0	11.6	0.0	0.3
Total Stops	50	0	0	2	9	1	62
Stop/Veh	0.45	0.00	0.00	0.02	1.00	0.02	0.05
Travel Dist (mi)	78.9	280.8	150.3	28.0	0.5	3.0	541.5
Travel Time (hr)	2.4	7.9	4.2	0.9	0.1	0.2	15.6
Avg Speed (mph)	33	36	37	32	9	19	35
Vehicles Entered	107	403	561	107	9	60	1247
Vehicles Exited	108	403	562	107	9	60	1249
Hourly Exit Rate	108	403	562	107	9	60	1249
Input Volume	128	485	562	105	11	61	1352
% of Volume	85	83	100	102	80	99	92
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0
Density (ft/veh)							719
Occupancy (veh)	2	8	4	1	0	0	15

Total Network Performance

Denied Delay (hr)	1262.5
Denied Del/Veh (s)	330.7
Total Delay (hr)	478.2
Total Del/Veh (s)	147.7
Stop Delay (hr)	367.9
Stop Del/Veh (s)	113.6
Total Stops	18689
Stop/Veh	1.60
Travel Dist (mi)	6902.4
Travel Time (hr)	1937.3
Avg Speed (mph)	10
Vehicles Entered	11181
Vehicles Exited	10801
Hourly Exit Rate	10801
Input Volume	38026
% of Volume	28
Denied Entry Before	34
Denied Entry After	2562
Density (ft/veh)	118
Occupancy (veh)	675

Arterial Level of Service: NW Cahaba River Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Colony Park	II	40	90.3	21.4	111.7	1.00	32.4	B
Healthy Way	II	40	32.1	32.9	65.0	0.31	17.4	D
Acton Rd	II	40	29.1	89.2	118.3	0.26	8.0	F
Altadena Rd	II	40	51.5	8.8	60.3	0.57	34.2	B
Dolly Ridge Rd	II	35	51.8	159.4	211.2	0.50	8.6	F
US 280	II	35	24.7	80.9	105.6	0.20	6.7	F
Total	II		279.5	392.6	672.1	2.86	15.3	E

Arterial Level of Service: SE Cahaba River Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Dolly Ridge Rd	II	35	24.7	46.5	71.2	0.20	10.0	F
Altadena Rd	II	40	46.8	18.2	65.0	0.50	27.9	C
Acton Rd	II	40	51.5	125.8	177.3	0.57	11.6	F
Healthy Way	II	40	29.1	185.0	214.1	0.26	4.4	F
Colony Park	II	40	32.1	15.4	47.5	0.31	23.8	C
Total	II		184.2	390.9	575.1	1.85	11.6	F

HCM 6th Signalized Intersection Summary

1: Cahaba River Rd & Dolly Ridge Rd

07/26/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	153	2	64	5	2	11	136	1016	3	9	1221	166
Future Volume (veh/h)	153	2	64	5	2	11	136	1016	3	9	1221	166
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	166	2	70	5	2	12	148	1104	3	10	1327	180
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	175	2	54	73	40	132	75	424	1	32	1291	174
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.80	0.80	0.80	0.80	0.80	0.80
Sat Flow, veh/h	1041	13	439	306	322	1075	55	530	1	5	1614	218
Grp Volume(v), veh/h	238	0	0	19	0	0	1255	0	0	1517	0	0
Grp Sat Flow(s),veh/h/ln	1493	0	0	1703	0	0	586	0	0	1836	0	0
Q Serve(g_s), s	14.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.0	0.0	0.0	1.3	0.0	0.0	104.0	0.0	0.0	104.0	0.0	0.0
Prop In Lane	0.70		0.29	0.26		0.63	0.12		0.00	0.01		0.12
Lane Grp Cap(c), veh/h	231	0	0	245	0	0	500	0	0	1497	0	0
V/C Ratio(X)	1.03	0.00	0.00	0.08	0.00	0.00	2.51	0.00	0.00	1.01	0.00	0.00
Avail Cap(c_a), veh/h	231	0	0	245	0	0	500	0	0	1497	0	0
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	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	58.5	0.0	0.0	50.6	0.0	0.0	9.1	0.0	0.0	13.8	0.0	0.0
Incr Delay (d2), s/veh	67.6	0.0	0.0	0.1	0.0	0.0	685.7	0.0	0.0	26.7	0.0	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(95%),veh/ln	17.9	0.0	0.0	1.0	0.0	0.0	172.8	0.0	0.0	55.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	126.1	0.0	0.0	50.7	0.0	0.0	694.8	0.0	0.0	40.5	0.0	0.0
LnGrp LOS	F	A	A	D	A	A	F	A	A	F	A	A
Approach Vol, veh/h		238			19			1255				1517
Approach Delay, s/veh		126.1			50.7			694.8				40.5
Approach LOS		F			D			F				D
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		109.0		21.0		109.0		21.0				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		104.0		16.0		104.0		16.0				
Max Q Clear Time (g_c+I1), s		106.0		18.0		106.0		3.3				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				318.4								
HCM 6th LOS				F								

HCM 6th Signalized Intersection Summary
 4: Cahaba River Rd/Dolly Ridge Rd & US 280

07/26/2018



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑	↗	↖↗↘	↖		↖↗	↖	
Traffic Volume (veh/h)	141	3720	1148	145	3596	233	924	117	139	224	103	100
Future Volume (veh/h)	141	3720	1148	145	3596	233	924	117	139	224	103	100
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		No		No
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	147	3875	0	151	3746	0	1004	127	0	243	112	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	112	2846		112	2846		700	256		265	139	
Arrive On Green	0.06	0.55	0.00	0.06	0.55	0.00	0.14	0.14	0.00	0.08	0.07	0.00
Sat Flow, veh/h	1795	5147	1598	1795	5147	1598	5063	1885	0	3483	1885	0
Grp Volume(v), veh/h	147	3875	0	151	3746	0	1004	127	0	243	112	0
Grp Sat Flow(s),veh/h/ln	1795	1716	1598	1795	1716	1598	1688	1885	0	1742	1885	0
Q Serve(g_s), s	9.0	80.0	0.0	9.0	80.0	0.0	20.0	9.0	0.0	10.0	8.5	0.0
Cycle Q Clear(g_c), s	9.0	80.0	0.0	9.0	80.0	0.0	20.0	9.0	0.0	10.0	8.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	112	2846		112	2846		700	256		265	139	
V/C Ratio(X)	1.32	1.36		1.35	1.32		1.43	0.50		0.92	0.81	
Avail Cap(c_a), veh/h	112	2846		112	2846		700	326		265	209	
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	67.8	32.3	0.0	67.8	32.3	0.0	62.3	57.9	0.0	66.4	66.0	0.0
Incr Delay (d2), s/veh	191.9	165.0	0.0	205.9	144.8	0.0	203.6	1.5	0.0	34.2	12.9	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(95%),veh/ln	6.4	108.0	0.0	17.1	99.0	0.0	33.8	7.9	0.0	9.6	8.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	259.7	197.3	0.0	273.7	177.2	0.0	265.9	59.4	0.0	100.6	78.9	0.0
LnGrp LOS	F	F		F	F		F	E		F	E	
Approach Vol, veh/h		4022	A		3897	A		1131	A		355	A
Approach Delay, s/veh		199.6			180.9			242.7			93.8	
Approach LOS		F			F			F			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.0	87.0	26.0	16.7	15.0	87.0	17.0	25.7				
Change Period (Y+Rc), s	6.0	7.0	6.0	6.0	6.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	9.0	80.0	20.0	16.0	9.0	80.0	11.0	25.0				
Max Q Clear Time (g_c+I1), s	11.0	82.0	22.0	10.5	11.0	82.0	12.0	11.0				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.5				

Intersection Summary

HCM 6th Ctrl Delay	193.1
HCM 6th LOS	F

Notes

Unsignalized Delay for [NER, NWR, SER, SWR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

5: Cahaba River Rd & Altadena Rd

07/26/2018



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	113	66	138	1027	1136	128
Future Volume (veh/h)	113	66	138	1027	1136	128
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1885	1885	1885	1885
Adj Flow Rate, veh/h	123	72	150	1116	1235	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	1	1	1	1
Cap, veh/h	115	67	274	1558	1558	
Arrive On Green	0.11	0.11	0.83	0.83	0.83	0.00
Sat Flow, veh/h	1078	631	454	1885	1885	0
Grp Volume(v), veh/h	196	0	150	1116	1235	0
Grp Sat Flow(s),veh/h/ln	1718	0	454	1885	1885	0
Q Serve(g_s), s	16.0	0.0	37.1	37.7	49.4	0.0
Cycle Q Clear(g_c), s	16.0	0.0	86.5	37.7	49.4	0.0
Prop In Lane	0.63	0.37	1.00			0.00
Lane Grp Cap(c), veh/h	183	0	274	1558	1558	
V/C Ratio(X)	1.07	0.00	0.55	0.72	0.79	
Avail Cap(c_a), veh/h	183	0	274	1558	1558	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	67.0	0.0	28.3	5.5	6.5	0.0
Incr Delay (d2), s/veh	86.2	0.0	7.7	2.8	4.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.4	0.0	8.0	17.5	22.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	153.2	0.0	35.9	8.4	10.8	0.0
LnGrp LOS	F	A	D	A	B	
Approach Vol, veh/h	196			1266	1235	A
Approach Delay, s/veh	153.2			11.6	10.8	
Approach LOS	F			B	B	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		129.0		21.0		129.0
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		124.0		16.0		124.0
Max Q Clear Time (g_c+I1), s		88.5		18.0		51.4
Green Ext Time (p_c), s		15.3		0.0		18.1

Intersection Summary

HCM 6th Ctrl Delay	21.5
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

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

HCM 6th Signalized Intersection Summary

7: Acton Rd & Cahaba River Rd

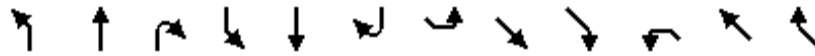
07/26/2018



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	88	455	645	313	415	83	405	387	501	142	839	335
Future Volume (veh/h)	88	455	645	313	415	83	405	387	501	142	839	335
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	96	495	701	340	451	90	440	421	545	154	912	364
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	175	440	373	269	436	87	344	770	653	334	814	323
Arrive On Green	0.06	0.23	0.23	0.12	0.29	0.29	0.16	0.41	0.41	0.07	0.32	0.32
Sat Flow, veh/h	1795	1885	1598	1795	1526	304	1795	1885	1598	1795	2504	993
Grp Volume(v), veh/h	96	495	701	340	0	541	440	421	545	154	650	626
Grp Sat Flow(s),veh/h/ln	1795	1885	1598	1795	0	1830	1795	1885	1598	1795	1791	1706
Q Serve(g_s), s	4.8	28.0	28.0	14.0	0.0	34.3	19.0	20.4	36.7	6.8	39.0	39.0
Cycle Q Clear(g_c), s	4.8	28.0	28.0	14.0	0.0	34.3	19.0	20.4	36.7	6.8	39.0	39.0
Prop In Lane	1.00		1.00	1.00		0.17	1.00		1.00	1.00		0.58
Lane Grp Cap(c), veh/h	175	440	373	269	0	524	344	770	653	334	582	555
V/C Ratio(X)	0.55	1.13	1.88	1.26	0.00	1.03	1.28	0.55	0.83	0.46	1.12	1.13
Avail Cap(c_a), veh/h	180	440	373	269	0	524	344	770	653	439	582	555
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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.6	46.0	46.0	34.5	0.0	42.8	38.4	27.0	31.8	24.3	40.5	40.5
Incr Delay (d2), s/veh	4.4	81.7	406.3	144.1	0.0	48.2	145.8	2.8	12.0	1.0	73.9	78.5
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(95%),veh/ln	4.0	32.6	83.1	25.7	0.0	30.3	29.8	14.4	22.2	5.1	39.7	39.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.9	127.7	452.3	178.6	0.0	91.0	184.1	29.8	43.8	25.3	114.4	119.0
LnGrp LOS	D	F	F	F	A	F	F	C	D	C	F	F
Approach Vol, veh/h		1292			881			1406			1430	
Approach Delay, s/veh		297.2			124.8			83.5			106.8	
Approach LOS		F			F			F			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	4.0	54.0	19.0	33.0	24.0	44.0	12.7	39.3				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	6.0	42.0	14.0	28.0	19.0	39.0	8.0	34.0				
Max Q Clear Time (g_c+1/3), s	6.8	38.7	16.0	30.0	21.0	41.0	6.8	36.3				
Green Ext Time (p_c), s	0.2	1.9	0.0	0.0	0.0	0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			152.6									
HCM 6th LOS			F									

HCM 6th Signalized Intersection Summary
 9: Colony Park & Cahaba River Rd

07/26/2018



Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕			↕	↕	↕	↕		↕	↕	↕
Traffic Volume (veh/h)	28	0	22	61	2	161	304	964	45	17	631	81
Future Volume (veh/h)	28	0	22	61	2	161	304	964	45	17	631	81
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	30	0	24	66	2	175	330	1048	49	18	686	88
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	176	25	88	327	8	232	469	1234	58	248	927	786
Arrive On Green	0.15	0.00	0.15	0.15	0.15	0.15	0.12	0.69	0.69	0.49	0.49	0.49
Sat Flow, veh/h	582	170	602	1449	57	1598	1795	1787	84	518	1885	1598
Grp Volume(v), veh/h	54	0	0	68	0	175	330	0	1097	18	686	88
Grp Sat Flow(s),veh/h/ln	1353	0	0	1506	0	1598	1795	0	1870	518	1885	1598
Q Serve(g_s), s	0.2	0.0	0.0	0.0	0.0	6.4	4.9	0.0	26.8	1.6	17.7	1.8
Cycle Q Clear(g_c), s	2.2	0.0	0.0	2.0	0.0	6.4	4.9	0.0	26.8	16.3	17.7	1.8
Prop In Lane	0.56		0.44	0.97		1.00	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	289	0	0	335	0	232	469	0	1291	248	927	786
V/C Ratio(X)	0.19	0.00	0.00	0.20	0.00	0.75	0.70	0.00	0.85	0.07	0.74	0.11
Avail Cap(c_a), veh/h	448	0	0	500	0	419	524	0	1349	248	927	786
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	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.0	0.0	0.0	23.1	0.0	25.0	10.6	0.0	7.1	17.7	12.4	8.3
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.3	0.0	4.9	3.7	0.0	5.2	0.6	5.3	0.3
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(95%),veh/ln	1.2	0.0	0.0	1.5	0.0	4.6	3.3	0.0	11.2	0.4	11.4	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.3	0.0	0.0	23.4	0.0	29.9	14.3	0.0	12.2	18.3	17.7	8.6
LnGrp LOS	C	A	A	C	A	C	B	A	B	B	B	A
Approach Vol, veh/h		54			243			1427			792	
Approach Delay, s/veh		23.3			28.1			12.7			16.7	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	2.1	35.0		13.9		47.1		13.9				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	30.0	30.0		16.0		44.0		16.0				
Max Q Clear Time (g_c+10), s	19.7	19.7		8.4		28.8		4.2				
Green Ext Time (p_c), s	0.2	3.5		0.5		7.7		0.1				

