

# Archibald Yell Boulevard Improvements 

## Traffic Study



Prepared For:

## City of Fayetteville

Arkansas

July 2020

# Archibald Yell Boulevard Improvements 

Traffic Study

## City of Fayetteville

## Fayetteville, AR

Prepared by:


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July 2020

## Engineer's Certification

I hereby certify that this Traffic Study for the Archibald Yell Boulevard Improvements project was prepared by Garver under my direct supervision for City of Fayetteville.


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### 1.0 Introduction

At the request of the City of Fayetteville, Garver performed a traffic study to evaluate the improvements along Archibald Yell Boulevard from Martin Luther King, Jr. Boulevard to Mountain Street. Two study intersections were analyzed as part of this study: Archibald Yell Boulevard/South Street and Archibald Yell Boulevard/College Avenue/Rock Street. Garver assessed the corridor with future volumes under existing four-lane typical and the proposed three-lane typical.

This document presents recommendations that were identified based on the following:

- Existing Conditions - Garver evaluated the existing conditions and reviewed peak hour turning movement counts at key intersections, which were collected on March 2017.
- Traffic Forecast - Garver determined an annual growth rate for the area using data from multiple resources including historic average daily traffic (ADT) data from ARDOT website and information from the Northwest Arkansas Regional Planning Commission's (NWARPC) travel demand models.
- Volume Development - Garver adjusted raw volumes to develop 2020 Existing volumes. The annual growth rate was applied to 2020 Existing volumes to develop 2040 Design Year traffic volumes.
- Operational Analysis - Synchro 10 and SimTraffic software were used to analyze the level of service (LOS) and queue lengths for 2020 Existing conditions, 2040 No Build conditions, and 2040 Build conditions.
- Conclusions and Recommendation - After performing the traffic analysis, conclusions and recommendations were formed and provided in the study.


### 2.0 Existing Conditions

The study segment of Archibald Yell Boulevard spans from Martin Luther King, Jr. Boulevard to Mountain Street. The existing corridor is four-lane undivided with a posted speed limit of 35 miles per hour ( mph ) and carries approximately 17,000 vehicles per day (vpd). There are two signalized intersections along the study corridor located at Martin Luther King, Jr. Boulevard and at Mountain Street. Figure 1 exhibits the study area.

The study intersections at South Street and at College Avenue/Rock Street are currently stop-controlled on the minor approaches as shown in Figure 2. The intersection of Archibald Yell Boulevard at South Street features a shared left-through lane and a shared through-right lane on the southbound and northbound approaches. A shared left-through-right lane is provided on the eastbound and westbound approaches.

The Archibald Yell Boulevard/College Avenue/Rock Street intersection is a five-leg intersection with Rock Street running in the east-west direction and College Avenue tying to Archibald Yell Boulevard on the south. The minor approaches at Rock Street and at College Avenue features a shared left-through-right lane. The major approaches along Archibald Yell Boulevard consists of a shared left-through lane and a shared through-right lane.


Figure 1: Study Area


Figure 2: Study Intersections

### 3.0 Volume Development

The most recent peak hour turning movement counts for the study intersections along Archibald Yell Boulevard were conducted in March 2017. The traffic counts were processed to determine 2017 AM and PM peak hour turning movement volumes, peak hour factors, and percentages of heavy vehicles for the study intersections. A seasonal adjustment factor was applied to the peak hour turning movement base counts to determine adjusted peak hour volumes. Refer to Appendix A - Traffic Data for traffic count data.

### 3.1 Development of 2020 Existing Volumes

To develop 2020 Existing volumes, a traffic growth rate for Archibald Yell Boulevard was applied to the adjusted 2017 peak hour turning movement volumes. Review of the 2017 ADT and 2019 ADT for Archibald Yell Boulevard, obtained from ARDOT website, depict a $5 \%$ decrease in traffic growth between those years. Therefore, no growth was assumed for Archibald Yell Boulevard between 2017 and 2020. The 2017 volumes were used as 2020 Existing volumes which are shown in Figure 3.

### 3.2 Traffic Forecast

A traffic forecast was conducted along Archibald Yell Boulevard to develop future volumes for the study intersections. From the ARDOT website, two permanent count stations were identified within the study corridor. Table 1 shows the historic ADT data for each of these count stations. Station 720293 has two missing years of data.

Several methods were investigated to project future volumes. First, the trend function was used in Excel to project 2020 and 2040 traffic volumes based on the historic volumes along with the 2019 ADT. This function is based on the equation $y=m x+b$, where $y$ represents the traffic volume and $x$ represents the year. For these calculations, the true "b" value was selected.

A second source utilized for traffic projections was information from NWARPC travel demand model for design years 2010 and 2040, and a third source used was the growth rate information for Archibald Yell Boulevard from the Fayetteville Mobility Plan.

A summary of the projected ADT and growth rates yielded from the various methods for each count station is shown in Table 2. As shown, the recommended annual growth rate for the study area was determined to be $1.60 \%$ based on the average of the growth rates (weighted by volume).

Table 1: Historic ADT Data

| Station | 720293 | 720292 |
| :---: | :---: | :---: |
| Approach | East of School <br> Avenue | North of MLK Blvd |
| 1999 | 13,000 | 16,000 |
| 2000 | 12,000 | 15,000 |
| 2001 | 12,000 | 15,000 |
| 2002 | 13,000 | 17,000 |
| 2003 | 14,000 | 17,000 |
| 2004 | 14,500 | 18,100 |
| 2005 | 14,500 | 16,600 |
| 2006 | 15,700 | 18,600 |
| 2007 | 15,100 | 18,300 |
| 2008 | 15,000 | 18,000 |
| 2009 | 15,000 | 18,000 |
| 2010 | 15,000 | 18,000 |
| 2011 | 15,000 | 17,000 |
| 2012 | 15,000 | 19,000 |
| 2013 | 15,000 | 18,000 |
| 2014 | - | 18,000 |
| 2015 | 17,000 | 19,000 |
| 2016 | 18,000 | 19,000 |
| 2017 | 17,000 | 21,000 |
| 2018 | - | 19,000 |
| 2019 | 16,000 | 18,000 |
|  |  |  |
|  |  |  |

