Downtown Durham Traffic Simulation Report

Durham-Orange Light Rail Transit Project

March 2015

Draft

Table of Contents

List of Tables

List of Figures

List of Appendices

List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AA	Alternatives Analysis
AM	Ante meridian/before noon
DEIS	Draft Environmental Impact Statement
D-O	Durham-Orange
D-O LRT	Durham-Orange Light Rail Transit
DTCC	Durham Technical Community College
EB	Eastbound
FHWA	Federal Highway Administration
I-40	Interstate 40
INRIX	A mobile computer application that pertains to road traffic
LOS	Level of Service
LPA	Locally Preferred Alternative
LRT	Light Rail Transit
MOE	Measures of Effectiveness
NB	Northbound
NC	North Carolina
NCCU	North Carolina Central University
NCDOT	North Carolina Department of Transportation
NCRR	North Carolina Railroad
NHC	New Hope Creek
PM	Post meridian/after noon
ROMF	Rail Operations Maintenance Facility
SB	Southbound
TRM	Triangle Transit Regional Demand Model
TSM	Transportation System Management
UNC	University of North Carolina
US	United States
VA	Veteran Affairs
WB	Westbound

1. Executive Summary

The primary study area in this Downtown Durham Traffic Simulation Report is a corridor, approximately 3.2 miles long that runs along Pettigrew Street within Durham city limits from Erwin Road in the northwest through Alston Avenue in the southeast. It also includes intersections on Main Street and Duke Street. A secondary study area analyzed additional intersections to the north and south of Pettigrew Street between E Chapel Hill Street and Dillard Street to determine the traffic impacts associated with closing westbound Pettigrew Street to general traffic.

Traffic analysis was conducted using Synchro and Vissim. The following scenarios were analyzed in this report:

- Existing Conditions
- 2040 No-Build Conditions
- Build LRT Conditions with at-grade alignment at Swift Avenue (Option 1)
- Build LRT Conditions with aerial alignment at Swift Avenue (Option 2)
  [It should be noted that of the Build Conditions scenarios evaluated in this report, only Option 2 was carried forward for study in the DEIS]

Under the Build Conditions, right-of-way constraints would require that Pettigrew Street be converted from two-way operation today to one-way eastbound operation between E Chapel Hill Street and Dillard Street, where the LRT would run along the north side of Pettigrew Street east of Chapel Hill Street. The 2040 Build LRT Option 1 requires the closure of Pettigrew Street between Case Street and east of Swift Avenue due to the limited right-of-way in this section. Build LRT Option 2 elevates the LRT at Swift Avenue and keeps Pettigrew Street open with operations similar to No-Build Conditions.

The overall intersection results of the No-Build versus Build Vissim analysis are shown in Table ES-2 below. During the analysis, roadway modifications to improve traffic operations were incorporated into the LRT Options analysis models in order to mitigate impacts in accordance with the NCDOT and City of Durham criteria. The modifications proposed as part of the LRT Options are presented in Table ES-1. The overall intersection results of the No-Build versus Build Vissim analysis are shown in Table ES-2. The Build analysis results include the modifications presented in Table ES-1.

Under the 2040 LRT At-Grade Swift Avenue Option 1, traffic impacts were observed in the area bounded by Main Street, Pettigrew Street, 9th Street and Broad Street. As this subarea is composed of short blocks arranged in a grid network that would already experience significant congestion under No-Build Conditions, several movements would be impacted significantly in Option 1. These traffic impacts are due to the at-grade crossing of the LRT at Broad Street/Swift Avenue which causes additional delays to the north/south running streets. In addition, the closure of Pettigrew Street between Case Street and east of Swift Avenue requires traffic to be rerouted to these already congested roadways to reach their destinations. In Option 2, when the LRT is elevated and Pettigrew Street is open between Case Street and east of Swift Avenue, most of these impacts would be removed. At Main Street and Broad Street under Option 2, the northbound Broad Street left turn would experience a degradation of LOS from D to E due to network signal timing changes aimed at improving the major east/west approaches.

In the downtown area east of Swift Avenue for both Build Options, all intersections would operate in accordance with applicable level of service thresholds with the exception of the following locations:

- Mangum Street and Main Street would experience an overall LOS degradation in the PM peak hour by worsening from LOS D to E.
- Pettigrew Street & Fayetteville Street would meet the overall delay/LOS intersection criteria, however, two movements would experience degradation of LOS in the PM peak hour with the southbound Pettigrew Street left and through movements both worsening from LOS C to E.
- Chapel Hill Street & Willard Street, which is an unsignalized intersection, would meet the overall/delay LOS intersection criteria; however, the stop-controlled Willard Street approach would degrade from LOS E to LOS F in the PM peak hour.

All three intersections would experience LOS impacts due to LRV signal preemption events and the network signal timing changes aimed at providing better east/west progression for the LRT. Mangum Street and Main Street is expected to operate at a high LOS D in the No-Build PM peak hour, and with preemption events the overall delay increases to LOS E. If the loss of on-street parking along Mangum Street is deemed acceptable by the City, a third southbound Mangum Street travel lane could be tested during the Engineering phase of the project to determine if traffic impacts would be mitigated at Mangum Street and Main Street.

The LOS movement impacts at Pettigrew Street and Fayetteville cannot be practically mitigated with roadway modifications due to right-of-way constraints and the location of the NCRR corridor that crosses the southbound approach upstream of the stop bar.

Due to preemption events, there are fewer acceptable gaps for vehicles on the stop-controlled Willard Street approach at Chapel Hill Street. The signalization of Willard Street and Chapel Hill Street was discussed with the City of Durham. However, due to the proximity of signals along Chapel Hill Street at Duke Street and Pettigrew Street, the city requested that the intersection remain stop-controlled.

Maximum queues would exceed available storage in several locations; however this is an infrequent occurrence and additional roadway modifications are not recommended at these locations due to the limited operational benefits that would require large capital expenditures via impractical right-of-way acquisitions and the reconstruction of bridges. Many of the turn bay maximum queues would also be contained within their overall approaches' storage space and therefore would not impact upstream intersections.

The expected average queues would be accommodated by the available storage at all locations except the southbound approach of Main Street at Mangum Street. As noted previously, the addition of a third southbound travel lane can be studied during Engineering if the City of Durham were to allow the existing parking lane to be rededicated as a travel lane.

Table ES-1: LRT Options Geometric Mitigations

Downtown Durham Segment	
Pettigrew Street at Swift Avenue	Pettigrew is closed between Case St and Swift Ave (Opt 1 only)
Pettigrew Street at Chapel Hill Street	Remove westbound Pettigrew St general traffic lanes
Pettigrew Street at Blackwell Street	Remove westbound Pettigrew St general traffic lanes Remove dedicated eastbound Pettigrew St left turn bay to provide a single left/through/right lane
Pettigrew Street at Mangum Street	Remove westbound Pettigrew St general traffic lanes Restripe southbound Mangum St right turn lane to a through lane Add dedicated eastbound Pettigrew St right turn lane
Pettigrew Street at Dillard Street	Eliminate dedicated northbound Dillard St left turn lane Restripe westbound Pettigrew St lane to prohibit through traffic to provide a left/right only lane Restripe southbound Dillard St left/through lane to a through lane
Pettigrew Street at Roxboro Street	Remove westbound Pettigrew St general traffic lanes Add dedicated eastbound Pettigrew St left turn lane Restripe northbound Roxboro St left/through to a through lane

Table ES-2: VISSIM Overall Intersection Analysis Summary – 2040 LRT Options vs 2040 No-Build

Intersection	No-Build		Option 1		Option 2	
	AM	PM	AM	PM	AM	PM
Main Street at 9th Street	C	D	C	E	C	C
Main Street at Iredell Street (Unsignalized)	A	D	A	C	A	C
Main Street at Broad Street	C	D	D	E	C	D
Pettigrew Street at 9th Street (Unsignalized)	B	F	A	F	B	F
Pettigrew Street at Swift Avenue (Unsignalized)	D	F	F	E	B	F
Main Street at Buchanan Boulevard	D	D	D	D	D	D
Maxwell Street at Buchanan Boulevard (Unsignalized)	A	F	A	F	A	F
Duke Street at Main Street	C	C	B	C	B	C
Duke Street at Peabody Street (Unsignalized)	A	A	A	A	A	A
Memorial Street at Duke Street (Unsignalized)	A	A	A	A	A	A
Chapel Hill Street at Duke Street	C	C	C	C	C	C
Chapel Hill Street at Willard Street (Unsignalized)	A	A	C	D	B	D
Pettigrew Street at Chapel Hill Street	A	B	B	C	B	C
Blackwell Street at Pettigrew Street	B	B	B	B	B	B
Blackwell Street at Ramseur Street	B	B	B	B	B	B
Main Street at Corcoran Street	B	B	B	B	B	C
Mangum Street at Main Street	C	D	D	E	D	E
Mangum Street at Ramseur Street	B	C	C	C	C	C
Mangum Street at Pettigrew Street	B	B	A	A	A	A
Roxboro Street at Pettigrew Street	B	B	B	C	B	B
Pettigrew Street at Dillard Street	B	B	B	C	B	C
Fayetteville Street at Pettigrew Street	C	C	C	D	C	D
Fayetteville Street at Jackie Robinson Drive	B	B	B	C	B	C
Morehead Avenue at Fayetteville Street	A	A	A	A	A	A
Pettigrew Street at Grant Street	B	B	B	B	B	B
Gann Street at Pettigrew Street (Unsignalized)	A	A	A	A	A	A
Alston Avenue at Gann Street	C	B	C	B	C	B

Indicates traffic Impact

Indicates traffic Impact Below Mid-D

2. Introduction

Through the Alternatives Analysis (AA) process completed in April 2012 prior to preliminary design, which included extensive public outreach, a Locally Preferred Alternative (LPA) was selected to address the purpose and need of the Durham-Orange (D-O) Corridor. The proposed project is a 17.1 mile double-track light rail transit (LRT) line with 17 proposed stations that will greatly expand transit service in Durham and Orange Counties. The Durham-Orange Light Rail Transit (D-O LRT) project extends from its western terminus at the University of North Carolina at Chapel Hill (UNC) at the UNC Hospitals Station to the eastern terminus in Durham at the Alston Avenue Station. The proposed D-O LRT Project improves public transportation access to a range of educational, medical, employment, and other important activity centers, in the D-O Corridor including: UNC; UNC Hospitals; the William and Ida Friday Center for Continuing Education; Duke University; Durham Veterans Affairs (VA) Medical Center and Duke University Medical Center (DUMC); downtown and east Durham.

2.1 Description of the Proposed D-O LRT

The proposed D-O LRT alignment generally follows North Carolina (NC) Highway 54 (NC 54), Interstate 40 (I-40), United States (US) 15-501, and parallel to North Carolina Railroad (NCRR) Corridor in downtown Durham and east Durham. The proposed alignment begins in Chapel Hill at UNC Hospitals, parallels Fordham Boulevard, proceeds eastward adjacent to NC 54, travels north along I-40, parallels US 15-501 before it turns east towards Duke University and runs within Erwin Road, and then follows the NCRR Corridor that parallels NC Highway 147 (NC 147) through downtown Durham, before reaching its eastern terminus in Durham near Alston Avenue. A total of 17 stations are planned, and up to 3,900 parking spaces along the D-O LRT alignment will be provided. In addition, a rail operations maintenance facility (ROMF) will be constructed to accommodate the D-O LRT fleet (12 cars, including spares).

2.2 Proposed Project Alternatives

Consistent with the September 2012 Scoping Report, and as described herein, the Draft Environmental Impact Statement (DEIS) will examine the potential environmental impacts of the LRT alternative as well as a small number of alignment, station, and ROMF siting options, including the following:

- Crossing of Little Creek between the Friday Center and the proposed Leigh Village Development (i.e., Alternatives C1, C1A, C2, C2A and associated station location)
- Crossing of New Hope Creek (NHC) and Sandy Creek between Patterson Place and South Square (i.e., NHC Alternatives 1 and 2 and associated station locations)
- Station options at Duke and Durham VA Medical Centers
- Five proposed locations for the ROMF

2.3 Purpose of Downtown Durham Traffic Simulation Report

The roadway network is one of the most critical elements of the transportation network, serving as a means to safely move people and goods and to support the economic development of an area. In an effort to balance safety and mobility with economic development and access, many owners of public roads have developed standards for determining the impacts of development on the roadway network

and the level to which those impacts must be mitigated. The standards and mitigation levels governing projects in Durham and Orange Counties of North Carolina have been identified in the *Traffic Methodology Report*.

The purpose of this technical memorandum is to analyze the traffic operations for the Downtown Durham section of the proposed D-O LRT in light of the policies identified in the *Traffic Methodology Report*. The proposed D-O LRT project would integrate the LRT along Pettigrew Street generally.

The goal of the study is to provide decision makers with an evaluation of the ability of the transportation system to accommodate the future travel demand and to help determine which improvements are necessary to accommodate that demand. As noted previously, improvements to the roadway network will be included in this evaluation to determine if reasonable improvements can be made to accommodate the forecasted traffic volumes for 2040 in accordance with the guiding policies. This study will also aim to determine which projects are necessary to accommodate the background growth in traffic and which are necessary to mitigate any additional impacts caused by the proposed D-O LRT project.

2.4 Downtown Durham Traffic Simulation Description

This report describes the approach and summarizes the findings and results of the traffic analysis conducted on the section of the D-O LRT alignment in Downtown Durham.

Preliminary designs were developed for the proposed downtown D-O LRT alignment and are included in the *Basis for Engineering Design* (Appendix D). The design converts Pettigrew Street to one-way eastbound only operation between E Chapel Hill Street and Dillard Street with the LRT running along the north side of the Pettigrew Street east of Chapel Hill Street. Five LRT stations are proposed for implementation along this section of the project. The westernmost of the five is elevated and located west of 9th Street and Pettigrew Street. The second of the LRT stations is located east of Buchanan Boulevard between Maxwell Avenue and NC 147. The third is located at the intersection with Pettigrew Street and E Chapel Hill Street. The fourth station is located along Pettigrew Street between Dillard Street and Fayetteville Street, and the easternmost of the five is located on the western side of Pettigrew Street's intersection with Alston Avenue. In the analysis, these five stations are referred to as the Ninth Street Station, Buchanan Boulevard station, Durham Station, Dillard Street Station, and Alston Avenue Station respectively.

The implementation of the proposed D-O LRT along the Pettigrew Street corridor would require the reconstruction of the roadway from Chapel Hill Street to Alston Avenue. Please see Section 3 for a discussion of the Build Options and refer to Appendix D for the preliminary design drawings.

To analyze the potential impacts brought by the LRT, Vissim micro-simulation models were developed to cover the area of the LRT corridor and the nearby intersections. The models aim to capture the direct impact of the LRT operation to the roadway system during both the 2040 weekday AM and PM peak hours. The LRT is assumed to operate with 10 minute peak period frequencies in the eastbound and westbound directions. Every train is assumed to have 20 seconds of dwell time at each station for passenger boarding and alighting.

The following Primary Study Area intersections were analyzed in the Vissim models and are also shown in Figure 1:

- Main Street and 9th Street (signalized)
- Main Street at Iredell Street (unsignalized)
- Main Street and Broad Street (signalized)
- Pettigrew Street and 9th Street/Erwin Road (unsignalized)
- Pettigrew Street and Swift Avenue/Broad Street (unsignalized)
- Main Street and Buchanan Boulevard (signalized)
- Maxwell Street and Buchanan Boulevard (unsignalized)
- Duke Street and Main Street (signalized)
- Duke Street and Peabody Street (unsignalized)
- Duke Street and Memorial Street (unsignalized)
- Duke Street and Chapel Hill Street (signalized)
- Chapel Hill Street and Willard Street (unsignalized)
- Chapel Hill Street and Pettigrew Street (signalized)
- Main Street and Corcoran Street (signalized)
- Ramseur Street and Blackwell Street (signalized)
- Pettigrew Street and Blackwell Street (signalized)
- Main Street and Mangum Street (signalized)
- Ramseur Street and Mangum Street (signalized)
- Pettigrew Street and Mangum Street (signalized)
- Pettigrew Street and Roxboro Street (signalized)
- Pettigrew Street and Dillard Street (signalized)
- Pettigrew Street and Fayetteville Street (signalized)
- Jackie Robinson Drive and Fayetteville Street (signalized)
- Morehead Avenue and Fayetteville Street (signalized)
- Pettigrew Street and Grant Street (signalized)
- Pettigrew Street and Gann Street (unsignalized)
- Alston Avenue and Gann Street (signalized)

As Pettigrew Street would be converted to one-way eastbound vehicular operation between Chapel Hill Street and Dillard Street to accommodate the LRT, westbound general traffic must find alternate routes to complete their trips. Public transit buses will be permitted to travel in the westbound LRT transit lane from Dillard Street in the east to the Durham Station Transit Center Driveway in the west. The potential impacts caused by the detoured traffic were identified in a regional demand model, and then Synchro models were developed to analyze the potential impacts brought by the detoured traffic outside the primary LRT corridor study area. This secondary study area Synchro network covers the area from Holloway Street/Morgan Street in the north to Jackie Robinson Drive in the south, Duke Street in the west and Dillard Street in the east. The secondary study area intersections are shown in Figure 2.

Figure 1: Primary Study Area Intersections

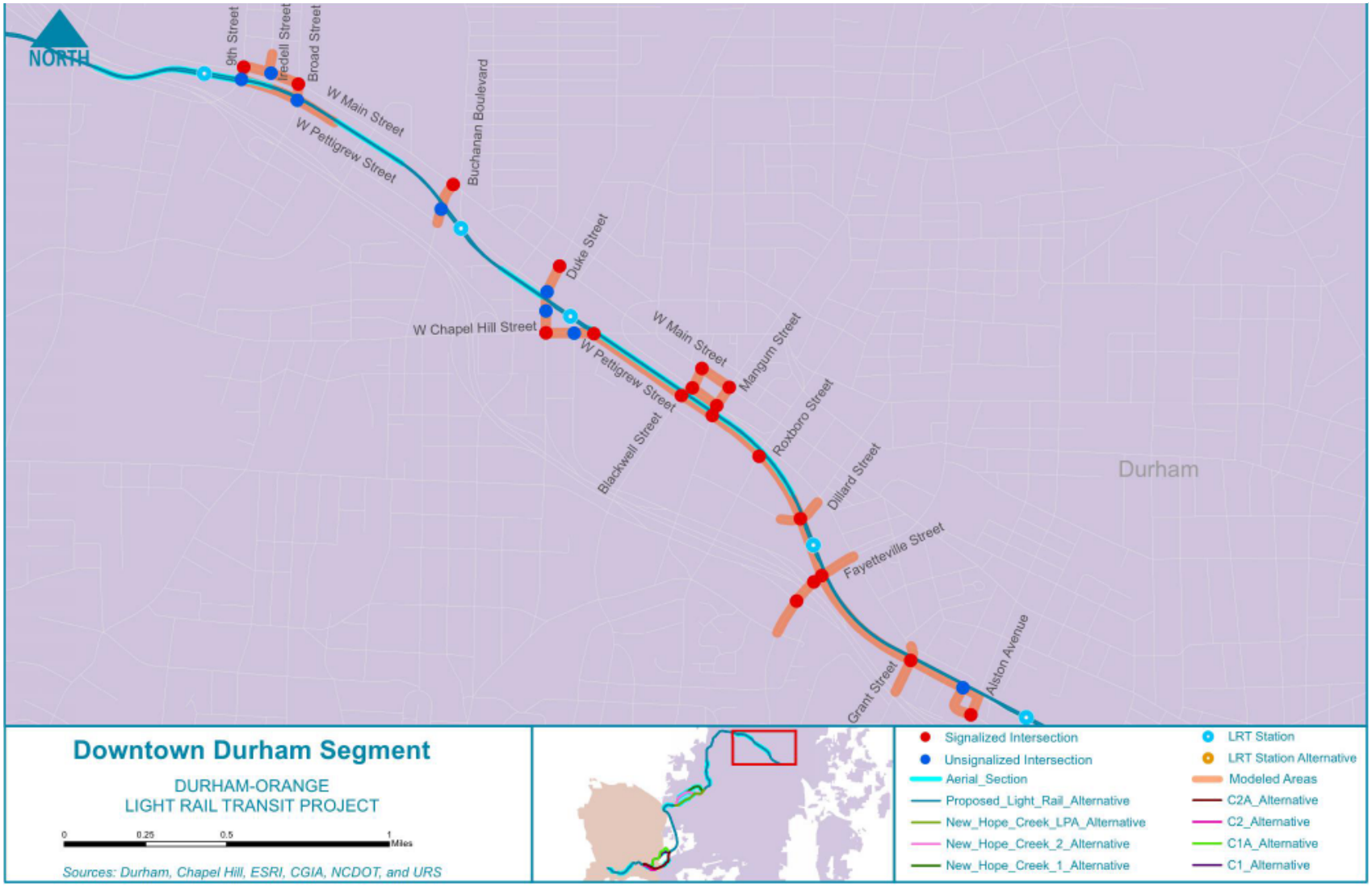
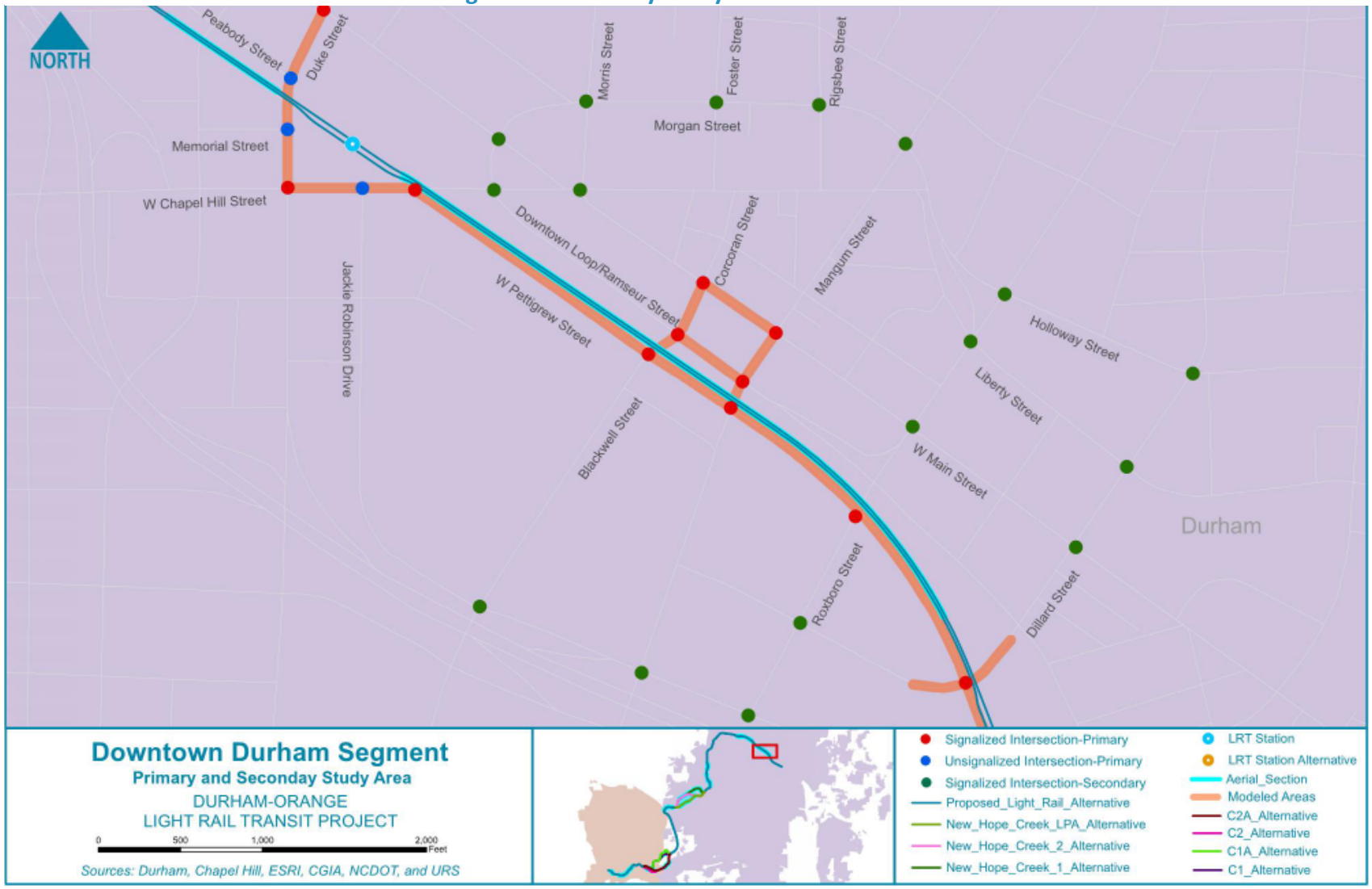


Figure 2: Secondary Study Area Intersections



3. Description of Scenarios

Four scenarios were analyzed for this study. Those scenarios included an Existing Conditions scenario that was also used for model calibration, a Future Year 2040 No-Build Alternative, and two options for the Future Year 2040 Build condition.

A brief description of the scenarios evaluated in the Vissim microscopic traffic simulation software follows.

3.1 2011 Base Year Scenario

The 2011 Base Year Scenario simulated traffic conditions as they existed in 2011. The goal of the 2011 Base Year Scenario was to develop a calibrated model that would serve as the basis for the creation of the models for future year No-Build and Build scenarios. As discussed in the *Traffic Methodology Report*, travel time and speed were calibrated.