Intersection Summary

HCM 6th Ctrl Delay	15.7
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary

11: Healthy Way & Cahaba River Rd

07/26/2018



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	17	825	285	290	501	102	200	135	308	243	244	50
Future Volume (veh/h)	17	825	285	290	501	102	200	135	308	243	244	50
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	18	897	0	315	545	111	217	147	335	264	265	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	229	691		240	770	157	317	189	682	116	81	17
Arrive On Green	0.37	0.37	0.00	0.11	0.51	0.51	0.43	0.43	0.43	0.43	0.43	0.43
Sat Flow, veh/h	783	1885	1598	1795	1520	310	653	443	1598	190	191	39
Grp Volume(v), veh/h	18	897	0	315	0	656	364	0	335	583	0	0
Grp Sat Flow(s),veh/h/ln	783	1885	1598	1795	0	1829	1096	0	1598	419	0	0
Q Serve(g_s), s	2.7	55.0	0.0	16.0	0.0	41.4	0.0	0.0	22.8	21.2	0.0	0.0
Cycle Q Clear(g_c), s	23.1	55.0	0.0	16.0	0.0	41.4	42.8	0.0	22.8	64.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.17	0.60		1.00	0.45		0.09
Lane Grp Cap(c), veh/h	229	691		240	0	927	506	0	682	214	0	0
V/C Ratio(X)	0.08	1.30		1.32	0.00	0.71	0.72	0.00	0.49	2.73	0.00	0.00
Avail Cap(c_a), veh/h	229	691		240	0	927	506	0	682	214	0	0
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	45.4	47.5	0.0	50.0	0.0	28.5	36.9	0.0	31.2	66.1	0.0	0.0
Incr Delay (d2), s/veh	0.7	144.5	0.0	168.3	0.0	4.5	4.9	0.0	0.6	790.6	0.0	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(95%),veh/ln	0	76.3	0.0	25.2	0.0	25.9	17.7	0.0	13.8	94.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.1	192.0	0.0	218.2	0.0	33.0	41.8	0.0	31.7	856.7	0.0	0.0
LnGrp LOS	D	F		F	A	C	D	A	C	F	A	A
Approach Vol, veh/h		915	A		971			699			583	
Approach Delay, s/veh		189.1			93.1			37.0			856.7	
Approach LOS		F			F			D			F	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		81.0		69.0	21.0	60.0		69.0				
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s		76.0		64.0	16.0	55.0		64.0				
Max Q Clear Time (g_c+I1), s		43.4		44.8	18.0	57.0		66.0				
Green Ext Time (p_c), s		4.8		3.6	0.0	0.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay	249.0
HCM 6th LOS	F

Notes

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

HCM 6th TWSC
 14: Cahaba River Rd & Grandview Medical Drwy

07/26/2018

Intersection						
Int Delay, s/veh	7.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↗	↗	↘	↘	↘
Traffic Vol, veh/h	74	911	496	23	72	172
Future Vol, veh/h	74	911	496	23	72	172
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	165	-	-	225	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	80	990	539	25	78	187

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	539	0	-	0	1689 539
Stage 1	-	-	-	-	539 -
Stage 2	-	-	-	-	1150 -
Critical Hdwy	4.11	-	-	-	6.41 6.21
Critical Hdwy Stg 1	-	-	-	-	5.41 -
Critical Hdwy Stg 2	-	-	-	-	5.41 -
Follow-up Hdwy	2.209	-	-	-	3.509 3.309
Pot Cap-1 Maneuver	1034	-	-	-	103 544
Stage 1	-	-	-	-	587 -
Stage 2	-	-	-	-	303 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1034	-	-	-	95 544
Mov Cap-2 Maneuver	-	-	-	-	95 -
Stage 1	-	-	-	-	542 -
Stage 2	-	-	-	-	303 -

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	48.4
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1034	-	-	-	95	544
HCM Lane V/C Ratio	0.078	-	-	-	0.824	0.344
HCM Control Delay (s)	8.8	-	-	-	128.2	15
HCM Lane LOS	A	-	-	-	F	C
HCM 95th %tile Q(veh)	0.3	-	-	-	4.5	1.5

1: Cahaba River Rd & Dolly Ridge Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.1	0.0	0.0	0.0	0.0	0.0	0.6	6.9	0.0	0.0	0.1	0.0
Denied Del/Veh (s)	1.4	0.3	1.1	0.1	0.1	0.1	29.4	48.8	0.0	0.0	0.2	0.1
Total Delay (hr)	4.4	0.1	1.7	0.1	0.0	0.0	12.3	81.1	0.2	0.1	8.4	1.0
Total Del/Veh (s)	101.2	101.9	95.2	46.1	59.8	11.4	614.4	562.5	598.1	58.3	32.0	29.1
Stop Delay (hr)	4.2	0.1	1.7	0.1	0.0	0.0	12.1	79.0	0.2	0.1	4.2	0.5
Stop Del/Veh (s)	95.2	93.2	90.3	44.3	55.6	11.3	603.0	547.9	554.5	42.7	16.0	15.6
Total Stops	155	2	69	4	1	9	139	786	3	8	460	61
Stop/Veh	0.98	1.00	1.05	0.80	1.00	1.00	1.93	1.51	3.00	0.89	0.48	0.51
Travel Dist (mi)	10.8	0.2	4.5	0.4	0.1	0.6	32.1	228.0	0.7	1.8	181.6	23.1
Travel Time (hr)	4.9	0.1	2.0	0.1	0.0	0.1	13.8	94.6	0.2	0.2	14.9	1.9
Avg Speed (mph)	2	3	2	5	4	11	2	3	4	8	12	12
Vehicles Entered	153	2	64	5	1	9	69	493	1	9	937	119
Vehicles Exited	152	2	64	5	1	9	58	425	1	9	928	118
Hourly Exit Rate	152	2	64	5	1	9	58	425	1	9	928	118
Input Volume	153	2	64	5	2	11	136	1016	3	9	1236	166
% of Volume	99	100	100	100	50	80	43	42	33	97	75	71
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	1	14	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	5	0	2	0	0	0	13	88	0	0	15	2

1: Cahaba River Rd & Dolly Ridge Rd Performance by movement

Movement	All
Denied Delay (hr)	7.6
Denied Del/Veh (s)	14.6
Total Delay (hr)	109.5
Total Del/Veh (s)	206.2
Stop Delay (hr)	102.0
Stop Del/Veh (s)	192.2
Total Stops	1697
Stop/Veh	0.89
Travel Dist (mi)	483.8
Travel Time (hr)	132.7
Avg Speed (mph)	4
Vehicles Entered	1862
Vehicles Exited	1772
Hourly Exit Rate	1772
Input Volume	2804
% of Volume	63
Denied Entry Before	0
Denied Entry After	15
Density (ft/veh)	36
Occupancy (veh)	125

4: Cahaba River Rd/Dolly Ridge Rd & US 280 Performance by movement

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Denied Delay (hr)	23.5	599.9	191.2	15.5	375.5	24.8	0.0	0.0	0.0	0.4	0.1	0.1
Denied Del/Veh (s)	600.4	571.9	576.9	385.9	371.7	376.3	0.0	0.0	0.0	6.9	3.6	3.9
Total Delay (hr)	3.6	26.1	3.5	5.4	40.1	1.0	12.1	1.1	0.4	7.3	3.4	1.2
Total Del/Veh (s)	133.7	35.0	15.2	166.9	49.3	19.7	91.9	76.8	20.5	112.1	117.6	41.9
Stop Delay (hr)	3.4	17.4	1.7	5.0	26.7	0.5	10.5	1.0	0.2	6.8	3.1	1.1
Stop Del/Veh (s)	127.8	23.3	7.4	156.2	32.8	10.4	80.1	65.4	11.0	104.4	107.4	35.6
Total Stops	109	1320	234	156	1618	47	589	51	21	329	129	77
Stop/Veh	1.12	0.49	0.28	1.34	0.55	0.26	1.24	0.96	0.31	1.41	1.24	0.72
Travel Dist (mi)	7.6	212.8	55.2	10.7	274.2	16.0	90.3	10.2	11.7	19.9	8.8	7.4
Travel Time (hr)	27.4	629.9	196.6	21.3	420.6	26.3	15.1	1.4	0.8	8.4	3.8	1.6
Avg Speed (mph)	2	7	10	2	6	10	6	7	15	2	2	5
Vehicles Entered	95	2645	838	113	2882	181	467	53	66	231	103	106
Vehicles Exited	91	2639	837	110	2871	180	463	53	65	229	102	105
Hourly Exit Rate	91	2639	837	110	2871	180	463	53	65	229	102	105
Input Volume	141	3720	1148	145	3596	233	924	118	139	224	103	100
% of Volume	65	71	73	76	80	77	50	45	47	102	99	105
Denied Entry Before	2	69	22	2	28	2	0	0	0	0	0	0
Denied Entry After	46	1131	355	32	755	56	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	4	30	5	6	45	2	15	1	1	8	4	1

4: Cahaba River Rd/Dolly Ridge Rd & US 280 Performance by movement

Movement	All
Denied Delay (hr)	1231.0
Denied Del/Veh (s)	436.4
Total Delay (hr)	105.2
Total Del/Veh (s)	48.0
Stop Delay (hr)	77.4
Stop Del/Veh (s)	35.3
Total Stops	4680
Stop/Veh	0.59
Travel Dist (mi)	724.7
Travel Time (hr)	1353.1
Avg Speed (mph)	6
Vehicles Entered	7780
Vehicles Exited	7745
Hourly Exit Rate	7745
Input Volume	10591
% of Volume	73
Denied Entry Before	125
Denied Entry After	2375
Density (ft/veh)	81
Occupancy (veh)	122

5: Cahaba River Rd & Altadena Rd Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Delay (hr)	5.1	3.7	0.5	2.6	0.0	0.0	11.8
Denied Del/Veh (s)	169.3	196.9	20.8	15.5	0.0	0.0	23.1
Total Delay (hr)	18.5	10.0	9.9	77.2	5.9	0.5	122.0
Total Del/Veh (s)	723.5	655.9	451.7	457.0	23.2	19.5	238.4
Stop Delay (hr)	18.5	10.1	9.9	77.4	1.7	0.2	117.8
Stop Del/Veh (s)	724.2	657.9	451.6	458.2	6.9	5.9	230.1
Total Stops	65	33	101	459	305	29	992
Stop/Veh	0.71	0.60	1.28	0.75	0.34	0.29	0.54
Travel Dist (mi)	14.0	8.2	40.5	308.1	442.9	48.1	861.7
Travel Time (hr)	24.1	14.0	11.5	87.9	17.1	1.8	156.4
Avg Speed (mph)	1	1	4	4	26	26	6
Vehicles Entered	91	55	77	588	891	97	1799
Vehicles Exited	68	39	66	493	892	98	1656
Hourly Exit Rate	68	39	66	493	892	98	1656
Input Volume	113	66	138	1027	1162	128	2634
% of Volume	60	59	48	48	77	77	63
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	18	12	1	7	0	0	38
Density (ft/veh)							66
Occupancy (veh)	19	10	11	85	17	2	145

7: Acton Rd & Cahaba River Rd Performance by movement

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Denied Delay (hr)	0.0	0.0	0.0	4.6	5.9	0.7	77.9	74.1	89.4	19.3	104.0	43.3
Denied Del/Veh (s)	0.0	0.0	0.0	78.4	81.4	49.8	678.7	677.3	660.7	465.5	448.3	435.5
Total Delay (hr)	3.7	21.5	26.1	15.5	22.0	3.9	17.7	9.2	2.1	3.1	21.5	19.0
Total Del/Veh (s)	209.8	205.5	191.6	274.0	319.6	289.5	306.5	164.5	30.7	102.9	124.4	252.6
Stop Delay (hr)	2.9	17.0	21.4	14.7	20.9	3.8	17.1	8.4	1.7	2.6	18.5	18.9
Stop Del/Veh (s)	168.4	162.9	157.1	259.8	303.8	277.7	296.5	150.3	25.1	88.5	107.3	250.9
Total Stops	150	741	1087	337	323	63	279	219	168	175	754	202
Stop/Veh	2.38	1.97	2.21	1.66	1.30	1.29	1.34	1.08	0.69	1.64	1.21	0.75
Travel Dist (mi)	34.9	204.2	273.6	47.2	59.2	11.6	24.8	24.7	31.0	12.5	71.9	31.2
Travel Time (hr)	4.6	26.6	34.0	21.5	29.5	5.0	96.3	83.9	92.5	22.7	127.1	63.4
Avg Speed (mph)	8	8	8	3	3	3	1	3	10	4	3	2
Vehicles Entered	62	366	482	198	243	48	199	196	241	104	598	262
Vehicles Exited	60	355	472	180	219	43	188	190	242	103	599	254
Hourly Exit Rate	60	355	472	180	219	43	188	190	242	103	599	254
Input Volume	88	470	645	313	415	83	405	387	501	142	839	335
% of Volume	68	76	73	58	53	52	46	49	48	73	71	76
Denied Entry Before	0	0	0	0	0	0	1	0	1	0	0	0
Denied Entry After	0	0	0	14	20	3	214	198	246	45	237	96
Density (ft/veh)												
Occupancy (veh)	5	27	34	17	24	4	18	10	3	3	23	20

7: Acton Rd & Cahaba River Rd Performance by movement

Movement	All
Denied Delay (hr)	419.2
Denied Del/Veh (s)	370.6
Total Delay (hr)	165.2
Total Del/Veh (s)	193.1
Stop Delay (hr)	148.1
Stop Del/Veh (s)	173.0
Total Stops	4498
Stop/Veh	1.46
Travel Dist (mi)	826.7
Travel Time (hr)	607.2
Avg Speed (mph)	4
Vehicles Entered	2999
Vehicles Exited	2905
Hourly Exit Rate	2905
Input Volume	4622
% of Volume	63
Denied Entry Before	2
Denied Entry After	1073
Density (ft/veh)	82
Occupancy (veh)	188

9: Colony Park & Cahaba River Rd Performance by movement

Movement	NBL	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR	All
Denied Delay (hr)	0.0	0.0	1.2	0.0	2.9	0.0	0.0	0.0	0.1	4.0	0.4	8.7
Denied Del/Veh (s)	2.4	7.4	71.9	85.0	63.4	0.0	0.0	0.0	26.0	27.0	19.4	17.6
Total Delay (hr)	1.7	1.1	0.7	0.1	4.3	1.1	2.3	0.1	1.4	55.6	6.3	74.7
Total Del/Veh (s)	247.9	168.2	45.0	91.3	100.1	19.7	12.6	9.8	380.7	377.1	321.7	151.9
Stop Delay (hr)	1.7	1.1	0.7	0.0	4.3	0.6	0.6	0.0	1.4	54.6	6.3	71.2
Stop Del/Veh (s)	246.1	169.0	42.0	86.4	100.5	11.1	3.0	3.4	375.6	370.0	317.5	144.7
Total Stops	22	22	47	2	115	146	175	10	16	477	65	1097
Stop/Veh	0.88	0.96	0.82	1.00	0.75	0.72	0.26	0.37	1.23	0.90	0.92	0.62
Travel Dist (mi)	1.7	1.6	3.0	0.1	7.8	61.9	199.0	8.4	7.1	317.4	42.3	650.5
Travel Time (hr)	1.8	1.2	2.1	0.1	7.6	2.9	7.7	0.3	1.7	67.8	7.9	101.0
Avg Speed (mph)	1	1	4	2	2	21	26	25	5	5	6	7
Vehicles Entered	25	23	57	2	153	200	662	26	13	517	69	1747
Vehicles Exited	20	20	56	2	141	200	661	27	9	380	52	1568
Hourly Exit Rate	20	20	56	2	141	200	661	27	9	380	52	1568
Input Volume	28	22	61	2	161	304	1027	45	17	631	81	2379
% of Volume	72	92	92	100	88	66	64	60	52	60	64	66
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	4	0	12	0	0	0	0	21	3	40
Density (ft/veh)												169
Occupancy (veh)	2	1	1	0	5	3	8	0	2	64	7	92

11: Healthy Way & Cahaba River Rd Performance by movement

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Denied Delay (hr)	0.1	1.3	0.4	3.4	9.1	1.8	14.5	8.6	21.4	49.6	51.8	12.0
Denied Del/Veh (s)	25.2	9.1	8.2	63.4	94.2	93.6	262.1	232.1	255.7	737.4	754.8	844.5
Total Delay (hr)	0.3	13.8	3.2	15.6	28.5	5.0	6.3	3.9	5.3	3.7	3.6	0.8
Total Del/Veh (s)	108.9	90.9	61.5	297.0	300.9	278.8	150.3	135.7	84.5	96.3	96.7	115.4
Stop Delay (hr)	0.2	10.5	2.2	14.5	26.4	4.7	6.0	3.7	4.8	3.7	3.5	0.8
Stop Del/Veh (s)	85.2	69.3	42.4	275.6	278.5	259.8	142.5	126.4	77.6	94.4	92.8	114.7
Total Stops	15	603	173	347	444	83	139	96	194	68	57	13
Stop/Veh	1.67	1.10	0.93	1.84	1.30	1.28	0.92	0.92	0.86	0.49	0.43	0.52
Travel Dist (mi)	2.2	136.1	46.3	52.4	94.0	17.9	16.2	11.1	24.1	5.2	4.9	0.9
Travel Time (hr)	0.4	18.9	5.0	20.5	40.1	7.4	21.3	12.8	27.6	53.5	55.5	12.8
Avg Speed (mph)	6	8	10	3	3	3	2	3	4	1	1	1
Vehicles Entered	8	528	184	179	322	63	149	103	223	136	131	25
Vehicles Exited	9	534	186	171	296	55	145	99	218	137	130	24
Hourly Exit Rate	9	534	186	171	296	55	145	99	218	137	130	24
Input Volume	17	825	285	290	501	102	200	135	308	243	244	50
% of Volume	52	65	65	59	59	54	73	73	71	56	53	48
Denied Entry Before	0	0	0	0	0	0	0	0	0	3	4	0
Denied Entry After	0	0	0	12	25	5	50	30	79	106	116	26
Density (ft/veh)												
Occupancy (veh)	0	18	5	17	31	6	7	4	6	4	4	1