Table 2: Summary of ADT and Growth Rates

| Archibald Yell Boulevard |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Method | Trend <br> Function | NWARPC <br> Model | Fayetteville <br> Mobility Plan | Average | Recommended |  |
| East of School Avenue |  |  |  |  |  |  |
| 2019 | 16,000 |  |  |  |  |  |
| AGR (\%) | 1.1 | 2.0 | 1.7 | 1.6 | 1.6 |  |
| 2020 | 17,405 | 16,328 | 16,264 | 16,500 | 16,500 |  |
| 2040 | 21,839 | 24,492 | 22,562 | 22,500 | 22,500 |  |
| North of MLK Blvd |  |  |  |  |  |  |
| 2019 |  | 18,000 |  |  |  |  |
| AGR (\%) | 0.8 | 2.0 | 1.7 | 1.5 | 1.6 |  |
| 2020 | 19,700 | 18,365 | 18,297 | 18,500 | 18,500 |  |
| 2040 | 23,173 | 27,453 | 25,382 | 24,500 | 25,000 |  |

### 3.3 Development of 2040 No Build Volumes

In order to develop future traffic volumes, the annual growth rates previously estimated were utilized. Using the regression formula, the growth rates were applied to the 2020 Existing volumes to develop 2040 No Build volumes. Figure 4 exhibit the 2040 No Build Volumes.



### 4.0 Operational Analysis

The study area was evaluated under 2020 Existing and 2040 No Build to establish a baseline for comparison for the build alternatives. Level of Service (LOS) was the key performance measure used for the analysis and was determined along the Archibald Yell Boulevard corridor as well as at key intersections within the study area.

LOS is a qualitative measure used to depict operational conditions within a traffic stream or at an intersection. LOS is typically designated into six categories. 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. A graphical representation of LOS is presented in Figure 5. For this study, LOS D is the threshold for acceptable level of service for any movement at a major intersection.

Operational analyses were conducted using Synchro 10 and SimTraffic software according to the Highway Capacity Manual 6th Edition (HCM) methodology and SimTraffic methodology.

The results from the operational analyses of 2020 Existing conditions and 2040 future No Build conditions for the study corridor are discussed in the following subsections.


Figure 5: Level of Service (LOS) Categories

### 4.1 Operational Analysis - 2020 Existing Conditions

### 4.1.1 Roadway Segment Analysis

The study segment of Archibald Yell Boulevard is a four-lane undivided roadway with curb and gutter and sidewalks along the west side. The corridor contains two signalized intersections, multiple unsignalized intersections, and many driveways to businesses. Existing conditions were analyzed using 2020 Existing volumes. The signalized intersections at Martin Luther King, Jr. Boulevard and at Mountain Street were modeled with current signal timings provided by the City of Fayetteville.

Under Existing conditions, the segments along Archibald Yell Boulevard 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 3. The complete results are provided in Appendix B - Operational Analysis Results. According to the results of this analysis, the study segment showed LOS C or better for both peak periods in 2020 Existing conditions.

Table 3: Roadway Segment Analysis - 2020 Existing Conditions

| Segment | Time Period | MOE | Northbound | Southbound |
| :---: | :---: | :---: | :---: | :---: |
|  | AM | LOS | A |  |
|  | Speed | 33.3 | B |  |
|  | PM | LOS | A | 25.1 |
|  |  | 32.3 | C |  |

### 4.1.2 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 4 provides the LOS delay thresholds as stated in HCM 6th Edition, pages 19-16 and 20-6.

Table 4: Thresholds for Control Delay at Intersections

| Level of <br> Service |  | Signalized <br> Intersection | Stop <br> Controlled <br> 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 |
| $\mathrm{v} / \mathrm{c}>1$ |  |  |  |

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 microsimulation methodology. The HCM methodology evaluates each intersection independently while SimTraffic microsimulation allows the user to analyze intersection operations both individually and in
context of the entire study network. Additionally, microsimulation 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 loading within the peak hour to account for the expected variability within a system. This variation also accounts for the various types of drivers (aggressiveness, gap acceptance tolerance) and vehicles (performance on grades, general acceleration/ deceleration). Finally, microsimulation provides the best means to demonstrate the impacts of queues on nearby intersections.

The results of the two study intersections based on HCM methodology and SimTraffic methodology are summarized in Tables 5 and 6. The complete results are provided in Appendix B - Operational Analysis Results.

The HCM methodology showed no results for the intersection at College Avenue/Rock Street, since it does not support intersections with more than four approaches. The intersection at South Street showed LOS C or better for all approaches according to the HCM methodology for both peak hours.

Table 5: 2020 Existing Conditions - HCM Results

| Intersection | Time Period | Control | MOE | EB Movement |  |  | WB Movement |  |  | NB (Archibald Yell) |  |  | NB (S College) |  |  | SB Movement |  |  | Overall |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |  |
| Archibald Yell Boulevard at College Avenue/Rock Street | AM | Two-Way Stop | LOS | HCM methodology does not support more than four approaches |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | Delay |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | PM |  | LOS |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | Delay |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Archibald Yell Boulevard at South Street | AM | Two-Way Stop | LOS | B |  |  | C |  |  | A |  |  |  |  |  | A |  |  | n/a |
|  |  |  | Delay |  | 14.0 |  |  | 15.8 |  |  | 8.6 |  |  |  |  |  | 9.8 |  |  |
|  | PM |  | LOS | C |  |  | C |  |  | A |  |  |  |  |  | A |  |  | n/a |
|  |  |  | Delay | 20.7 |  |  | 20.2 |  |  | 9.7 |  |  |  |  |  | 9.0 |  |  |  |
| Archibald Yell Boulevard at MLK Boulevard |  | Signal | LOS | D | B | B | C |  |  | C |  |  |  |  |  | C |  |  | D |
|  |  |  | Delay | 50.2 | 18.8 | 16.9 | 28.3 |  |  | 26.3 |  |  |  |  |  | 25.5 | 51 |  | 38.0 |
|  | PM |  | LOS | C | C | C | C |  |  | C |  |  |  |  |  | B | E |  | D |
|  |  |  | Delay | 31.9 | 28.6 | 23.7 | 31.1 |  |  | 23.9 |  |  |  |  |  | 18.5 | 60 |  | 38.1 |