3.2 2040 No-Build Alternative

This alternative determined what the traffic operations would be in the vicinity of the proposed D-O LRT project if the proposed project is not constructed. The No-Build Scenario assumed the local transportation system would evolve as currently planned, but without implementation of the proposed project and associated improvements. As part of the No-Build improvements, it was assumed the NCRR tracks would be grade-separated between Blackwell Street and Mangum Street. The Vissim models do not include NCRR rail traffic due to their rare occurrences during the AM and PM peak hours and therefore the status of the NCRR grade-separation project would not affect this analysis.

3.3 2040 Build Alternative– One-Way Eastbound Pettigrew Street

The 2040 Build Alternative determined what the traffic operations would be in the vicinity of the proposed project if the light rail is constructed and the stations are constructed in downtown Durham.

The Build analysis was based on a preliminary design as well as the currently planned improvements within the study area. Please refer to the Appendix D for the Preliminary Design drawings for Option 1 and Option 2.

Under both options, Pettigrew would be converted to one-way eastbound between Chapel Hill Street and Dillard Street, and the LRT runs along the north side of Pettigrew Street east of Chapel Hill Street.

The 2040 Build Option 1 would close Pettigrew Street between Case Street and east of Swift Avenue to provide exclusive right-of-way for the LRT to cross Swift Avenue at-grade.

The 2040 Build Option 2 elevates LRT at Swift Avenue and keeps Pettigrew Street open from Case Street to east of Swift Avenue.

In terms of the LRT's signal operation, for the purpose of this analysis it was assumed that traffic signals along Pettigrew Street will be programmed to operate with traffic signal pre-emption. Traffic signal pre-emption takes place when traffic signal timing is interrupted to allow trains to remain on schedule. In the case of Downtown Durham, it is assumed the normal traffic signal timing is altered to allow the train to proceed uninhibited. While the train is in the intersection, all conflicting movements must stop

although traffic traveling parallel to the tracks can proceed with the train. Any difference in signal phase length as a result of the passing train is made up within one traffic signal cycle after the train passes.

4. Methodology

The use of microscopic traffic simulation was completed using Vissim (version 5.4). Vissim is a microscopic, behavior-based multi-purpose traffic simulation program that evaluates each vehicle individually every model time step and then assigns the appropriate behavior logic according to the traffic operations that the specific vehicle encounters. For many engineering disciplines, simulation has become an indispensable instrument for the optimization of complex technical systems. This is also true for transportation planning and traffic engineering, where simulation is an invaluable and cost-reducing tool. The microscopic simulation model was developed for the studied section of the project and was based on a calibrated base model for the area.

The methodology for microscopic simulation begins with a base model developed from data collected for the transportation network. The base model is then calibrated against data measured in the field to arrive at a calibrated base model. Once the base model is calibrated, future year alternatives can be developed and analyzed for impact study. As in real-life operations, microscopic simulation models are constrained to the capacity of a given roadway, and as such the model can only load traffic up to the capacity of a facility, with excess vehicles being denied entry and queue up outside the model network. This can happen for future scenarios when demand has been forecasted to outgrow the capacity of the existing roadways.

4.1 Measures of Effectiveness

Measures of effectiveness (MOE) are system performance statistics that best characterize the degree to which a particular alternative meets the project objectives. The MOEs for microscopic simulation can be abundant due to the nature of the analysis. The primary MOEs for urban arterials are typically average speed and vehicle density for individual segments as well as average travel time and speed for individual origin-destination pairs within the network. On an overall network level, MOEs such as average system speed, average system delay, and number of stops can provide overall indications of the operations of a network.

As discussed in the *Traffic Methodology Report*, corridor-level MOEs including average speed and travel time were used as the method for calibrating the base year model. Control delay, which is utilized to determine intersection LOS, and queuing were the MOEs for the future year models. The concept of Highway Capacity Manual's Level of Service was adopted here for the purpose of simply categorizing the delays. Please note that the calculation methods of HCM delay and VISSIM delay are different, as Vissim delay includes control delay as well as queue delay, whereas, HCM includes control delay only, The LOS grades are based on Vissim delays, which will provide a more conservative result than the HCM-based delays.

The acceptable levels for the future year MOEs were enumerated in the *Traffic Methodology Report*. Additional information regarding the base year MOEs can be found in Section 6.1. Both NCDOT and City of Durham have established guidelines that specify when chosen MOEs meet the required thresholds. The NCDOT's "Policy on Street and Driveway Access to North Carolina Highways" states that when comparing base network conditions to project conditions, mitigation improvements to the roadway network are required if at least one of the following conditions exist:

- The total average delay at an intersection or an individual approach increases by 25% or greater, while maintaining the same Level of Service
- The Level of Service degrades by at least one level
- Or Level of Service is F
- For turning lanes, mitigation improvements shall be identified when the analysis indicates that the 95th percentile queue exceeds the storage capacity of the existing lane.

For the purposes of this analysis, traffic impacts were considered significant if the Build Alternative delay was at or above a middle LOS D or 45.0 seconds or greater for a signalized intersection. Those overall intersections or movements that reported delays greater than 45.0 seconds and experienced an LOS degradation or increase in delay greater than 25% compared to the No-Build were highlighted in the Vissim LOS tables with orange. For those intersections or movements that reported a Build LOS better than middle D or less than 45.0 seconds, the impacts were not considered as significant and were highlighted with yellow.

To be considered a queue impact, the maximum queue length for any Build movement would exceed both the respective No-Build movement's maximum queue length and the build movement storage length by 10 feet.

Table 1: City of Durham Traffic Level of Service Standards

Application	Level of Service Standard
Downtown Tier	LOS E
Compact Neighborhood Tier	LOS E
Urban Tier	LOS D
Suburban Tier	LOS D
Rural Tier	LOS C

For the Downtown Durham segment, those intersections under the jurisdiction of the City of Durham utilized the "Downtown Tier" criteria for MOE evaluation and traffic impact analysis.

4.2 Vissim Network Development

4.2.1 Geometry

The basis for developing the geometric data was a combination of aerial photographs and contour maps. Aerial photography was used as a background to digitize the network into the simulation model. The three-dimensional attributes and grades were determined based on a contour map of the study area.

The geometry in the 2011 Base Year network and the 2040 No-Build network are based on the current geometry of Downtown Durham. The network was created using aerials from NC OneMap, Google Maps, field verification, and contour maps from the North Carolina Department of Transportation (NCDOT).

4.2.2 Traffic Control

Signal timing and coordination plans were obtained from City of Durham for the nineteen signals included in the study area. These plans were used to input timing, phasing, and detectors for the following intersections in the base year:

- Main Street at 9th Street
- Main Street at Broad Street
- Main Street at Buchanan Boulevard
- Duke Street at Main Street
- Duke Street at E Chapel Hill Street
- E Chapel Hill Street at Pettigrew Street
- Blackwell Street/Corcoran Street at Pettigrew Street
- Mangum Street at Pettigrew Street
- Roxboro Street at Pettigrew Street
- Dillard Street at Pettigrew Street
- Grant Street at Pettigrew Street
- Alston Street at Gann Street
- Blackwell Street/Corcoran Street at Downtown Loop/Ramseur Street
- Mangum Street at Downtown Loop/Ramseur Street
- Corcoran Street at Main Street
- Mangum Street at Main Street
- Fayetteville Street at Pettigrew Street
- Fayetteville Street at Jackie Robinson Drive
- Fayetteville Street at Morehead Avenue

The signalized intersections for the future year networks were input into Synchro for signal optimization prior to being input into Vissim. The future year signalized intersections included the previously listed intersections. The future year signal timings were composed from the base year timing, and then re-optimized based on the 2040 traffic volumes.

4.2.3 Speed Data

The average speed data in the area were collected using the floating car technique during off-peak periods with low volumes. This data was used to develop desired speed distributions for the network. Weekday peak periods speed data was collected from INRIX (a mobile application pertaining to road traffic). This data was used to determine the average speed during the peak periods from the approximate time the initial count data was collected. This data was used in calibration of the model. The desired speed distribution for turning vehicles at intersections was assumed to be 12.6 mph with a standard deviation of 1.2 mph for right turns and 21 mph with a standard deviation of 2 mph for left turns. There were two main speed distributions used for roadways: 1) 25 mph posted, with a range of 19 to 31 mph in Vissim, and 2) 35 mph posted with a range of 32 to 48 mph.

4.2.4 Driving Behavior Parameters

The driving behavior parameters were used to guide vehicles through the network during the simulation models. Both the car-following and lane-change models in Vissim use an extensive range of parameters. Some of these may be adapted by the user to change basic driving behavior. Vissim uses five driving behavior models, of which only one was used in the base model: Urban (motorized). The Urban (motorized) parameters were used to model the surface streets within the network and were based on the Wiedemann 74 model. The Wiedemann 74 model includes three parameters which can be calibrated based on the data collected. Default values were used in developing the base model and any modifications made to the parameters were documented in the calibration section of this report.

4.2.5 Estimated Traffic Volumes

Simulation models are capable of using unbalanced input volumes and their own internal algorithms to balance the network; however using this method of traffic volume input can produce inaccuracies in actual processed volumes at particular locations. To accurately model the network, the volumes were developed into a balanced network. The traffic volumes for the proposed project were based on peak hour count data that was balanced along Pettigrew Street by adjusting through volumes and adding sink and source nodes to correspond to mid-block locations that could serve as origins and destinations of traffic. These locations included parking lots for commercial establishments as well as parking areas for residential development along the corridor.

Volumes for the 2011 Existing Condition were developed based on the 2011 count data. The projection of the future volumes for no-build and build conditions were based on Triangle Regional Travel Demand Model (TRM) v5 as outlined in the *Traffic Methodology Report*.

Due to the introduction of the LRT, including park & ride lots and a modal demand shift from personal vehicles to public transit, the 2040 No-Build and Build volumes were based on separate TRM roadway growth rates. Separate future 2040 Build balanced volumes were developed for Build Option 1 and Build Option 2 in the vicinity of Pettigrew Street and Main Street between Erwin Road/9th Street and Broad Street/Swift Avenue due to the closure of Pettigrew Street between Case Street and east of Swift Avenue under LRT Option 1. Due to the localized closure of Pettigrew Street, the east/west volumes were rerouted to Main Street via Erwin Street/9th Street and Broad Street/Swift Avenue.

Both LRT Option 1 and Option 2 assumed that westbound Pettigrew Street would be closed to general traffic between Chapel Hill Street and Dillard Street, which would require vehicles to find alternative

paths to complete their westbound trips. As a result, Build volumes would increase on Main Street, Holloway Street/Morgan Street, and to a lesser extent Jackie Robinson Drive. Similarly, the north/south running roadways including Roxboro Street and Dillard Street that connect to the alternate westbound roadways are expected to accommodate additional Build volumes compared to No-Build Conditions.

The balanced AM and PM peak hour volumes for the 2011 Existing, 2040 No-Build, 2040 LRT Option 1, and 2040 LRT Option 2 scenarios are shown in Appendix A.

4.2.6 Simulation Settings and Repetitions

Each simulation was run for one hour with 15 minutes of seeding time for the network to load. The number of simulation runs was based on the process described in Appendix B of the Federal Highway Administration (FHWA) Traffic Analysis Toolbox. The average speed of each simulation run was used as a basis for determining the number of required repetitions, with a confidence level of 95% and a confidence interval of 5 mph. It was calculated that each alternative/option would need to be run with 16 repetitions each for both the AM and PM peak periods.

4.2.7 Output

The output data was extracted from the model using the Travel Time evaluation, Data Collection, and the Analyzer Reports modules. The Travel Time evaluation provided average travel times for user defined start and end points within the network. The Analyzer Report module provided delay data which was utilized to determine the LOS. The Analyzer Report module provides queuing information as well.

4.2.8 Base Year Calibration

The base year model was calibrated by comparing modeled travel times versus historic INRIX speed data as described in the *Traffic Analysis Methodology Report*. Historic data was extracted for Pettigrew Street within the study area for AM and PM peak one hour periods during all weekdays for the month of May in 2011. The average speed and corresponding travel time for each direction along Pettigrew Street was determined from the data. It should be noted that INRIX speed data is composed of link-based speeds (as opposed to spot speeds taken at a fixed point); therefore, the model network was developed to match the same extents as the INRIX speed data. For this study this included the Pettigrew Street segments between Chapel Hill Street and Alston Avenue for both directions during the AM and PM peak hours.

For the calibration effort, the average travel time was determined by averaging a statistically adequate number of model runs (see Section 6.1). Speed calibration targets of ±2.5 mph (desirable) and ±5 mph (acceptable) were set as described in the *Traffic Analysis Methodology Report*.

5. Synchro Network Development

In addition to the Vissim analysis addressing the direct impact along the LRT corridor, as Pettigrew Street is converted to one-way eastbound operation for general traffic between Chapel Hill Street and Dillard Street, the potential impacts brought by the detoured traffic outside the LRT corridor were analyzed in Synchro models by comparing the Build scenario to No-Build scenario. The Synchro model was developed for three future scenarios – 2040 No-Build and the two 2040 Build Options. This secondary Synchro network covers an area from Holloway Street/Morgan Street in the north to Jackie Robinson Drive in the south, Duke Street in the west and Dillard Street in the east. As a result, the following intersections were analyzed in Synchro:

- Downtown Loop at Chapel Hill Street
- Great Jones Street at W Main Street
- Great Jones Street at Morris Street
- E Chapel Hill Street/Main Street at Morris Street
- Morgan Street at Foster Street
- Blackwell Street at Jackie Robinson Drive
- Morgan Street at Rigsbee Avenue
- Morgan Street at Mangum Street
- Mangum Street at Jackie Robinson Drive
- Holloway Street at Roxboro Street
- Liberty Loop at Roxboro Street
- Main Street at Roxboro Street
- Dillard Street at Roxboro Street
- Jackie Robinson Drive at Roxboro Street
- Dillard Street at Holloway Street
- Dillard Street at Liberty Street
- Dillard Street at Main Street

5.1 Estimated Traffic Volumes

The field peak hour traffic counts for the intersections above were obtained from City of Durham. The counts year ranges from 2007 to 2010. First these counts were aligned to the year of 2011 by applying aggregated growth factors derived from the regional demand model. The traffic volumes were then balanced by adjusting through volumes and adding sink and source nodes to correspond to mid-block locations that could serve as origins and destinations of traffic.

The projection of the future volumes for no-build and build conditions was based on the Triangle Regional Travel Demand Model (TRM) v5. Link growth rates derived from the TRM were applied to the existing

balanced volumes to provide realistic traffic patterns in the future conditions. The resulting future scenarios' balanced volumes were adjusted to provide feasible Volume-to-Capacity ratios in an effort to avoid supersaturated roadways.

5.2 Traffic Control

The existing signal and coordination plans were obtained by Synchro models provided by City of Durham. The future year signal timings were composed from the base year timing, and then re-optimized based on the projected 2040 traffic volumes for the No-Build and Build alternatives. To accommodate the multi-modal users of the Downtown Durham area and minimize pedestrian waiting times, future signal cycle lengths were limited to a maximum of 120 seconds at locations not directly impacted by the LRT. Maximum cycle lengths of 140 seconds were proposed at intersections directly impacted by LRT crossings to accommodate the green time lost to preemption events.

6. Simulation Results

Based on the above model network elements and the methodologies defined under MOEs, the results from Vissim and Synchro can be determined.

6.1 2011 Existing Conditions

The 2011 Existing Conditions Vissim model was developed and calibrated, as described in Section 4.2.89 above. The INRIX speed data, taken from a 1.3 mile corridor along Pettigrew Street showed the following average speeds and corresponding travel times. The results of the calibrated base model are shown in Table 2 below.

Based on the data included in Table 2 and the calibration criteria of ± 5 mph with a desired target range of ±2.5 mph, the base model is considered to be calibrated and can be utilized as the basis for developing the future year alternatives/options. All four travel time values fell within the acceptable range. In general, the speeds in the model were lower than those from the INRIX data.

Table 2: 2011 Existing Conditions - Calibrated Base Model Summary

Direction	Length	Peak Period	Calibrated Model		INRIX		Travel Time Difference (min)	Speed Difference (MPH)	Calibration Range
			Average Travel Time (min)	Average Speed (MPH)	Average Travel Time (min)	Average Speed (MPH)			
Eastbound Travel Time Summary									
EB Corridor Wide	1.31	AM	3.99	19.69	3.73	21.78	0.26	-2.09	Within Desirable
		PM	3.99	19.69	3.67	22.18	0.32	-2.49	Within Desirable
Westbound Travel Time Summary									
WB Corridor Wide	1.16	AM	3.60	19.36	3.22	22.45	0.38	-3.08	Within Acceptable
		PM	3.82	18.22	3.27	22.10	0.55	-3.89	Within Acceptable

6.2 2040 No-Build Alternative

The 2040 No-Build Alternative model was developed based on the calibrated Existing Conditions model. The signals optimized in the Synchro model for the 2040 No-Build volumes were incorporated and the 2040 No-Build volumes were then input into the Vissim model.

The Highway Capacity Manual defines LOS for signalized and unsignalized intersections as a function of the average vehicle control delay. LOS may be calculated per movement or per approach for any intersection configuration, but LOS for the intersection as a whole is only defined for signalized and all-way stop configurations. Table 3 and Table 4 demonstrate the different levels of service for signalized and unsignalized intersections based on delay and volume to capacity ratio.

Table 3: Level of Service – Signalized Intersections

Level of Service	Delay (seconds)	Description
A	≤10	This level is typically assigned when the volume-to capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.
B	>10-20	This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.
C	>20-35	This level is typically assigned when progression is favorable or the cycle length is moderate. Individual *cycle failures* (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. This number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.
D	>35-55	This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.
E	>55-80	This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.
F	>80	This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

Table 4: Level of Service – Unignalized Intersections

Level of Service	Delay (seconds)
A	≤10
B	>10-15
C	>15-25
D	>25-35
E	>35-50
F	>50

The Downtown Durham Primary Study Area 2040 No-Build Vissim MOEs are presented in Table 5 for the AM and PM peak hours.

Table 5: 2040 No-Build Alternative Vissim Summary

Intersection	Movement	AM Peak			PM Peak		
		Volume (vph)	Delay (s)	LOS	Volume (vph)	Delay (s)	LOS
Main Street at 9th Street	EBL	84	28.7	C	63	41.1	D
	EBR	62	26.8	C	58	50.5	D
	EBT	348	30.8	C	599	53.8	D
	NBL	78	29.3	C	47	32.4	C
	NBR	111	18.6	B	302	48.9	D
	NBT	176	27.4	C	300	50.8	D
	SBL	127	27.8	C	240	65.2	E
	SBR	96	33.8	C	76	32.7	C
	SBT	384	37.2	D	198	39.5	D
	WBL	128	18.8	B	216	70.0	E
	WBR	114	13.2	B	245	14.2	B
	WBT	274	16.7	B	452	17.7	B
	All		**27.0**	**C**		**43.4**	**D**
Main Street at Iredell Street (Unsignalized)	EBL	119	3.3	A	176	17.9	C
	EBT	467	3.2	A	965	16.9	C
	SBL	37	17.0	C	33	225.0	F
	SBR	20	11.5	B	77	175.0	F
	WBR	145	2.6	A	25	11.6	B
	WBT	496	3.7	A	836	15.7	C
	All		**3.9**	**A**		**26.8**	**D**

Intersection	Movement	AM Peak			PM Peak		
		Volume (vph)	Delay (s)	LOS	Volume (vph)	Delay (s)	LOS
Main Street at Broad Street	EBL	14	57.2	E	113	37.9	D
	EBR	143	6.9	A	255	7.9	A
	EBT	347	37.3	D	630	34.4	C
	NBL	252	30.1	C	283	51.0	D
	NBR	243	2.7	A	185	1.5	A
	NBT	299	17.3	B	448	16.1	B
	SBL	66	60.5	E	116	107.6	F
	SBR	52	28.8	C	65	78.8	E
	SBT	412	43.7	D	625	93.0	F
	WBL	175	68.3	E	167	49.3	D
	WBR	32	21.7	C	87	48.9	D
	WBT	337	26.9	C	513	53.7	D
	All		**30.9**	**C**		**47.3**	**D**
Pettigrew Street at 9th Street (Unsignalized)	NBR	29	9.0	A	82	128.0	F
	NBT	220	14.5	B	596	141.6	F
	SBL	25	1.6	A	42	12.4	B
	SBT	549	0.4	A	430	1.9	A
	WBL	79	39.4	E	26	19.7	C
	WBR	145	38.7	E	53	46.6	E
	All		**11.9**	**B**		**59.4**	**F**
Pettigrew Street at Swift Avenue (Unsignalized to Signalized)	EBL	6	104.7	F	53	373.3	F
	EBR	31	32.2	D	166	316.2	F
	EBT	2	42.6	E	3	345.7	F
	NBL	191	25.1	D	48	118.5	F
	NBR	19	27.9	D	9	67.0	F
	NBT	777	47.1	E	820	122.4	F
	SBL	22	48.7	E	16	133.0	F
	SBR	42	1.9	A	45	1.3	A
	SBT	666	0.7	A	986	1.0	A
	WBL	1	38.6	E	17	854.1	F
	WBR	11	100.9	F	43	941.6	F
	WBT	2	106.4	F	6	928.8	F
	All		**26.2**	**D**		**92.5**	**F**

Intersection	Movement	AM Peak			PM Peak		
		Volume (vph)	Delay (s)	LOS	Volume (vph)	Delay (s)	LOS
Main Street at Buchanan Boulevard	EBL	128	52.8	D	187	118.9	F
	EBR	86	7.5	A	69	12.4	B
	EBT	475	24.4	C	554	24.5	C
	NBL	79	67.5	E	97	117.9	F
	NBR	63	13.1	B	67	18.6	B
	NBT	177	48.2	D	350	60.1	E
	SBL	170	80.7	F	107	154.1	F
	SBR	170	24.4	C	179	43.1	D
	SBT	327	56.1	E	312	95.5	F
	WBL	51	62.5	E	36	93.5	F
	WBR	44	26.8	C	181	26.1	C
	WBT	293	27.6	C	689	27.2	C
	All		**39.8**	**D**		**52.0**	**D**
Maxwell Street at Buchanan Boulevard (Unsignalized)	EBL	52	24.8	C	40	1273.0	F
	EBR	74	15.1	C	49	984.3	F
	EBT	0	0.0	A	0	0.0	A
	NBL	13	7.9	A	57	96.3	F
	NBR	0	0.0	A	0	0.0	A
	NBT	267	7.5	A	474	107.1	F
	SBL	0	0.0	A	0	0.0	A
	SBR	17	0.6	A	50	2.3	A
	SBT	447	0.6	A	367	1.3	A
	WBL	0	0.0	A	0	0.0	A
	WBR	0	0.0	A	0	0.0	A
	WBT	0	0.0	A	0	0.0	A
	All		**5.6**	**A**		**85.8**	**F**
Duke Street at Main Street	EBL	170	40.1	D	172	49.1	D
	EBT	374	36.7	D	446	37.8	D
	NBL	251	11.4	B	274	13.9	B
	NBR	40	11.1	B	28	12.8	B
	NBT	956	12.1	B	1133	14.1	B
	WBR	22	21.0	C	24	28.9	C
	WBT	93	33.6	C	270	35.2	D
	All		**20.4**	**C**		**23.6**	**C**

Intersection	Movement	AM Peak			PM Peak		
		Volume (vph)	Delay (s)	LOS	Volume (vph)	Delay (s)	LOS
Duke Street at Peabody Street (Unsignalized)	EBL	16	10.5	B	28	16.0	C
	EBT	3	10.4	B	15	20.6	C
	NBL	59	0.6	A	104	0.8	A
	NBR	1	0.5	A	4	3.1	A
	NBT	1218	3.1	A	1399	6.2	A
	WBR	13	10.5	B	8	13.2	B
	WBT	31	14.7	B	30	17.1	C
	All		**3.5**	**A**		**6.4**	**A**
Memorial Street at Duke Street (Unsignalized)	EBL1	0	0.7	A	0	3.5	A
	EBL2	5	8.9	A	15	15.5	C
	NBL	20	3.6	A	10	6.8	A
	NBT1	1273	4.8	A	1492	8.4	A
	NBT2	0	2.8	A	0	6.9	A
	All		**2.9**	**A**		**7.1**	**A**
Chapel Hill Street at Duke Street	EBL	193	20.3	C	161	61.5	E
	EBT	690	15.1	B	388	17.0	B
	NBL	117	26.4	C	189	38.0	D
	NBR	132	12.4	B	111	7.7	A
	NBT	1039	27.8	C	1318	40.8	D
	WBR	61	13.6	B	23	15.7	B
	WBT	383	16.5	B	749	17.2	B
	All		**21.1**	**C**		**31.3**	**C**
Chapel Hill Street at Willard Street (Unsignalized)	EBR	137	1.6	A	52	1.3	A
	EBT	685	1.7	A	447	1.6	A
	NBL	15	15.5	C	42	47.4	E
	NBR	29	11.4	B	93	26.3	D
	WBL	47	7.9	A	57	4.0	A
	WBT	429	1.0	A	730	9.5	A
	All		**2.0**	**A**		**8.7**	**A**