11: Healthy Way & Cahaba River Rd Performance by movement

Movement	All
Denied Delay (hr)	173.9
Denied Del/Veh (s)	250.3
Total Delay (hr)	90.1
Total Del/Veh (s)	153.0
Stop Delay (hr)	80.9
Stop Del/Veh (s)	137.4
Total Stops	2232
Stop/Veh	1.05
Travel Dist (mi)	411.2
Travel Time (hr)	275.9
Avg Speed (mph)	4
Vehicles Entered	2051
Vehicles Exited	2004
Hourly Exit Rate	2004
Input Volume	3200
% of Volume	63
Denied Entry Before	7
Denied Entry After	449
Density (ft/veh)	84
Occupancy (veh)	102

14: Cahaba River Rd & Grandview Medical Drwy Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	2.9	0.1	0.0	0.2	3.2
Denied Del/Veh (s)	0.0	0.0	21.6	9.2	1.2	3.4	7.9
Total Delay (hr)	0.1	1.4	8.2	0.4	0.3	0.8	11.3
Total Del/Veh (s)	9.7	7.7	66.0	56.8	16.5	16.8	28.5
Stop Delay (hr)	0.0	0.0	8.0	0.3	0.3	0.7	9.4
Stop Del/Veh (s)	1.8	0.2	64.2	54.5	14.8	15.4	23.9
Total Stops	19	0	54	2	65	36	176
Stop/Veh	0.36	0.00	0.12	0.09	1.00	0.21	0.12
Travel Dist (mi)	37.3	457.2	113.9	5.7	3.7	8.5	626.4
Travel Time (hr)	1.1	13.0	14.0	0.6	0.5	1.3	30.6
Avg Speed (mph)	33	35	10	11	8	7	23
Vehicles Entered	51	643	447	23	65	172	1401
Vehicles Exited	51	644	399	21	65	166	1346
Hourly Exit Rate	51	644	399	21	65	166	1346
Input Volume	74	972	496	23	72	172	1810
% of Volume	69	66	80	92	90	97	74
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	38	1	1	2	42
Density (ft/veh)							404
Occupancy (veh)	1	13	11	1	0	1	27

Total Network Performance

Denied Delay (hr)	1855.4
Denied Del/Veh (s)	443.1
Total Delay (hr)	686.9
Total Del/Veh (s)	214.9
Stop Delay (hr)	609.7
Stop Del/Veh (s)	190.7
Total Stops	15554
Stop/Veh	1.35
Travel Dist (mi)	5819.9
Travel Time (hr)	2710.5
Avg Speed (mph)	7
Vehicles Entered	11041
Vehicles Exited	10422
Hourly Exit Rate	10422
Input Volume	42776
% of Volume	24
Denied Entry Before	134
Denied Entry After	4032
Density (ft/veh)	87
Occupancy (veh)	855

APPENDIX C: BUILD CONDITION ALTERNATIVES LEVEL OF SERVICE TABLES

HCM 6th Results - 2040 Build Alternative 1																
Intersection	Time Period	Control	MOE	EB Movement			WB Movement			NB Movement			SB Movement			Overall
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Cahaba River Road at Dolly Ridge Road	AM	Signal	LOS	C	A	C	B	A	D	D	A	D	D	A	D	C
			Delay	27.4	0.0	20.4	14.8	0.0	41.8	49.7	0.0	41.3	47.0	0.0	54.1	34.3
	PM		LOS	A	A	E	F	A	B	F	A	E	E	A	E	E
			Delay	8.3	0.0	57.8	227.9	0.0	10.2	192.9	0.0	75.6	64.4	0.0	67.2	56.4
Cahaba River Road at Altadena Road	AM	Signal	LOS			B	B	B		C		C				B
			Delay			14.4	10.2	11.9		32.8		33.3				15.5
	PM		LOS			B	C	A		D		D				B
			Delay			19.0	25.7	7.5		54.3		48.8			17.0	
Cahaba River Road at Acton Road / Colonnade Pkwy	AM	Signal	LOS	F	E	n/a ²	E	A	F	E	D	n/a ²	D	E	n/a ²	E
			Delay	94.1	59.4	n/a ²	77.9	0.0	101.5	89.4	51.0	n/a ²	47.2	64.5	n/a ²	70.9
	PM		LOS	D	F	n/a ²	F	A	F	E	C	n/a ²	C	E	n/a ²	E
			Delay	50.6	90.4	n/a ²	91.2	0.0	97.8	75.6	30.8	n/a ²	27.2	70.9	n/a ²	71.5
Cahaba River Road at Healthy Way / Blue Lake Drive	AM	Signal	LOS	C	B	n/a ²	A	A	D	C	D	n/a ²	C	A	D	C
			Delay	21.0	12.2	n/a ²	7.8	0.0	42.4	31.7	40.7	n/a ²	31.7	0.0	35.9	31.4
	PM		LOS	B	E	n/a ²	F	A	B	F	D	n/a ²	E	A	F	E
			Delay	16.4	62.0	n/a ²	107.7	0.0	17.2	143.8	50.3	n/a ²	63.9	0.0	133.3	70.3
Cahaba River Road at Old 280 Ct / Colony Park Drive	AM	Signal	LOS	B	A	B	A	C	A	B	A	A	B	A	D	C
			Delay	11.6	0.0	13.7	10.0	23.7	9.5	17.5	0.0	0.0	16.5	0.0	38.9	22.2
	PM		LOS	B	A	B	B	B	A	C	A	A	C	A	D	B
			Delay	11.6	0.0	17.0	12.5	14.0	7.8	31.5	0.0	0.0	31.3	0.0	42.2	17.6
Cahaba River Road at Grandview Medical Center Access	AM	One-Way Stop	LOS	A	n/a ¹				n/a ¹				D		B	A
			Delay	9.3	n/a ¹				n/a ¹				32.9		13.4	1.8
	PM		LOS	A	n/a ¹				n/a ¹				F		B	A
			Delay	8.8	n/a ¹				n/a ¹			138.2		15.0	7.2	

Delay measured in seconds

n/a¹ - It is a free movement and hence no delay reported.

n/a² - HCM 6th Edition methodology does not calculate delay for yield-controlled channelized right at signalized intersections

n/a³ - LOS F due to v/c > 1

Table C-1: 2040 Build Alternative 1 – HCM Results

SimTraffic Results - 2040 Build Alternative 1																
Intersection	Time Period	Control	MOE	EB Movement			WB Movement			NB Movement			SB Movement			Overall
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Cahaba River Road at Dolly Ridge Road	AM	Signal	LOS	C	B	B	F	F	F	F	F	D	E	E	D	F
			Delay	21.7	16.9	13.8	209.9	210.8	235.5	214.1	80.8	37.0	56.5	57.0	35.2	131.8
	PM		LOS	C	B	B	F	F	F	F	F	F	E	E	D	F
			Delay	22.6	18.4	16.7	111.9	109.0	95.4	585.0	100.9	104.3	57.7	77.3	35.3	85.6
Cahaba River Road at Altadena Road	AM	Signal	LOS			B	B			D		B				E
			Delay			19.3	13.6			40.4		12.5				62.7
	PM		LOS			A	A	A	A	A		A				B
			Delay			7.4	0.7	1.3	6.1	1.4	0.3			17.2		
Cahaba River Road at Acton Road / Colonnade Pkwy	AM	Signal	LOS	F	E	B	F	F	F	E	E	A	C	E	A	E
			Delay	89.2	56.4	11.8	190.7	137.2	132.3	75.7	58.0	9.3	34.9	57.8	5.6	73.5
	PM		LOS	E	D	C	F	E	E	E	D	B	F	F	E	E
			Delay	63.1	48.9	30.3	132.2	70.6	63.7	60.9	35.6	12.9	87.2	137.1	79.8	71.2
Cahaba River Road at Healthy Way / Blue Lake Drive	AM	Signal	LOS	C	B	A	E	F	E	C	C	A	C	C	C	D
			Delay	34.5	17.4	9.2	89.5	82.7	78.1	34.1	31.5	2.8	32.5	30.8	21.4	61.1
	PM		LOS	E	E	D	F	C	C	F	F	E	F	F	E	E
			Delay	56.1	64.4	37.7	96.2	30.6	24.5	290.7	197.8	64.3	42.8	84.9	71.2	74.7
Cahaba River Road at Old 280 Ct / Colony Park Drive	AM	Signal	LOS	B	B	B	D	D	C	D	C	C	B		B	C
			Delay	19.8	14.0	12.7	37.5	51.0	32.7	48.5	28.3	25.9		15.6	14.8	29.8
	PM		LOS	C	B	B	C	B	B	D	B	C	D		B	B
			Delay	24.9	16.4	15.1	22.5	19.0	11.7	35.7	17.1	33.4		45.2	12.5	18.4
Cahaba River Road at Grandview Medical Center Access	AM	One-Way Stop	LOS	B	A				A	A			B		A	A
			Delay	10.2	6.9				1.6	2.3			14.0		1.2	4.3
	PM		LOS	B	A				A	A			D		A	A
			Delay	11.0	8.5				1.4	2.0			27.5		1.8	6.6

Table C-2: 2040 Build Alternative 1 – SimTraffic Results

HCM 6th Results - 2040 Build Alternative 2																
Intersection	Time Period	Control	MOE	EB Movement			WB Movement			NB Movement			SB Movement			Overall
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Cahaba River Road at Dolly Ridge Road	AM	Signal	LOS	A	A	C	B	B	B	D	A	D	D	A	D	B
			Delay	7.7	0.0	20.4	14.8	10.6	10.5	49.7	0.0	41.3	47.0	0.0	54.1	19.7
	PM		LOS	A	A	E	F	A	A	F	A	E	E	A	E	D
		Delay	3.9	0.0	61.9	175.5	4.9	4.8	192.9	0.0	75.6	64.4	0.0	67.2	54.1	
Cahaba River Road at Altadena Road	AM	Signal	LOS		B		B	A		C		C			B	
			Delay			14.4	10.3	4.5		33.0		33.5			12.2	
	PM		LOS		B		C	A		D		D			B	
		Delay			19.0	25.7	3.0		54.3		48.8			15.2		
Cahaba River Road at Acton Road / Colonnade Pkwy	AM	Signal	LOS	D	D	n/a ²	D	D	D	B	D	n/a ²	C	C	n/a ²	D
			Delay	47.0	52.0	n/a ²	53.0	37.8	38.0	19.8	55.0	n/a ²	28.1	28.1	n/a ²	40.2
	PM		LOS	D	E	n/a ²	E	C	C	E	C	n/a ²	C	D	n/a ²	D
		Delay	42.6	63.0	n/a ²	71.3	27.9	28.0	64.0	34.2	n/a ²	23.5	49.1	n/a ²	48.7	
Cahaba River Road at Healthy Way / Blue Lake Drive	AM	Signal	LOS	A	B	n/a ²	A	B	B	C	C	n/a ²	C	C	n/a ²	B
			Delay	8.9	14.4	n/a ²	8.8	13.3	13.4	23.7	30.6	n/a ²	23.9	26.4	n/a ²	15.0
	PM		LOS	B	E	n/a ²	D	B	B	E	D	n/a ²	E	E	n/a ²	D
		Delay	13.9	57.3	n/a ²	53.2	12.2	12.2	68.1	44.9	n/a ²	55.6	67.9	n/a ²	46.9	
Cahaba River Road at Old 280 Ct / Colony Park Drive	AM	Signal	LOS	A	A	B	B	B	A	B	A	A	B	A	C	B
			Delay	9.0	0.0	14.1	10.1	12.4	9.7	17.0	0.0	0.0	16.0	0.0	34.9	17.5
	PM		LOS	A	A	B	B	A	A	C	A	A	C	A	D	B
		Delay	6.4	0.0	17.3	12.7	9.5	8.0	30.0	0.0	0.0	29.9	0.0	39.4	15.6	
Cahaba River Road at Grandview Medical Center Access	AM	One-Way Stop	LOS	A	n/a ¹				n/a ¹				E		B	A
			Delay	9.3	n/a ¹				n/a ¹				35.5		10.7	1.7
	PM		LOS	A	n/a ¹				n/a ¹				F		B	A
		Delay	8.8	n/a ¹				n/a ¹				155.3		11.6	7.9	

Delay measured in seconds

n/a¹ - It is a free movement and hence no delay reported.

n/a² - HCM 6th Edition methodology does not calculate delay for yield-controlled channelized right at signalized intersections

n/a³ - LOS F due to v/c > 1

Table C-3: 2040 Build Alternative 2 – HCM Results

SimTraffic Results - 2040 Build Alternative 2																
Intersection	Time Period	Control	MOE	EB Movement			WB Movement			NB Movement			SB Movement			Overall
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Cahaba River Road at Dolly Ridge Road	AM	Signal	LOS	C	B	B	F	F	E	F	F	D	E	E	C	F
			Delay	23.4	17.7	13.8	282.1	234.4	72.0	317.9	94.2	46.9	59.5	79.2	27.7	180.6
	PM		LOS	C	B	B	F	E	D	F	F	F	D	E	B	E
		Delay	24.7	18.2	15.0	94.1	76.4	37.0	942.1	247.3	90.4	43.6	78.6	15.0	70.8	
Cahaba River Road at Altadena Road	AM	Signal	LOS		B	B	B	B		C		B			B	
			Delay			19.6	12.5	18.7	12.3		27.8		11.4			16.0
	PM		LOS		C	C	C	A		D		B			B	
		Delay			27.2	21.4	25.0	9.5		47.0		17.5		19.7		
Cahaba River Road at Acton Road / Colonnade Pkwy	AM	Signal	LOS	D	D	B	D	D	C	D	D	A	C	C	A	D
			Delay	47.5	42.9	11.0	49.9	39.6	30.9	51.9	52.1	7.0	30.3	33.5	2.9	40.1
	PM		LOS	D	D	C	E	C	B	E	C	B	D	E	B	D
		Delay	54.0	43.6	27.7	70.4	27.5	16.0	58.2	34.8	17.6	38.1	60.0	11.3	40.0	
Cahaba River Road at Healthy Way / Blue Lake Drive	AM	Signal	LOS	B	B	A	B	B	A	C	C	A	C	C	A	B
			Delay	19.4	16.6	8.4	12.9	11.4	8.7	21.7	25.0	2.6	25.4	25.8	1.1	13.5
	PM		LOS	D	E	C	D	B	A	E	D	C	E	E	A	D
		Delay	38.9	57.8	26.9	49.7	11.6	7.2	63.8	50.2	29.6	67.8	55.7	1.2	42.5	
Cahaba River Road at Old 280 Ct / Colony Park Drive	AM	Signal	LOS	B	B	A	B	A	A	B	A	A	B	A	A	B
			Delay	15.7	12.4	8.6	11.6	9.7	4.1	14.6	9.6	8.3	14.4	0.0	8.0	10.5
	PM		LOS	C	B	B	B	B	A	C	A	B	C	C	A	B
		Delay	21.6	17.6	14.8	18.6	10.6	5.2	33.3	0.0	15.9	30.4	25.8	6.9	15.4	
Cahaba River Road at Grandview Medical Center Access	AM	One-Way Stop	LOS	A	A				A	A			B		A	A
			Delay	9.2	6.6				0.8	2.4			11.5		1.1	3.8
	PM		LOS	B	A				A	A			E		A	A
		Delay	10.4	8.6				0.6	1.9			37.9		1.5	6.8	