Based on the SimTraffic methodology, the intersection at College Avenue/Rock Street showed adequate LOS C or better for all movements in the PM peak hour. However, LOS Fs are exhibited for movements on the minor approaches in the AM peak hour. The South Street intersection showed LOS D or better for all movements for both peak hours.

Table 6: 2020 Existing Conditions - SimTraffic Results

| Intersection | Time Period | Control | MOE | Es Movement |  |  | WB Movement |  |  | NB (Archibald Yell) |  |  |  | NW (S College) |  | SB Movement |  |  |  | Overall |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Right2 | Left | Right | Left2 | Left | Thru | Right |  |
| Archibald Yell Boulevard at College Avenue/Rock Street | AM | Two-Way Stop | LOS | A | A | F | F | F | F | A | A | A | A | F | F | A | B | A | A | D |
|  |  |  | Delay | 0.0 | 0.0 | 73.2 | 222.6 | 312.5 | 194.0 | 4.7 | 1.3 | 0.7 | 1.1 | 103.9 | 61.3 | 8.3 | 11.7 | 2.8 | 0.2 | 30.6 |
|  | PM |  | LOS | A | A | A | A | A | A | A | A | A | A | C | B | A | A | A | A | A |
|  |  |  | Delay | 0.0 | 0.0 | 4.3 | 0.0 | 0.0 | 8.4 | 6.3 | 1.1 | 0.4 | 0.0 | 22.7 | 11.4 | 9.3 | 10.0 | 3.3 | 0.3 | 5.1 |
| Archibald Yell Boulevard at South Street |  | Two-Way Stop | LOS | A | C | A | A | B | A | A | A | A |  |  |  |  | A | A | A | A |
|  | AM |  | Delay | 6.9 | 16.2 | 3.8 | 0.0 | 14.8 | 5.7 | 4.6 | 0.6 | 0.0 |  |  |  |  | 3.5 | 0.3 | 0.1 | 0.7 |
|  | PM |  | LOS | C | D | A | C | A | A | A | A | A |  |  |  |  | A | A | A | A |
|  |  |  | Delay | 17.6 | 29.0 | 9.0 | 19.2 | 0.0 | 4.4 | 4.4 | 0.6 | 0.4 |  |  |  |  | 4.4 | 0.4 | 0.0 | 0.8 |
| Archibald Yell Boulevard at MLK Boule vard | AM | Signal | LOS | E | C | A | C | D | C | C | C | A |  |  |  |  | C | C | B | C |
|  | AM |  | Delay | 55.6 | 33.2 | 9.3 | 20.5 | 36.4 | 21.6 | 23.8 | 23.9 | 6.2 |  |  |  |  | 22.1 | 28.7 | 19.0 | 29.0 |
|  | PM |  | LOS | D | D | A | C | D | B | C | C | B |  |  |  |  | C | D | C | C |
|  |  |  | Delay | 52.7 | 41.9 | 5.7 | 22.9 | 36.4 | 18.4 | 29.1 | 24.2 | 15.8 |  |  |  |  | 24.9 | 39.5 | 31.7 | 31.7 |

### 4.1.3 Queue Lengths

Queue lengths were reviewed and compared to the available storage lengths in order to identify areas where improvements may be needed. The 95th percentile queue lengths obtained from the Synchro models according to HCM methodology are shown in Table 7. The queue lengths shown in the table are expressed in terms of feet by assuming an average vehicle length of 25 feet since the HCM methodology yields queues in terms of vehicles. Table 8 shows the 95th percentile queue lengths in feet based on the SimTraffic methodology.

There are no dedicated left-turn or right-turn lanes provided at the study intersections in the Existing conditions. The results of both methodologies did not show any significant queueing at the intersection at South Street. For the intersection at College Avenue/Rock Street, the SimTraffic results showed some queueing on the northbound approach on College Avenue and extensive queueing on the westbound approach on Rock Street in the AM peak hour.

Table 7: Intersection Queues (ft) - 2020 Existing Conditions - HCM Results

| Intersection | Control | Time <br> Period | EB Movement |  |  | WB Movement |  |  | NB (Archibald Yell) |  |  | NB (S College) |  |  | SB Movement |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Archibald Yell Boulevard at College Avenue/Rock Street | Two-Way Stop | AM | HCM methodology does not support more than four approaches |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | PM |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Archibald Yell Boulevard | Two-Way Stop | AM | 5 |  |  | 8 |  |  | 0 |  |  |  |  |  | 0 |  |  |
|  |  | PM | 10 |  |  | 3 |  |  | 3 |  |  |  |  |  | 0 |  |  |
| Archibald Yell Boulevard at MLK Boule vard | Signal | AM | 413 | 218 | 0 | 13 | 370 |  | 78 | 220 |  |  |  |  | 23 | 378 |  |
|  |  | PM | 308 | 370 | 170 | 45 | 210 |  | 100 | 160 |  |  |  |  | 70 | 533 |  |