Intersection	Movement	AM Peak			PM Peak		
		Volume (vph)	Delay (s)	LOS	Volume (vph)	Delay (s)	LOS
Pettigrew Street at Chapel Hill Street	EBR	260	3.6	A	167	3.3	A
	EBT	454	3.8	A	373	4.1	A
	NBL	86	17.1	B	246	47.3	D
	NBR	69	8.9	A	41	36.5	D
	WBL	42	13.7	B	37	15.1	B
	WBT	390	8.5	A	541	13.9	B
	All		**6.7**	**A**		**16.6**	**B**
Blackwell Street at Pettigrew Street	EBL	13	32.4	C	26	26.4	C
	EBR	36	11.1	B	53	11.9	B
	EBT	121	20.8	C	143	18.1	B
	NBL	21	16.8	B	43	20.1	C
	NBR	7	9.2	A	47	12.1	B
	NBT	139	15.3	B	200	16.2	B
	SBL	51	3.0	A	74	12.8	B
	SBR	33	1.0	A	44	2.4	A
	SBT	164	1.4	A	187	7.1	A
	WBL	9	16.6	B	35	5.8	A
	WBR	51	15.7	B	49	10.9	B
	WBT	205	14.3	B	126	6.3	A
	All		**11.9**	**B**		**12.2**	**B**
Blackwell Street at Ramseur Street	EBL	16	14.6	B	111	18.6	B
	EBR	7	5.0	A	190	14.3	B
	EBT	385	16.2	B	371	17.0	B
	NBR	7	4.0	A	57	2.7	A
	NBT	196	8.7	A	218	6.8	A
	SBL	27	16.5	B	81	14.7	B
	SBT	241	15.0	B	115	13.3	B
	All		**14.0**	**B**		**13.5**	**B**

Intersection	Movement	AM Peak			PM Peak		
		Volume (vph)	Delay (s)	LOS	Volume (vph)	Delay (s)	LOS
Main Street at Corcoran Street	EBL	52	28.2	C	41	33.3	C
	EBR	50	21.7	C	24	24.7	C
	EBT	176	26.7	C	223	31.6	C
	NBL	20	7.2	A	38	9.8	A
	NBR	9	3.9	A	16	7.4	A
	NBT	183	5.7	A	275	8.8	A
	SBL	24	12.6	B	57	14.9	B
	SBR	22	7.1	A	35	8.0	A
	SBT	187	12.5	B	154	11.0	B
	WBL	31	11.2	B	18	32.8	C
	WBR	42	6.2	A	66	21.2	C
	WBT	174	8.7	A	165	30.8	C
	All		**13.9**	**B**		**19.1**	**B**
Mangum Street at Main Street	EBR	7	36.9	D	24	36.9	D
	EBT	202	42.8	D	272	31.8	C
	SBL	173	16.6	B	92	34.5	C
	SBR	7	5.3	A	14	8.7	A
	SBT	1099	17.7	B	985	33.4	C
	WBL	84	53.4	D	281	179.1	F
	WBT	240	23.3	C	235	79.9	E
	All		**23.0**	**C**		**53.6**	**D**
Mangum Street at Ramseur Street	EBR	117	45.6	D	176	46.6	D
	EBT	302	20.8	C	333	9.4	A
	SBL	91	17.8	B	61	29.3	C
	SBT	1099	16.8	B	1229	28.2	C
	All		**19.7**	**B**		**26.5**	**C**
Mangum Street at Pettigrew Street	EBR	52	26.1	C	122	15.8	B
	EBT	127	40.8	D	142	23.5	C
	SBL	54	0.7	A	58	0.6	A
	SBR	67	0.5	A	29	0.3	A
	SBT	1095	0.2	A	1318	0.3	A
	WBL	77	58.6	E	123	68.3	E
	WBT	198	37.5	D	181	33.7	C
	All		**11.4**	**B**		**10.7**	**B**

Intersection	Movement	AM Peak			PM Peak		
		Volume (vph)	Delay (s)	LOS	Volume (vph)	Delay (s)	LOS
Pettigrew Street at Dillard Street	EBL	15	12.4	B	26	11.6	B
	EBR	25	5.9	A	27	9.7	A
	EBT	75	9.3	A	197	12.2	B
	NBL	0	0.0	A	51	25.0	C
	NBR	34	8.2	A	69	14.1	B
	NBT	100	17.6	B	251	16.6	B
	SBL	45	21.3	C	96	24.6	C
	SBR	98	9.9	A	16	13.4	B
	SBT	110	18.5	B	238	16.9	B
	WBL	25	6.1	A	69	17.8	B
	WBR	18	3.6	A	32	11.7	B
	WBT	87	6.0	A	78	16.3	B
	All		**12.3**	**B**		**16.5**	**B**
Fayetteville Street at Pettigrew Street	EBL	7	61.4	E	10	38.7	D
	EBR	26	5.6	A	124	29.3	C
	EBT	57	53.9	D	180	45.2	D
	NBL	35	5.9	A	19	5.2	A
	NBR	61	0.3	A	133	0.5	A
	NBT	388	1.3	A	436	1.1	A
	SBL	41	21.1	C	42	25.8	C
	SBR	7	13.4	B	4	24.9	C
	SBT	445	22.4	C	667	27.0	C
	WBL	90	59.8	E	131	143.1	F
	WBR	50	31.3	C	40	65.4	E
	WBT	127	47.2	D	83	64.0	E
	All		**21.3**	**C**		**31.1**	**C**
Fayetteville Street at Jackie Robinson Drive	NBL	185	14.2	B	308	17.8	B
	NBT	367	11.7	B	567	10.8	B
	SBR	40	2.1	A	31	6.9	A
	SBT	521	6.8	A	891	7.2	A
	WBL	144	40.5	D	151	43.9	D
	WBR	117	6.7	A	21	41.5	D
	WBT	13	36.8	D	8	42.9	D
	All		**12.9**	**B**		**13.2**	**B**

Intersection	Movement	AM Peak			PM Peak		
		Volume (vph)	Delay (s)	LOS	Volume (vph)	Delay (s)	LOS
Morehead Avenue at Fayetteville Street	EBL	33	45.3	D	130	54.5	D
	EBR	130	6.6	A	17	6.7	A
	EBT	0	0.0	A	0	0.0	A
	NBR	18	1.8	A	3	2.6	A
	NBT	519	2.6	A	745	3.2	A
	SBL	71	3.2	A	146	6.2	A
	SBT	594	1.5	A	896	2.4	A
	All		**3.5**	**A**		**6.5**	**A**
Pettigrew Street at Grant Street	EBL	0	0.0	A	27	17.5	B
	EBR	13	3.2	A	0	0.0	A
	EBT	146	6.2	A	328	15.9	B
	NBL	0	0.0	A	54	25.5	C
	NBR	73	9.8	A	185	21.4	C
	NBT	51	19.6	B	119	25.0	C
	SBL	86	25.2	C	134	25.9	C
	SBR	0	0.0	A	0	0.0	A
	SBT	68	23.0	C	59	21.4	C
	WBL	127	7.8	A	140	16.2	B
	WBR	121	5.4	A	92	8.3	A
	WBT	267	7.0	A	200	11.0	B
	All		**10.5**	**B**		**18.0**	**B**
Gann Street at Pettigrew Street (Unsignalized)	EBR	72	2.7	A	121	2.9	A
	EBT	287	2.9	A	496	2.8	A
	NBL	102	9.4	A	172	15.7	C
	NBR	12	7.1	A	43	13.1	B
	WBL	23	8.4	A	63	10.1	B
	WBT	437	0.4	A	357	0.5	A
	All		**2.6**	**A**		**4.7**	**A**

Intersection	Movement	AM Peak			PM Peak		
		Volume (vph)	Delay (s)	LOS	Volume (vph)	Delay (s)	LOS
Alston Avenue at Gann Street	EBL	69	57.6	E	31	56.0	E
	EBR	182	13.1	B	186	7.2	A
	NBL	14	18.4	B	137	18.6	B
	NBT	875	12.0	B	1500	9.7	A
	SBR	46	12.2	B	22	10.2	B
	SBT	1440	14.0	B	1355	13.4	B
	WBL	457	59.5	E	150	55.3	E
	WBR	315	41.9	D	147	11.9	B
	WBT	52	58.9	E	1	24.4	C
	All		**23.1**	**C**		**13.8**	**B**
Roxboro Street at Pettigrew Street	EBL	90	57.0	E	77	26.4	C
	EBT	91	43.3	D	123	14.7	B
	NBL	188	9.1	A	205	20.9	C
	NBR	24	2.6	A	127	7.9	A
	NBT	1524	9.0	A	1244	20.5	C
	WBR	98	67.6	E	46	19.5	B
	WBT	87	81.0	F	99	28.5	C
	All		**18.4**	**B**		**20.0**	**B**

Overall, as indicated in Table 5 for the No-Build Vissim outputs, the downtown Durham corridor is relatively less congested compared to other corridors studied as part of the D-O LRT project. All of the overall intersections report an LOS D or better during the AM peak hour. Several individual movements in the area bounded by Main Street, Pettigrew Street, Broad Street, and 9th Street operate at LOS E or F in the future. This is not unexpected as the only planned improvement for these intersections would grade separate the NCRR track between Blackwell Street and Mangum Street and the demand is expected to increase by approximately from 30% to 60% in this dense grid area. The overall LOS at Pettigrew Street and Swift Ave and at Pettigrew Street and 9th Street are F during the PM peak hour. This is partially due to the traffic demand growth at the intersections themselves and partially due to the demand growth at the downstream intersections. The demand at the intersection of Main Street and 9th Street is expected to increase from 1,798 vehicles per hour in 2012 to 2,796 vehicles per hour in 2040. The demand at Main Street and Broad Street is expected to increase from 2,652 vehicles per hour in the year of 2011 to 3,487 vehicles per hour in 2040. Because it is a dense grid network, the queues are expected to spill back from the downstream intersections and cause further delay. In addition, the Smith Warehouse driveway at Buchanan Boulevard also operates at LOS F under 2040 No-Build conditions due to the queue spillback from the intersection of Main Street and Buchanan Boulevard.

A 2040 No-Build Synchro-based model was developed to further investigate the potential signal optimization in the micro-simulation area to improve traffic operation. In addition to covering the same

network area as in the Vissim model along the LRT corridor, a secondary study area Synchro network, as described in Section 5, was developed to analyze the effects of traffic detoured due to Pettigrew Street's one-way eastbound conversion. Refer to Appendix C for Synchro model outputs for the No-Build scenario.

It is important to note that there are No-Build background issues that would exist regardless of the potential D-O LRT project. These areas of congestion will also have an impact on meeting the thresholds laid out in NCDOT's "Policy on Street and Driveway Access to North Carolina Highways".

Based on the results of the Vissim analyses, the following intersections in the primary study area are anticipated to operate at LOS E or LOS F in at least one No-Build peak hour:

- Pettigrew Street and 9th Street
- Pettigrew Street and Swift Avenue
- Maxwell Street and Buchanan Boulevard

In the secondary study network, all intersections are expected to operate at LOS C or better for both AM and PM peak hours.

6.3 2040 Build Conditions Option 1 - LRT at-grade at Swift Avenue

As it has been described in Section 3.3, the 2040 LRT Option 1 would close Pettigrew Street between Case Street and east of Swift Avenue to provide for an exclusive right-of-way for the LRT to cross Swift Avenue at-grade. In addition, Pettigrew Street would be converted to one-way eastbound general traffic operation between E Chapel Hill Street and Dillard Street, and the LRT would run along the north side of the Pettigrew Street east of Chapel Hill Street.

Based on the above model network elements and the methodologies defined under MOEs, the results from Vissim for the 2040 Build Conditions were determined. Detailed traffic delay at individual movement level and overall intersection level was compared to No-Build scenarios in Table 10 (AM peak hour) and Table 11 (PM peak hour) in Section 7. Queuing information for 2040 LRT Option 1 is also included in the comparison tables.

6.4 2040 Build Conditions Option 2 – Elevated LRT at Swift Avenue

Option 2 would elevate the LRT at Swift Avenue and keep Pettigrew Street open from Case Street to east of Swift Avenue. Similar to Option 1, Pettigrew Street would be converted to one-way eastbound general traffic operation between E Chapel Hill Street and Dillard Street, and the LRT would run along the north side of the Pettigrew Street east of Chapel Hill Street.

Based on the above model network elements and the methodologies defined under MOEs, the results from Vissim for the 2040 Build Conditions were determined. Detailed traffic delay at the individual movement level and overall intersection level were compared to No-Build scenarios in Table 12 (AM peak hour) and Table 13 (PM peak hour) in Section 7. Queuing information for 2040 LRT Option 2 is also included in Table 12 (AM peak hour) and Table 13 (PM peak hour).

Proposed geometric mitigations that have been applied to both the 2040 LRT Option 1 and 2040 LRT Option 2 are listed in Table 6.

Intersection signal timing changes from 1) Existing to No-Build and from 2) No-Build to Build including traffic signal cycle length and phasing modifications are shown in Table 7 for LRT Option 1, and LRT Option 2 from Buchanan Boulevard to Alston Avenue. Table 8 shows the scenario changes for the single intersection under LRT Option 2 that would have a different geometry than LRT Option 1. Tables 7 and 8 also indicate the lane configuration modifications that are proposed between Existing to No-Build, and No-Build to Build conditions.

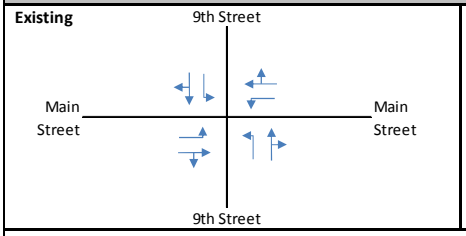
Table 6: LRT Options Geometric Mitigation Measures

Downtown Durham Segment	
Pettigrew Street at Swift Avenue	Pettigrew is closed between Case St and Swift Ave (Opt 1 only)
Pettigrew Street at Chapel Hill Street	Remove westbound Pettigrew St general traffic lanes
Pettigrew Street at Blackwell Street	Remove westbound Pettigrew St general traffic lanes Remove dedicated eastbound Pettigrew St left turn bay to provide single left/through/right lane
Pettigrew Street at Mangum Street	Remove westbound Pettigrew St general traffic lanes Restripe southbound Mangum St right turn lane to a through lane Add dedicated eastbound Pettigrew St right turn lane
Pettigrew Street at Dillard Street	Eliminate dedicated northbound Dillard St left turn lane Restripe westbound Pettigrew St lane to prohibit through traffic to provide a left/right only lane Restripe southbound Dillard St left/through lane to a through lane
Pettigrew Street at Roxboro Street	Remove westbound Pettigrew St general traffic lanes Add dedicated eastbound Pettigrew St left turn lane Restripe northbound left/through to a through lane

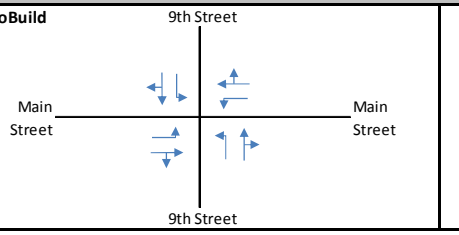
Table 7. 2040 LRT Option 1 Signal & Lane Configuration Modifications

Main Street and 9th Street

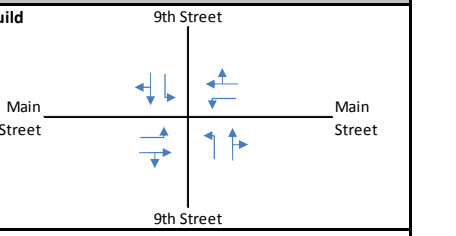
Existing



NoBuild



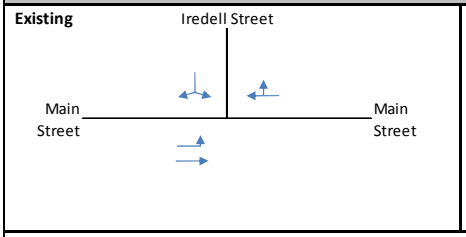
Build



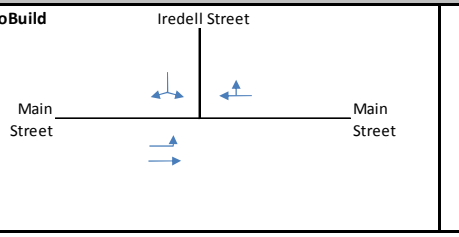
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	90s to 120s	WBL, NBL and SBL Proteced Only changed to Permitted/Protected	Existing to NoBuild	90s to 140s	WBL, NBL and SBL Proteced Only changed to Permitted/Protected
NoBuild to Build	No Change	No Change	NoBuild to Build	No Change	No Change

Main Street and Iredell Street

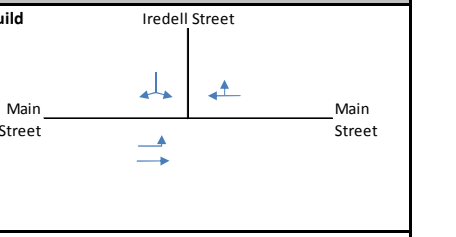
Existing



NoBuild



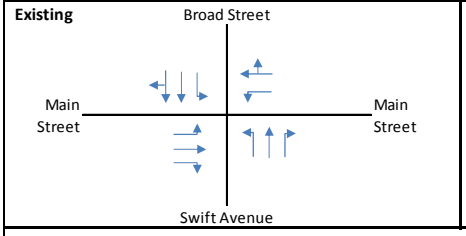
Build



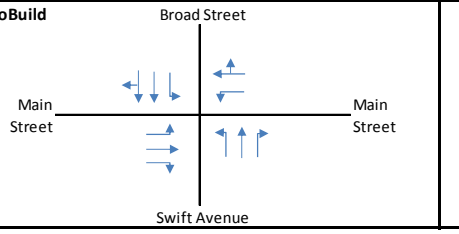
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	-	Unsignalized	Existing to NoBuild	-	Unsignalized
NoBuild to Build	-	Unsignalized	NoBuild to Build	-	Unsignalized

Main Street at Broad Street/Swift Avenue

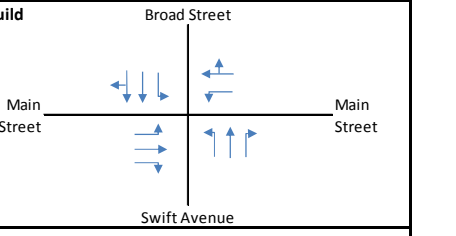
Existing



NoBuild



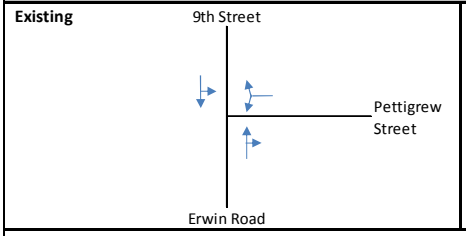
Build



AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	90s to 120s	No Change	Existing to NoBuild	90s to 140s	EBL and WBL Protected Only to Permitted/Protected
NoBuild to Build	No Change	No Change	NoBuild to Build	No Change	No Change

Pettigrew Street and 9th Street/Erwin Road

Existing



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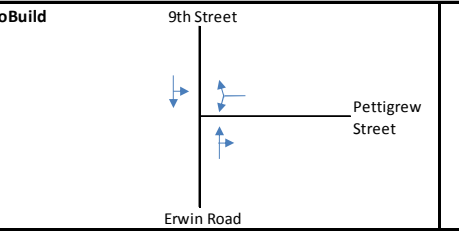
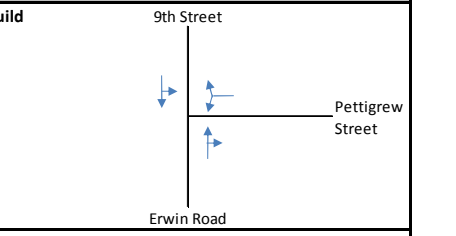


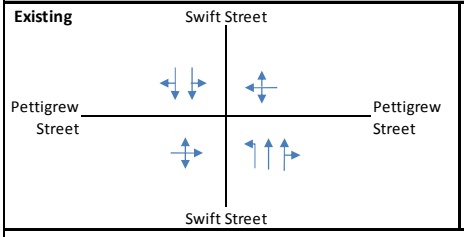
Build



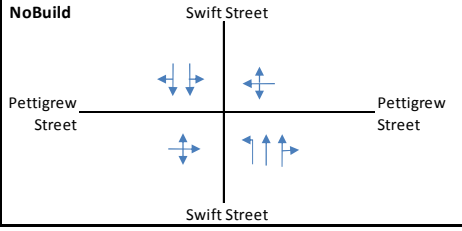
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	-	Unsignalized	Existing to NoBuild	-	Unsignalized
NoBuild to Build	-	Unsignalized	NoBuild to Build	-	Unsignalized

Pettigrew Street and Swift Avenue

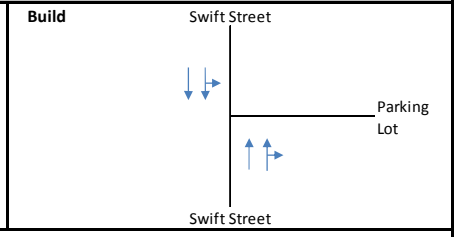
Existing



NoBuild



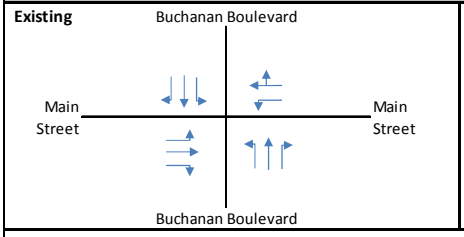
Build



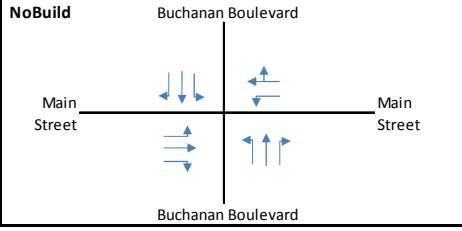
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	-	Unsignalized	Existing to NoBuild	-	Unsignalized
NoBuild to Build	-	Road Closed	NoBuild to Build	-	Road Closed

Buchanan Boulevard and Main Street

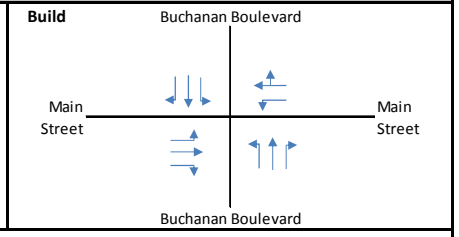
Existing



NoBuild



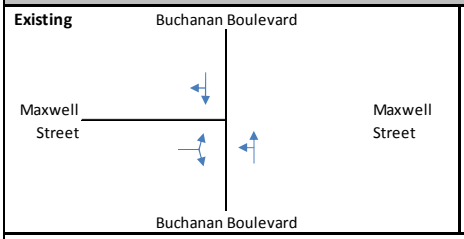
Build



AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	90s to 120s	NBL and SBL Permitted changed to Protected only	Existing to NoBuild	90s to 140s	NBL and SBL Permitted changed to Protected only
NoBuild to Build	No Change	No Change	NoBuild to Build	No Change	No Change

Buchanan Boulevard and Maxwell Street

Existing



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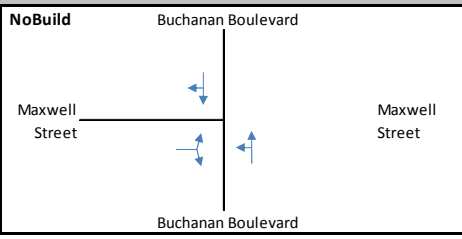
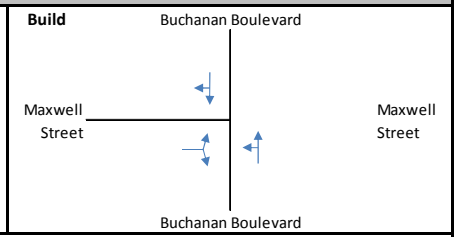


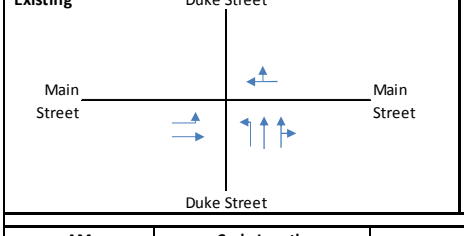
Build



AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	-	Unsignalized	Existing to NoBuild	-	Unsignalized
NoBuild to Build	-	Unsignalized	NoBuild to Build	-	Unsignalized

Duke Street and Main Street

Existing



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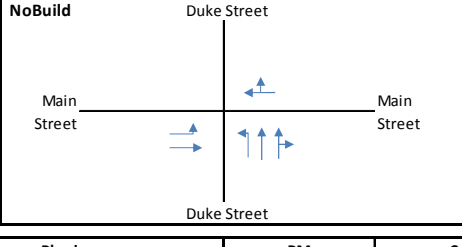
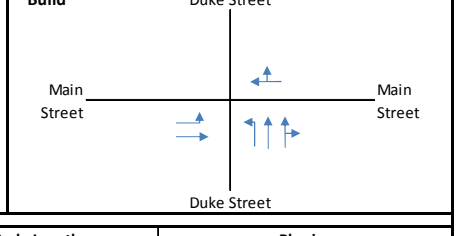