Table C-4: 2040 Build Alternative 2 – SimTraffic Results

APPENDIX D: EXISTING CONDITIONS FIGURES



2111 Parkway Office Cir
Suite 100
Hoover, AL 35244
(205) 443-3080

NOT FOR CONSTRUCTION

REV.	DATE	DESCRIPTION	BY



REGIONAL PLANNING COMMISSION
OF GREATER BIRMINGHAM
IN COOPERATION WITH
JEFFERSON COUNTY, ALABAMA
CAHABA RIVER ROAD
APPLE FEASIBILITY STUDY

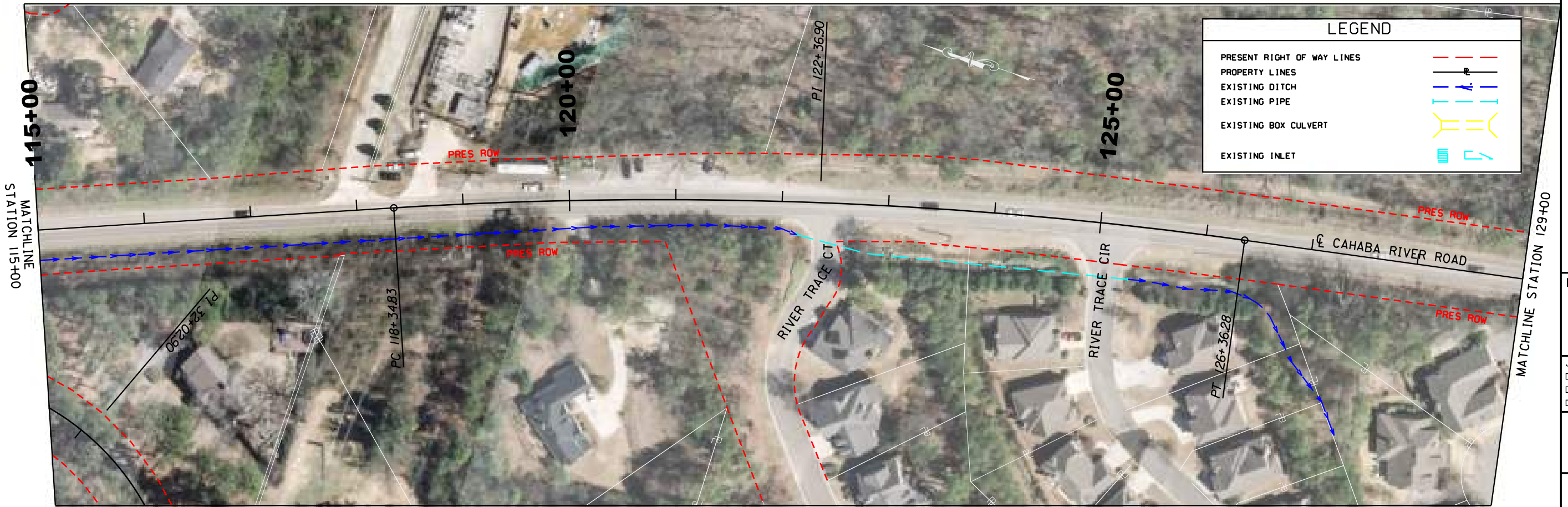
PLAN SHEET

JOB NO.: 17137010
DATE: 05/2018
DESIGNED BY: JMB
DRAWN BY: JMB

1 INCH = 30 FEET
BAR IS ONE INCH ON ORIGINAL DRAWING
0' 1" 2" 3" 4" 5" 6" 7" 8" 9" 10"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER

SHEET NUMBER **4**



LEGEND

- PRESENT RIGHT OF WAY LINES
- PROPERTY LINES
- EXISTING DITCH
- EXISTING PIPE
- EXISTING BOX CULVERT
- EXISTING INLET

\$\$\$USERS\$ \$FILES\$
\$\$\$ACCESS\$WORKSPACES\$
\$\$\$TIMES\$ \$\$\$\$



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NOT FOR CONSTRUCTION

REV.	DATE	DESCRIPTION	BY



REGIONAL PLANNING COMMISSION
OF GREATER BIRMINGHAM
IN COOPERATION WITH
JEFFERSON COUNTY, ALABAMA
CAHABA RIVER ROAD
APPLE FEASIBILITY STUDY

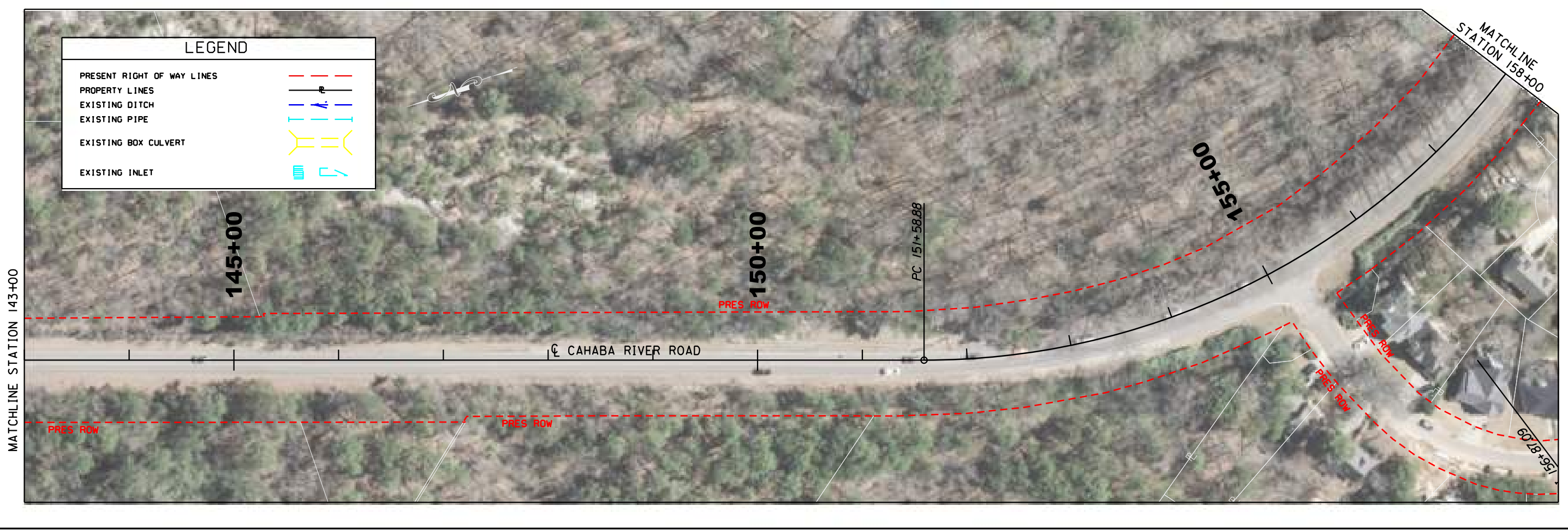
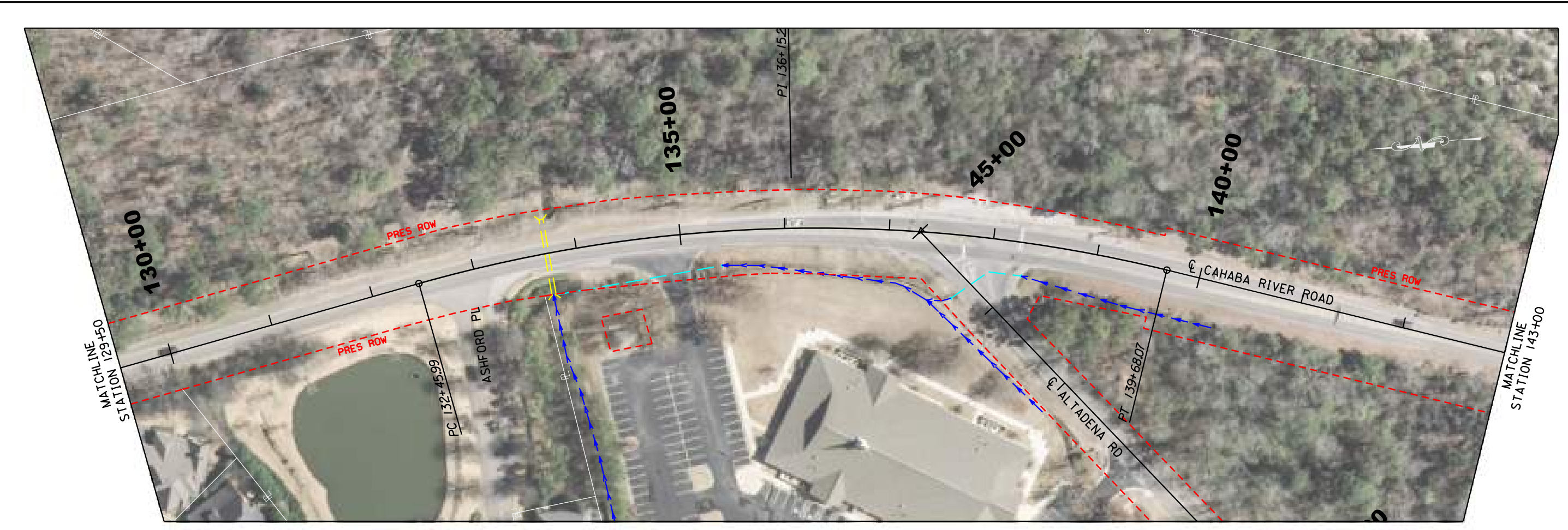
PLAN SHEET

JOB NO.: 17137010
DATE: 05/2018
DESIGNED BY: JMB
DRAWN BY: JMB

1 INCH = 30 FEET
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER

SHEET NUMBER **5**



LEGEND

PRESENT RIGHT OF WAY LINES	
PROPERTY LINES	
EXISTING DITCH	
EXISTING PIPE	
EXISTING BOX CULVERT	
EXISTING INLET	

\$\$\$DATE\$\$\$ \$\$\$\$TIME\$\$\$
\$\$\$USER\$\$\$ \$\$\$ACCESS\$\$\$WORKSPACES
\$\$\$FILES\$\$\$



2111 Parkway Office Cir
Suite 100
Hoover, AL 35244
(205) 443-3080

NOT FOR CONSTRUCTION

REV.	DATE	DESCRIPTION	BY



REGIONAL PLANNING COMMISSION
OF GREATER BIRMINGHAM
IN COOPERATION WITH
JEFFERSON COUNTY, ALABAMA
CAHABA RIVER ROAD
APPLE FEASIBILITY STUDY

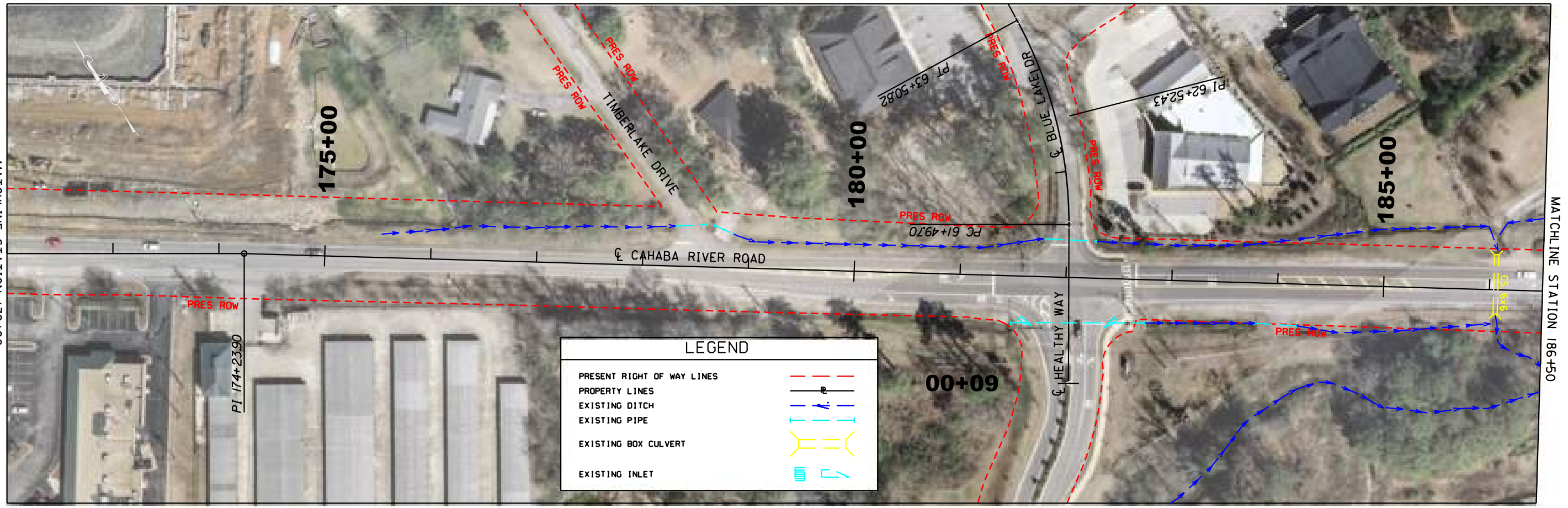
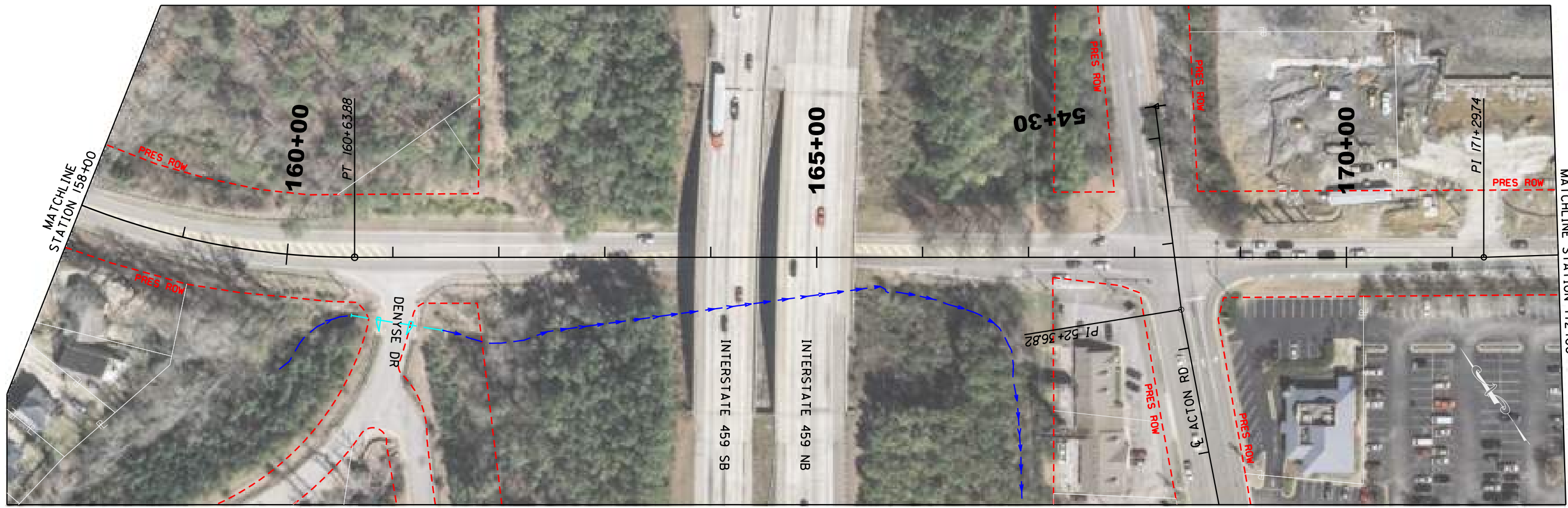
PLAN SHEET

JOB NO.: 17137010
DATE: 05/2018
DESIGNED BY: JMB
DRAWN BY: JMB

1 INCH = 30 FEET
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER

SHEET NUMBER **6**



LEGEND

PRESENT RIGHT OF WAY LINES	
PROPERTY LINES	
EXISTING DITCH	
EXISTING PIPE	
EXISTING BOX CULVERT	
EXISTING INLET	

\$\$\$USERS\$ \$FILES\$
\$\$\$ACCESS\$WORKSPACES\$ \$FILES\$
\$\$\$DATES\$ \$STIMSS\$



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NOT FOR CONSTRUCTION

REV.	DATE	DESCRIPTION	BY



REGIONAL PLANNING COMMISSION
OF GREATER BIRMINGHAM
IN COOPERATION WITH
JEFFERSON COUNTY, ALABAMA
CAHABA RIVER ROAD
APPLE FEASIBILITY STUDY