Table 8: Intersection Queues (ft) - 2020 Existing Conditions - SimTraffic Results

| Intersection | Control | Time Period | EB Movement |  |  | WB Movement |  |  | NB (Archibald Yell) |  |  | NB (S College) |  |  | SB Movement |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Archibald Yell Boulevard | Two-Way | AM | 24 |  |  | 675 |  |  | 21 |  |  | 209 |  |  | 83 |  |  |
| Street | Stop | PM | 27 |  |  | 60 |  |  | 13 |  |  | 162 |  |  | 96 |  |  |
| Archibald Yell Boulevard at South Street | Two-Way Stop | AM | 35 |  |  | 39 |  |  | 16 |  |  |  |  |  | 6 |  |  |
|  |  | PM | 54 |  |  | 17 |  |  | 20 |  |  |  |  |  | 14 |  |  |
| Archibald Yell Boulevard at MLK Boulevard | Signal | AM | 233 | 522 | 331 | 69 | 289 |  | 91 | 183 |  |  |  |  | 67 | 248 |  |
|  |  | PM | 236 | 619 | 397 | 81 | 212 |  | 137 | 172 |  |  |  |  | 191 | ${ }^{1} 524$ |  |

${ }^{1}$ Include queue length from upstream intersection

### 4.2 Operational Analysis - 2040 No Build Conditions

For the 2040 No Build conditions, peak hour factors and peak periods were assumed to remain unchanged from the 2020 Existing conditions. The signal timings at existing signalized intersections were optimized. The 2040 No Build traffic volumes were used, and the analyses were performed using the same methodology and assumptions as were used for the 2020 Existing conditions. The results are described in the following subsections.

### 4.2.1 Roadway Segment Analysis

As with 2020 Existing conditions, the Archibald Yell Boulevard was analyzed as urban street segments according to the HCM methodology. The results are summarized in Table 9. The complete results are provided in Appendix B - Operational Analysis Results.

According to the results of this analysis, the corridor experienced good level of service in the northbound direction for both peak periods. In the southbound direction, the corridor performed adequately in the AM peak hour, but showed poor LOS E in the PM peak hour. This is likely due to the failing performance of the southbound approach at the Archibald Yell Boulevard/Martin Luther King, Jr. Boulevard intersection in the year 2040 as exhibited in Table 10. The SimTraffic simulation show extensive southbound queueing at the Martin Luther King, Jr. Boulevard intersection.

Table 9: Roadway Segment Analysis - 2040 No Build Conditions

| Segment | Time Period | MOE | Northbound | Southbound |
| :---: | :---: | :---: | :---: | :---: |
|  |  | LOS | A | C |
|  |  | Speed | 31.9 | 20.0 |
| PM | LOS | A | E |  |
|  | Speed | 30.9 | 13.1 |  |

### 4.2.2 Intersection Analysis

The results from the 2040 No Build intersection analysis are shown in Tables 10 and 11. The complete results are provided in Appendix B-Operational Analysis Results. Both methodologies showed the operation of the study intersections along Archibald Yell Boulevard to deteriorate by Design Year 2040. Multiple movements on the minor approaches are failing during at least one peak hour. The results show the intersection at Martin Luther King, Jr. Boulevard will perform poorly in 2040.

Table 10: 2040 No Build Conditions - HCM Results


Table 11: 2040 No Build Conditions - SimTraffic Results

| Intersection | Time Period | Control | moE | EB Movement |  |  | WB Movement |  |  | NB (Archibald Yell) |  |  |  | NW (S College) |  | SB Movement |  |  |  | Overall |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Right2 | Left | Right | Left2 | Left | Thru | Right |  |
| Archibald Yell Boulevard at College Avenue/Rock Street |  | Two-Way Stop | Los | A | A | F | A | F | F | A | A | A | A | F | F | C | C | A | A | F |
|  |  |  | Delay | 0.0 | 0.0 | 112.6 | 0.0 | 1157.3 | 1163.5 | 5.6 | 1.6 | 1.1 | 0.7 | 454.6 | 456.4 | 15.9 | 19.6 | 4.9 | 0.4 | 206.3 |
|  | PM |  | LOS | A | A | D | A | A | C | A | A | A | A | F | F | C | C | A | A | C |
|  |  |  | Delay | 0.0 | 0.0 | 27.3 | 0.0 | 0.0 | 17.9 | 8.8 | 1.6 | 1.1 | 0.0 | 188.3 | 134.8 | 19.1 | 20.4 | 4.4 | 1.0 | 16.4 |
| Archibald Yell Boulevard at South Street |  | Two-Way Stop | LOS | A | C | A | A | D | B | A | A | A |  |  |  |  | A | A | A | A |
|  | AM |  | Delay | 0.0 | 18.9 | 5.3 | 0.0 | 30.0 | 10.6 | 3.2 | 0.9 | 0.0 |  |  |  |  | 6.5 | 0.4 | 0.1 | 1.1 |
|  | PM |  | LOS | E | E | C | E | F | A | A | A | A |  |  |  |  | A | A | A | A |
|  |  |  | Delay | 36.5 | 40.3 | 16.6 | 41.1 | 50.8 | 4.7 | 6.6 | 0.8 | 0.7 |  |  |  |  | 6.1 | 0.6 | 0.1 | 1.4 |
| Archibald Yell Boulevard at MLK Boule vard | AM | Signal | LOS | F | F | F | D | F | E | F | F | D |  |  |  |  | D | D | C | F |
|  |  |  | Delay | 402.4 | 358.1 | 289.2 | 44.4 | 80.4 | 79.8 | 87.7 | 84.6 | 54.6 |  |  |  |  | 51.2 | 46.5 | 34.8 | 154.0 |
|  | PM |  | LOS | F | F | F | D | E | D | F | D | C |  |  |  |  | C | D | C | F |
|  |  |  | Delay | 709.8 | 681.9 | 630.8 | 53.1 | 63.1 | 44.1 | 159.4 | 45.6 | 24.1 |  |  |  |  | 33.9 | 52.9 | 33.8 | 274.8 |

### 4.2.3 Queue Lengths

The queue lengths for 2040 No Build conditions are tabulated in Tables 12 and 13. The SimTraffic results show the queue lengths on the minor approaches at the College Avenue/Rock Street intersection will worsen in 2040. Extensive queues are exhibited on the westbound approach on Rock Street and northbound approach on College Avenue. As previously mentioned, the SimTraffic simulation shows extensive southbound queueing at the Martin Luther King, Jr. Boulevard intersection which extends to the School Avenue intersection in the PM peak hour. In addition, the simulation also shows significant queueing in the PM peak hour for the northbound left-turn movement and the eastbound approach at the intersection of Archibald Yell Boulevard and School Avenue.