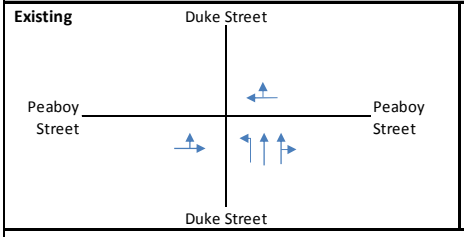
Build



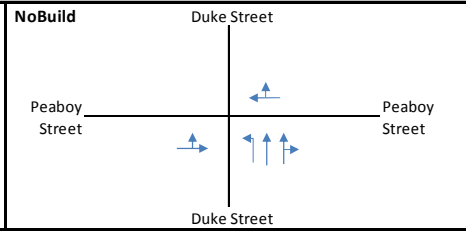
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	80s to 120s	No Change	Existing to NoBuild	90s to 140s	No Change
NoBuild to Build	No Change	No Change	NoBuild to Build	No Change	No Change

Duke Street and Peaboy Street

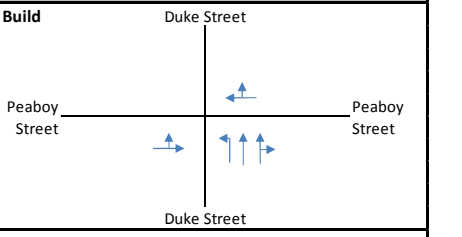
Existing



NoBuild



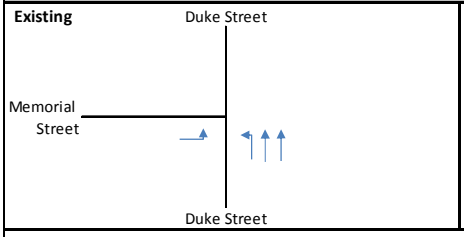
Build



AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	-	Unsignalized	Existing to NoBuild	-	Unsignalized
NoBuild to Build	-	Unsignalized	NoBuild to Build	-	Unsignalized

Duke Street and Memorial Street

Existing



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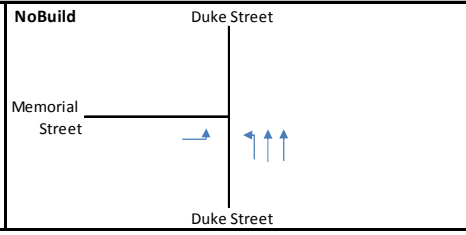
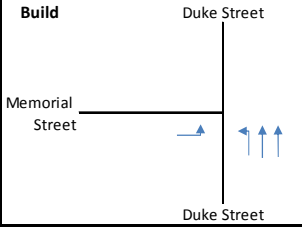


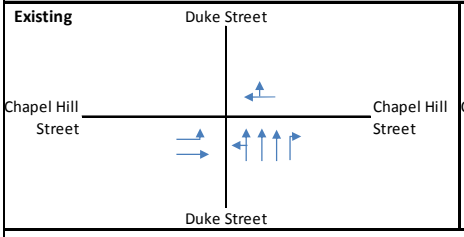
Build



AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	-	Unsignalized	Existing to NoBuild	-	Unsignalized
NoBuild to Build	-	Unsignalized	NoBuild to Build	-	Unsignalized

Duke Street and Chapel Hill Street

Existing



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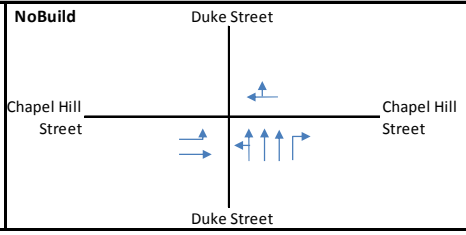
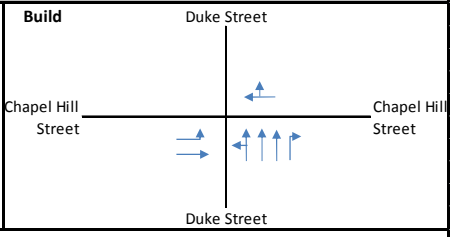


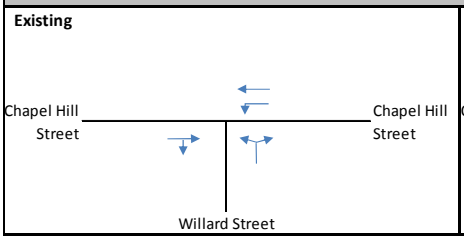
Build



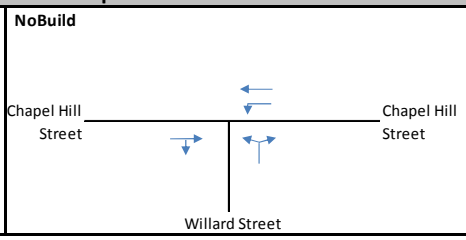
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	80s to 90s	EBL Protected Only changed to Permitted/Protected	Existing to NoBuild	90s to 120s	No Change
NoBuild to Build	No Change	No Change	NoBuild to Build	No Change	No Change

Chapel Hill Street at Willard Street

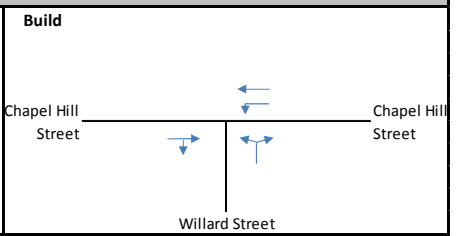
Existing



NoBuild



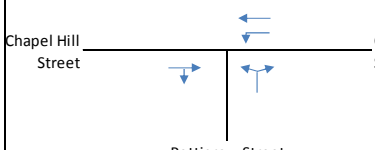
Build



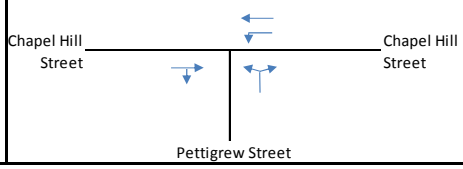
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	-	Unsignalized	Existing to NoBuild	-	Unsignalized
NoBuild to Build	-	Unsignalized	NoBuild to Build	-	Unsignalized

Chapel Hill Street at Pettigrew Street

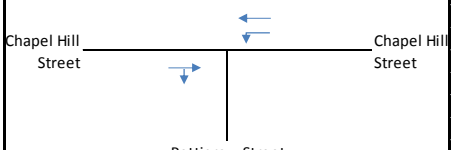
Existing



NoBuild



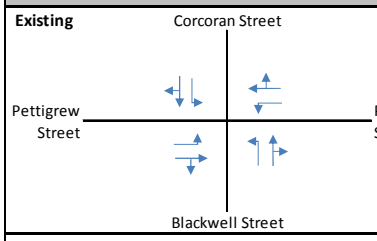
Build



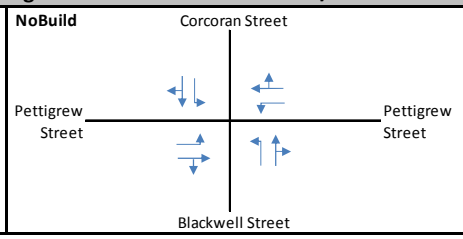
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	80s to 90s	No Change	Existing to NoBuild	90s to 120s	No Change
NoBuild to Build	No Change	NBL Proteced is removed	NoBuild to Build	No Change	NBL Proteced is removed

Pettigrew Street at Corcoran Street/Blackwell Street

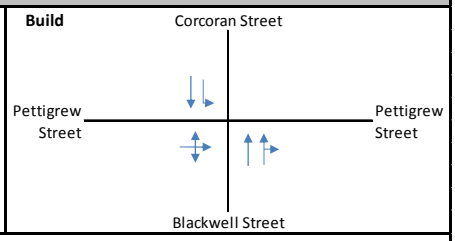
Existing



NoBuild



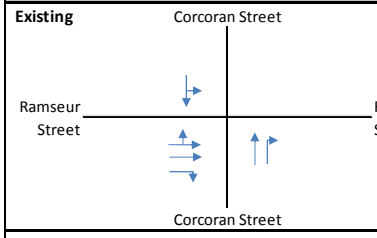
Build



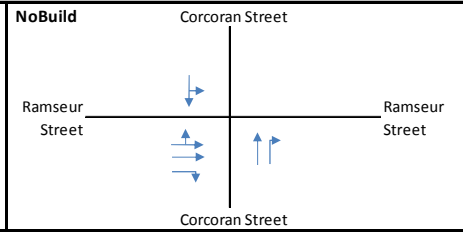
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	85s to 90s	No Change	Existing to NoBuild	No Change	No Change
NoBuild to Build	No Change	WBL and NBL Permitted are removed Transit Signal Preemption	NoBuild to Build	No Change	WBL and NBL Permitted are removed Transit Signal Preemption

Ramseur Street at Corcoran Street

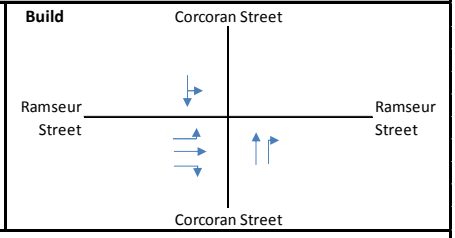
Existing



NoBuild



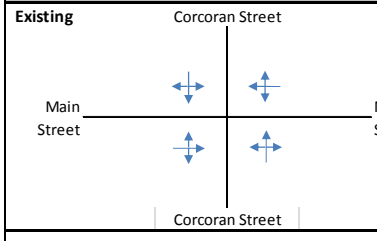
Build



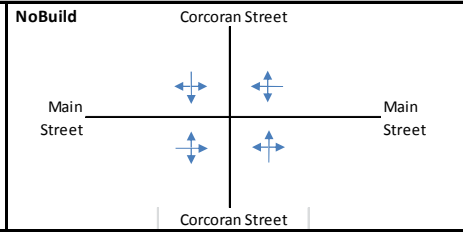
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	85s to 90s	No Change	Existing to NoBuild	No Change	No Change
NoBuild to Build	No Change	No Change	NoBuild to Build	No Change	No Change

Main Street at Corcoran Street

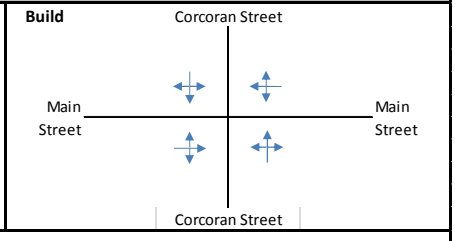
Existing



NoBuild



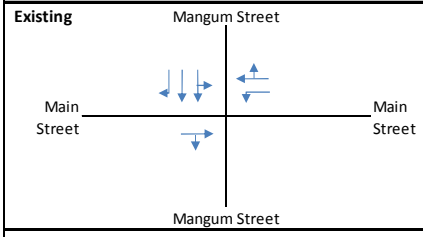
Build



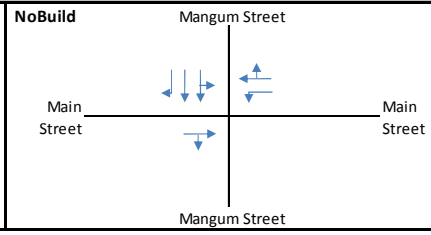
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	54s to 90s	No Change	Existing to NoBuild	54s to 90s	No Change
NoBuild to Build	No Change	No Change	NoBuild to Build	No Change	No Change

Main Street at Mangum Street

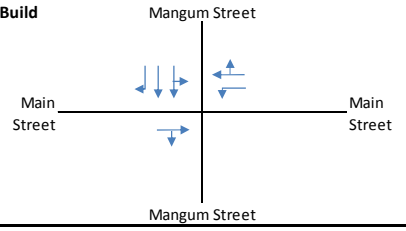
Existing



NoBuild



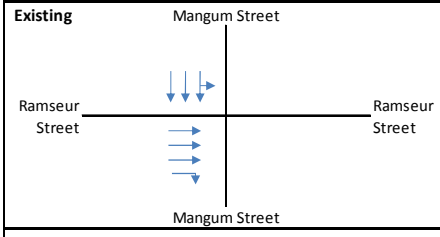
Build



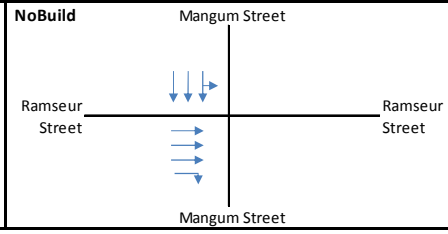
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	75s to 90s	No Change	Existing to NoBuild	No Change	No Change
NoBuild to Build	No Change	No Change	NoBuild to Build	No Change	No Change

Ramseur Street at Mangum Street

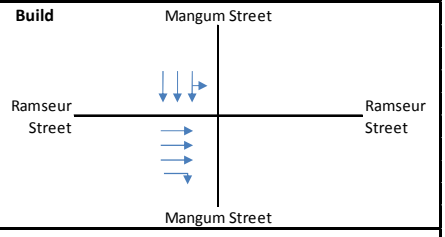
Existing



NoBuild



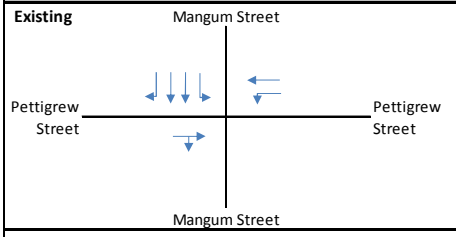
Build



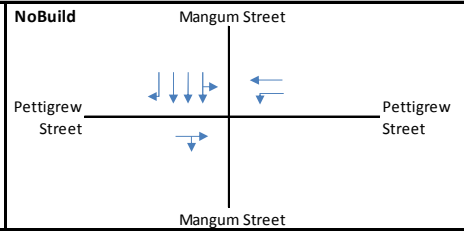
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	75s to 90s	No Change	Existing to NoBuild	No Change	No Change
NoBuild to Build	No Change	No Change	NoBuild to Build	No Change	No Change

Pettigrew Street at Mangum Street

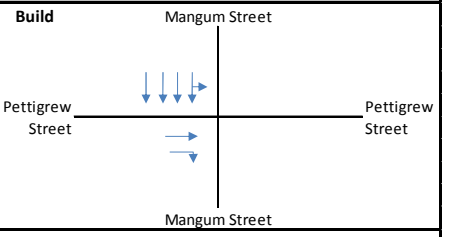
Existing



NoBuild



Build

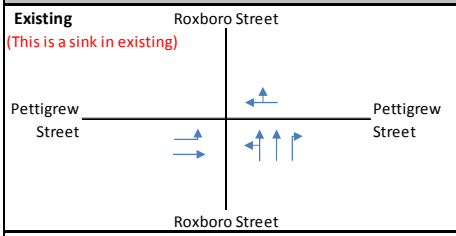


AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	75s to 90s	No Change	Existing to NoBuild	No Change	No Change
NoBuild to Build	No Change	WBL and SBR Permitted are removed EBR changed to Permitted Transit Signal Preemption	NoBuild to Build	No Change	WBL and SBR Permitted are removed EBR changed to Permitted Transit Signal Preemption

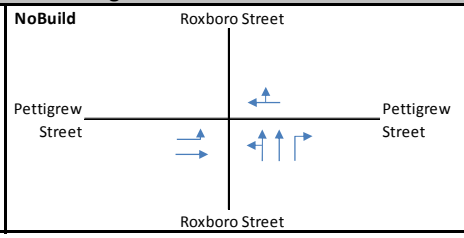
Pettigrew Street at Roxboro Street

Existing

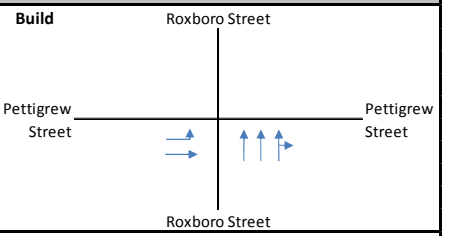
(This is a sink in existing)



NoBuild



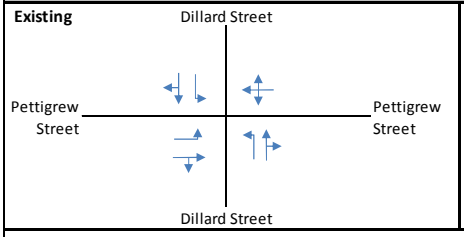
Build



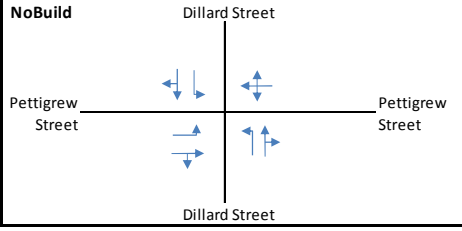
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	75s to 90s	-	Existing to NoBuild	90s to 75s	-
NoBuild to Build	No Change	NBL and NBR Permitted are removed Transit Signal Preemption	NoBuild to Build	No Change	NBL and NBR Permitted are removed Transit Signal Preemption

Pettigrew Street at Dillard Street

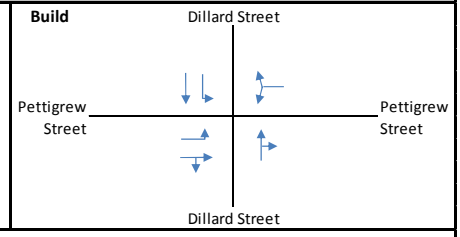
Existing



NoBuild



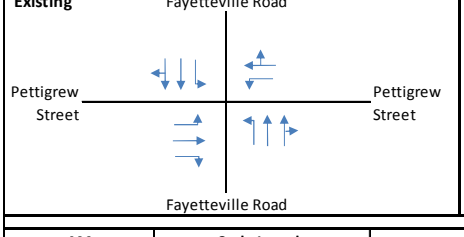
Build



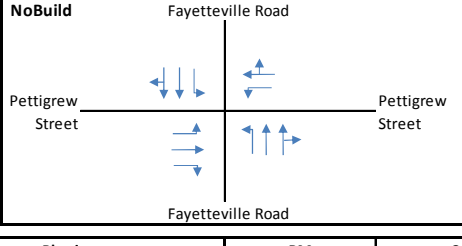
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	75s to 60s	No Change	Existing to NoBuild	60s to 65s	No Change
NoBuild to Build	No Change	NBL Permitted is removed Transit Signal Preemption	NoBuild to Build	No Change	NBL Permitted is removed Transit Signal Preemption

Pettigrew Street at Fayetteville Road

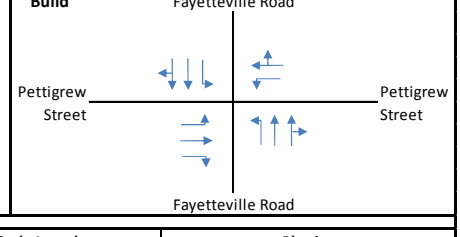
Existing



NoBuild



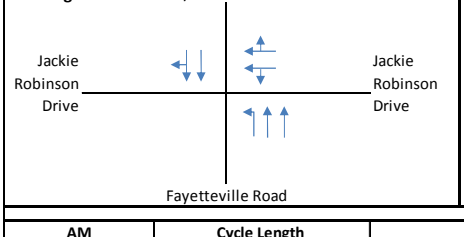
Build



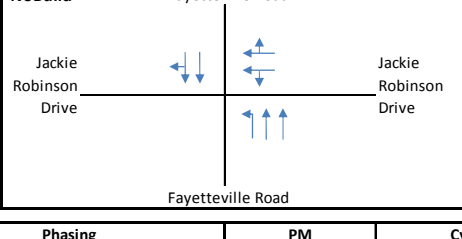
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	100s to 120s	No Change	Existing to NoBuild	110s to 120s	No Change
NoBuild to Build	No Change	SBL Permitted changed to Protected Only Transit Signal Preemption	NoBuild to Build	No Change	SBL Permitted changed to Protected Only Transit Signal Preemption

Fayetteville Road at Jackie Robinson Drive

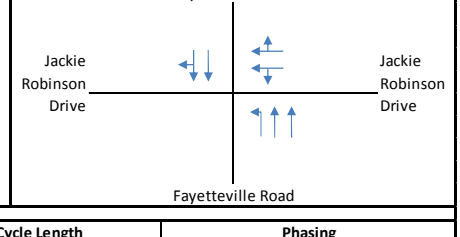
Existing



NoBuild



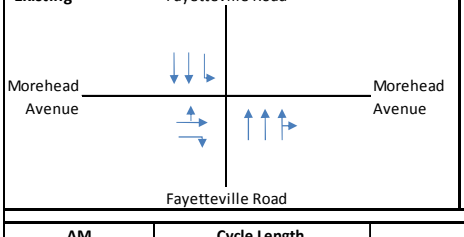
Build



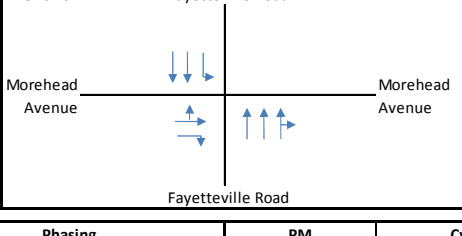
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	100s to 120s	NBL Protected Only changed to Permitted/Protected	Existing to NoBuild	110s to 120s	NBL Protected Only changed to Permitted/Protected
NoBuild to Build	No Change	No Change	NoBuild to Build	No Change	No Change

Fayetteville Road at Morehead Avenue

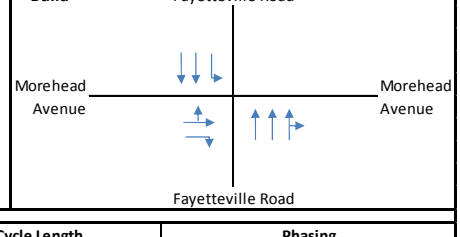
Existing



NoBuild

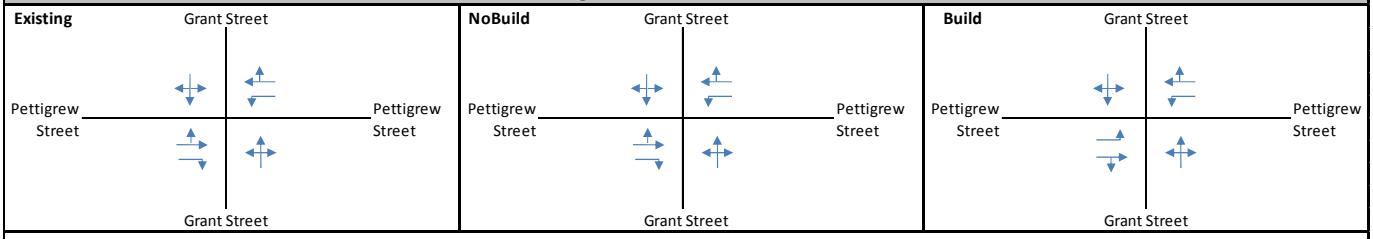


Build



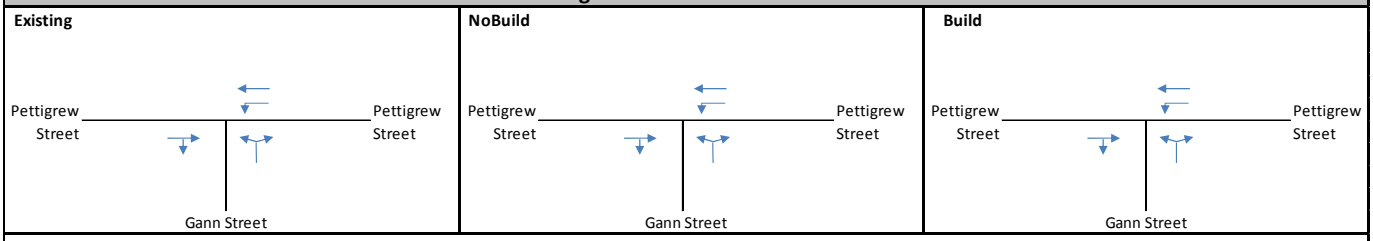
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	100s to 120s	No Change	Existing to NoBuild	110s to 120s	No Change
NoBuild to Build	No Change	No Change	NoBuild to Build	No Change	No Change

Pettigrew Street at Grant Street



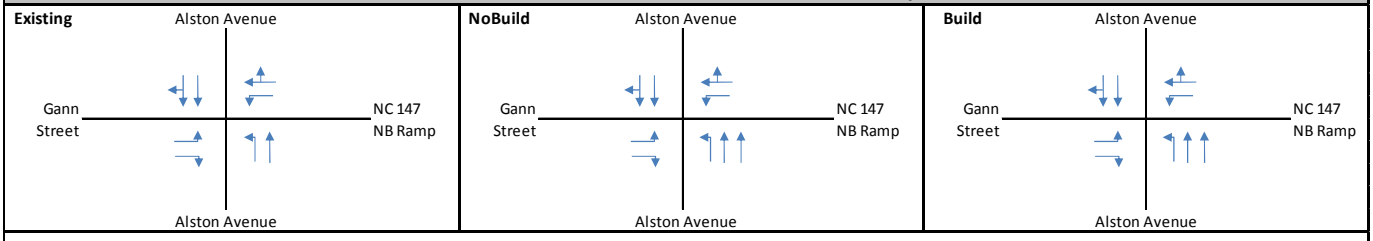
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	No Change	No Change	Existing to NoBuild	No Change	No Change
NoBuild to Build	No Change	EBR Permitted is removed Transit Signal Preemption	NoBuild to Build	No Change	EBR Permitted is removed Transit Signal Preemption

Pettigrew Street at Gann Street



AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	-	Unsignalized	Existing to NoBuild	-	Unsignalized
NoBuild to Build	-	Unsignalized	NoBuild to Build	-	Unsignalized

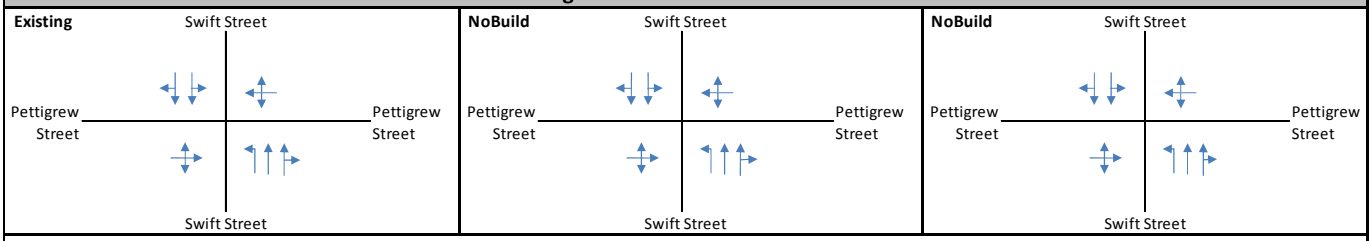
Alston Avenue at Gann Street/NC 147 NB Ramp



AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	75s to 120s	WBL and NBL Permitted changed to Permitted/Protected	Existing to NoBuild	80s to120s	WBL and NBL Permitted changed to Permitted/Protected
NoBuild to Build	No Change	No Change	NoBuild to Build	No Change	No Change

Table 8. 2040 LRT Option 2 Signal & Lane Configuration Modifications

Pettigrew Street and Swift Avenue



AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	-	Unsignalized	Existing to NoBuild	-	Unsignalized
NoBuild to Build	-	Unsignalized	NoBuild to Build	-	Unsignalized

7. Summary of Results

The following section summarizes the Vissim simulation results for the 2040 No-Build versus the two 2040 Build LRT Alternatives in a side by side manner. Table 9 through Table 12 include individual movement and overall intersection delays, LOS and queuing information as reported by Vissim for all future scenarios.