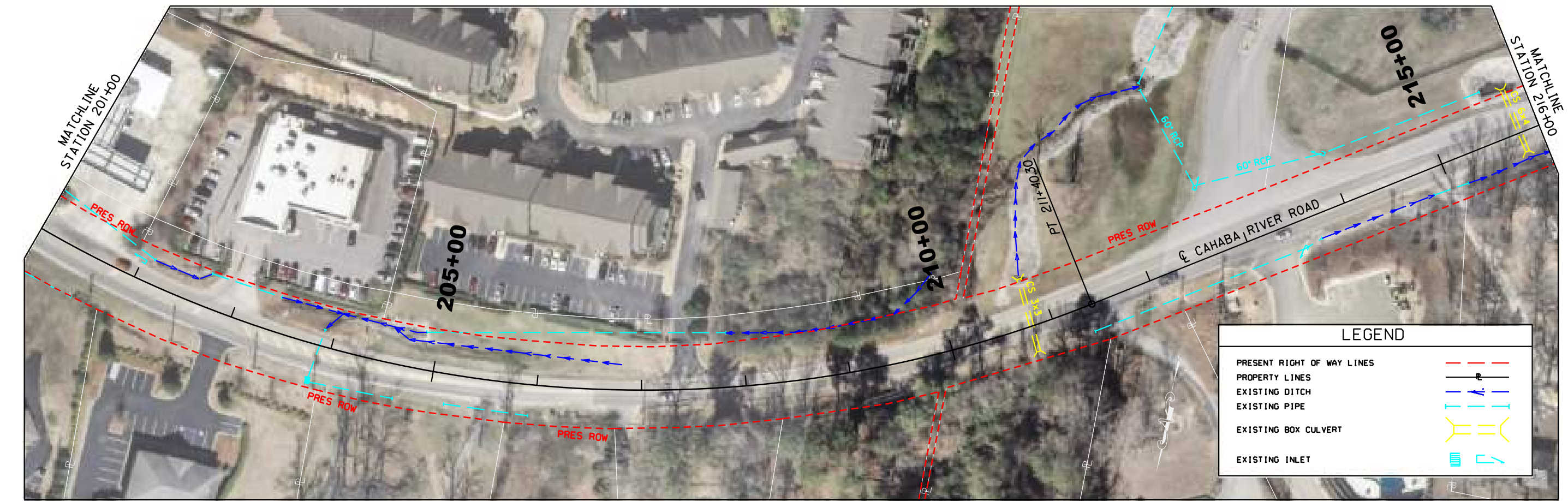
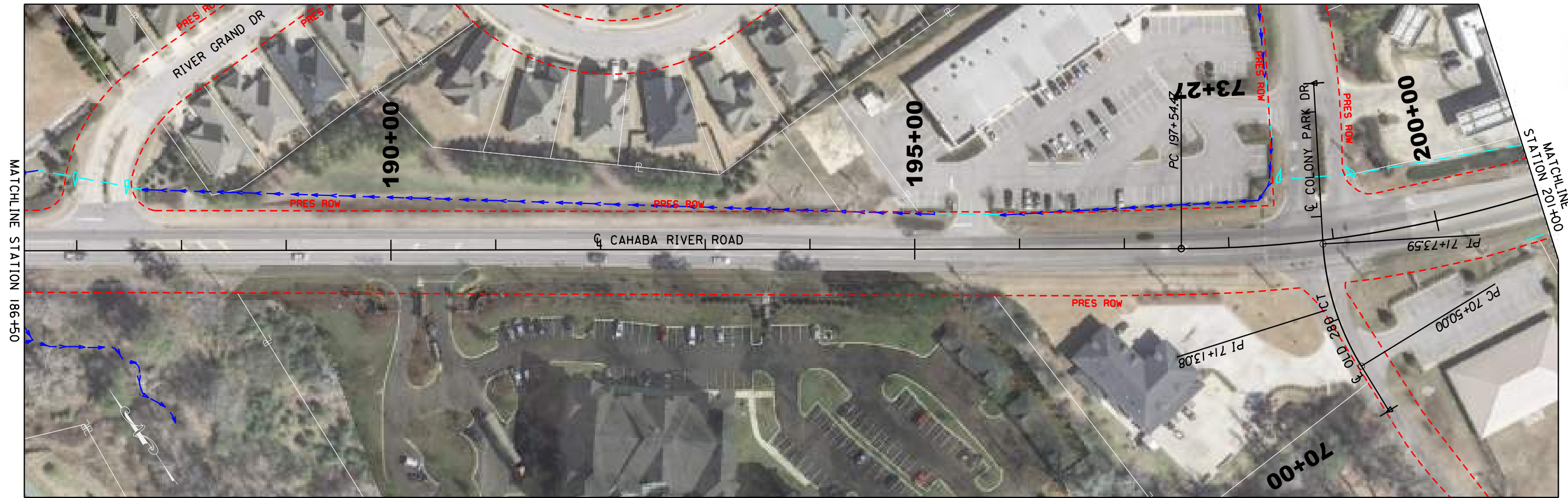
PLAN SHEET

JOB NO.: 17137010
DATE: 05/2018
DESIGNED BY: JMB
DRAWN BY: JMB

1 INCH = 30 FEET
BAR IS ONE INCH ON ORIGINAL DRAWING
0' 1" = 1' IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER

SHEET NUMBER **7**



LEGEND	
PRESENT RIGHT OF WAY LINES	
PROPERTY LINES	
EXISTING DITCH	
EXISTING PIPE	
EXISTING BOX CULVERT	
EXISTING INLET	

\$\$\$BUSINESS ACCESSWORKSPACES
\$\$\$DATESS \$\$\$\$TIMESS
\$\$\$FILES



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REV.	DATE	DESCRIPTION	BY



REGIONAL PLANNING COMMISSION
OF GREATER BIRMINGHAM
IN COOPERATION WITH
JEFFERSON COUNTY, ALABAMA
CAHABA RIVER ROAD
APPLE FEASIBILITY STUDY

PLAN SHEET

JOB NO.: 17137010
DATE: 05/2018
DESIGNED BY: JMB
DRAWN BY: JMB

1 INCH = 30 FEET
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER

SHEET NUMBER **8**



LEGEND	
PRESENT RIGHT OF WAY LINES	
PROPERTY LINES	
EXISTING DITCH	
EXISTING PIPE	
EXISTING BOX CULVERT	
EXISTING INLET	

\$\$\$USERS\$ \$SDATES\$ \$STIMES\$
\$\$\$ACCESS\$WORKSPACES\$
\$\$\$FILES\$



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CAHABA RIVER ROAD
APPLE FEASIBILITY STUDY

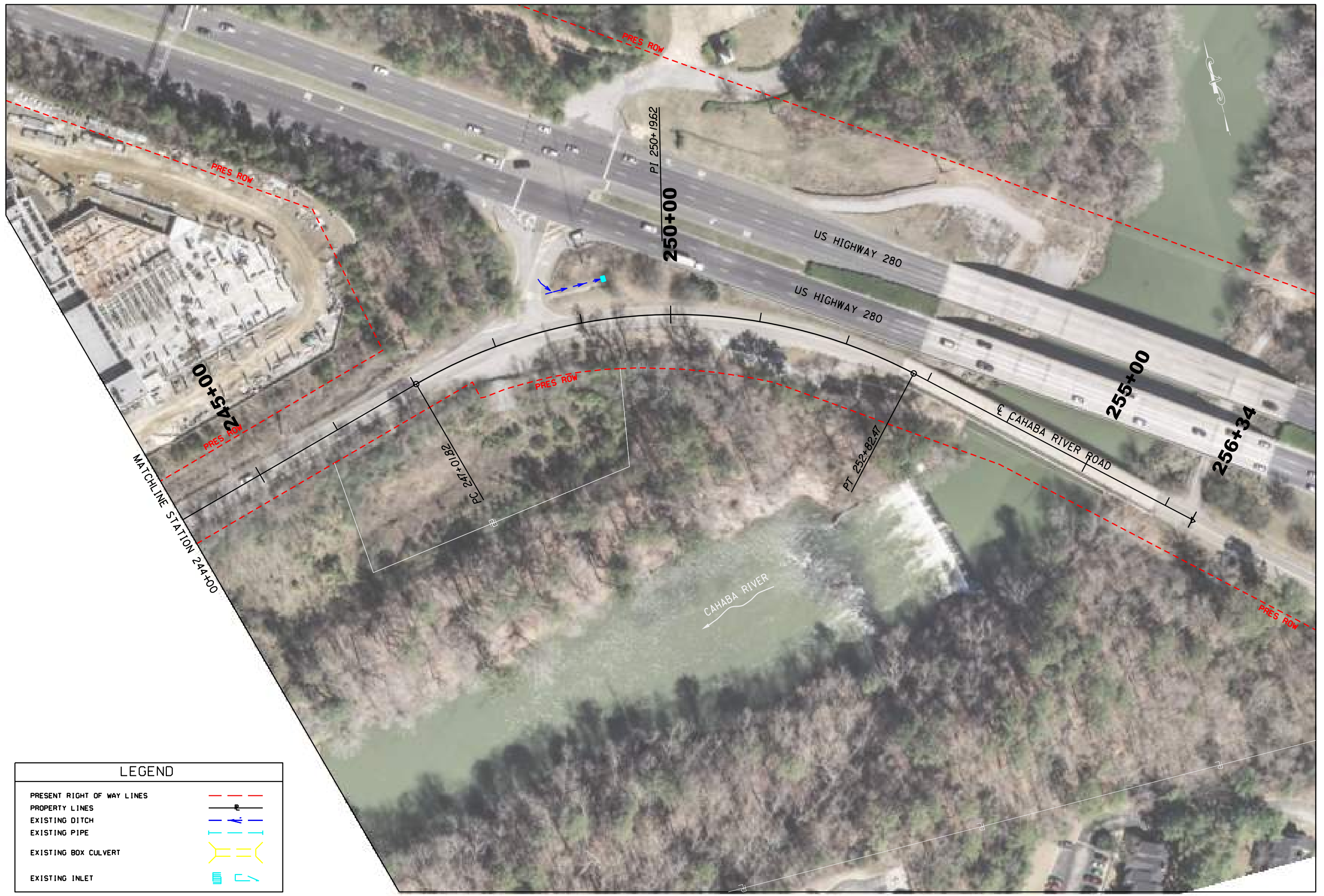
PLAN SHEET

JOB NO.: 17137010
DATE: 05/2018
DESIGNED BY: JMB
DRAWN BY: JMB

1 INCH = 30 FEET
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER

SHEET NUMBER **9**



LEGEND	
PRESENT RIGHT OF WAY LINES	
PROPERTY LINES	
EXISTING DITCH	
EXISTING PIPE	
EXISTING BOX CULVERT	
EXISTING INLET	

\$\$\$USERS\$ \$SDATES\$ \$STMESS\$
\$\$\$ACCESS\$WORKSPACES\$
\$\$\$FILES\$

APPENDIX E: PROPOSED IMPROVEMENTS FIGURES



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CAHABA RIVER ROAD
APPLE FEASIBILITY STUDY

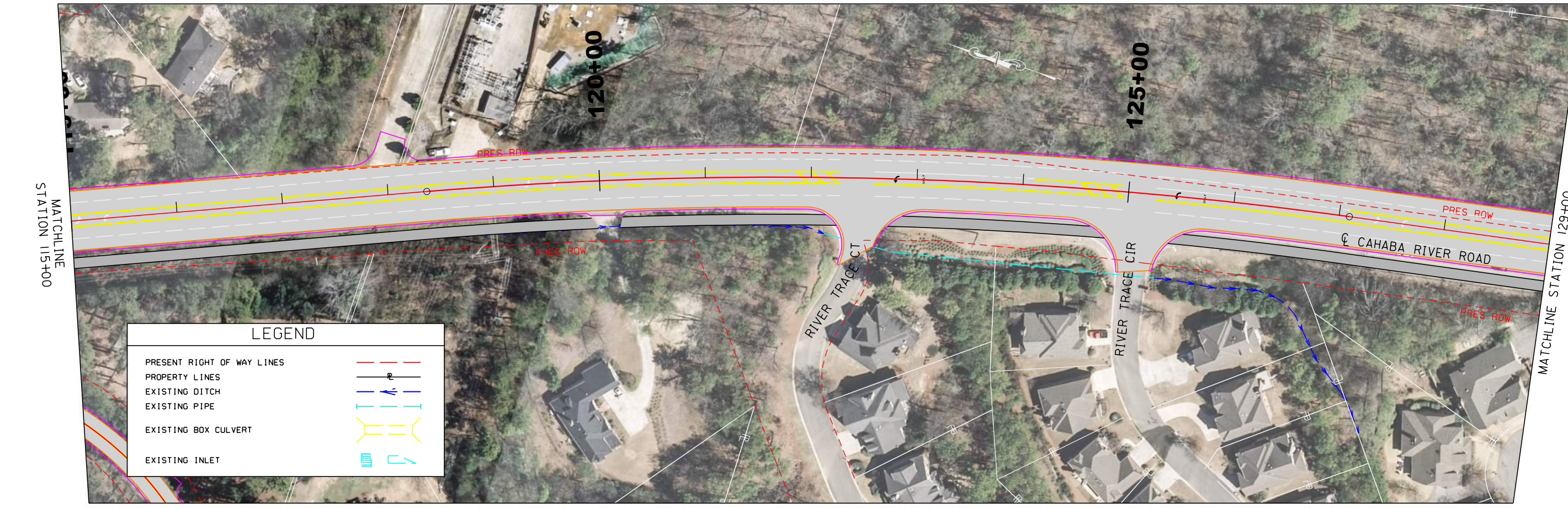
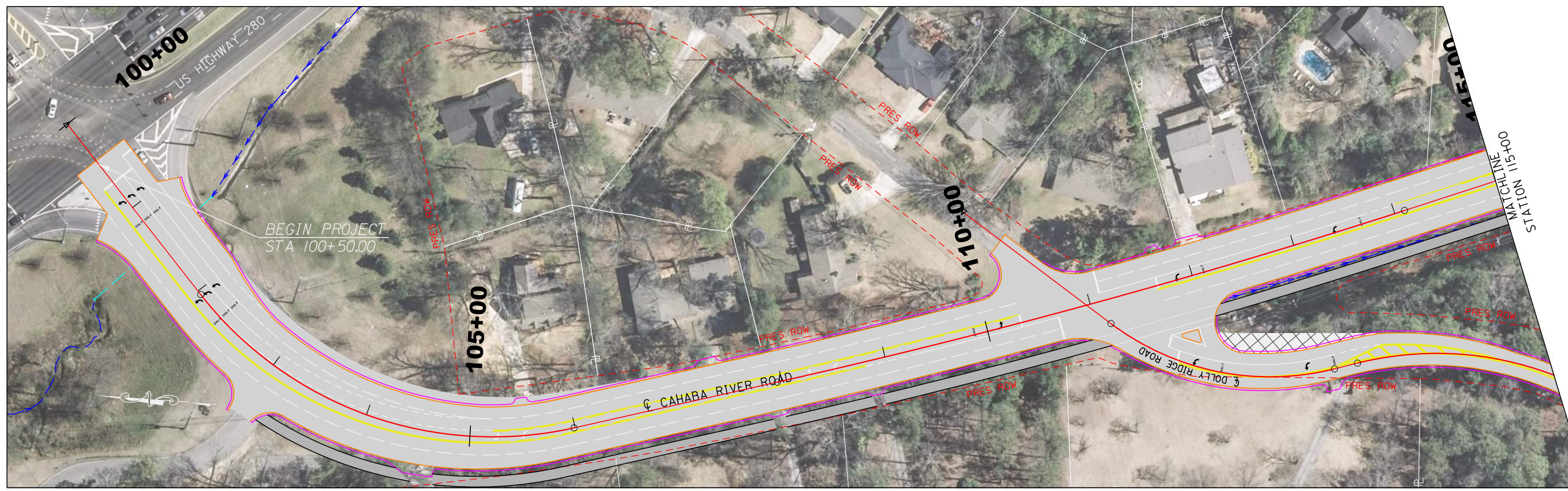
PROPOSED IMPROVEMENTS MAP