Table 12: Intersection Queues (ft) - 2040 No Build Conditions - HCM Results

| Intersection | Control | Time Period | EB Movement |  |  | WB Movement |  |  | NB (Archibald Yell) |  |  | NB (S College) |  |  | SB Movement |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Archibald Yell Boulevard at College Avenue/Rock Street | Two-Way Stop | AM | HCM methodology does not support more than four approaches |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | PM |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Archibald Yell Boulevard at South Street | Two-Way Stop | AM | 10 |  |  | 18 |  |  | 0 |  |  |  |  |  | 3 |  |  |
|  |  | PM | 40 |  |  | 8 |  |  | 3 |  |  |  |  |  | 3 |  |  |
| Archibald Yell Boulevard at MLK Boule vard | Signal | AM | 800 | 270 | 113 | 20 | 748 |  | 193 | 380 |  |  |  |  | 35 | 1108 |  |
|  |  | PM | 980 | 900 | 293 | 93 | 493 |  | 393 | 278 |  |  |  |  | 125 | 1200 |  |

Table 13: Intersection Queues (ft) - 2040 No Build Conditions - SimTraffic Results

| Intersection | Control | Time Period | EB Movement |  |  | WB Movement |  |  | NB (Archibald Yell) |  |  | NB (S College) |  |  | SB Movement |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Archibald Yell Boulevard | Two-Way | AM | 29 |  |  | 677 |  |  | 23 |  |  | 670 |  |  | 166 |  |  |
| Street | Stop | PM | 42 |  |  | 88 |  |  | 22 |  |  | 439 |  |  | 185 |  |  |
| Archibald Yell Boulevard | Two-Way | AM | 42 |  |  | 49 |  |  | 13 |  |  |  |  |  | 14 |  |  |
| at South Street | Stop | PM | 67 |  |  | 27 |  |  | 24 |  |  |  |  |  | 22 |  |  |
| Archibald Yell Boulevard at MLK Boule vard | Signal | AM | 210 | 689 | 695 | 235 | 435 |  | 257 | 620 |  |  |  |  | 92 | ${ }^{1} 486$ |  |
|  |  | PM | 205 | 567 | 752 | 224 | 362 |  | 240 | 764 |  |  |  |  | 246 | ${ }^{1} 747$ |  |

${ }^{1}$ Include queue length from upstream intersection

### 5.0 Build Conditions

The Fayetteville Mobility Plan provides recommended improvements for the Archibald Yell Boulevard corridor, some of which were analyzed as part of this study. The Build alternative condition includes new signals and pedestrian crossings at South Street, a road diet along Archibald Yell Boulevard reducing the roadway dedicated to vehicles from four lanes to three lanes, and improvements to the intersection at College Avenue/Rock Street. The Build alternative was evaluated for 2020 and 2040 design years.

A proposed concept of the improvements to the intersection at College Avenue/Rock Street consists of intersection realignment with pedestrian crossings as shown in Figure 6. Traffic from Rock Street on the west side of Archibald Yell Boulevard is no longer able to cross Archibald Yell Boulevard to continue east on Rock Street and vice versa. Other restricted movements with the proposed concept are northbound left-turn from Archibald Yell Boulevard to Rock Street, northbound left-turn from College Avenue to Rock Street, and eastbound and westbound left-turns from Rock Street to Archibald Yell Boulevard.


Figure 6: Proposed Improvements at the Intersection of Archibald Yell Boulevard and College Avenue / Rock Street

### 5.1 Development of 2020 and 2040 Build Volumes

Volume information from the NWARPC travel demand model was provided for the 2040 No Build conditions (four lane) and the 2040 Build conditions (road diet). The daily volumes along Archibald Yell Boulevard were compared between the two conditions. As shown in Table 14, the segment between Martin Luther King, Jr. Boulevard and School Avenue show a slight volume reduction while the segment between School Avenue and Rock Street show negligible volume increase in the Build conditions. Based on the results, it was assumed that traffic will continue to use the study corridor in the Build conditions.

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Table 14: Daily Volume Comparison

| Location | Between MLK Blvd <br> and School Ave | Between School <br> Ave and South St | Between South St <br> and Rock St |
| :---: | :---: | :---: | :---: |
| 2040 No Build | 23,320 | 13,540 | 13,920 |
| 2040 Build | 22,707 | 13,578 | 13,950 |
| Reduction (\%) | $2.63 \%$ | $-0.28 \%$ | $-0.22 \%$ |

Due to the realignment and restrictions of multiple movements at the proposed intersection at College Avenue/Rock Street, 2020 Existing and 2040 No Build volumes were distributed accordingly at the intersection resulting in 2020 and 2040 Build volumes which are exhibited in Figure 7 and 8, respectively.



### 5.2 Operational Analysis - 2020 Build Conditions

As with Existing and No Build conditions, the study intersections were analyzed using Synchro and its companion SimTraffic software. For the 2020 Build conditions, signal timings for the proposed traffic signal at South Street were optimized and coordinated with the traffic signal at Mountain Street. The results are described in the following subsections.

### 5.2.1 Roadway Segment Analysis

As part of the Build conditions, a road diet was proposed for the Archibald Yell Boulevard converting the existing four-lane undivided roadway to a three-lane roadway. The three-lane roadway extends from north of Martin Luther King, Jr. Boulevard to College Avenue/Rock Street. Lane configurations at Martin Luther King Jr. Boulevard intersection remained the same as Existing conditions.