Table 13 and Table 14 compare the 2040 No-Build versus 2040 Build LRT Options Scenarios' Synchro results for the secondary study area outside of the Pettigrew Street LRT corridor.

Table 9: D-O LRT: Downtown Durham Segment – VISSIM Intersection Analysis Output Summary - 2040 Build Option 1 vs. 2040 No-Build AM Peak Hour 8:00 - 9:00 AM

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
1	Main Street at 9th Street[1]	EBL	84	84	81	84	24.8	28.7	-3.9	-13.6%	C	C	10	12	-2	-15.90%	625	115	111	4	3.5%
		EBR	63	64	61	62	26.2	26.8	-0.6	-2.2%	C	C	68	77	-9	-12.22%	900	439	428	11	2.6%
		EBT	366	364	343	348	29.0	30.8	-1.9	-6.0%	C	C	78	88	-10	-11.28%	900	456	445	11	2.4%
		NBL	73	76	72	78	31.6	29.3	2.3	8.0%	C	C	33	83	-51	-60.76%	106	237	223	14	6.1%
		NBR	119	119	111	111	18.0	18.6	-0.7	-3.7%	B	B	19	66	-47	-70.89%	106	213	199	13	6.7%
		NBT	60	59	173	176	35.2	27.4	7.7	28.2%	D	C	33	83	-51	-60.76%	106	237	223	14	6.1%
		SBL	145	143	127	127	27.0	27.8	-0.8	-3.0%	C	C	114	125	-12	-9.46%	330	514	485	28	5.8%
		SBR	84	83	95	96	33.9	33.8	0.1	0.3%	C	C	91	104	-12	-11.87%	330	484	456	28	6.2%
		SBT	349	354	375	384	38.5	37.2	1.4	3.7%	D	D	114	125	-12	-9.46%	330	514	485	28	5.8%
		WBL	200	233	125	128	18.9	18.8	0.2	0.8%	B	B	17	10	7	63.29%	190	226	139	87	62.8%
		WBR	210	244	111	114	10.5	13.2	-2.7	-20.3%	B	B	25	27	-2	-8.88%	300	365	328	37	11.1%
		WBT	226	257	265	274	14.7	16.7	-1.9	-11.6%	B	B	32	35	-3	-7.57%	300	387	350	37	10.4%
		All	**1979**	**2080**	**1940**	**1982**	**25.5**	**27.0**	**-1.5**	**-5.7%**	**C**	**C**	**53**	**70**	**-17**	**-24.35%**		**515**	**487**	**28**	**5.8%**
2	Main Street at Iredell Street[1] (Unsignalized)	EBL	119	117	118	119	5.0	3.3	1.7	52.4%	A	A	2	8	-5	-70.18%	60	168	91	77	85.2%
		EBT	512	509	462	467	3.6	3.2	0.5	15.5%	A	A	2	8	-5	-70.18%	290	168	91	77	85.2%
		SBL	44	42	38	37	22.3	17.0	5.3	31.4%	C	C	0	3	-3	-87.07%	370	44	40	4	11.1%
		SBR	22	21	21	20	14.6	11.5	3.1	27.2%	B	B	0	3	-3	-87.07%	370	44	40	4	11.1%
		WBR	119	141	138	145	3.5	2.6	0.9	33.9%	A	A	5	1	4	776.67%	290	316	97	218	224.5%
		WBT	615	713	481	496	5.1	3.7	1.4	38.9%	A	A	5	1	4	776.67%	290	316	97	218	224.5%
		All	**1432**	**1543**	**1258**	**1284**	**5.1**	**3.9**	**1.2**	**31.9%**	**A**	**A**	**3**	**4**	**-1**	**-33.28%**		**322**	**140**	**182**	**129.4%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
3	Main Street at Broad Street[1]	EBL	13	14	13	14	101.2	57.2	44.0	76.9%	F	E	30	43	-12	-29.09%	198	393	390	3	0.7%
		EBR	169	166	144	143	5.6	6.9	-1.4	-19.8%	A	A	0	3	-3	-98.39%	317	23	54	-31	-58.0%
		EBT	374	371	342	347	33.5	37.3	-3.8	-10.2%	C	D	88	101	-13	-12.60%	317	452	444	8	1.9%
		NBL	381	461	241	252	21.6	30.1	-8.5	-28.2%	C	C	100	202	-102	-50.68%	121	184	275	-91	-33.1%
		NBR	223	270	237	243	1.2	2.7	-1.4	-53.2%	A	A	0	0	0	-62.82%	116	33	48	-15	-31.3%
		NBT	238	285	290	299	23.9	17.3	6.6	37.8%	C	B	100	202	-102	-50.68%	121	184	275	-91	-33.1%
		SBL	87	83	69	66	50.7	60.5	-9.8	-16.1%	D	E	26	24	2	8.35%	130	183	180	3	1.7%
		SBR	90	89	50	52	31.8	28.8	3.0	10.3%	C	C	40	66	-26	-39.59%	450	410	466	-56	-12.1%
		SBT	335	329	411	412	45.1	43.7	1.4	3.2%	D	D	69	96	-27	-27.70%	450	453	508	-55	-10.8%
		WBL	139	161	171	175	266.1	68.3	197.8	289.6%	F	E	449	92	357	387.86%	412	677	463	214	46.1%
		WBR	37	40	33	32	48.6	21.7	26.9	123.7%	D	C	53	23	30	126.54%	560	576	390	186	47.8%
		WBT	265	304	328	337	57.0	26.9	30.1	112.1%	E	C	81	57	24	41.34%	560	657	473	185	39.1%
		All	**2352**	**2573**	**2328**	**2372**	**44.6**	**30.9**	**13.7**	**44.2%**	**D**	**C**	**86**	**76**	**10**	**13.84%**		**677**	**578**	**99**	**17.1%**
4	Pettigrew Street at 9th Street[1] (Unsignalized)	EBT LRT	6	6	N/A	N/A	5.6	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBR	23	24	28	29	2.9	9.0	-6.1	-68.2%	A	A	1	11	-10	-90.03%	720	116	174	-58	-33.3%
		NBT	238	241	213	220	3.0	14.5	-11.5	-79.5%	A	B	1	11	-10	-90.03%	720	116	174	-58	-33.3%
		SBL	30	32	24	25	1.0	1.6	-0.6	-36.0%	A	A	0	0	0	-71.43%	105	55	53	3	5.3%
		SBT	582	619	537	549	0.3	0.4	0.0	-11.5%	A	A	0	0	0	-71.43%	105	55	53	3	5.3%
		WBL	14	13	75	79	18.6	39.4	-20.8	-52.8%	C	E	0	33	-33	-99.96%	185	23	298	-275	-92.3%
		WBR	14	13	143	145	12.8	38.7	-25.9	-66.9%	B	E	0	33	-33	-99.96%	185	23	298	-275	-92.3%
		WBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**912**	**942**	**1019**	**1047**	**1.6**	**11.9**	**-10.3**	**-86.6%**	**A**	**B**	**0**	**15**	**-14**	**-97.97%**		**125**	**310**	**-185**	**-59.7%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
5	Pettigrew Street at Swift Avenue[1] (Unsignalized)	EBL			6	6		104.7				F		5			506		73		
		EBR			32	31		32.2				D		5			506		73		
		EBT			1	2		42.6				E		5			506		73		
		EBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL			186	191		25.1				D		49			443		440		
		NBR			19	19		27.9				D		204			443		684		
		NBT	843	1016	752	777	101.1	47.1	53.9	114.5%	F	E	716	204	512	250.87%	443	851	684	167	24.4%
		SBL			21	22		48.7				E		12			137		188		
		SBR			40	42		1.9				A		12			137		188		
		SBT	643	656	662	666	0.8	0.7	0.1	20.9%	A	A	3	12	-9	-76.26%	137	201	188	13	6.9%
		WBL			1	1		38.6				E		2			515		9		
		WBR			10	11		100.9				F		2			515		9		
		WBT			2	2		106.4				F		2			515		9		
		WBT LRT	6	6	N/A	N/A	1.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		137	N/A	N/A	N/A
		All	**1498**	**1672**	**1733**	**1770**	**57.1**	**26.2**	**30.9**	**118.0%**	**F**	**D**	**180**	**43**	**137**	**318.76%**		**851**	**684**	**166**	**24.3%**
6	Main Street at Buchanan Boulevard[1]	EBL	134	127	134	128	51.8	52.8	-1.0	-1.8%	D	D	40	42	-3	-6.19%	215	329	421	-92	-21.8%
		EBR	86	86	87	86	7.2	7.5	-0.3	-3.8%	A	A	0	0	0	50.00%	267	9	5	5	97.6%
		EBT	464	464	476	475	23.8	24.4	-0.6	-2.6%	C	C	77	83	-6	-7.76%	607	562	579	-18	-3.1%
		NBL	74	79	73	79	66.4	67.5	-1.1	-1.6%	E	E	35	36	-1	-3.05%	70	178	185	-7	-3.9%
		NBR	63	61	65	63	12.0	13.1	-1.2	-8.8%	B	B	0	0	0	-21.74%	120	17	18	-1	-5.0%
		NBT	177	171	183	177	43.8	48.2	-4.5	-9.3%	D	D	48	56	-8	-13.60%	433	191	206	-15	-7.3%
		SBL	160	164	165	170	81.5	80.7	0.8	1.0%	F	F	128	134	-6	-4.52%	130	472	471	1	0.2%
		SBR	171	169	171	170	23.4	24.4	-1.0	-4.2%	C	C	4	5	-1	-25.50%	130	190	176	14	8.0%
		SBT	325	325	326	327	56.2	56.1	0.1	0.2%	E	E	158	154	4	2.49%	400	471	470	2	0.4%
		WBL	50	50	52	51	60.5	62.5	-1.9	-3.1%	E	E	17	18	-1	-3.56%	382	168	163	5	2.9%
		WBR	43	43	45	44	27.9	26.8	1.1	3.9%	C	C	59	58	1	2.31%	530	397	371	26	7.0%
		WBT	292	293	293	293	27.7	27.6	0.2	0.5%	C	C	59	58	1	2.31%	530	397	371	26	7.0%
		All	**2040**	**2032**	**2070**	**2063**	**39.0**	**39.8**	**-0.7**	**-1.8%**	**D**	**D**	**52**	**54**	**-2**	**-2.97%**		**568**	**579**	**-11**	**-1.9%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
7	Maxwell Street at Buchanan Boulevard[2] (Unsignalized)	EBL	50	48	54	52	19.3	24.8	-5.5	-22.1%	C	C	15	25	-10	-38.97%	465	234	263	-29	-10.9%
		EBR	71	70	75	74	11.9	15.1	-3.2	-21.2%	B	C	2	6	-4	-72.99%	465	83	134	-51	-38.3%
		EBT			0	0		0.0				A		6			465		134		
		NBL	13	13	13	13	3.5	7.9	-4.3	-55.1%	A	A	1	7	-6	-83.01%	558	103	143	-40	-27.9%
		NBR			0	0		0.0				A		7			558		143		
		NBT	263	263	267	267	6.8	7.5	-0.7	-9.1%	A	A	15	7	9	124.38%	558	234	143	91	64.1%
		SBL			0	0		0.0				A		0			432		11		
		SBR	16	16	17	17	0.6	0.6	0.0	8.7%	A	A	0	0	0	475.00%	432	39	11	28	242.6%
		SBT	446	445	448	447	1.2	0.6	0.6	117.0%	A	A	0	0	0	475.00%	432	39	11	28	242.6%
		WBL			0	0		0.0				A		0			295		0		
		WBR			0	0		0.0				A		25			295		263		
		WBT			0	0		0.0				A		0			295		0		
		All	**859**	**855**	**873**	**870**	**4.9**	**5.6**	**-0.6**	**-11.4%**	**A**	**A**	**6**	**7**	**-1**	**-18.55%**		**234**	**263**	**-29**	**-10.9%**
8	Duke Street at Main Street[1]	EBL	154	154	175	170	38.8	40.1	-1.3	-3.3%	D	D	33	43	-9	-22.07%	198	301	307	-6	-2.1%
		EBT	403	405	369	374	37.7	36.7	1.0	2.6%	D	D	105	92	13	13.97%	323	329	329	0	0.1%
		NBL	258	260	250	251	9.6	11.4	-1.8	-15.7%	A	B	13	16	-3	-17.74%	204	308	386	-78	-20.2%
		NBR	49	47	41	40	10.0	11.1	-1.0	-9.4%	B	B	30	39	-9	-22.58%	300	388	389	-1	-0.4%
		NBT	929	923	966	956	10.2	12.1	-1.9	-15.6%	B	B	37	47	-10	-21.87%	300	411	413	-1	-0.3%
		WBR	21	21	22	22	17.6	21.0	-3.5	-16.5%	B	C	11	11	-1	-6.15%	221	151	156	-6	-3.7%
		WBT	98	96	95	93	31.7	33.6	-1.9	-5.6%	C	C	19	20	-1	-5.43%	221	169	175	-6	-3.3%
		All	**1912**	**1906**	**1917**	**1906**	**19.4**	**20.4**	**-1.0**	**-5.1%**	**B**	**C**	**35**	**38**	**-3**	**-7.57%**		**413**	**415**	**-1**	**-0.3%**
9	Duke Street at Peabody Street[1] (Unsignalized)	EBL	11	11	17	16	13.6	10.5	3.1	29.4%	B	B	0	0	0	-50.00%	390	15	22	-7	-33.0%
		EBT	3	3	3	3	11.6	10.4	1.2	11.0%	B	B	0	0	0	-50.00%	390	15	22	-7	-33.0%
		NBL	63	62	60	59	0.7	0.6	0.1	8.8%	A	A	0	0	0	0.00%	140	0	0	0	0.0%
		NBR	1	1	1	1	0.2	0.5	-0.4	-69.9%	A	A	1	2	-1	-62.40%	140	94	141	-47	-33.6%
		NBT	1212	1207	1226	1218	2.3	3.1	-0.9	-27.2%	A	A	1	2	-1	-62.40%	140	94	141	-47	-33.6%
		WBR	12	12	13	13	10.9	10.5	0.3	3.3%	B	B	0	0	0	-30.43%	543	30	41	-11	-26.4%
		WBT	33	32	32	31	13.1	14.7	-1.6	-10.7%	B	B	0	0	0	-30.43%	543	30	41	-11	-26.4%
		All	**1336**	**1328**	**1352**	**1341**	**2.7**	**3.5**	**-0.8**	**-23.0%**	**A**	**A**	**0**	**1**	**0**	**-60.49%**		**94**	**141**	**-47**	**-33.6%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
10	Memorial Street at Duke Street[1] (Unsignalized)	EBL1	0	0	0	0	0.7	0.7	-0.1	-7.9%	A	A	5	0	5	0.00%	370	309	0	309	0.0%
		EBL2	4	5	4	5	11.4	8.9	2.5	27.5%	B	A	11	0	11	0.00%	370	360	0	360	0.0%
		NBL	14	15	20	20	5.3	3.6	1.7	47.2%	A	A	8	4	4	109.72%	213	247	209	38	18.0%
		NBT1	64	1265	60	1273	6.9	4.8	2.1	44.5%	A	A	5	4	1	23.15%	213	309	209	99	47.4%
		NBT2	1209		1223		4.7	2.8	1.9	66.2%	A	A	11	4	7	180.25%	213	360	209	150	71.7%
		All	**1291**	**1285**	**1307**	**1298**	**4.8**	**2.9**	**1.9**	**64.1%**	**A**	**A**	**8**	**2**	**6**	**239.79%**		**360**	**209**	**151**	**71.8%**
11	Chapel Hill Street at Duke Street[1]	EBL	201	196	199	193	24.5	20.3	4.2	20.6%	C	C	18	19	-1	-3.55%	220	325	307	19	6.1%
		EBT	670	669	688	690	30.5	15.1	15.4	102.0%	C	B	125	71	54	76.60%	336	383	381	2	0.5%
		NBL	120	115	122	117	26.3	26.4	-0.1	-0.5%	C	C	78	74	4	5.91%	455	296	293	3	1.2%
		NBR	126	126	130	132	35.6	12.4	23.2	188.1%	D	B	64	61	3	4.65%	455	277	275	2	0.8%
		NBT	1031	1026	1045	1039	28.2	27.8	0.3	1.2%	C	C	78	74	4	5.91%	455	296	293	3	1.2%
		WBR	55	58	58	61	25.5	13.6	12.0	88.3%	C	B	71	30	40	133.29%	275	378	291	87	30.0%
		WBT	359	361	384	383	27.2	16.5	10.6	64.4%	C	B	87	45	41	91.17%	275	408	321	87	27.2%
		All	**2562**	**2551**	**2626**	**2615**	**28.6**	**21.1**	**7.5**	**35.4%**	**C**	**C**	**74**	**53**	**21**	**39.16%**		**410**	**386**	**24**	**6.2%**
12	Chapel Hill Street at Willard Street[1] (Unsignalized)	EBR	138	137	136	137	13.4	1.6	11.9	763.5%	B	A	89	0	89	52725.93%	275	340	41	299	734.5%
		EBT	658	658	683	685	19.0	1.7	17.4	1048.7%	C	A	89	0	89	52725.93%	275	340	41	299	734.5%
		NBL	14	13	15	15	30.5	15.5	15.0	96.8%	D	C	4	0	4	2157.14%	460	99	31	68	218.7%
		NBR	85	84	28	29	33.3	11.4	21.9	192.7%	D	B	4	0	4	2157.14%	460	99	31	68	218.7%
		WBL	99	95	51	47	14.6	7.9	6.8	86.2%	B	A	1	0	1	7866.67%	142	125	17	108	643.2%
		WBT	400	406	427	429	5.3	1.0	4.3	414.6%	A	A	1	0	1	5750.00%	205	89	7	81	1100.8%
		All	**1394**	**1393**	**1339**	**1342**	**15.2**	**2.0**	**13.2**	**650.2%**	**C**	**A**	**31**	**0**	**31**	**29464.71%**		**340**	**66**	**274**	**416.6%**
13	Pettigrew Street at Chapel Hill Street[1]	EBR	269	270	256	260	7.0	3.6	3.4	95.8%	A	A	88	2	86	3542.78%	206	284	153	131	85.5%
		EBT	474	472	454	454	8.6	3.8	4.9	128.3%	A	A	97	9	88	929.12%	206	301	200	101	50.6%
		EBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL			87	86		17.1				B		9			377		168		
		NBR			69	69		8.9				A		3			377		139		
		WBL	39	37	42	42	31.0	13.7	17.3	126.8%	C	B	60	17	43	257.02%	222	291	206	85	41.3%
		WBT	499	501	391	390	22.3	8.5	13.8	162.9%	C	A	60	17	43	257.02%	275	291	206	85	41.3%
		WBT LRT	6	6	N/A	N/A	6.7	N/A	N/A	N/A	A	N/A	10	N/A	N/A	N/A		247	N/A	N/A	N/A
		All	**1293**	**1280**	**1299**	**1301**	**14.2**	**6.7**	**7.6**	**114.2%**	**B**	**A**	**53**	**10**	**43**	**445.23%**		**301**	**255**	**46**	**18.3%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
14	Blackwell Street at Pettigrew Street[2]	EBL	0	0	14	13	0.0	32.4	-32.4	-100.0%	A	C	35	1	34	2519.16%	150	246	39	207	529.9%
		EBR	117	116	35	36	21.5	11.1	10.4	94.2%	C	B	23	10	12	122.36%	785	218	137	80	58.3%
		EBT	83	83	123	121	36.4	20.8	15.6	74.8%	D	C	35	20	16	79.65%	785	246	159	86	54.2%
		EBT LRT	6	6	N/A	N/A	3.0	N/A	N/A	N/A	A	N/A	1	N/A	N/A	N/A		125	N/A	N/A	N/A
		NBL			21	21		16.8				B		2			100		65		
		NBR	90	89	7	7	4.2	9.2	-5.0	-54.4%	A	A	2	7	-5	-71.69%	148	68	153	-84	-55.3%
		NBT	82	83	140	139	15.7	15.3	0.4	2.4%	B	B	7	12	-5	-41.72%	148	92	167	-75	-44.8%
		SBL	6	6	50	51	3.0	3.0	0.0	-0.8%	A	A	1	1	1	102.02%	98	67	50	18	35.2%
		SBR			34	33		1.0				A		1			98		50		
		SBT	94	91	171	164	2.5	1.4	1.1	74.9%	A	A	1	1	1	102.02%	98	67	50	18	35.2%
		WBL			7	9		16.6				B		0			143		25		
		WBR			49	51		15.7				B		13			375		278		
		WBT			211	205		14.3				B		18			375		291		
		WBT LRT	6	6	N/A	N/A	0.1	N/A	N/A	N/A	A	N/A	1	N/A	N/A	N/A		64	N/A	N/A	N/A
		All	**500**	**468**	**861**	**850**	**15.2**	**11.9**	**3.3**	**27.6%**	**B**	**B**	**12**	**7**	**5**	**66.81%**		**246**	**291**	**-45**	**-15.5%**
15	Blackwell Street at Ramseur Street[1]	EBL	19	20	15	16	13.2	14.6	-1.5	-10.2%	B	B	22	24	-2	-7.57%	1081	148	155	-8	-5.0%
		EBR	3	2	6	7	4.8	5.0	-0.2	-3.0%	A	A	30	32	-2	-4.94%	263	193	202	-8	-4.1%
		EBT	348	351	384	385	14.9	16.2	-1.3	-7.9%	B	B	22	24	-2	-7.57%	1081	148	155	-8	-5.0%
		NBR	2	2	7	7	0.3	4.0	-3.7	-93.6%	A	A	0	13	-13	-99.26%	98	9	135	-126	-93.4%
		NBT	80	81	196	196	2.8	8.7	-5.9	-67.8%	A	A	1	29	-28	-96.13%	98	31	202	-171	-84.5%
		SBL	34	34	26	27	13.0	16.5	-3.5	-21.1%	B	B	9	28	-20	-69.61%	200	155	284	-129	-45.4%
		SBT	98	95	248	241	12.2	15.0	-2.8	-18.4%	B	B	9	28	-20	-69.61%	200	155	284	-129	-45.4%
		All	**583**	**585**	**883**	**879**	**12.5**	**14.0**	**-1.4**	**-10.3%**	**B**	**B**	**13**	**25**	**-12**	**-48.06%**		**204**	**284**	**-80**	**-28.2%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
16	Main Street at Corcoran Street[2]	EBL	44	42	55	52	30.7	28.2	2.5	8.7%	C	C	49	44	5	10.71%	158	322	301	21	6.8%
		EBR	15	16	50	50	19.7	21.7	-2.0	-9.3%	B	C	39	34	5	13.92%	158	306	285	21	7.2%
		EBT	244	236	180	176	26.7	26.7	0.1	0.3%	C	C	49	44	5	10.71%	158	322	301	21	6.8%
		NBL	6	6	20	20	9.5	7.2	2.3	32.0%	A	A	4	6	-2	-28.73%	202	93	92	1	1.0%
		NBR	5	7	8	9	6.1	3.9	2.2	57.2%	A	A	2	3	-1	-37.39%	202	84	83	1	1.1%
		NBT	87	88	183	183	8.7	5.7	3.0	52.2%	A	A	4	6	-2	-28.73%	202	93	92	1	1.0%
		SBL	46	46	24	24	16.5	12.6	3.9	31.2%	B	B	10	15	-4	-28.98%	172	151	196	-45	-23.0%
		SBR	19	18	23	22	8.0	7.1	1.0	14.0%	A	A	5	9	-4	-40.39%	172	131	176	-45	-25.7%
		SBT	94	91	193	187	12.8	12.5	0.3	2.1%	B	B	10	15	-4	-28.98%	172	151	196	-45	-23.0%
		WBL	22	22	31	31	9.9	11.2	-1.3	-11.7%	A	B	11	10	1	6.59%	310	188	106	82	77.9%
		WBR	76	76	40	42	6.1	6.2	-0.1	-1.8%	A	A	6	4	1	30.40%	310	166	84	82	97.6%
		WBT	246	240	179	174	7.5	8.7	-1.2	-13.6%	A	A	11	10	1	6.59%	310	188	106	82	77.9%
		All	**904**	**888**	**986**	**970**	**15.2**	**13.9**	**1.3**	**9.0%**	**B**	**B**	**17**	**17**	**0**	**0.07%**		**328**	**301**	**27**	**9.0%**
17	Mangum Street at Main Street[1]	EBR	9	9	7	7	50.2	36.9	13.3	35.9%	D	D	93	43	50	117.34%	311	365	231	134	58.3%
		EBT	286	280	204	202	55.1	42.8	12.2	28.5%	E	D	108	56	52	92.80%	311	383	249	134	54.0%
		SBL	170	172	171	173	35.7	16.6	19.2	115.6%	D	B	199	76	123	160.72%	166	532	465	67	14.5%
		SBR	18	17	7	7	13.0	5.3	7.7	144.0%	B	A	185	65	120	186.22%	166	514	444	70	15.7%
		SBT	1081	1082	1096	1099	35.5	17.7	17.8	100.1%	D	B	199	76	123	160.72%	166	532	465	67	14.5%
		WBL	48	45	88	84	47.5	53.4	-5.9	-11.1%	D	D	12	28	-16	-57.81%	185	91	192	-101	-52.5%
		WBT	326	321	243	240	23.0	23.3	-0.3	-1.3%	C	C	46	33	13	38.08%	342	335	266	68	25.6%
		All	**1938**	**1926**	**1817**	**1812**	**36.5**	**23.0**	**13.5**	**58.6%**	**D**	**C**	**120**	**54**	**66**	**122.77%**		**532**	**465**	**67**	**14.5%**
18	Mangum Street at Ramseur Street[1]	EBR	107	108	116	117	52.6	45.6	7.0	15.3%	D	D	41	40	0	0.81%	318	179	143	36	24.8%
		EBT	276	279	298	302	16.0	20.8	-4.8	-23.1%	B	C	41	40	0	0.81%	318	179	143	36	24.8%
		SBL	87	89	89	91	29.1	17.8	11.3	63.4%	C	B	139	78	61	77.73%	225	325	317	8	2.7%
		SBT	1051	1047	1101	1099	27.3	16.8	10.6	63.1%	C	B	139	78	61	77.73%	225	325	317	8	2.7%
		All	**1521**	**1523**	**1605**	**1609**	**27.2**	**19.7**	**7.5**	**38.2%**	**C**	**B**	**90**	**59**	**31**	**51.55%**		**325**	**317**	**8**	**2.7%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
19	Mangum Street at Pettigrew Street[1]	EBR	52	52	53	52	7.3	26.1	-18.8	-71.9%	A	C	20	23	-3	-14.08%	375	189	188	2	0.8%
		EBT	126	126	127	127	36.6	40.8	-4.2	-10.2%	D	D	31	43	-12	-28.11%	375	210	224	-14	-6.3%
		EBT LRT	6	6	N/A	N/A	8.6	N/A	N/A	N/A	A	N/A	2	N/A	N/A	N/A		200	N/A	N/A	N/A
		SBL	49	49	55	54	1.6	0.7	0.9	132.7%	A	A	1	0	1	752.17%	82	102	52	51	98.4%
		SBR			67	67		0.5				A		0			82		42		
		SBT	1105	1106	1095	1095	0.7	0.2	0.4	176.9%	A	A	1	0	1	752.17%	82	102	52	51	98.4%
		WBL	52	52	78	77	7.3	58.6	-51.2	-87.5%	A	E	20	27	-7	-27.23%	353	189	168	21	12.4%
		WBT			200	198		37.5				D		44			400		252		
		WBT LRT	6	6	N/A	N/A	0.4	N/A	N/A	N/A	A	N/A	1	N/A	N/A	N/A		86	N/A	N/A	N/A
		All	**1361**	**1333**	**1675**	**1670**	**4.4**	**11.4**	**-6.9**	**-61.0%**	**A**	**B**	**8**	**20**	**-11**	**-57.60%**		**219**	**275**	**-56**	**-20.4%**
20	Pettigrew Street at Dillard Street[2]	EBL	30	27	16	15	13.5	12.4	1.1	8.9%	B	B	3	2	1	86.18%	153	74	67	7	9.9%
		EBR	18	20	24	25	5.4	5.9	-0.5	-8.8%	A	A	0	1	-1	-83.13%	917	32	76	-44	-58.1%
		EBT	49	50	76	75	7.7	9.3	-1.6	-17.1%	A	A	2	3	-2	-49.02%	917	73	105	-32	-30.1%
		EBT LRT	6	6	N/A	N/A	0.7	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		87	N/A	N/A	N/A
		NBL			0	0		0.0				A		0			155		0		
		NBR	8	8	34	34	11.5	8.2	3.3	40.5%	B	A	4	5	-1	-19.42%	822	86	114	-28	-24.6%
		NBT	66	68	100	100	26.5	17.6	8.9	50.9%	C	B	10	11	-1	-7.36%	822	100	128	-28	-21.7%
		SBL	38	37	46	45	28.5	21.3	7.2	34.0%	C	C	31	27	4	14.39%	264	216	214	1	0.7%
		SBR			101	98		9.9				A		18			264		187		
		SBT	110	109	110	110	26.9	18.5	8.4	45.2%	C	B	31	27	4	14.39%	264	216	214	1	0.7%
		WBL	36	37	25	25	8.3	6.1	2.3	37.6%	A	A	2	2	0	19.59%	695	93	111	-17	-15.8%
		WBR	45	43	17	18	8.4	3.6	4.8	133.4%	A	A	2	1	1	192.56%	695	93	96	-3	-3.2%
		WBT			88	87		6.0				A		2			695		111		
		WBT LRT	6	6	N/A	N/A	5.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**419**	**399**	**638**	**632**	**18.1**	**12.3**	**5.8**	**47.5%**	**B**	**B**	**10**	**8**	**2**	**18.71%**		**220**	**214**	**5**	**2.4%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
21	Fayetteville Street at Pettigrew Street[1]	EBL	10	9	8	7	57.4	61.4	-4.1	-6.6%	E	E	3	2	0	6.77%	210	43	44	-1	-2.0%
		EBR	6	6	26	26	4.6	5.6	-1.0	-17.4%	A	A	0	0	0	0.00%	273	0	0	0	0.0%
		EBT	53	53	59	57	36.9	53.9	-17.1	-31.6%	D	D	11	18	-7	-41.23%	696	105	133	-29	-21.4%
		EBT LRT	6	6	N/A	N/A	5.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL	3	3	35	35	8.5	5.9	2.6	44.0%	A	A	11	4	6	139.49%	70	143	145	-2	-1.6%
		NBR	46	45	58	61	0.4	0.3	0.1	43.9%	A	A	46	46	0	0.20%	70	140	140	1	0.6%
		NBT	365	371	382	388	2.7	1.3	1.4	112.7%	A	A	11	4	6	139.49%	70	143	145	-2	-1.6%
		SBL	58	58	42	41	40.3	21.1	19.2	90.8%	D	C	15	5	9	178.62%	250	226	124	102	82.9%
		SBR	1	1	7	7	22.3	13.4	9.0	67.1%	C	B	86	32	54	165.75%	400	358	207	152	73.5%
		SBT	434	432	449	445	42.5	22.4	20.1	90.0%	D	C	86	52	35	67.07%	400	358	250	108	43.3%
		WBL	93	96	87	90	49.0	59.8	-10.8	-18.0%	D	E	21	28	-7	-24.97%	100	193	200	-7	-3.3%
		WBR	103	108	45	50	33.2	31.3	1.9	6.2%	C	C	49	31	18	60.02%	1570	345	254	91	35.7%
		WBT	94	90	127	127	52.2	47.2	5.0	10.5%	D	D	49	44	5	10.52%	1570	345	277	68	24.5%
		WBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**1277**	**1272**	**1323**	**1334**	**29.2**	**21.3**	**7.9**	**36.9%**	**C**	**C**	**28**	**22**	**5**	**23.66%**		**388**	**292**	**96**	**32.7%**
22	Fayetteville Street at Jackie Robinson Drive[1]	NBL	228	227	186	185	26.4	14.2	12.2	86.2%	C	B	35	13	22	166.84%	277	266	150	116	77.0%
		NBT	322	328	359	367	20.7	11.7	9.0	76.4%	C	B	24	14	10	66.88%	286	213	137	76	55.0%
		SBR	43	44	39	40	1.0	2.1	-1.0	-50.9%	A	A	6	9	-3	-35.83%	70	137	156	-18	-11.8%
		SBT	490	490	524	521	4.6	6.8	-2.2	-31.7%	A	A	11	16	-5	-30.05%	70	156	172	-16	-9.4%
		WBL	172	169	149	144	40.1	40.5	-0.4	-0.9%	D	D	45	39	5	14.01%	345	264	222	42	19.0%
		WBR	91	91	115	117	9.3	6.7	2.6	38.2%	A	A	35	33	2	5.60%	345	251	217	34	15.6%
		WBT	13	13	13	13	38.8	36.8	2.0	5.5%	D	D	45	39	5	14.01%	603	264	222	42	19.0%
		All	**1361**	**1362**	**1385**	**1387**	**17.1**	**12.9**	**4.2**	**33.0%**	**B**	**B**	**29**	**24**	**5**	**21.78%**		**285**	**224**	**61**	**27.3%**
23	Morehead Avenue at Fayetteville Street[1]	EBL	43	44	31	33	49.5	45.3	4.2	9.3%	D	D	13	8	5	54.25%	1260	102	87	15	17.1%
		EBR	143	139	133	130	6.9	6.6	0.3	4.2%	A	A	2	1	1	122.63%	1195	69	53	15	28.6%
		EBT	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	13	8	5	54.25%	1260	102	87	15	17.1%
		NBR	20	20	18	18	2.1	1.8	0.3	16.7%	A	A	1	1	0	22.22%	389	64	63	1	2.4%
		NBT	507	511	514	519	2.9	2.6	0.3	11.2%	A	A	3	3	0	5.50%	389	82	81	1	1.8%
		SBL	99	93	74	71	4.8	3.2	1.6	50.7%	A	A	1	0	1	240.98%	255	90	53	37	68.6%
		SBT	564	566	598	594	2.3	1.5	0.8	52.9%	A	A	3	2	1	89.92%	275	159	141	17	12.2%
		All	**1376**	**1373**	**1368**	**1365**	**4.7**	**3.5**	**1.2**	**32.7%**	**A**	**A**	**5**	**3**	**2**	**55.30%**		**168**	**141**	**27**	**19.0%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
24	Pettigrew Street at Grant Street[2]	EBL	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	0	5	-5	-100.00%	155	0	107	-107	-100.0%
		EBR	7	7	13	13	7.4	3.2	4.2	134.0%	A	A	5	0	5	86100.00%	1570	122	4	118	2959.5%
		EBT	151	149	145	146	7.4	6.2	1.3	20.3%	A	A	5	5	1	17.92%	1570	122	107	15	13.9%
		EBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	21	7	13	178.37%	625	213	112	101	90.0%
		NBR	104	102	73	73	14.9	9.8	5.1	52.3%	B	A	14	4	11	300.69%	625	198	96	102	106.0%
		NBT	96	93	51	51	27.1	19.6	7.5	38.0%	C	B	21	7	13	178.37%	625	213	112	101	90.0%
		SBL	93	90	89	86	34.0	25.2	8.8	35.0%	C	C	25	16	9	52.81%	266	221	199	22	11.0%
		SBR	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	25	7	18	272.70%	266	221	181	39	21.8%
		SBT	51	50	69	68	31.7	23.0	8.7	37.7%	C	C	25	16	9	52.81%	266	221	199	22	11.0%
		WBL	67	69	127	127	8.9	7.8	1.1	14.0%	A	A	2	4	-2	-47.59%	70	67	86	-19	-22.2%
		WBR	122	123	121	121	10.9	5.4	5.6	103.3%	B	A	20	6	14	252.87%	193	298	163	135	82.8%
		WBT	287	294	259	267	10.3	7.0	3.2	46.2%	B	A	20	8	12	141.08%	193	300	174	126	72.6%
		WBT LRT	6	6	N/A	N/A	5.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**989**	**977**	**948**	**952**	**15.2**	**10.5**	**4.7**	**44.3%**	**B**	**B**	**13**	**7**	**6**	**85.69%**		**308**	**215**	**93**	**43.2%**
25	Gann Street at Pettigrew Street[2] (Unsignalized)	EBR	74	73	72	72	2.1	2.7	-0.6	-21.4%	A	A	0	0	0	0.00%	206	0	0	0	0.0%
		EBT	290	282	290	287	2.4	2.9	-0.5	-17.3%	A	A	0	0	0	0.00%	206	0	0	0	0.0%
		NBL	101	105	99	102	9.8	9.4	0.4	3.7%	A	A	0	0	0	71.43%	248	54	45	9	18.9%
		NBR	11	11	12	12	8.0	7.1	0.9	12.4%	A	A	0	0	0	71.43%	248	54	45	9	18.9%
		WBL	21	21	23	23	8.1	8.4	-0.3	-3.5%	A	A	0	0	0	0.00%	367	9	8	1	7.3%
		WBT	421	426	432	437	0.4	0.4	0.0	7.6%	A	A	0	0	0	0.00%	367	0	0	0	0.0%
		All	**918**	**918**	**929**	**933**	**2.5**	**2.6**	**-0.1**	**-4.6%**	**A**	**A**	**0**	**0**	**0**	**25.00%**		**54**	**45**	**9**	**18.9%**
26	Alston Avenue at Gann Street[1]	EBL	61	63	69	69	59.4	57.6	1.8	3.2%	E	E	25	26	-1	-5.30%	196	212	217	-5	-2.4%
		EBR	183	182	182	182	12.9	13.1	-0.2	-1.2%	B	B	16	18	-1	-6.92%	196	201	206	-5	-2.6%
		NBL	13	13	14	14	18.6	18.4	0.2	1.2%	B	B	31	33	-2	-7.04%	300	254	261	-7	-2.8%
		NBT	873	870	878	875	11.2	12.0	-0.7	-5.9%	B	B	31	33	-2	-7.04%	528	254	261	-7	-2.8%
		SBR	48	46	48	46	12.2	12.2	0.0	-0.3%	B	B	70	74	-4	-5.83%	190	554	579	-25	-4.3%
		SBT	1441	1438	1443	1440	13.4	14.0	-0.6	-4.1%	B	B	72	76	-4	-5.74%	1037	557	582	-25	-4.3%
		WBL	425	457	431	457	61.0	59.5	1.4	2.4%	E	E	372	370	2	0.50%	188	686	685	1	0.1%
		WBR	296	321	294	315	43.3	41.9	1.4	3.4%	D	D	147	128	20	15.48%	1000	653	652	1	0.1%
		WBT	47	52	48	52	62.2	58.9	3.3	5.6%	E	E	163	142	21	14.67%	1000	677	676	1	0.1%
		All	**3386**	**3442**	**3407**	**3450**	**22.9**	**23.1**	**-0.2**	**-0.8%**	**C**	**C**	**103**	**100**	**3**	**2.95%**		**690**	**698**	**-8**	**-1.1%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
27	Roxboro Street at Pettigrew Street[1]	EBL	86	86	90	90	49.7	57.0	-7.2	-12.7%	D	E	31	38	-7	-19.53%	220	197	172	25	14.3%
		EBT	89	89	91	91	37.8	43.3	-5.5	-12.6%	D	D	31	38	-7	-19.53%	288	197	172	25	14.3%
		EBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL			189	188		9.1				A		50			541		439		
		NBR	8	8	25	24	5.3	2.6	2.7	102.9%	A	A	83	38	46	121.37%	541	547	408	139	34.0%
		NBT	1950	1973	1501	1524	12.2	9.0	3.2	35.4%	B	A	94	50	44	88.63%	541	569	439	130	29.7%
		WBR			100	98		67.6				E		80			916		349		
		WBT			88	87		81.0				F		94			916		368		
		WBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	1	N/A	N/A	N/A		44	N/A	N/A	N/A
		All	**2157**	**2156**	**2085**	**2102**	**14.6**	**18.4**	**-3.8**	**-20.5%**	**B**	**B**	**48**	**55**	**-8**	**-13.97%**		**569**	**484**	**84**	**17.4%**
28	LRT at Buchanan Boulevard[2]	EBT LRT	6	6			0.0				A		0					0			
		NBT	277	263			3.3				A		4					155			
		SBT	516	445			7.0				A		23					437			
		WBT LRT	6	6			5.1				A		9					234			
		All	805	708			5.7				A		9					437			
	Downtown Durham Corridor	**EB LRT**	6	6			23.1														
	Downtown Durham Corridor	**WB LRT**	6	6			23.4														
		All	40355	40770	40971	41136	21.0	17.2			C	B	37	30	7	22.37%		851	747	104	13.9%