JOB NO.: 17137010
DATE: 12/2018
DESIGNED BY: JMB
DRAWN BY: JMB

1 INCH = 30 FEET
BAR IS ONE INCH ON ORIGINAL DRAWING
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DRAWING NUMBER

SHEET NUMBER **4**



LEGEND

PRESENT RIGHT OF WAY LINES	
PROPERTY LINES	
EXISTING DITCH	
EXISTING PIPE	
EXISTING BOX CULVERT	
EXISTING INLET	

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IN COOPERATION WITH
JEFFERSON COUNTY, ALABAMA
CAHABA RIVER ROAD
APPLE FEASIBILITY STUDY

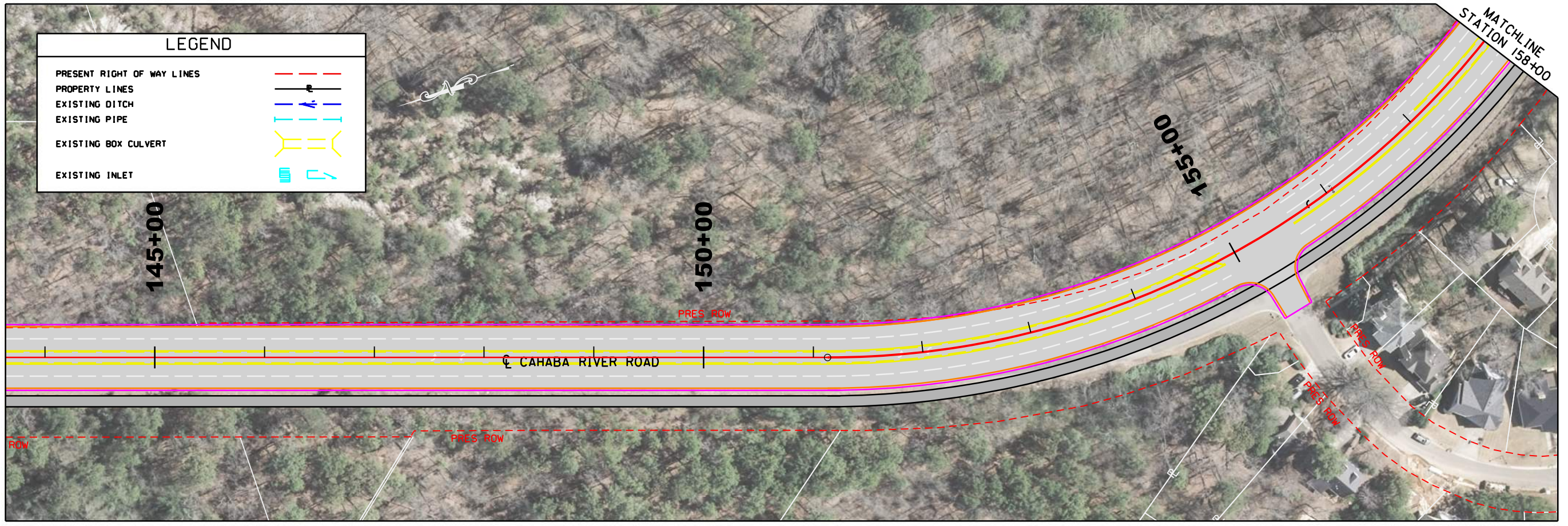
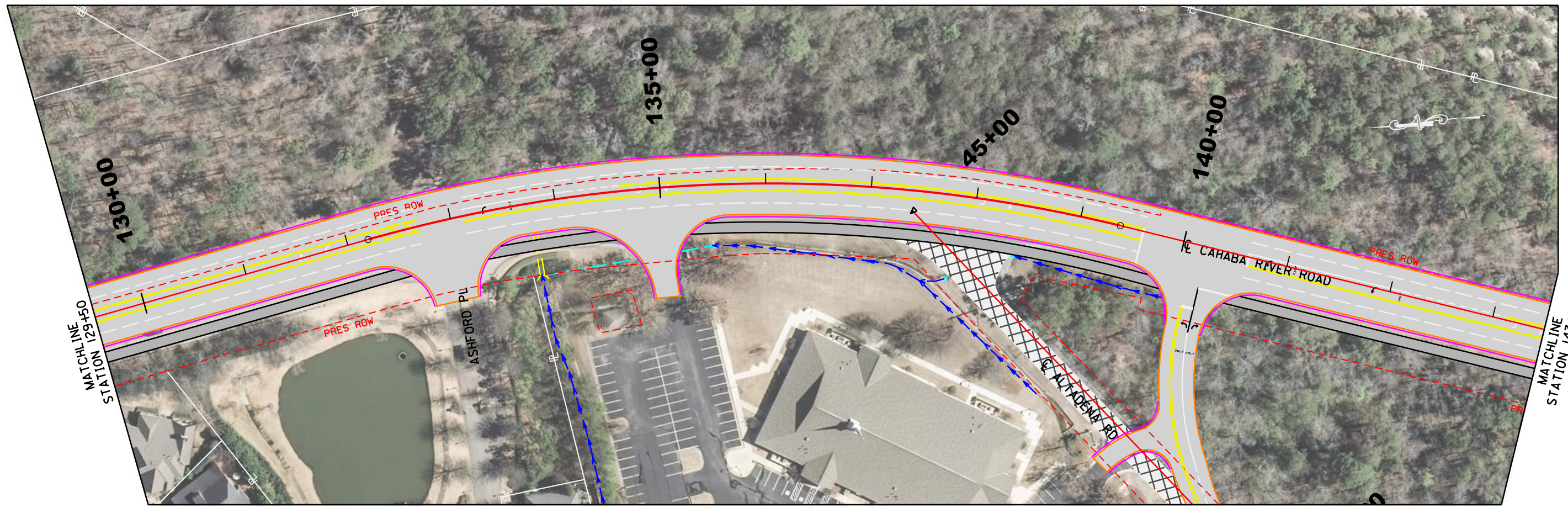
PROPOSED IMPROVEMENTS MAP

JOB NO.: 17137010
DATE: 12/2018
DESIGNED BY: JMB
DRAWN BY: JMB

1 INCH = 30 FEET
BAR IS ONE INCH ON ORIGINAL DRAWING
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DRAWING NUMBER

SHEET NUMBER **5**



LEGEND

- PRESENT RIGHT OF WAY LINES: Red dashed line
- PROPERTY LINES: Black solid line with 'P'
- EXISTING DITCH: Blue dashed line with 'D'
- EXISTING PIPE: Blue dashed line with 'P'
- EXISTING BOX CULVERT: Yellow dashed line with 'C'
- EXISTING INLET: Blue dashed line with 'I'

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JEFFERSON COUNTY, ALABAMA
CAHABA RIVER ROAD
APPLE FEASIBILITY STUDY

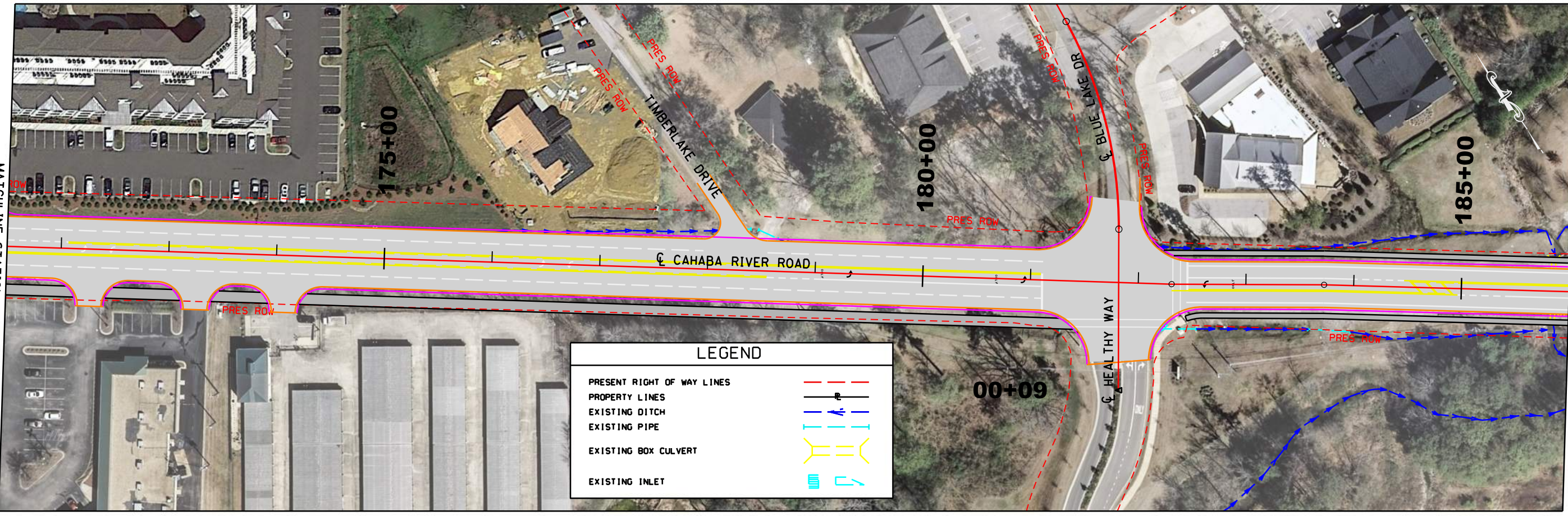
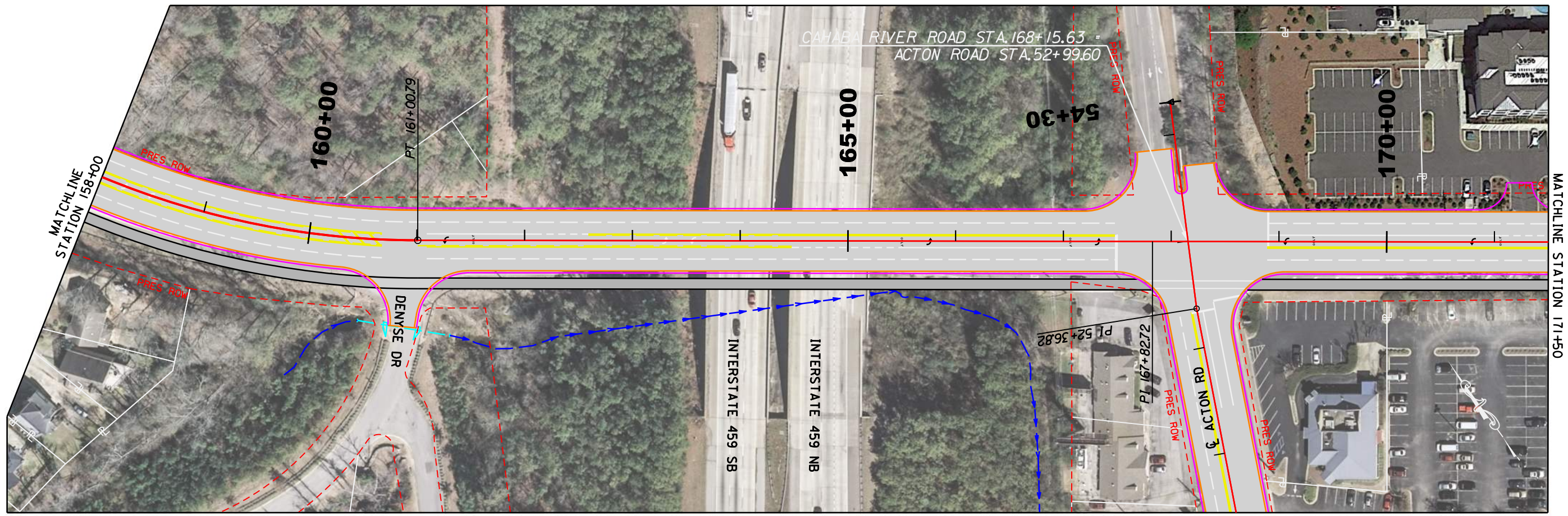
PROPOSED IMPROVEMENTS MAP

JOB NO.: 17137010
DATE: 12/2018
DESIGNED BY: JMB
DRAWN BY: JMB

1 INCH = 30 FEET
BAR IS ONE INCH ON ORIGINAL DRAWING
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DRAWING NUMBER

SHEET NUMBER **6**



LEGEND

- PRESENT RIGHT OF WAY LINES: Red dashed line
- PROPERTY LINES: Black dashed line
- EXISTING DITCH: Blue dashed line with arrow
- EXISTING PIPE: Blue dashed line with T-junction
- EXISTING BOX CULVERT: Yellow dashed line with T-junction
- EXISTING INLET: Cyan dashed line with T-junction

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IN COOPERATION WITH
JEFFERSON COUNTY, ALABAMA
CAHABA RIVER ROAD
APPLE FEASIBILITY STUDY

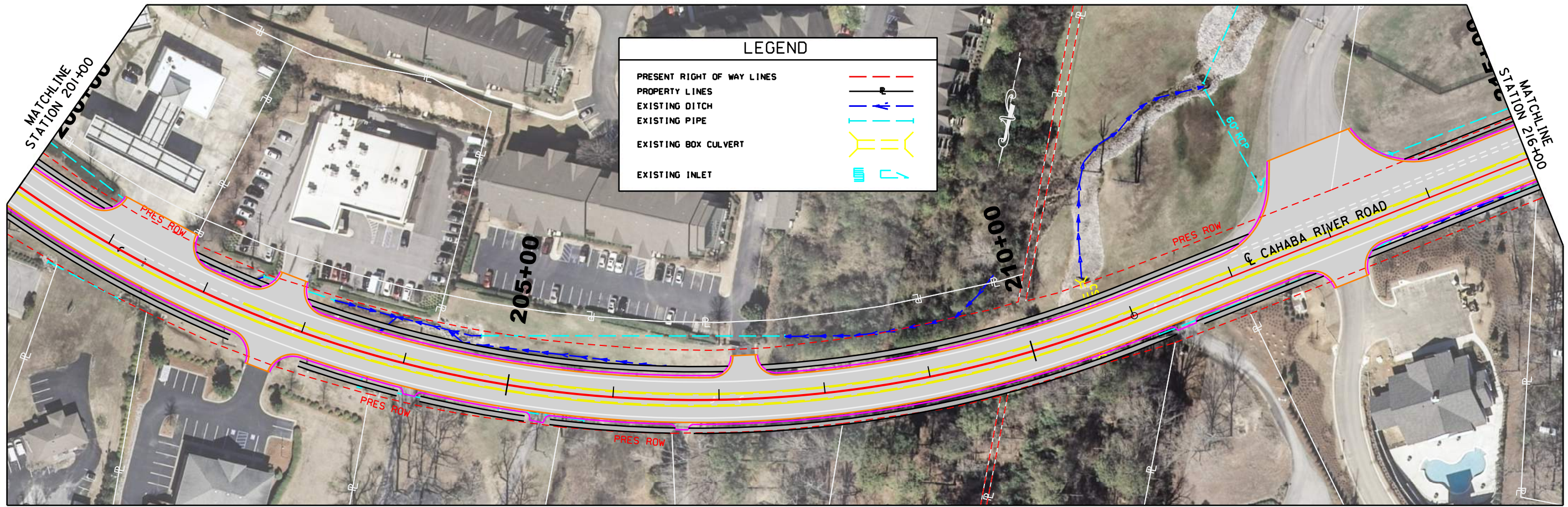
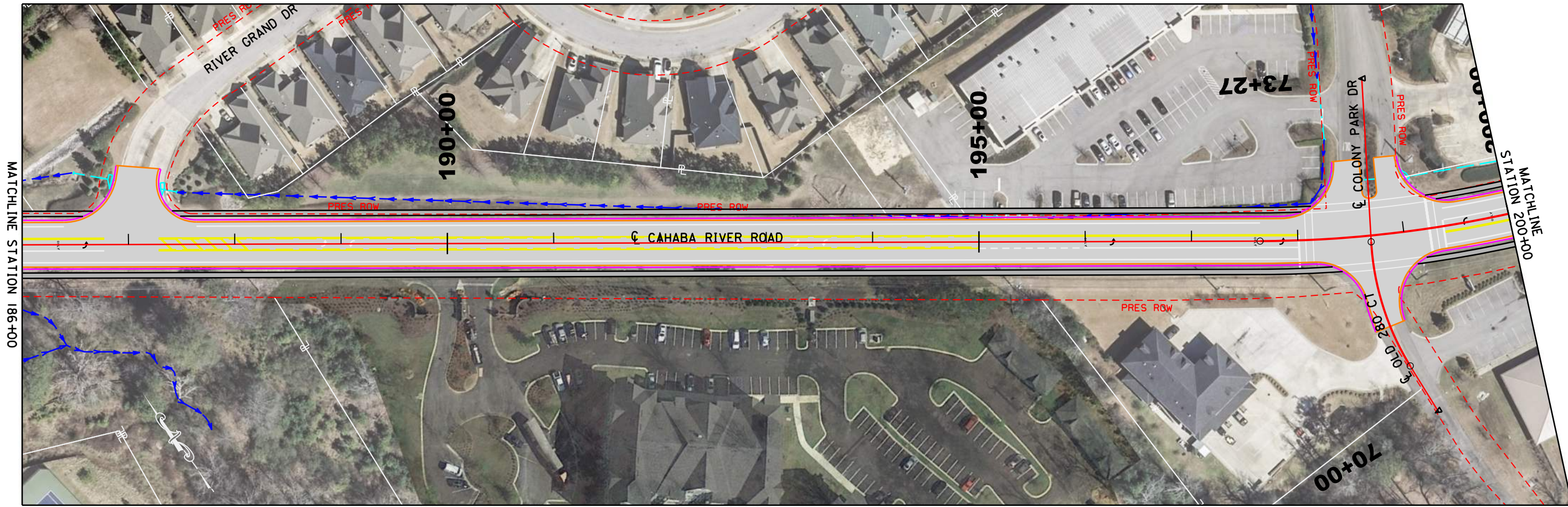
PROPOSED IMPROVEMENTS MAP