The Archibald Yell Boulevard corridor was analyzed as urban street segments according to the HCM methodology. The results are summarized in Table 5. The complete results are provided in Appendix B Operational Analysis Results.

According to the results of this analysis, the segment between South Street and Mountain Street showed LOS C or better for both directions during both peak hours. For the segment between Martin Luther King, Jr. Boulevard and South Street, the northbound direction performed adequately for both peak hours, however, the southbound direction showed poor LOS E in the PM peak hour.

Table 15: Roadway Segment Analysis - 2020 Build Conditions

| Segment | Time Period | MOE | Northbound | Southbound |
| :---: | :---: | :---: | :---: | :---: |
|  |  | LOS |  | C |
|  |  | Speed | 25.3 | 18.7 |
| Between South <br> Street and | AM | LOS | B | E |
|  | Speed | 26.1 | 13.0 |  |
|  | PM | LOS | B | C |
|  |  | 28.3 | 26.1 |  |

### 5.2.2 Intersection Analysis

The intersection at College Avenue/Rock Street will be realigned in the Build conditions thus creating two intersections: Archibald Yell Boulevard at College Avenue/Rock Street (East) and Archibald Yell Boulevard
at College Avenue/Rock Street (West). Both intersections will be stop-controlled in the minor approaches. In addition, the intersection at South Street will be signalized and left-turn storage as added on the minor approaches. The results from the 2020 Build intersection analysis are shown in Tables 16 and 17. The complete results are provided in Appendix B- Operational Analysis Results.

The HCM methodology showed no results for the intersection at College Avenue/Rock Street (East), since it does not support the proposed intersection geometry, and adequate LOS C or better for both peak hours for the intersection at College Avenue/Rock Street (West). The results also show the intersection at South Street will experience overall LOS C for both peak hours with LOS E for multiple movements on the minor approaches.

The results according to the SimTraffic methodology show LOS C or better for all study intersections for both peak hours with the exception of the eastbound movement at College Avenue/Rock Street (West) which shows failing LOS F during the AM peak hour. The SimTraffic results for this movement varies from the HCM results due to the low volume. The SimTraffic implies that delay may occur despite the low volume.

Table 16: 2020 Build Conditions - HCM Results

$n / a^{1}$ - Free-flow movement
$\qquad$

Table 17: 2020 Build Conditions - SimTraffic Results

| Intersection | Time Period | Control | MOE | EB Movement |  |  | WB Movement |  |  | NB (Archibald Yell) |  |  | NW (S College) |  |  | SB Movement |  |  | Overall |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |  |
| Archibald Yell Boulevard at College Avenue/Rock Street (East) | AM | One-Way Stop | LOS |  |  |  |  |  | B |  | A | A |  | C | A | A | A |  | A |
|  |  |  | Delay |  |  |  |  |  | 10.6 |  | 0.8 | 0.3 |  | 21.1 | 0.0 | 7.4 | 0.9 |  | 3.9 |
|  | PM |  | LOS |  |  |  |  |  | A |  | A | A |  | D | B | A | A |  | A |
|  |  |  | Delay |  |  |  |  |  | 1.3 |  | 1.4 | 1.0 |  | 26.9 | 12.7 | 6.8 | 1.6 |  | 3.1 |
| Archibald Yell <br> Boulevard at College Avenue/Rock Street (West) | AM | One-Way Stop | LOS |  |  |  |  |  |  |  | A | A |  |  |  | A | A | A | A |
|  |  |  | Delay |  |  |  |  |  |  |  | 1.9 | 0.0 |  |  |  | 9.4 | 0.6 | 0.1 | 2.3 |
|  | PM |  | LOS |  |  |  |  |  |  |  | A | A |  |  |  | A | A | A | A |
|  |  |  | Delay |  |  |  |  |  |  |  | 2.2 | 0.0 |  |  |  | 8.5 | 0.9 | 0.2 | 2.3 |
| Archibald Yell Boulevard at South Street | AM | Signal | LOS | A | C | A | A | C | B | A | A | A |  |  |  | A | A | A | A |
|  |  |  | Delay | 0.0 | 34.5 | 5.1 | 7.9 | 27.6 | 10.2 | 5.2 | 2.8 | 0.0 |  |  |  | 6.0 | 1.7 | 0.3 | 2.9 |
|  | PM |  | LOS | C | C | A | D | D | A | B | A | A |  |  |  | A | A | A | A |
|  |  |  | Delay | 33.8 | 29.8 | 8.6 | 48.4 | 42.7 | 4.9 | 11.1 | 2.2 | 1.4 |  |  |  | 5.1 | 1.7 | 0.9 | 2.4 |
| Archibald Yell Boulevard at MLK Boule vard | AM | Signal | LOS | C | B | A | B | C | B | D | D | A |  |  |  | D | B | B | C |
|  | AM |  | Delay | 31.5 | 18.2 | 3.1 | 17.7 | 32.0 | 19.0 | 44.2 | 40.2 | 7.1 |  |  |  | 36.2 | 19.7 | 11.3 | 26.6 |
|  | PM |  | LOS | D | D | A | C | D | B | C | C | A |  |  |  | C | D | C | C |
|  |  |  | Delay | 47.0 | 36.2 | 6.5 | 25.0 | 36.5 | 17.8 | 30.5 | 30.0 | 9.5 |  |  |  | 27.6 | 39.0 | 25.9 | 31.6 |

### 5.2.3 Queue Lengths

The queue lengths for 2020 Build conditions are tabulated in Tables 18 and 19. The HCM results show significant queue lengths at the South Street intersection on the northbound approach in the AM peak hour and on the southbound approach in the PM peak hour. No extensive queue length was shown for any of the movements according to the SimTraffic methodology.