1 - NCDOT Traffic Impact Criteria is applied

2 - City of Durham Traffic Impact Criteria is applied

Indicates LRT Movement

Indicates Traffic Impact

Indicates Traffic Impact below Mid-D

Build Max Queue length exceeds No-Build and Storage Space by more than 10 feet

Table 10: D-O LRT: Downtown Durham Segment – VISSIM Intersection Analysis Output Summary - 2040 Build Option 1 vs. 2040 No-Build PM Peak Hour 5:00 - 6:00 PM

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
1	Main Street at 9th Street[1]	EBL	53	61	52	63	44.7	41.1	3.6	8.7%	D	D	8	8	0	-0.25%	625	74	77	-3	-3.9%
		EBR	45	52	48	58	60.2	50.5	9.6	19.1%	E	D	304	284	20	7.16%	900	457	453	4	0.9%
		EBT	518	592	498	599	66.2	53.8	12.4	23.0%	E	D	318	298	21	6.91%	900	474	470	4	0.9%
		NBL	25	47	18	47	32.6	32.4	0.2	0.5%	C	C	192	116	76	65.51%	106	255	185	71	38.2%
		NBR	206	327	140	302	37.6	48.9	-11.4	-23.2%	D	D	170	100	70	69.59%	106	231	165	66	40.0%
		NBT	158	250	127	300	41.3	50.8	-9.5	-18.7%	D	D	192	116	76	65.51%	106	255	185	71	38.2%
		SBL	244	270	219	240	184.3	65.2	119.2	182.8%	F	E	378	181	197	108.63%	330	609	503	107	21.2%
		SBR	71	74	65	76	60.3	32.7	27.5	84.1%	E	C	350	157	193	123.37%	330	580	472	108	22.9%
		SBT	141	147	180	198	66.9	39.5	27.4	69.3%	E	D	378	181	197	108.63%	330	609	503	107	21.2%
		WBL	214	263	168	216	46.2	70.0	-23.8	-34.0%	D	E	106	158	-52	-33.03%	190	388	392	-4	-1.0%
		WBR	230	286	187	245	18.9	14.2	4.6	32.6%	B	B	171	149	22	14.73%	300	374	373	1	0.3%
		WBT	357	441	347	452	22.5	17.7	4.9	27.5%	C	B	186	163	23	14.16%	300	396	395	1	0.3%
		All	**2263**	**2810**	**2048**	**2796**	**59.4**	**43.4**	**16.0**	**36.7%**	**E**	**D**	**229**	**159**	**70**	**44.11%**		**609**	**529**	**80**	**15.2%**
2	Main Street at Iredell Street[1] (Unsignalized)	EBL	145	174	135	176	15.9	17.9	-2.0	-11.4%	C	C	105	103	2	2.10%	60	327	321	6	1.9%
		EBT	825	1015	726	965	18.5	16.9	1.6	9.2%	C	C	105	103	2	2.10%	290	327	321	6	1.9%
		SBL	30	32	27	33	180.9	225.0	-44.2	-19.6%	F	F	81	117	-36	-31.16%	370	204	203	1	0.6%
		SBR	79	80	67	77	141.2	175.0	-33.8	-19.3%	F	F	81	117	-36	-31.16%	370	204	203	1	0.6%
		WBR	17	22	20	25	7.6	11.6	-4.0	-34.2%	A	B	65	101	-36	-35.53%	290	416	418	-2	-0.6%
		WBT	724	910	635	836	13.8	15.7	-1.9	-12.1%	B	C	65	101	-36	-35.53%	290	416	418	-2	-0.6%
		All	**1821**	**2233**	**1610**	**2112**	**24.4**	**26.8**	**-2.3**	**-8.7%**	**C**	**D**	**84**	**107**	**-23**	**-21.85%**		**416**	**418**	**-2**	**-0.6%**

Node	Intersection	Movement	Volume (VPH) Build Model	Volume (VPH) Build Demand	Volume (VPH) No-Build Model	Volume (VPH) No-Build Demand	Delay (Seconds) Build	Delay (Seconds) No-Build	Delay (Seconds) Difference	Delay (Seconds) Difference %	LOS Build	LOS No-Build	Avg Queue Length (ft) Build	Avg Queue Length (ft) No Build	Avg Queue Length (ft) Difference	Avg Queue Length (ft) Difference %	Max Queue Length (ft) Storage Space Available	Max Queue Length (ft) Build	Max Queue Length (ft) No-Build	Max Queue Length (ft) Difference	Max Queue Length (ft) Difference %
3	Main Street at Broad Street[1]	EBL	96	118	87	113	127.1	37.9	89.2	235.4%	F	D	300	271	29	10.86%	198	459	454	5	1.1%
		EBR	269	323	196	255	8.8	7.9	0.9	11.9%	A	A	1	3	-2	-65.96%	317	95	114	-19	-16.5%
		EBT	496	606	477	630	39.8	34.4	5.5	16.0%	D	C	311	318	-7	-2.19%	317	474	469	5	1.0%
		NBL	280	312	175	283	30.3	51.0	-20.7	-40.6%	C	D	120	209	-89	-42.74%	121	221	267	-46	-17.2%
		NBR	164	182	131	185	1.7	1.5	0.2	12.0%	A	A	2	101	-99	-98.26%	116	113	251	-138	-55.0%
		NBT	331	352	318	448	15.7	16.1	-0.5	-2.8%	B	B	120	209	-89	-42.74%	121	221	267	-46	-17.2%
		SBL	108	126	80	116	106.9	107.6	-0.7	-0.7%	F	F	104	86	18	20.65%	130	562	561	1	0.2%
		SBR	90	105	42	65	69.5	78.8	-9.3	-11.8%	E	E	310	339	-29	-8.63%	450	531	528	3	0.6%
		SBT	483	573	437	625	80.7	93.0	-12.2	-13.2%	F	F	349	375	-25	-6.78%	450	573	569	3	0.6%
		WBL	137	187	146	167	251.7	49.3	202.4	410.7%	F	D	433	49	384	784.76%	412	676	348	329	94.5%
		WBR	95	129	77	87	52.8	48.9	3.9	7.9%	D	D	178	263	-85	-32.45%	560	588	591	-2	-0.4%
		WBT	372	515	443	513	58.9	53.7	5.1	9.6%	E	D	222	326	-104	-31.89%	560	671	673	-2	-0.3%
		All	**2919**	**3528**	**2609**	**3487**	**57.0**	**47.3**	**9.7**	**20.5%**	**E**	**D**	**204**	**212**	**-8**	**-3.87%**		**677**	**674**	**3**	**0.5%**
4	Pettigrew Street at 9th Street[1] (Unsignalized)	EBT LRT	6	6	N/A	N/A	5.6	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBR	7	10	35	82	74.3	128.0	-53.7	-41.9%	F	F	212	278	-66	-23.62%	720	305	362	-57	-15.7%
		NBT	376	609	257	596	107.5	141.6	-34.1	-24.1%	F	F	212	278	-66	-23.62%	720	305	362	-57	-15.7%
		SBL	18	22	33	42	5.8	12.4	-6.6	-53.5%	A	B	3	22	-20	-88.44%	105	138	180	-42	-23.5%
		SBT	382	440	362	430	0.6	1.9	-1.3	-69.8%	A	A	3	22	-20	-88.44%	105	138	180	-42	-23.5%
		WBL	76	87	18	26	387.5	19.7	367.8	1871.9%	F	C	182	1	180	12335.04%	185	323	63	260	413.0%
		WBR	12	15	38	53	339.7	46.6	293.1	628.3%	F	E	182	1	180	12335.04%	185	323	63	260	413.0%
		WBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**883**	**1183**	**743**	**1229**	**79.0**	**59.4**	**19.6**	**33.1%**	**F**	**F**	**99**	**100**	**-1**	**-1.31%**		**328**	**362**	**-34**	**-9.3%**