JOB NO.: 17137010
DATE: 12/2018
DESIGNED BY: JMB
DRAWN BY: JMB

1 INCH = 30 FEET
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER

SHEET NUMBER **7**



LEGEND	
PRESENT RIGHT OF WAY LINES	
PROPERTY LINES	
EXISTING DITCH	
EXISTING PIPE	
EXISTING BOX CULVERT	
EXISTING INLET	

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REGIONAL PLANNING COMMISSION
OF GREATER BIRMINGHAM
IN COOPERATION WITH
JEFFERSON COUNTY, ALABAMA
CAHABA RIVER ROAD
APPLE FEASIBILITY STUDY

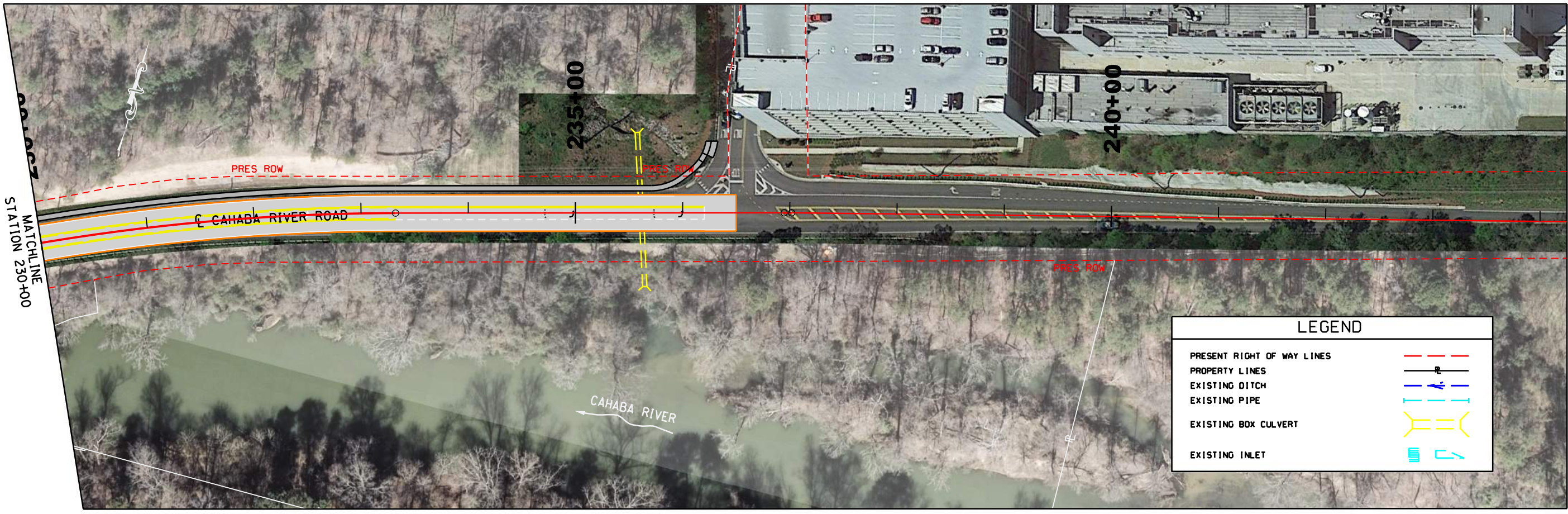
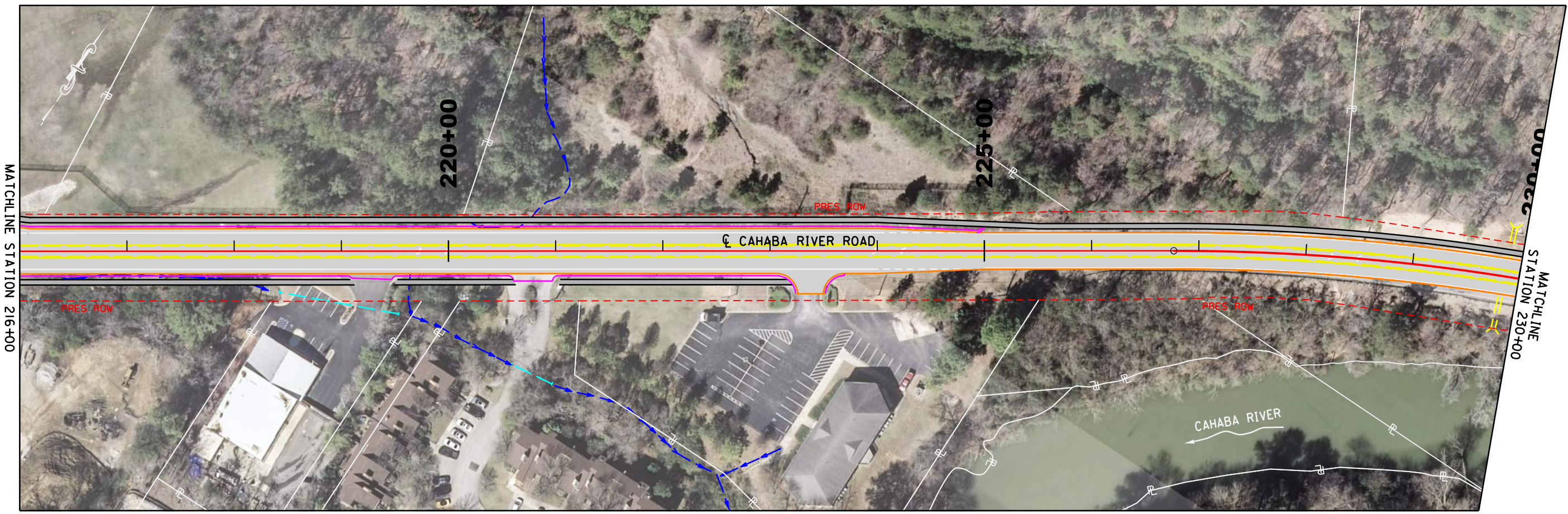
PROPOSED IMPROVEMENTS MAP

JOB NO.: 17137010
DATE: 12/2018
DESIGNED BY: JMB
DRAWN BY: JMB

1 INCH = 30 FEET
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER

SHEET NUMBER **8**



LEGEND

- PRESENT RIGHT OF WAY LINES
- PROPERTY LINES
- EXISTING DITCH
- EXISTING PIPE
- EXISTING BOX CULVERT
- EXISTING INLET

APPENDIX F: REASONABLE ALTERNATIVE LOCATION COST ESTIMATES



Cahaba River Road Corridor Study
Preliminary Location Cost Estimate
 2040 Build Alternative 1

Item of Work	Unit	Quantity	Cost	Extension
Base and Surface	S.Y.	25057	\$96.00	\$2,405,472.00
Grade and Drain	S.Y.	25057	\$38.00	\$952,166.00
Shared Use Path	S.Y.	7223	\$15.00	\$108,345.00
Overlay	S.Y.	40483	\$15.00	\$607,245.00
Sidewalk	S.Y.	8556	\$35.00	\$299,460.00
Curb and Gutter	L.F.	28400	\$15.00	\$426,000.00
Storm Drain	L.F.	22720	\$60.00	\$1,363,200.00
Inlets	Each	142	\$3,750.00	\$532,500.00
Retaining Wall	S.F.	400	\$40.00	\$16,000.00
Signing (4 lane x 4 lane)	Intersection	2	\$40,000.00	\$80,000.00
Signing (4 lane x 2 lane)	Intersection	3	\$30,000.00	\$90,000.00
Traffic Handling	Intersection	5	\$3,500.00	\$17,500.00
SUBTOTAL				\$6,897,888.00
Mobilization (9.7%)				\$669,095.14
Engineering Controls (1.3%)				\$89,672.54
Construction Engineering and Inspection (15%)				\$1,148,498.35
CONSTRUCTION TOTAL				\$8,805,154.03
Utility Cost	Mile	1.5	\$1,700,000.00	\$2,550,000.00
Right of Way Cost	Mile	1.5	\$1,500,000.00	\$2,250,000.00
ESTIMATED PROJECT TOTAL				\$13,605,154.03



Cahaba River Road Corridor Study
Preliminary Location Cost Estimate
 2040 Build Alternative 2

Item of Work	Unit	Quantity	Cost	Extension
Base and Surface	S.Y.	35945	\$96.00	\$3,450,720.00
Grade and Drain	S.Y.	35945	\$38.00	\$1,365,910.00
Shared Use Path	S.Y.	8778	\$15.00	\$131,670.00
Sidewalk	S.Y.	7000	\$35.00	\$245,000.00
Curb and Gutter	L.F.	28400	\$15.00	\$426,000.00
Storm Drain	L.F.	22720	\$60.00	\$1,363,200.00
Inlets	Each	142	\$3,750.00	\$532,500.00
Overlay	S.Y.	40483	\$15.00	\$607,245.00
Retaining Wall	S.F.	400	\$40.00	\$16,000.00
Signing (4 lane x 4 lane)	Intersection	2	\$40,000.00	\$80,000.00
Signing (4 lane x 2 lane)	Intersection	3	\$30,000.00	\$90,000.00
Traffic Handling	Intersection	5	\$3,500.00	\$17,500.00
SUBTOTAL				\$8,325,745.00
Mobilization (9.7%)				\$807,597.27
Engineering Controls (1.3%)				\$108,234.69
Construction Engineering and Inspection (15%)				\$1,386,236.54
CONSTRUCTION TOTAL				\$10,627,813.49
Utility Cost	Mile	1.5	\$1,700,000.00	\$2,550,000.00
Right of Way Cost	Mile	1.5	\$1,500,000.00	\$2,250,000.00
ESTIMATED PROJECT TOTAL				\$15,427,813.49



Cahaba River Road Corridor Study
Preliminary Location Cost Estimate
 2040 Build Alternative 3

Item of Work	Unit	Quantity	Cost	Extension
Base and Surface	S.Y.	49597	\$96.00	\$4,761,312.00
Grade and Drain	S.Y.	49597	\$38.00	\$1,884,686.00
Shared Use Path	S.Y.	7778	\$15.00	\$116,670.00
Sidewalk	S.Y.	4783	\$35.00	\$167,405.00
Curb and Gutter	L.F.	24930	\$15.00	\$373,950.00
Storm Drain	L.F.	22720	\$60.00	\$1,363,200.00
Inlets	Each	142	\$3,750.00	\$532,500.00
Overlay	S.Y.	40483	\$15.00	\$607,245.00
Retaining Wall	S.F.	10000	\$40.00	\$400,000.00
Signing (4 lane x 4 lane)	Intersection	2	\$40,000.00	\$80,000.00
Signing (4 lane x 2 lane)	Intersection	3	\$30,000.00	\$90,000.00
Traffic Handling	Intersection	5	\$3,500.00	\$17,500.00
SUBTOTAL				\$10,394,468.00
Mobilization (9.7%)				\$1,008,263.40
Engineering Controls (1.3%)				\$135,128.08
Construction Engineering and Inspection (15%)				\$1,730,678.92
CONSTRUCTION TOTAL				\$13,268,538.40
Utility Cost	Mile	1.5	\$1,700,000.00	\$2,550,000.00
Right of Way Cost	Mile	1.5	\$1,500,000.00	\$2,250,000.00
ESTIMATED PROJECT TOTAL				\$18,068,538.40

APPENDIX G: PREFERRED ALTERNATE COST ESTIMATE

Estimate Cahaba River Rd

Estimated Cost:\$11,084,132.50

Contingency: 15.00%

Estimated Total: \$12,746,752.37

Base Date: 12/10/18

Spec Year: 18

Unit System: E

Work Type: Roadway Widening, Add'l Lanes, Pass Lane

Highway Type: UNDIVIDED/COLLECTOR (MAJOR)

Urban/Rural Type: BIRMINGHAM

Season: WINTER

County: JEFFERSON

Latitude of Midpoint: 0

Longitude of Midpoint: 0

District: 03

Federal Project Number:

State Project Number:

Prepared by System Administrator

<u>Line #</u>	<u>Item Number</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Price</u>	<u>Extension</u>
<u>Description</u>					
<u>Supplemental Description</u>					
Group 0001: Initial Group					
0005	201A000	1.000	LS	\$224,000.00000	\$224,000.00
Clearing & Grubbing (Approximately 56 acres) (\$4000 per acre max bid)					
0006	206B009	1.000	LS	\$5,000.00000	\$5,000.00
Removal Of Old Box Culvert, Partial, Station 133+85)					
0007	206B010	1.000	LS	\$10,000.00000	\$10,000.00
Removal Of Old Box Culvert, Partial, Station 185+85)					
0008	206B011	1.000	LS	\$50,000.00000	\$50,000.00
Removal Of Old Box Culvert, Partial, Station 215+65)					
0009	206C010	78.000	SQYD	\$30.50000	\$2,379.00
Removing Concrete Driveway					
0010	206D000	939.000	LF	\$10.00000	\$9,390.00
Removing Pipe					
0011	206D001	1,743.000	LF	\$3.00000	\$5,229.00
Removing Guardrail					
0012	206D003	2,884.000	LF	\$8.25000	\$23,793.00
Removing Curb And Gutter					
0013	206E000	21.000	Each	\$260.00000	\$5,460.00
Removing Headwalls					
0014	206E001	8.000	Each	\$650.00000	\$5,200.00
Removing Inlets					
0015	206E002	2.000	Each	\$1,000.00000	\$2,000.00
Removing Junction Boxes					
0016	206E008	6.000	Each	\$350.00000	\$2,100.00
Removing Guardrail End Anchor (All Type)					
0017	206E042	5.000	Each	\$615.00000	\$3,075.00
Removing Inlets (Partial)					
0018	210A000	224,202.000	CUYD	\$5.25000	\$1,177,060.50
Unclassified Excavation					
0019	210D000	35,541.000	CUYD	\$11.25000	\$399,836.25
Borrow Excavation					
0020	214A000	17,323.000	CUYD	\$7.75000	\$134,253.25
Structure Excavation					