Table 18: Intersection Queues (ft) - 2020 Build Conditions - HCM Results

| Intersection | Control | Time Period | EB Movement |  |  | WB Movement |  |  | NB (Archibald Yell) |  |  | NB (S College) |  |  | SB Movement |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Archibald Yell Boulevard at College Avenue/Rock Street (East) | One-Way Stop | AM PM | HCM methodology does not support the intersection geometry |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Archibald Yell Boulevard | One-Way | AM | 0 |  |  |  |  |  | - |  |  |  |  |  | 18 |  |  |
| Street (West) |  | PM | 3 |  |  |  |  |  | - |  |  |  |  |  | 23 |  |  |
| Archibald Yell Boulevard |  | AM | 3 | 28 |  | 3 |  |  | 3 | 883 |  |  |  |  | 5 |  |  |
| at South Street | Signal | PM | 5 | 38 |  | 3 |  |  | 13 | 190 |  |  |  |  | 3 |  |  |
| Archibald Yell Boulevard at MLK Boule vard | Signal | AM | 403 | 213 | 85 | 13 |  |  | 115 | 218 |  |  |  |  | 25 | 363 |  |
|  |  | PM | 308 | 370 | 170 | 45 |  |  | 100 | 160 |  |  |  |  | 70 | 533 |  |

Table 19: Intersection Queues (ft) - 2020 Build Conditions - SimTraffic Results

| Intersection | Control | Time Period | EB Movement |  |  | WB Movement |  |  | NB (Archibald Yell) |  |  | NB (S College) |  |  | SB Movement |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Archibald Yell Boulevard at College Avenue/Rock Street (East) | One-Way Stop | AM |  |  |  |  |  | 187 |  | 5 |  |  |  |  | 46 | 40 |  |
|  |  | PM |  |  |  |  |  | 31 |  | 7 |  |  |  |  | 78 | 66 |  |
| Archibald Yell Boulevard | One-Way Stop | AM |  | 23 |  |  |  |  |  | 6 |  |  |  |  | 77 |  |  |
| Street (West) |  | PM |  | 33 |  |  |  |  |  |  |  |  |  |  | 85 |  |  |
| Archibald Yell Boule vard at South Street | Signal | AM | 0 | 37 |  | 4 | 45 |  | 20 | 10 |  |  |  |  | 10 |  |  |
|  |  | PM | 17 | 44 |  | 6 | 22 |  | 31 | 7 |  |  |  |  | 17 |  |  |
| Archibald Yell Boulevard at MLK Boulevard | Signal | AM | 227 | 394 | 60 | 37 | 276 |  | 182 | 438 |  |  |  |  | 49 |  |  |
|  |  | PM | 234 | 619 | 424 | 62 | 222 |  | 177 | 285 |  |  |  |  | 190 |  |  |

${ }^{1}$ Include queue length from upstream intersection

### 5.3 Operational Analysis - 2040 Build Conditions

The Build conditions were analyzed for the year 2040 utilizing the 2040 Build traffic volumes. The analyses were performed using the same methodology and assumptions as were used for the 2020 Build conditions. The results are described in the following subsections.

### 5.3.1 Roadway Segment Analysis

The Archibald Yell Boulevard was analyzed as urban street segments according to the HCM methodology. The results are summarized in Table 20. The complete results are provided in Appendix B - Operational Analysis Results.

According to the results of this analysis, the segment between South Street and Mountain Street showed LOS C or better for both directions during both peak hours. For the segment between Martin Luther King, Jr. Boulevard and South Street, the northbound direction performed adequately for both peak hours, however, the southbound direction showed poor LOS E and LOS F in the AM and PM peak hour, respectively, which is most likely due to the poor performance of the southbound approach at the Martin Luther King, Jr. Boulevard intersection as shown in Table 21. The SimTraffic simulation shows extensive southbound queueing at the Martin Luther King, Jr. Boulevard intersection.

Table 20: Roadway Segment Analysis - 2040 Build Conditions

| Segment | Time Period | MOE | Northbound | Southbound |
| :---: | :---: | :---: | :---: | :---: |
| Between MLK <br> Boulevard and <br> South Street | AM | LOS | C | E |
|  |  | Speed | 22.7 | 13.2 |
|  | PM | LOS | C | F |
|  |  | Speed | 23.7 | 7.7 |
| Between South Street and Mountain Street | AM | LOS | B | B |
|  |  | Speed | 28.0 | 25.8 |
|  | PM | LOS | B | C |
|  |  | Speed | 24.5 | 21.7 |

### 5.3.2 Intersection Analysis

The results from the 2040 Build intersection analysis are shown in Tables 20 and 21. The complete results are provided in Appendix B - Operational Analysis Results.

Table 20 shows LOS C or better for all movements at College Avenue/Rock Street (West) according to the HCM methodology. At the South Street intersection, multiple movements will operate at failing LOS E/F in the AM peak hour with overall LOS D. In the PM peak hour, this intersection operates overall at LOS C with LOS E for the eastbound shared thru-right movement. At the Martin Luther King, Jr. Boulevard intersection, the HCM results show the southbound approach will fail in 2040 similar to the No Build conditions.

According to the SimTraffic methodology, the majority of the movements for the study intersections will operate adequately with the exception of failing LOS E/F for the northbound approach from College Avenue at the College Avenue/Rock Street (East) intersection and for the eastbound approach at the College Avenue/Rock Street (West) intersection during both peak hours. The SimTraffic results for the eastbound approach College Avenue/Rock Street (West) varies from the HCM results due to the low volume. The SimTraffic implies that delay may occur despite the low volume. The results also show the intersection at Martin Luther King, Jr. Boulevard will perform poorly in 2040.