Node	Intersection	Movement	Volume (VPH) Build		Volume (VPH) No-Build		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Model	Demand	Model	Demand	Build	No-Build	Difference	Difference %	Build	No-Build	Build	No Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
5	Pettigrew Street at Swift Avenue[1] (Unsignalized)	EBL			29	53		373.3				F		638			506		840		
		EBR			89	166		316.2				F		638			506		840		
		EBT			2	3		345.7				F		638			506		840		
		EBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL			33	48		118.5				F		187			443		395		
		NBR			7	9		67.0				F		658			443		784		
		NBT	775	846	574	820	94.7	122.4	-27.7	-22.6%	F	F	527	715	-188	-26.25%	443	827	841	-14	-1.7%
		SBL			11	16		133.0				F		30			137		222		
		SBR			32	45		1.3				A		30			137		222		
		SBT	888	1083	734	986	0.9	1.0	-0.1	-12.6%	A	A	3	30	-27	-90.11%	137	164	222	-58	-26.3%
		WBL			9	17		854.1				F		369			515		502		
		WBR			22	43		941.6				F		369			515		502		
		WBT			3	6		928.8				F		369			515		502		
		WBT LRT	6	6	N/A	N/A	0.7	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		87	N/A	N/A	N/A
		All	**1676**	**1929**	**1544**	**2212**	**44.1**	**92.5**	**-48.4**	**-52.3%**	**E**	**F**	**133**	**389**	**-257**	**-65.94%**		**827**	**847**	**-20**	**-2.4%**
6	Main Street at Buchanan Boulevard[1]	EBL	182	184	183	187	119.2	118.9	0.3	0.3%	F	F	339	343	-4	-1.22%	215	611	610	1	0.2%
		EBR	64	65	68	69	11.5	12.4	-0.9	-7.1%	B	B	0	0	0	0.00%	267	0	0	0	0.0%
		EBT	540	549	541	554	24.1	24.5	-0.4	-1.7%	C	C	15	16	-1	-4.79%	607	474	462	13	2.7%
		NBL	76	94	72	97	119.7	117.9	1.8	1.5%	F	F	90	83	7	8.51%	70	191	211	-20	-9.5%
		NBR	55	66	52	67	18.9	18.6	0.3	1.8%	B	B	0	0	0	3.57%	120	10	8	2	25.2%
		NBT	274	339	256	350	55.6	60.1	-4.5	-7.5%	E	E	106	109	-3	-2.61%	433	199	222	-23	-10.6%
		SBL	101	109	98	107	151.0	154.1	-3.1	-2.0%	F	F	167	165	2	1.12%	130	471	475	-4	-0.8%
		SBR	175	180	170	179	41.5	43.1	-1.5	-3.6%	D	D	8	10	-2	-20.79%	130	290	255	34	13.5%
		SBT	283	310	280	312	92.9	95.5	-2.5	-2.7%	F	F	269	277	-8	-2.87%	400	471	474	-3	-0.5%
		WBL	32	34	35	36	94.8	93.5	1.3	1.4%	F	F	38	44	-6	-13.02%	382	484	516	-32	-6.2%
		WBR	182	183	181	181	26.1	26.1	0.0	-0.1%	C	C	233	229	4	1.81%	530	620	621	-1	-0.1%
		WBT	698	685	701	689	27.7	27.2	0.5	1.7%	C	C	233	229	4	1.81%	530	620	621	-1	-0.1%
		All	**2664**	**2798**	**2636**	**2828**	**51.4**	**52.0**	**-0.5**	**-1.0%**	**D**	**D**	**125**	**125**	**-1**	**-0.42%**		**622**	**622**	**0**	**0.0%**

Node	Intersection	Movement	Volume (VPH) Build		Volume (VPH) No-Build		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Model	Demand	Model	Demand	Build	No-Build	Difference	Difference %	Build	No-Build	Build	No Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
7	Maxwell Street at Buchanan Boulevard[2] (Unsignalized)	EBL	7	37	12	40	1374.8	1273.0	101.8	8.0%	F	F	441	510	-69	-13.57%	465	554	615	-61	-9.8%
		EBR	8	48	13	49	1181.6	984.3	197.3	20.0%	F	F	163	192	-29	-15.09%	465	190	218	-28	-12.9%
		EBT			0	0		0.0				A		192			465		218		
		NBL	47	55	44	57	83.8	96.3	-12.5	-13.0%	F	F	301	383	-82	-21.35%	558	451	516	-65	-12.6%
		NBR			0	0		0.0				A		383			558		516		
		NBT	397	462	367	474	110.7	107.1	3.6	3.3%	F	F	441	383	58	15.10%	558	554	516	38	7.5%
		SBL			0	0		0.0				A		1			432		153		
		SBR	45	48	46	50	3.9	2.3	1.7	74.8%	A	A	1	1	0	12.61%	432	127	153	-26	-17.2%
		SBT	334	361	336	367	1.9	1.3	0.6	44.8%	A	A	1	1	0	12.61%	432	127	153	-26	-17.2%
		WBL			0	0		0.0				A		0			295		0		
		WBR			0	0		0.0				A		510			295		615		
		WBT			0	0		0.0				A		0			295		0		
		All	**840**	**1011**	**818**	**1037**	**79.6**	**85.8**	**-6.2**	**-7.2%**	**F**	**F**	**225**	**213**	**12**	**5.48%**		**554**	**615**	**-61**	**-9.8%**
8	Duke Street at Main Street[1]	EBL	174	178	168	172	48.9	49.1	-0.3	-0.5%	D	D	57	53	4	7.98%	198	310	311	0	-0.1%
		EBT	443	449	440	446	37.3	37.8	-0.4	-1.2%	D	D	117	118	-1	-0.74%	323	331	334	-3	-0.8%
		NBL	246	246	274	274	13.9	13.9	0.0	0.4%	B	B	21	25	-4	-14.80%	204	412	408	4	1.0%
		NBR	27	27	29	28	13.2	12.8	0.5	3.6%	B	B	73	64	9	14.65%	300	404	400	5	1.2%
		NBT	1175	1167	1143	1133	14.7	14.1	0.6	4.3%	B	B	83	73	10	13.30%	300	428	423	5	1.1%
		WBR	26	27	23	24	28.0	28.9	-1.0	-3.3%	C	C	54	53	1	1.78%	221	253	255	-2	-0.9%
		WBT	285	276	278	270	34.8	35.2	-0.4	-1.2%	C	D	65	64	1	1.34%	221	271	273	-2	-0.8%
		All	**2376**	**2370**	**2355**	**2347**	**23.9**	**23.6**	**0.3**	**1.2%**	**C**	**C**	**67**	**64**	**3**	**4.60%**		**432**	**425**	**7**	**1.6%**
9	Duke Street at Peabody Street[1] (Unsignalized)	EBL	30	28	31	28	14.9	16.0	-1.1	-6.9%	B	C	1	1	0	-32.84%	390	53	56	-4	-6.2%
		EBT	12	11	16	15	19.0	20.6	-1.6	-7.9%	C	C	1	1	0	-32.84%	390	53	56	-4	-6.2%
		NBL	102	102	105	104	0.8	0.8	0.1	8.9%	A	A	0	0	0	0.00%	140	0	0	0	0.0%
		NBR	3	3	4	4	0.6	3.1	-2.4	-79.4%	A	A	12	17	-5	-31.24%	140	156	272	-116	-42.7%
		NBT	1409	1405	1407	1399	5.9	6.2	-0.4	-5.6%	A	A	12	17	-5	-31.24%	140	156	272	-116	-42.7%
		WBR	7	7	8	8	16.3	13.2	3.1	23.1%	C	B	0	0	0	-65.22%	543	27	38	-11	-29.8%
		WBT	29	27	31	30	16.5	17.1	-0.6	-3.3%	C	C	0	0	0	-65.22%	543	27	38	-11	-29.8%
		All	**1591**	**1583**	**1601**	**1588**	**6.0**	**6.4**	**-0.4**	**-5.9%**	**A**	**A**	**4**	**5**	**-2**	**-31.27%**		**156**	**272**	**-116**	**-42.7%**

Node	Intersection	Movement	Volume (VPH) Build Model	Volume (VPH) Build Demand	Volume (VPH) No-Build Model	Volume (VPH) No-Build Demand	Delay (Seconds) Build	Delay (Seconds) No-Build	Delay (Seconds) Difference	Delay (Seconds) Difference %	LOS Build	LOS No-Build	Avg Queue Length (ft) Build	Avg Queue Length (ft) No Build	Avg Queue Length (ft) Difference	Avg Queue Length (ft) Difference %	Max Queue Length (ft) Storage Space Available	Max Queue Length (ft) Build	Max Queue Length (ft) No-Build	Max Queue Length (ft) Difference	Max Queue Length (ft) Difference %
10	Memorial Street at Duke Street[1] (Unsignalized)	EBL1	1	0	1	0	5.5	3.5	2.0	56.8%	A	A	9	0	9	144500.00%	370	343	3	340	10924.9%
		EBL2	9	10	13	15	14.0	15.5	-1.5	-9.8%	B	C	29	0	29	468400.00%	370	401	3	398	12797.6%
		NBL	9	10	10	10	8.8	6.8	2.0	28.9%	A	A	35	22	14	63.61%	213	297	287	9	3.2%
		NBT1	102	1500	104	1492	10.3	8.4	1.9	22.2%	B	A	9	22	-13	-58.07%	213	343	287	56	19.4%
		NBT2	1399		1394		8.9	6.9	1.9	27.7%	A	A	29	22	8	35.84%	213	401	287	114	39.6%
		All	**1519**	**1520**	**1522**	**1517**	**9.0**	**7.1**	**1.9**	**26.6%**	**A**	**A**	**22**	**13**	**9**	**72.96%**		**402**	**287**	**114**	**39.8%**
11	Chapel Hill Street at Duke Street[1]	EBL	152	149	163	161	48.5	61.5	-13.1	-21.3%	D	E	43	67	-24	-35.37%	220	338	350	-12	-3.4%
		EBT	366	365	389	388	16.5	17.0	-0.6	-3.3%	B	B	33	35	-2	-6.42%	336	345	365	-20	-5.6%
		NBL	221	221	189	189	40.2	38.0	2.3	6.0%	D	D	167	147	20	13.85%	455	582	520	63	12.1%
		NBR	113	113	111	111	9.5	7.7	1.7	22.6%	A	A	151	131	20	15.38%	455	563	500	63	12.6%
		NBT	1339	1343	1320	1318	43.2	40.8	2.4	5.8%	D	D	167	147	20	13.85%	455	582	520	63	12.1%
		WBR	18	18	23	23	21.9	15.7	6.2	39.7%	C	B	183	121	62	51.32%	275	399	397	2	0.6%
		WBT	712	717	747	749	23.3	17.2	6.0	35.0%	C	B	203	140	63	45.06%	275	429	427	2	0.5%
		All	**2922**	**2926**	**2943**	**2939**	**33.6**	**31.3**	**2.3**	**7.5%**	**C**	**C**	**135**	**112**	**23**	**20.35%**		**582**	**520**	**63**	**12.1%**
12	Chapel Hill Street at Willard Street[1] (Unsignalized)	EBR	59	57	55	52	5.8	1.3	4.5	345.4%	A	A	13	0	13	2931.88%	275	303	72	231	321.5%
		EBT	420	421	446	447	11.3	1.6	9.7	617.5%	B	A	13	0	13	2931.88%	275	303	72	231	321.5%
		NBL	41	43	40	42	142.2	47.4	94.9	200.3%	F	E	108	18	90	508.26%	460	299	203	96	47.6%
		NBR	119	118	97	93	105.7	26.3	79.4	301.7%	F	D	108	18	90	508.26%	460	299	203	96	47.6%
		WBL	81	79	59	57	4.6	4.0	0.5	13.6%	A	A	21	6	15	271.82%	142	240	271	-31	-11.4%
		WBT	689	692	729	730	18.3	9.5	8.8	92.7%	C	A	48	20	28	139.05%	205	238	278	-40	-14.4%
		All	**1409**	**1410**	**1426**	**1421**	**25.7**	**8.7**	**17.0**	**195.7%**	**D**	**A**	**52**	**10**	**41**	**401.58%**		**310**	**284**	**26**	**9.3%**
13	Pettigrew Street at Chapel Hill Street[1]	EBR	137	141	164	167	6.3	3.3	3.1	93.7%	A	A	50	3	47	1693.97%	206	278	193	85	44.1%
		EBT	402	398	379	373	7.7	4.1	3.6	87.5%	A	A	56	9	47	517.08%	206	295	240	55	22.9%
		EBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL			248	246		47.3				D		78			377		384		
		NBR			40	41		36.5				D		58			377		355		
		WBL	24	25	38	37	35.2	15.1	20.2	134.1%	D	B	118	33	85	254.52%	222	299	244	55	22.4%
		WBT	770	771	542	541	38.3	13.9	24.4	175.0%	D	B	118	33	85	254.52%	275	299	244	55	22.4%
		WBT LRT	6	6	N/A	N/A	5.3	N/A	N/A	N/A	A	N/A	9	N/A	N/A	N/A		247	N/A	N/A	N/A
		All	**1345**	**1335**	**1410**	**1405**	**25.6**	**16.6**	**9.0**	**54.1%**	**C**	**B**	**59**	**36**	**23**	**64.35%**		**300**	**387**	**-87**	**-22.5%**

Node	Intersection	Movement	Volume (VPH) Build		Volume (VPH) No-Build		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Model	Demand	Model	Demand	Build	No-Build	Difference	Difference %	Build	No-Build	Build	No Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
14	Blackwell Street at Pettigrew Street[2]	EBL	16	15	25	26	26.8	26.4	0.4	1.4%	C	C	27	3	24	863.27%	150	263	59	204	343.1%
		EBR	104	107	53	53	16.0	11.9	4.1	34.8%	B	B	16	10	7	66.69%	785	235	198	36	18.4%
		EBT	106	108	142	143	25.9	18.1	7.8	42.8%	C	B	27	17	10	58.62%	785	263	223	40	18.0%
		EBT LRT	6	6	N/A	N/A	1.4	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		62	N/A	N/A	N/A
		NBL			42	43		20.1				C		4			100		142		
		NBR	68	67	49	47	8.5	12.1	-3.6	-29.6%	A	B	7	16	-8	-53.86%	148	124	176	-52	-29.7%
		NBT	209	204	206	200	16.3	16.2	0.0	0.3%	B	B	16	22	-6	-25.76%	148	147	190	-43	-22.4%
		SBL	29	29	72	74	13.7	12.8	0.9	6.8%	B	B	29	10	19	181.65%	98	164	96	68	70.2%
		SBR			43	44		2.4				A		10			98		96		
		SBT	217	219	185	187	7.2	7.1	0.1	2.0%	A	A	29	10	19	181.65%	98	164	96	68	70.2%
		WBL			35	35		5.8				A		1			143		30		
		WBR			48	49		10.9				B		2			375		103		
		WBT			130	126		6.3				A		5			375		117		
		WBT LRT	6	6	N/A	N/A	0.2	N/A	N/A	N/A	A	N/A	1	N/A	N/A	N/A		73	N/A	N/A	N/A
		All	**777**	**749**	**1029**	**1027**	**14.0**	**12.2**	**1.8**	**14.9%**	**B**	**B**	**17**	**9**	**8**	**87.29%**		**263**	**230**	**33**	**14.2%**
15	Blackwell Street at Ramseur Street[1]	EBL	38	40	107	111	15.3	18.6	-3.3	-17.7%	B	B	29	31	-3	-8.76%	1081	173	192	-19	-10.1%
		EBR	185	186	185	190	19.0	14.3	4.8	33.3%	B	B	29	59	-31	-51.66%	263	175	260	-85	-32.8%
		EBT	348	348	376	371	15.2	17.0	-1.7	-10.3%	B	B	29	31	-3	-8.76%	1081	173	192	-19	-10.1%
		NBR	91	88	59	57	1.6	2.7	-1.1	-41.6%	A	A	0	11	-10	-98.94%	98	18	129	-111	-86.1%
		NBT	134	131	220	218	4.2	6.8	-2.6	-37.7%	A	A	3	24	-21	-88.41%	98	49	195	-146	-74.7%
		SBL	41	42	80	81	11.7	14.7	-3.0	-20.2%	B	B	5	13	-8	-60.98%	200	96	171	-75	-43.8%
		SBT	62	62	114	115	10.5	13.3	-2.8	-20.9%	B	B	5	13	-8	-60.98%	200	96	171	-75	-43.8%
		All	**897**	**897**	**1141**	**1143**	**12.5**	**13.5**	**-1.0**	**-7.1%**	**B**	**B**	**14**	**26**	**-12**	**-45.90%**		**175**	**263**	**-89**	**-33.6%**

Node	Intersection	Movement	Volume (VPH) Build Model	Volume (VPH) Build Demand	Volume (VPH) No-Build Model	Volume (VPH) No-Build Demand	Delay (Seconds) Build	Delay (Seconds) No-Build	Delay (Seconds) Difference	Delay (Seconds) Difference %	LOS Build	LOS No-Build	Avg Queue Length (ft) Build	Avg Queue Length (ft) No Build	Avg Queue Length (ft) Difference	Avg Queue Length (ft) Difference %	Max Queue Length (ft) Storage Space Available	Max Queue Length (ft) Build	Max Queue Length (ft) No-Build	Max Queue Length (ft) Difference	Max Queue Length (ft) Difference %
16	Main Street at Corcoran Street[2]	EBL	48	46	43	41	31.7	33.3	-1.6	-4.7%	C	C	59	57	2	3.90%	158	321	353	-32	-9.0%
		EBR	10	10	23	24	22.8	24.7	-1.9	-7.5%	C	C	48	46	2	4.68%	158	305	337	-32	-9.4%
		EBT	261	253	231	223	30.3	31.6	-1.3	-4.2%	C	C	59	57	2	3.90%	158	321	353	-32	-9.0%
		NBL	13	14	38	38	9.9	9.8	0.1	1.2%	A	A	7	16	-9	-57.59%	202	121	182	-60	-33.1%
		NBR	6	7	15	16	8.1	7.4	0.7	9.2%	A	A	4	12	-8	-70.02%	202	112	172	-60	-34.8%
		NBT	152	150	274	275	7.3	8.8	-1.5	-17.0%	A	A	7	16	-9	-57.59%	202	121	182	-60	-33.1%
		SBL	75	72	56	57	15.3	14.9	0.5	3.1%	B	B	11	13	-2	-16.06%	172	164	188	-25	-13.0%
		SBR	34	33	37	35	7.7	8.0	-0.4	-4.4%	A	A	6	8	-2	-21.22%	172	143	168	-25	-14.6%
		SBT	86	82	158	154	11.1	11.0	0.2	1.7%	B	B	11	13	-2	-16.06%	172	164	188	-25	-13.0%
		WBL	7	12	13	18	25.0	32.8	-7.8	-23.8%	C	C	24	30	-5	-17.64%	310	269	279	-10	-3.7%
		WBR	73	122	46	66	16.6	21.2	-4.7	-22.0%	B	C	18	21	-4	-16.98%	310	248	258	-10	-4.0%
		WBT	116	190	118	165	24.4	30.8	-6.5	-21.0%	C	C	24	30	-5	-17.64%	310	269	279	-10	-3.7%
		All	**881**	**991**	**1053**	**1112**	**20.0**	**19.1**	**0.8**	**4.4%**	**B**	**B**	**23**	**27**	**-3**	**-12.61%**		**340**	**381**	**-41**	**-10.7%**
17	Mangum Street at Main Street[1]	EBR	32	29	25	24	35.8	36.9	-1.1	-2.9%	D	D	61	48	13	27.68%	311	379	357	22	6.3%
		EBT	309	303	278	272	32.9	31.8	1.1	3.5%	C	C	74	61	13	22.03%	311	398	375	22	6.0%
		SBL	80	84	92	92	74.0	34.5	39.5	114.7%	E	C	364	135	229	170.19%	166	539	510	29	5.6%
		SBR	15	15	14	14	22.5	8.7	13.8	158.5%	C	A	346	120	226	188.62%	166	520	491	29	5.9%
		SBT	935	974	982	985	68.7	33.4	35.2	105.4%	E	C	364	135	229	170.19%	166	539	510	29	5.6%
		WBL	179	298	200	281	182.5	179.1	3.5	1.9%	F	F	277	282	-5	-1.62%	185	373	375	-2	-0.5%
		WBT	180	309	162	235	88.8	79.9	8.9	11.1%	F	E	112	57	55	96.17%	342	367	361	5	1.5%
		All	**1731**	**2012**	**1752**	**1903**	**75.3**	**53.6**	**21.7**	**40.4%**	**E**	**D**	**228**	**120**	**109**	**90.99%**		**539**	**512**	**27**	**5.2%**
18	Mangum Street at Ramseur Street[1]	EBR	152	147	176	176	53.5	46.6	6.9	14.9%	D	D	55	54	1	2.77%	318	224	224	1	0.3%
		EBT	326	331	335	333	9.8	9.4	0.4	4.4%	A	A	55	54	1	2.77%	318	224	224	1	0.3%
		SBL	63	73	56	61	39.3	29.3	10.0	34.2%	D	C	219	213	6	2.79%	225	328	335	-7	-2.0%
		SBT	1084	1228	1151	1229	37.6	28.2	9.4	33.4%	D	C	219	213	6	2.79%	225	328	335	-7	-2.0%
		All	**1624**	**1779**	**1718**	**1799**	**33.6**	**26.5**	**7.1**	**27.0%**	**C**	**C**	**137**	**133**	**4**	**2.78%**		**328**	**335**	**-7**	**-2.0%**

Node	Intersection	Movement	Volume (VPH) Build Model	Volume (VPH) Build Demand	Volume (VPH) No-Build Model	Volume (VPH) No-Build Demand	Delay (Seconds) Build	Delay (Seconds) No-Build	Delay (Seconds) Difference	Delay (Seconds) Difference %	LOS Build	LOS No-Build	Avg Queue Length (ft) Build	Avg Queue Length (ft) No Build	Avg Queue Length (ft) Difference	Avg Queue Length (ft) Difference %	Max Queue Length (ft) Storage Space Available	Max Queue Length (ft) Build	Max Queue Length (ft) No-Build	Max Queue Length (ft) Difference	Max Queue Length (ft) Difference %
19	Mangum Street at Pettigrew Street[1]	EBR	100	101	119	122	4.9	15.8	-10.9	-68.8%	A	B	5	15	-10	-66.11%	375	137	254	-116	-45.9%
		EBT	104	103	143	142	19.9	23.5	-3.6	-15.3%	B	C	12	29	-18	-60.46%	375	158	290	-132	-45.5%
		EBT LRT	6	6	N/A	N/A	6.7	N/A	N/A	N/A	A	N/A	2	N/A	N/A	N/A		200	N/A	N/A	N/A
		SBL	42	47	56	58	1.8	0.6	1.2	192.0%	A	A	2	0	2	4037.50%	82	126	44	82	188.7%
		SBR			28	29		0.3				A		0			82		34		
		SBT	1189	1328	1243	1318	0.9	0.3	0.6	202.2%	A	A	2	0	2	4037.50%	82	126	44	82	188.7%
		WBL	100	101	122	123	4.9	68.3	-63.4	-92.8%	A	E	5	55	-50	-91.00%	353	137	302	-164	-54.5%
		WBT			185	181		33.7				C		36			400		241		
		WBT LRT	6	6	N/A	N/A	0.5	N/A	N/A	N/A	A	N/A	4	N/A	N/A	N/A		103	N/A	N/A	N/A
		All	**1463**	**1579**	**1897**	**1973**	**2.7**	**10.7**	**-8.0**	**-74.5%**	**A**	**B**	**4**	**19**	**-15**	**-78.88%**		**207**	**382**	**-174**	**-45.7%**
20	Pettigrew Street at Dillard Street[2]	EBL	154	155	25	26	17.5	11.6	5.9	50.9%	B	B	15	2	13	774.01%	153	215	57	159	279.9%
		EBR	9	9	27	27	7.6	9.7	-2.1	-21.6%	A	A	1	4	-3	-80.52%	917	89	150	-61	-40.5%
		EBT	99	103	195	197	11.5	12.2	-0.7	-5.9%	B	B	5	12	-7	-56.55%	917	126	179	-52	-29.3%
		EBT LRT	6	6	N/A	N/A	1.4	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		125	N/A	N/A	N/A
		NBL			53	51		25.0				C		6			155		89		
		NBR	4	4	72	69	17.7	14.1	3.6	25.8%	B	B	18	21	-3	-12.19%	822	191	231	-40	-17.2%
		NBT	193	188	251	251	22.5	16.6	5.9	35.4%	C	B	25	28	-3	-9.56%	822	203	245	-42	-17.2%
		SBL	137	133	97	96	37.1	24.6	12.5	50.8%	D	C	65	46	19	40.97%	264	288	252	36	14.2%
		SBR			16	16		13.4				B		33			264		225		
		SBT	221	217	244	238	23.1	16.9	6.2	36.8%	C	B	65	46	19	40.97%	264	288	252	36	14.2%
		WBL	9	9	67	69	21.7	17.8	3.9	22.2%	C	B	9	10	-2	-17.56%	695	129	183	-53	-29.1%
		WBR	87	89	32	32	22.6	11.7	11.0	94.1%	C	B	9	6	2	36.09%	695	129	168	-39	-23.0%
		WBT			78	78		16.3				B		10			695		183		
		WBT LRT	6	6	N/A	N/A	5.2	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**933**	**907**	**1158**	**1150**	**22.4**	**16.5**	**5.9**	**35.9%**	**C**	**B**	**23**	**19**	**4**	**23.11%**		**305**	**277**	**28**	**10.1%**