<u>Line #</u>	<u>Item Number</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Price</u>	<u>Extension</u>
<u>Description</u>					
<u>Supplemental Description</u>					
0021	214B001 Foundation Backfill, Commercial	5,197.000	CUYD	\$38.00000	\$197,486.00
0022	231B002 Roadbed Stabilizing Material, ALDOT #410 (Modified)	13,540.000	Ton	\$25.00000	\$338,500.00
0023	301A004 Crushed Aggregate Base Course, Type B, Plant Mixed, 4" Compacted Thickness	9,369.000	SQYD	\$6.50000	\$60,898.50
0024	301A012 Crushed Aggregate Base Course, Type B, Plant Mixed, 6" Compacted Thickness	49,597.000	SQYD	\$11.00000	\$545,567.00
0026	401A000 Bituminous Treatment A	87,200.000	SQYD	\$1.00000	\$87,200.00
0027	405A000 Tack Coat	17,379.000	Gal	\$3.50000	\$60,826.50
0028	407B000 Joint Sealant For Hot Mix Asphalt Pavement	11.000	Mile	\$300.00000	\$3,300.00
0029	408A051 Planing Existing Pavement (Approximately 0.00" Thru 1.0" Thick)	2,751.000	SQYD	\$3.00000	\$8,253.00
0030	410H000 Material Remixing Device	1.000	Each	\$29,500.00000	\$29,500.00
0031	424A360 Superpave Bituminous Concrete Wearing Surface Layer, 1/2" Maximum Aggregate Size Mix, ESAL Range C/D	7,735.000	Ton	\$75.00000	\$580,125.00
0032	424B650 Superpave Bituminous Concrete Upper Binder Layer, 3/4" Maximum Aggregate Size Mix, ESAL Range C/D	6,917.000	Ton	\$70.00000	\$484,190.00
0033	424B681 Superpave Bituminous Concrete Lower Binder Layer, 1" Maximum Aggregate Size Mix, ESAL Range C/D	10,557.000	Ton	\$60.00000	\$633,420.00
0034	424B684 Superpave Bituminous Concrete Lower Binder Layer, Patching, 3/4" Maximum Aggregate Size Mix, ESAL Range C/D	500.000	Ton	\$115.00000	\$57,500.00
0035	424B689 Superpave Bituminous Concrete Lower Binder Layer, Leveling, 1" Maximum Aggregate Size Mix, ESAL Range C/D	2,500.000	Ton	\$85.00000	\$212,500.00
0036	430B003 Aggregate Surfacing (ALDOT #57)	500.000	Ton	\$35.00000	\$17,500.00
0037	502A000 Steel Reinforcement	18,782.000	LB	\$1.25000	\$23,477.50

<u>Line #</u>	<u>Item Number</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Price</u>	<u>Extension</u>
<u>Description</u>					
<u>Supplemental Description</u>					
0038	524B010 Culvert Concrete Extension	128.000	CUYD	\$750.00000	\$96,000.00
0039	529A010 Retaining Wall	14,804.000	SQFT	\$75.00000	\$1,110,300.00
0040	530A002 24" Roadway Pipe (Class 3 R.C.)	150.000	LF	\$65.00000	\$9,750.00
0041	530A004 36" Roadway Pipe (Class 3 R.C.)	250.000	LF	\$85.00000	\$21,250.00
0042	530A005 42" Roadway Pipe (Class 3 R.C.)	74.000	LF	\$110.00000	\$8,140.00
0043	533A098 18" Storm Sewer Pipe (Class 3 R.C.)	14,005.000	LF	\$35.00000	\$490,175.00
0044	533A099 24" Storm Sewer Pipe (Class 3 R.C.)	2,241.000	LF	\$49.25000	\$110,369.25
0045	533A100 30" Storm Sewer Pipe (Class 3 R.C.)	747.000	LF	\$70.00000	\$52,290.00
0046	533A101 36" Storm Sewer Pipe (Class 3 R.C.)	1,681.000	LF	\$75.00000	\$126,075.00
0047	533A103 48" Storm Sewer Pipe (Class 3 R.C.)	402.000	LF	\$90.00000	\$36,180.00
0048	600A000 Mobilization	1.000	LS	\$750,000.00000	\$750,000.00
0049	601A000 Furnishing Base, Soil And Structure Laboratories	1.000	Each	\$15,000.00000	\$15,000.00
0050	602A000 Right Of Way Markers	50.000	Each	\$300.00000	\$15,000.00
0051	603A001 Furnishing Type 2 Field Office	1.000	Each	\$10,000.00000	\$10,000.00
0052	610C001 Loose Riprap, Class 2	560.000	Ton	\$55.00000	\$30,800.00
0053	610D003 Filter Blanket, Geotextile	4,534.000	SQYD	\$2.75000	\$12,468.50

<u>Line #</u>	<u>Item Number</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Price</u>	<u>Extension</u>
<u>Description</u>					
<u>Supplemental Description</u>					
0054	614A000 Slope Paving	500.000	CUYD	\$330.00000	\$165,000.00
0055	618A000 Concrete Sidewalk, 4" Thick	4,783.000	SQYD	\$50.00000	\$239,150.00
0056	618B003 Concrete Driveway, 6" Thick (Includes Wire Mesh)	489.000	SQYD	\$65.00000	\$31,785.00
0057	619A002 18" Roadway Pipe End Treatment, Class 1	2.000	Each	\$875.00000	\$1,750.00
0058	619A003 24" Roadway Pipe End Treatment, Class 1	6.000	Each	\$930.00000	\$5,580.00
0059	619A005 36" Roadway Pipe End Treatment, Class 1	1.000	Each	\$1,315.00000	\$1,315.00
0060	619A006 42" Roadway Pipe End Treatment, Class 1	2.000	Each	\$1,250.00000	\$2,500.00
0061	619A007 48" Roadway Pipe End Treatment, Class 1	1.000	Each	\$2,000.00000	\$2,000.00
0062	620A000 Minor Structure Concrete	10.000	CUYD	\$1,100.00000	\$11,000.00
0063	621A011 Junction Boxes, Type 1 Or 1P	25.000	Each	\$2,700.00000	\$67,500.00
0064	621B002 Junction Box Units, Type 4 Or 2P	5.000	Each	\$1,650.00000	\$8,250.00
0065	621B011 Junction Box Units, Type 1 Or 1P	5.000	Each	\$600.00000	\$3,000.00
0066	621C001 Inlets, Type B	5.000	Each	\$2,800.00000	\$14,000.00
0067	621C015 Inlets, Type S1 Or S3 (1 Wing)	61.000	Each	\$3,850.00000	\$234,850.00
0068	621C016 Inlets, Type S2 Or S4 (1 Wing)	20.000	Each	\$4,500.00000	\$90,000.00
0069	621C017 Inlets, Type S1 Or S3 (2 Wing)	18.000	Each	\$4,000.00000	\$72,000.00

<u>Line #</u>	<u>Item Number</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Price</u>	<u>Extension</u>
<u>Description</u>					
<u>Supplemental Description</u>					
0070	621C018 Inlets, Type S2 Or S4 (2 Wing)	2.000	Each	\$4,500.00000	\$9,000.00
0071	621C109 Inlets, Type PD	7.000	Each	\$5,100.00000	\$35,700.00
0072	621D015 Inlet Units, Type S1 Or S3	20.000	Each	\$725.00000	\$14,500.00
0073	621D016 Inlet Units, Type S2 Or S4	5.000	Each	\$825.00000	\$4,125.00
0074	623C003 Combination Curb & Gutter, Type C (Modified)	25,896.000	LF	\$12.50000	\$323,700.00
0075	629A095 Concrete Median or Safety Barrier, Type CSF-42	244.000	LF	\$75.00000	\$18,300.00
0076	630A001 Steel Beam Guardrail, Class A, Type 2	1,200.000	LF	\$20.00000	\$24,000.00
0077	630C080 Guardrail End Anchor, Type 20 Series (MASH)	4.000	Each	\$3,125.00000	\$12,500.00
0078	645K500 Manhole Frame And Cover Reset	10.000	Each	\$875.00000	\$8,750.00
0079	650A000 Topsoil	977.000	CUYD	\$18.00000	\$17,586.00
0080	650B000 Topsoil From Stockpiles	25,263.000	CUYD	\$6.25000	\$157,893.75
0081	652A100 Seeding	46.000	Acre	\$575.00000	\$26,450.00
0082	654A001 Solid Sodding (Bermuda)	7,608.000	SQYD	\$4.00000	\$30,432.00
0083	656A010 Mulching	46.000	Acre	\$400.00000	\$18,400.00
0084	665A000 Temporary Seeding	46.000	Acre	\$140.00000	\$6,440.00
0085	665B001 Temporary Mulching	414.000	Ton	\$150.00000	\$62,100.00

<u>Line #</u>	<u>Item Number</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Price</u>	<u>Extension</u>
<u>Description</u>					
<u>Supplemental Description</u>					
0086	665C010 Temporary Pipe	75.000	LF	\$37.50000	\$2,812.50
0087	665D001 Temporary Pipe End Treatment	2.000	Each	\$700.00000	\$1,400.00
0088	665E000 Polyethylene	1,000.000	SQYD	\$1.85000	\$1,850.00
0089	665G000 Sand Bags	500.000	Each	\$4.50000	\$2,250.00
0090	665I000 Temporary Riprap, Class 2	200.000	Ton	\$50.00000	\$10,000.00
0091	665J002 Silt Fence	16,500.000	LF	\$2.50000	\$41,250.00
0092	665N000 Temporary Coarse Aggregate,ALDOT Number 1	700.000	Ton	\$35.00000	\$24,500.00
0093	665O001 Silt Fence Removal	16,500.000	LF	\$0.50000	\$8,250.00
0094	665P005 Inlet Protection, Stage 3 Or 4	113.000	Each	\$400.00000	\$45,200.00
0095	665Q002 Wattle	5,000.000	LF	\$5.50000	\$27,500.00
0096	680A001 Geometric Controls	1.000	LS	\$125,000.00000	\$125,000.00
0097	701A227 Solid White, Class 2, Type A Traffic Stripe (5" Wide)	3.000	Mile	\$3,350.00000	\$10,050.00
0098	701A230 Solid Yellow, Class 2, Type A Traffic Stripe (5" Wide)	6.000	Mile	\$3,150.00000	\$18,900.00
0099	701A239 Broken White, Class 2, Type A Traffic Stripe (5" Wide)	5.000	Mile	\$1,900.00000	\$9,500.00
0100	701A244 Broken Yellow, Class 2, Type A Traffic Stripe (5" Wide)	6.000	Mile	\$1,825.00000	\$10,950.00
0101	701B207 Dotted, Class 2, Type A Traffic Stripe (5" Wide)	2,730.000	LF	\$1.50000	\$4,095.00

<u>Line #</u>	<u>Item Number</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Price</u>	<u>Extension</u>
<u>Description</u>					
<u>Supplemental Description</u>					
0102	701C000 Broken Temporary Traffic Stripe	22.000	Mile	\$800.00000	\$17,600.00
0103	701C001 Solid Temporary Traffic Stripe	18.000	Mile	\$880.00000	\$15,840.00
0104	701F001 Dotted Temporary Traffic Stripe (Paint)	5,410.000	LF	\$1.50000	\$8,115.00
0105	703A002 Traffic Control Markings, Class 2, Type A	4,258.000	SQFT	\$4.25000	\$18,096.50
0106	703B002 Traffic Control Legends, Class 2, Type A	718.000	SQFT	\$4.75000	\$3,410.50
0107	703D001 Temporary Traffic Control Markings	1,629.000	SQFT	\$1.75000	\$2,850.75
0108	705A030 Pavement Markers, Class A-H, Type 2-C	483.000	Each	\$4.50000	\$2,173.50
0109	705A037 Pavement Markers, Class A-H, Type 2-D	680.000	Each	\$4.50000	\$3,060.00
0110	710A115 Class 4, Aluminum Flat Sign Panels 0.08" Thick Or Steel Flat Sign Panels 14 Gauge (Type III Or Type IV Background)	400.000	SQFT	\$19.25000	\$7,700.00
0111	710A126 Class 8, Aluminum Flat Sign Panels 0.08" Thick Or Steel Flat Sign Panels 14 Gauge (Type IX Background)	100.000	SQFT	\$20.00000	\$2,000.00
0112	710B021 Roadway Sign Post (#3 U Channel, Galvanized Steel or 2", 14 Ga Square Tubular Steel)	1,000.000	LF	\$12.00000	\$12,000.00
0113	730A000 Removal Of Existing Traffic Control Unit ((Cahaba River Road / Dolly Ridge Road)	1.000	LS	\$3,500.00000	\$3,500.00
0114	730A001 Removal Of Existing Traffic Control Unit ((Cahaba River Road / Altadena Road)	1.000	LS	\$3,500.00000	\$3,500.00
0115	730A002 Removal Of Existing Traffic Control Unit ((Cahaba River Road / Acton Road)	1.000	LS	\$3,500.00000	\$3,500.00
0116	730A003 Removal Of Existing Traffic Control Unit ((Cahaba River Road / Healthy Way)	1.000	LS	\$3,500.00000	\$3,500.00
0117	730A004 Removal Of Existing Traffic Control Unit ((Cahaba River Road / Old 280)	1.000	LS	\$3,500.00000	\$3,500.00
0118	730C000 Furnishing And Installing Traffic Control Unit ((Cahaba River Road / Dolly Ridge Road)	1.000	LS	\$8,700.00000	\$8,700.00

<u>Line #</u>	<u>Item Number</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Price</u>	<u>Extension</u>
<u>Description</u>					
<u>Supplemental Description</u>					
0119	730C001	1.000	LS	\$8,700.00000	\$8,700.00
Furnishing And Installing Traffic Control Unit ((Cahaba River Road / Altadena Road)					
0120	730C002	1.000	LS	\$8,700.00000	\$8,700.00
Furnishing And Installing Traffic Control Unit ((Cahaba River Road / Acton Road)					
0121	730C003	1.000	LS	\$8,700.00000	\$8,700.00
Furnishing And Installing Traffic Control Unit ((Cahaba River Road / Healthy Way)					
0122	730C004	1.000	LS	\$8,700.00000	\$8,700.00
Furnishing And Installing Traffic Control Unit ((Cahaba River Road / Old 280)					
0123	730E000	20.000	Each	\$2,000.00000	\$40,000.00
Metal Traffic Signal Pole Foundation					
0124	730H001	15,000.000	LF	\$3.00000	\$45,000.00
Loop Wire					
0125	730I001	25,000.000	LF	\$1.25000	\$31,250.00
Loop Detector Lead-In-Cable					
0126	730K000	25.000	Each	\$400.00000	\$10,000.00
Traffic Signal Junction Box					
0128	730L003	100.000	LF	\$4.00000	\$400.00
1", Non-Metallic, Conduit					
0129	730L005	7,500.000	LF	\$7.50000	\$56,250.00
2", Non-Metallic, Conduit					
0130	730P022	45.000	Each	\$925.00000	\$41,625.00
Vehicular Signal Head, 12 Inch, 3 Section, Type LED					
0131	730P023	3.000	Each	\$1,200.00000	\$3,600.00
Vehicular Signal Head, 12 Inch, 4 Section, Type LED					
0132	730Q011	9.000	Each	\$1,450.00000	\$13,050.00
Pedestrian Signal Head, Type LED					
0133	730R022	4.000	Each	\$19,250.00000	\$77,000.00
Controller Assembly, Type III, 8 Phase					
0134	740B000	1,897.000	SQFT	\$6.75000	\$12,804.75
Construction Signs					
0135	740D000	750.000	Each	\$25.00000	\$18,750.00
Channelizing Drums					
0136	740E000	500.000	Each	\$7.25000	\$3,625.00
Cones (36 Inches High)					

<u>Line #</u>	<u>Item Number</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Price</u>	<u>Extension</u>
<u>Description</u>					
<u>Supplemental Description</u>					
0137	740F002 Barricades, Type III	50.000	Each	\$200.00000	\$10,000.00
0138	740I002 Warning Lights, Type B	25.000	Each	\$200.00000	\$5,000.00
0139	740M001 Ballast For Cone	50.000	Each	\$5.00000	\$250.00
0140	741C010 Portable Sequential Arrow And Chevron Sign Unit	4.000	Each	\$2,000.00000	\$8,000.00
0141	742A001 Portable Changeable Message Sign, Type 2	4.000	Each	\$5,200.00000	\$20,800.00
0142	756A022 4" Electrical Conduit, 1 Line, Type 5 Installation	100.000	LF	\$45.00000	\$4,500.00
0143	756A028 6" Electrical Conduit, 1 Line, Type 5 Installation	2,500.000	LF	\$60.00000	\$150,000.00
0144	756A030 4" Electrical Conduit, 2 Lines, Type 5 Installation	250.000	LF	\$90.00000	\$22,500.00

Total for Group 0001:\$11,084,132.50