Table 21: 2040 Build Conditions - HCM Results


Table 22: 2040 Build Conditions - SimTraffic Results

| Intersection | Time Period | Control | MOE | EB Movement |  |  | WB Movement |  |  | NB (Archibald Yell) |  |  | NW (S College) |  |  | SB Movement |  |  | Overall |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |  |
| Archibald Yell Boulevard at College Avenue/Rock Street (East) | AM | One-Way Stop | LOS |  |  |  |  |  | D |  | A | A |  | E | A | A | A |  | A |
|  |  |  | Delay |  |  |  |  |  | 25.7 |  | 1.2 | 0.3 |  | 44.5 | 0.0 | 9.6 | 1.8 |  | 8.8 |
|  | PM |  | Los |  |  |  |  |  | A |  | A | A |  | F | E | A | A |  | A |
|  |  |  | Delay |  |  |  |  |  | 2.3 |  | 3.0 | 1.5 |  | 52.8 | 49.2 | 8.1 | 2.7 |  | 6.7 |
| Archibald Yell Boulevard at College Avenue/Rock Street (West) | AM | One-Way Stop | LOS |  |  |  |  |  |  |  | A | A |  |  |  | B | A | A | A |
|  |  |  | Delay |  |  |  |  |  |  |  | 2.9 | 0.8 |  |  |  | 14.7 | 1.1 | 0.3 | 3.4 |
|  | PM |  | LOS |  |  |  |  |  |  |  | B | A |  |  |  | A | A | A | A |
|  |  |  | Delay |  |  |  |  |  |  |  | 10.7 | 0.0 |  |  |  | 9.4 | 1.5 | 0.3 | 5.6 |
| Archibald Yell Boulevard at South Street |  | Signal | LOS | D | D | A | A | C | B | A | A | A |  |  |  | B | A | A | A |
|  | AM |  | Delay | 51.6 | 36.3 | 9.2 | 0.0 | 32.6 | 12.6 | 7.8 | 4.0 | 0.0 |  |  |  | 15.5 | 2.4 | 0.8 | 4.0 |
|  | PM |  | Los | C | D | B | D | D | A | A | A | A |  |  |  | A | A | A | A |
|  |  |  | Delay | 33.9 | 39.6 | 14.6 | 48.0 | 47.3 | 6.4 | 9.4 | 4.0 | 2.3 |  |  |  | 7.7 | 2.7 | 0.8 | 3.8 |
| Archibald Yell Boulevard at MLK Boule vard | AM | Signal | LOS | F | F | F | D | E | D | F | F | F |  |  |  | D | D | C | F |
|  | AM |  | Delay | 330.6 | 301.5 | 249.6 | 51.7 | 60.6 | 50.8 | 492.6 | 452.1 | 275.7 |  |  |  | 39.9 | 46.3 | 30.8 | 211.7 |
|  | PM |  | LOS | F | F | F | D | E | F | F | F | F |  |  |  | C | D | C | F |
|  |  |  | Delay | 1194.0 | 1128.1 | 1001.1 | 42.5 | 76.4 | 102.4 | 769.9 | 745.0 | 590.6 |  |  |  | 32.5 | 43.0 | 25.7 | 559.7 |

### 5.3.3 Queue Lengths

The queue lengths for the 2040 Build conditions are tabulated in Tables 22 and 23. The HCM results show significant queue lengths at the South Street intersection on the northbound approach during both peak hours and on the southbound approach during the PM peak hour. The results according to the SimTraffic methodology show some queueing at the College Avenue/Rock Street (East) intersection on the westbound approach along Rock Street in the AM peak hour and on the northbound approach along College Avenue in the PM peak hour.

The SimTraffic results show extensive southbound queueing at the Martin Luther King, Jr. Boulevard intersection in the PM peak hour, similar to the No Build conditions. The simulation also shows a significant queue in the PM peak hour for the northbound left-turn movement and the eastbound approach at the
intersection of Archibald Yell Boulevard and School Avenue. At times, the queue for the northbound left-turn movement spills onto the northbound through lane.

Table 23: Intersection Queues (ft) - 2040 Build Conditions - HCM Results

| Intersection | Control | Time Period | EB Movement |  |  | WB Movement |  |  | NB (Archibald Yell) |  |  | NB (S College) |  |  | SB Movement |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Archibald Yell Boule vard at College Avenue/Rock Street (East) | One-Way Stop | AM | HCM methodology does not support the intersection geometry |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Archibald Yell Boule vard at College Avenue/Rock Street (West) | One-Way Stop | AM | 0 |  |  |  |  |  | - |  |  |  |  |  | 35 | - |  |
|  |  | PM | 5 |  |  |  |  |  | - |  |  |  |  |  | 48 |  |  |
| Archibald Yell Boule vard at South Street | Signal | AM | 3 | 48 |  | 3 | 105 |  | 3 | 1508 |  |  |  |  | 13 |  |  |
|  |  | PM | 5 | 65 |  | 5 |  |  | 15 |  |  |  |  |  | 13 |  |  |
| Archibald Yell Boule vard at MLK Boulevard | Signal | AM | 880 | 265 | 110 | 20 |  |  | 193 |  |  |  |  |  | 35 |  |  |
|  |  | PM | 905 | 820 | 268 | 78 |  |  | 380 |  |  |  |  |  | 118 |  |  |

Table 24: Intersection Queues (ft) - 2040 Build Conditions - SimTraffic Results


### 6.0 Conclusions

The proposed improvements for Archibald Yell Boulevard which includes new signals at South Street, a road diet along Archibald Yell Boulevard, and improvements to the intersection at College Avenue/Rock Street were analyzed for this study. Based on the results of the analysis, the following were concluded:

- The proposed road diet will perform adequately through the year 2040 for the segment of Archibald Yell Boulevard between School Avenue and Mountain Street. The results show failing LOS for the segment between South Street and Martin Luther King, Jr. Boulevard specifically for the southbound direction. This is likely due to failing performance of the intersection of Archibald Yell Boulevard and Martin Luther King, Jr. Boulevard by the year 2040. The segment between Martin Luther King, Jr. and School Avenue should remain two lanes in each direction.
- The proposed signals at South Street intersection will provide acceptable level of service with LOS D or better for all movements through the year 2040.
- The proposed conceptual improvements for the intersection at College Avenue/Rock Street will improve the performance of the intersection when compared to No Build conditions. However, delay and queues may still develop on the minor approaches.