Node	Intersection	Movement	Volume (VPH) Build		Volume (VPH) No-Build		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Model	Demand	Model	Demand	Build	No-Build	Difference	Difference %	Build	No-Build	Build	No Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
21	Fayetteville Street at Pettigrew Street[1]	EBL	5	5	10	10	50.9	38.7	12.2	31.6%	D	D	1	2	0	-24.64%	210	28	38	-9	-24.2%
		EBR	67	66	126	124	10.5	29.3	-18.8	-64.2%	B	C	0	17	-17	-99.28%	273	17	156	-139	-89.1%
		EBT	124	125	180	180	42.0	45.2	-3.2	-7.1%	D	D	30	48	-18	-37.75%	696	230	281	-51	-18.3%
		EBT LRT	6	6	N/A	N/A	5.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL	6	6	20	19	8.1	5.2	2.9	56.0%	A	A	7	2	5	253.00%	70	132	64	67	105.1%
		NBR	146	146	128	133	0.4	0.5	-0.2	-31.3%	A	A	9	2	7	346.06%	70	131	64	67	103.8%
		NBT	364	372	429	436	2.4	1.1	1.3	120.9%	A	A	7	2	5	253.00%	70	132	64	67	105.1%
		SBL	76	75	43	42	58.4	25.8	32.7	126.8%	E	C	28	6	23	408.04%	250	409	148	261	177.0%
		SBR	2	2	4	4	58.8	24.9	33.9	136.4%	E	C	193	91	101	110.87%	400	412	405	7	1.8%
		SBT	692	692	670	667	64.4	27.0	37.3	138.2%	E	C	193	91	101	110.87%	400	412	405	7	1.8%
		WBL	119	125	123	131	75.4	143.1	-67.7	-47.3%	E	F	51	133	-82	-61.71%	100	282	474	-192	-40.5%
		WBR	62	60	39	40	24.1	65.4	-41.3	-63.2%	C	E	20	62	-41	-67.07%	1570	203	378	-175	-46.3%
		WBT	47	46	84	83	51.2	64.0	-12.8	-20.0%	D	E	20	62	-41	-67.07%	1570	203	378	-175	-46.3%
		WBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**1721**	**1720**	**1855**	**1869**	**40.3**	**31.1**	**9.2**	**29.5%**	**D**	**C**	**40**	**43**	**-3**	**-7.29%**		**413**	**500**	**-87**	**-17.4%**
22	Fayetteville Street at Jackie Robinson Drive[1]	NBL	383	385	309	308	40.0	17.8	22.3	125.4%	D	B	108	29	79	276.49%	277	373	275	98	35.6%
		NBT	511	519	560	567	23.6	10.8	12.8	118.2%	C	B	65	20	45	223.97%	286	378	240	138	57.6%
		SBR	4	5	30	31	1.5	6.9	-5.4	-78.1%	A	A	21	40	-19	-47.16%	70	175	195	-20	-10.4%
		SBT	874	878	889	891	6.1	7.2	-1.1	-15.4%	A	A	28	40	-12	-30.67%	70	194	195	-1	-0.3%
		WBL	158	155	157	151	45.3	43.9	1.4	3.3%	D	D	45	44	1	1.20%	345	244	239	5	2.1%
		WBR	5	5	17	21	7.7	41.5	-33.8	-81.5%	A	D	35	44	-9	-21.22%	345	232	239	-8	-3.3%
		WBT	5	5	8	8	39.0	42.9	-4.0	-9.2%	D	D	45	44	1	1.20%	603	244	239	5	2.1%
		All	**1939**	**1952**	**1970**	**1977**	**20.7**	**13.2**	**7.4**	**56.3%**	**C**	**B**	**49**	**37**	**12**	**32.48%**		**378**	**288**	**90**	**31.2%**
23	Morehead Avenue at Fayetteville Street[1]	EBL	120	123	129	130	53.9	54.5	-0.6	-1.1%	D	D	39	43	-4	-9.58%	1260	205	214	-9	-4.2%
		EBR	0	0	18	17	0.0	6.7	-6.7	-100.0%	A	A	18	21	-3	-14.70%	1195	172	181	-9	-5.0%
		EBT	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	39	43	-4	-9.58%	1260	205	214	-9	-4.2%
		NBR	0	0	3	3	0.0	2.6	-2.6	-100.0%	A	A	5	3	2	56.06%	389	119	101	18	18.0%
		NBT	774	781	739	745	6.4	3.2	3.2	100.0%	A	A	8	6	2	36.31%	389	137	119	18	15.3%
		SBL	130	131	147	146	11.6	6.2	5.4	87.3%	B	A	5	2	3	150.00%	255	144	86	59	68.4%
		SBT	901	902	899	896	5.6	2.4	3.2	132.1%	A	A	17	5	11	224.82%	275	360	109	251	230.1%
		All	**1926**	**1937**	**1935**	**1937**	**9.3**	**6.5**	**2.8**	**43.2%**	**A**	**A**	**19**	**18**	**1**	**5.79%**		**360**	**214**	**146**	**68.2%**

Node	Intersection	Movement	Volume (VPH) Build Model	Volume (VPH) Build Demand	Volume (VPH) No-Build Model	Volume (VPH) No-Build Demand	Delay (Seconds) Build	Delay (Seconds) No-Build	Delay (Seconds) Difference	Delay (Seconds) Difference %	LOS Build	LOS No-Build	Avg Queue Length (ft) Build	Avg Queue Length (ft) No Build	Avg Queue Length (ft) Difference	Avg Queue Length (ft) Difference %	Max Queue Length (ft) Storage Space Available	Max Queue Length (ft) Build	Max Queue Length (ft) No-Build	Max Queue Length (ft) Difference	Max Queue Length (ft) Difference %
24	Pettigrew Street at Grant Street[2]	EBL	37	39	25	27	17.1	17.5	-0.4	-2.3%	B	B	3	32	-30	-91.38%	155	57	291	-234	-80.5%
		EBR	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	17	0	17	0.00%	1570	226	0	226	0.0%
		EBT	308	307	324	328	10.9	15.9	-5.0	-31.6%	B	B	17	32	-15	-46.75%	1570	226	291	-65	-22.3%
		EBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL	59	58	53	54	28.8	25.5	3.4	13.3%	C	C	31	44	-13	-29.71%	625	256	306	-49	-16.1%
		NBR	97	97	188	185	18.9	21.4	-2.5	-11.5%	B	C	23	35	-11	-32.52%	625	242	290	-48	-16.6%
		NBT	87	83	123	119	27.9	25.0	2.9	11.4%	C	C	31	44	-13	-29.71%	625	256	306	-49	-16.1%
		SBL	123	118	137	134	35.5	25.9	9.7	37.3%	D	C	47	23	23	99.33%	266	316	255	61	23.8%
		SBR	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	47	14	33	237.03%	266	316	241	75	31.2%
		SBT	109	107	61	59	33.5	21.4	12.2	56.9%	C	C	47	23	23	99.33%	266	316	255	61	23.8%
		WBL	214	215	137	140	17.0	16.2	0.8	4.6%	B	B	16	9	7	83.94%	70	207	118	89	75.8%
		WBR	92	92	92	92	10.6	8.3	2.3	28.1%	B	A	12	7	5	73.31%	193	193	140	52	37.4%
		WBT	169	173	193	200	11.2	11.0	0.2	1.7%	B	B	13	11	2	18.71%	193	195	151	44	28.9%
		WBT LRT	6	6	N/A	N/A	5.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**1306**	**1289**	**1334**	**1338**	**18.8**	**18.0**	**0.7**	**4.0%**	**B**	**B**	**22**	**23**	**-1**	**-5.32%**		**343**	**332**	**10**	**3.1%**
25	Gann Street at Pettigrew Street[2] (Unsignalized)	EBR	156	157	121	121	3.8	2.9	0.9	29.6%	A	A	0	0	0	0.00%	206	7	0	7	0.0%
		EBT	414	410	501	496	4.3	2.8	1.5	53.8%	A	A	0	0	0	0.00%	206	7	0	7	0.0%
		NBL	126	128	169	172	15.5	15.7	-0.1	-0.9%	C	C	3	3	0	1.34%	248	134	122	12	9.9%
		NBR	88	87	44	43	13.3	13.1	0.2	1.7%	B	B	3	3	0	1.34%	248	134	122	12	9.9%
		WBL	27	26	64	63	8.7	10.1	-1.4	-14.1%	A	B	0	0	0	-100.00%	367	13	39	-27	-67.4%
		WBT	414	420	350	357	0.6	0.5	0.1	25.3%	A	A	0	0	0	0.00%	367	0	0	0	0.0%
		All	**1225**	**1228**	**1249**	**1252**	**4.9**	**4.7**	**0.3**	**5.5%**	**A**	**A**	**1**	**1**	**0**	**0.57%**		**134**	**122**	**12**	**9.9%**
26	Alston Avenue at Gann Street[1]	EBL	33	34	30	31	52.2	56.0	-3.9	-6.9%	D	E	10	10	0	-1.08%	196	153	156	-3	-2.2%
		EBR	177	175	188	186	7.1	7.2	-0.2	-2.1%	A	A	4	6	-1	-22.01%	196	142	151	-10	-6.4%
		NBL	129	128	136	137	19.1	18.6	0.5	2.7%	B	B	45	47	-2	-4.80%	300	414	395	19	4.9%
		NBT	1473	1484	1490	1500	9.0	9.7	-0.8	-7.9%	A	A	45	47	-2	-4.80%	528	414	395	19	4.9%
		SBR	21	20	23	22	14.3	10.2	4.1	40.1%	B	B	72	51	21	40.57%	190	550	208	342	164.6%
		SBT	1358	1346	1360	1355	15.1	13.4	1.7	12.8%	B	B	74	59	15	26.36%	1037	554	223	330	148.0%
		WBL	154	153	151	150	39.6	55.3	-15.7	-28.4%	D	E	36	52	-16	-30.88%	188	227	300	-73	-24.2%
		WBR	153	150	150	147	11.2	11.9	-0.7	-5.6%	B	B	1	1	0	2.76%	1000	83	80	3	4.2%
		WBT	1	1	1	1	34.1	24.4	9.7	39.6%	C	C	4	4	0	6.54%	1000	108	103	4	4.3%
		All	**3499**	**3491**	**3529**	**3529**	**13.6**	**13.8**	**-0.3**	**-1.9%**	**B**	**B**	**32**	**31**	**2**	**5.26%**		**554**	**409**	**145**	**35.4%**

Node	Intersection	Movement	Volume (VPH) Build Model	Volume (VPH) Build Demand	Volume (VPH) No-Build Model	Volume (VPH) No-Build Demand	Delay (Seconds) Build	Delay (Seconds) No-Build	Delay (Seconds) Difference	Delay (Seconds) Difference %	LOS Build	LOS No-Build	Avg Queue Length (ft) Build	Avg Queue Length (ft) No Build	Avg Queue Length (ft) Difference	Avg Queue Length (ft) Difference %	Max Queue Length (ft) Storage Space Available	Max Queue Length (ft) Build	Max Queue Length (ft) No-Build	Max Queue Length (ft) Difference	Max Queue Length (ft) Difference %
27	Roxboro Street at Pettigrew Street[1]	EBL	34	36	77	77	23.4	26.4	-2.9	-11.2%	C	C	10	15	-5	-36.48%	220	152	139	13	9.4%
		EBT	112	114	122	123	15.1	14.7	0.4	2.8%	B	B	10	15	-5	-36.48%	288	152	139	13	9.4%
		EBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL			206	205		20.9				C		110			541		474		
		NBR	152	153	127	127	24.7	7.9	16.9	214.5%	C	A	258	99	160	161.77%	541	569	458	111	24.3%
		NBT	1563	1577	1228	1244	35.6	20.5	15.1	73.7%	D	C	273	110	163	148.68%	541	587	474	113	23.8%
		WBR			46	46		19.5				B		13			916		163		
		WBT			101	99		28.5				C		20			916		178		
		WBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	1	N/A	N/A	N/A		45	N/A	N/A	N/A
		All	**1887**	**1880**	**1907**	**1921**	**33.0**	**20.0**	**13.0**	**65.0%**	**C**	**B**	**118**	**54**	**63**	**116.26%**		**587**	**474**	**113**	**23.8%**
28	LRT at Buchanan Boulevard[2]	EBT LRT	6	6			0.0				A		0					0			
		NBT	453	462			54.8				F		137					213			
		SBT	343	361			3.9				A		30					354			
		WBT LRT	6	6			5.1				A		9					235			
		All	808	823			32.4				D		44					356			
	Downtown Durham Corridor	**EB LRT**	6	6			20.2														
	Downtown Durham Corridor	**WB LRT**	6	6			22.0														
		All	46845	49870	46792	50848	31.7	27.7			C	C	79	88	-9	-9.72%		827	851	-24	-2.8%

1 - NCDOT Traffic Impact Criteria is applied

2 - City of Durham Traffic Impact Criteria is applied

Indicates LRT Movement

Indicates Traffic Impact

Indicates Traffic Impact below Mid-D

Build Max Queue length exceeds No-Build and Storage Space by more than 10 feet

Table 11: D-O LRT: Downtown Durham Segment – VISSIM Intersection Analysis Output Summary - 2040 Build Option2 vs. 2040 No-Build AM Peak Hour 8:00 - 9:00 AM

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
1	Main Street at 9th Street[1]	EBL	84	84	81	84	25.5	28.7	-3.2	-11.2%	C	C	10	12	-2	-13.8%	625	109	111	-2	-1.8%
		EBR	63	64	61	62	22.1	26.8	-4.6	-17.2%	C	C	63	77	-14	-18.7%	900	437	428	9	2.1%
		EBT	366	364	343	348	27.3	30.8	-3.6	-11.5%	C	C	73	88	-15	-17.4%	900	454	445	9	2.0%
		NBL	72	76	72	78	31.2	29.3	1.9	6.4%	C	C	85	83	2	2.5%	106	227	223	4	1.9%
		NBR	121	119	111	111	17.1	18.6	-1.5	-8.1%	B	B	68	66	2	2.8%	106	204	199	4	2.1%
		NBT	189	187	173	176	25.5	27.4	-2.0	-7.2%	C	C	85	83	2	2.5%	106	227	223	4	1.9%
		SBL	126	124	127	127	28.5	27.8	0.7	2.4%	C	C	116	125	-9	-7.6%	330	464	485	-21	-4.3%
		SBR	84	83	95	96	33.6	33.8	-0.1	-0.4%	C	C	94	104	-10	-9.3%	330	435	456	-21	-4.6%
		SBT	369	373	375	384	38.8	37.2	1.6	4.4%	D	D	116	125	-9	-7.6%	330	464	485	-21	-4.3%
		WBL	135	133	125	128	13.0	18.8	-5.8	-30.7%	B	B	6	10	-4	-40.0%	190	130	139	-9	-6.5%
		WBR	116	116	111	114	7.3	13.2	-5.8	-44.3%	A	B	11	27	-16	-58.6%	300	298	328	-30	-9.3%
		WBT	256	257	265	274	10.4	16.7	-6.3	-37.7%	B	B	17	35	-18	-51.6%	300	320	350	-30	-8.7%
		All	**1980**	**1980**	**1940**	**1982**	**24.6**	**27.0**	**-2.4**	**-9.0%**	**C**	**C**	**62**	**70**	**-8**	**-11.0%**		**474**	**487**	**-12**	**-2.5%**
2	Main Street at Iredell Street[1] (Unsignalized)	EBL	118	117	118	119	3.0	3.3	-0.3	-9.9%	A	A	0	8	-7	-93.9%	60	70	91	-20	-22.6%
		EBT	494	490	462	467	2.2	3.2	-0.9	-29.6%	A	A	0	8	-7	-93.9%	290	70	91	-20	-22.6%
		SBL	44	42	38	37	16.7	17.0	-0.3	-1.7%	C	C	0	3	-3	-96.0%	370	26	40	-13	-33.2%
		SBR	22	21	21	20	10.7	11.5	-0.8	-6.7%	B	B	0	3	-3	-96.0%	370	26	40	-13	-33.2%
		WBR	138	141	138	145	2.8	2.6	0.2	8.6%	A	A	1	1	0	50.0%	290	130	97	32	33.3%
		WBT	485	485	481	496	3.9	3.7	0.3	6.8%	A	A	1	1	0	50.0%	290	130	97	32	33.3%
		All	**1302**	**1296**	**1258**	**1284**	**3.6**	**3.9**	**-0.2**	**-6.1%**	**A**	**A**	**0**	**4**	**-3**	**-87.8%**		**159**	**140**	**19**	**13.5%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
3	Main Street at Broad Street[1]	EBL	13	14	13	14	77.8	57.2	20.6	36.0%	E	E	23	43	-20	-46.0%	198	338	390	-52	-13.3%
		EBR	151	147	144	143	2.5	6.9	-4.5	-64.3%	A	A	0	3	-3	-99.2%	317	11	54	-43	-78.8%
		EBT	375	371	342	347	30.3	37.3	-7.0	-18.9%	C	D	73	101	-28	-27.7%	317	425	444	-19	-4.2%
		NBL	271	273	241	252	36.1	30.1	6.0	19.9%	D	C	127	202	-75	-37.2%	121	271	275	-4	-1.5%
		NBR	250	250	237	243	2.5	2.7	-0.1	-4.5%	A	A	2	0	2	409.0%	116	158	48	110	232.2%
		NBT	302	302	290	299	26.5	17.3	9.2	53.0%	C	B	127	202	-75	-37.2%	121	271	275	-4	-1.5%
		SBL	65	61	69	66	67.5	60.5	7.0	11.6%	E	E	26	24	2	8.4%	130	156	180	-24	-13.2%
		SBR	50	51	50	52	28.6	28.8	-0.3	-0.9%	C	C	52	66	-14	-20.9%	450	431	466	-35	-7.4%
		SBT	399	389	411	412	46.5	43.7	2.8	6.3%	D	D	82	96	-13	-14.0%	450	473	508	-35	-6.8%
		WBL	162	160	171	175	66.3	68.3	-2.0	-2.9%	E	E	68	92	-24	-26.2%	412	328	463	-136	-29.3%
		WBR	29	29	33	32	17.2	21.7	-4.5	-20.8%	B	C	15	23	-9	-37.0%	560	292	390	-98	-25.1%
		WBT	301	302	328	337	24.0	26.9	-2.9	-10.7%	C	C	45	57	-12	-21.8%	560	375	473	-98	-20.7%
		All	**2369**	**2349**	**2328**	**2372**	**31.3**	**30.9**	**0.3**	**1.0%**	**C**	**C**	**53**	**76**	**-22**	**-29.6%**		**496**	**578**	**-82**	**-14.2%**
4	Pettigrew Street at 9th Street[1] (Unsignalized)	EBT LRT	6	6	N/A	N/A	1.9	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBR	28	30	28	29	10.3	9.0	1.3	14.7%	B	A	9	11	-2	-20.1%	720	209	174	36	20.6%
		NBT	237	241	213	220	15.4	14.5	0.9	6.2%	C	B	9	11	-2	-20.1%	720	209	174	36	20.6%
		SBL	23	24	24	25	1.9	1.6	0.3	21.6%	A	A	0	0	0	30.4%	105	103	53	50	95.2%
		SBT	543	546	537	549	0.4	0.4	0.0	-3.3%	A	A	0	0	0	30.4%	105	103	53	50	95.2%
		WBL	73	74	75	79	35.5	39.4	-3.9	-9.9%	E	E	29	33	-4	-12.1%	185	282	298	-16	-5.4%
		WBR	146	141	143	145	40.0	38.7	1.2	3.2%	E	E	29	33	-4	-12.1%	185	282	298	-16	-5.4%
		WBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**1062**	**1056**	**1019**	**1047**	**11.9**	**11.9**	**0.0**	**0.2%**	**B**	**B**	**10**	**15**	**-5**	**-35.4%**		**306**	**310**	**-3**	**-1.1%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
5	Pettigrew Street at Swift Avenue[1] (Unsignalized)	EBL	6	6	6	6	34.1	104.7	-70.7	-67.5%	D	F	0	5	-5	-92.0%	506	21	73	-52	-71.5%
		EBR	33	31	32	31	9.0	32.2	-23.1	-71.9%	A	D	0	5	-5	-92.0%	506	21	73	-52	-71.5%
		EBT	2	2	1	2	12.0	42.6	-30.6	-71.8%	B	E	0	5	-5	-92.0%	506	21	73	-52	-71.5%
		EBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL	192	188	186	191	7.9	25.1	-17.1	-68.4%	A	D	1	49	-48	-97.2%	443	105	440	-335	-76.1%
		NBR	20	20	19	19	10.9	27.9	-17.0	-60.9%	B	D	58	204	-146	-71.8%	443	575	684	-109	-15.9%
		NBT	807	808	752	777	19.3	47.1	-27.8	-59.1%	C	E	58	204	-146	-71.8%	443	575	684	-109	-15.9%
		SBL	22	22	21	22	13.1	48.7	-35.6	-73.2%	B	E	1	12	-12	-95.8%	137	116	188	-72	-38.4%
		SBR	38	38	40	42	1.4	1.9	-0.5	-24.6%	A	A	1	12	-12	-95.8%	137	116	188	-72	-38.4%
		SBT	652	636	662	666	0.4	0.7	-0.3	-49.1%	A	A	1	12	-12	-95.8%	137	116	188	-72	-38.4%
		WBL	1	1	1	1	6.4	38.6	-32.2	-83.4%	A	E	0	2	-2	-100.0%	515	0	9	-9	-100.0%
		WBR	11	11	10	11	38.2	100.9	-62.7	-62.1%	E	F	0	2	-2	-100.0%	515	0	9	-9	-100.0%
		WBT	2	2	2	2	23.7	106.4	-82.7	-77.7%	C	F	0	2	-2	-100.0%	515	0	9	-9	-100.0%
		WBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**1798**	**1765**	**1733**	**1770**	**10.6**	**26.2**	**-15.6**	**-59.7%**	**B**	**D**	**9**	**43**	**-34**	**-80.1%**		**575**	**684**	**-109**	**-15.9%**
6	Main Street at Buchanan Boulevard[1]	EBL	134	127	134	128	51.8	52.8	-1.0	-1.8%	D	D	40	42	-3	-6.3%	215	329	421	-92	-21.8%
		EBR	86	86	87	86	7.3	7.5	-0.2	-2.9%	A	A	0	0	0	50.0%	267	9	5	5	97.6%
		EBT	464	464	476	475	23.8	24.4	-0.6	-2.5%	C	C	77	83	-6	-7.6%	607	562	579	-17	-3.0%
		NBL	74	79	73	79	66.3	67.5	-1.2	-1.8%	E	E	35	36	-1	-3.6%	70	180	185	-5	-2.5%
		NBR	63	61	65	63	11.9	13.1	-1.3	-9.5%	B	B	0	0	0	-93.5%	120	7	18	-10	-58.5%
		NBT	177	171	183	177	44.1	48.2	-4.2	-8.6%	D	D	49	56	-7	-12.9%	433	191	206	-15	-7.1%
		SBL	159	164	165	170	81.0	80.7	0.3	0.4%	F	F	125	134	-8	-6.2%	130	472	471	1	0.2%
		SBR	171	169	171	170	23.2	24.4	-1.2	-4.9%	C	C	4	5	-1	-14.7%	130	190	176	14	7.9%
		SBT	325	325	326	327	55.8	56.1	-0.3	-0.6%	E	E	156	154	3	1.7%	400	471	470	2	0.4%
		WBL	50	50	52	51	60.4	62.5	-2.1	-3.3%	E	E	17	18	-1	-3.9%	382	168	163	5	2.9%
		WBR	44	43	45	44	27.9	26.8	1.1	4.2%	C	C	59	58	1	2.3%	530	397	371	26	7.0%
		WBT	293	293	293	293	27.7	27.6	0.2	0.6%	C	C	59	58	1	2.3%	530	397	371	26	7.0%
		All	**2040**	**2032**	**2070**	**2063**	**39.0**	**39.8**	**-0.8**	**-2.0%**	**D**	**D**	**52**	**54**	**-2**	**-3.4%**		**568**	**579**	**-11**	**-1.9%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
7	Maxwell Street at Buchanan Boulevard[2] (Unsignalized)	EBL	50	48	54	52	19.1	24.8	-5.7	-23.1%	C	C	15	25	-10	-41.3%	465	235	263	-28	-10.6%
		EBR	71	70	75	74	11.6	15.1	-3.6	-23.5%	B	C	2	6	-4	-74.5%	465	82	134	-52	-38.9%
		EBT			0	0		0.0				A		6			465		134		
		NBL	13	13	13	13	3.5	7.9	-4.4	-55.4%	A	A	1	7	-6	-84.0%	558	101	143	-42	-29.4%
		NBR			0	0		0.0				A		7			558		143		
		NBT	263	263	267	267	6.7	7.5	-0.9	-11.6%	A	A	15	7	8	115.7%	558	235	143	92	64.7%
		SBL			0	0		0.0				A		0			432		11		
		SBR	16	16	17	17	0.6	0.6	0.0	5.4%	A	A	0	0	0	1200.0%	432	52	11	41	355.0%
		SBT	446	445	448	447	1.2	0.6	0.6	114.8%	A	A	0	0	0	1200.0%	432	52	11	41	355.0%
		WBL			0	0		0.0				A		0			295		0		
		WBR			0	0		0.0				A		25			295		263		
		WBT			0	0		0.0				A		0			295		0		
		All	**859**	**855**	**873**	**870**	**4.8**	**5.6**	**-0.7**	**-13.4%**	**A**	**A**	**5**	**7**	**-1**	**-20.8%**		**235**	**263**	**-28**	**-10.6%**
8	Duke Street at Main Street[1]	EBL	154	154	175	170	38.8	40.1	-1.3	-3.3%	D	D	34	43	-9	-21.8%	198	300	307	-7	-2.4%
		EBT	403	405	369	374	37.7	36.7	1.0	2.7%	D	D	105	92	13	14.0%	323	329	329	-1	-0.2%
		NBL	259	260	250	251	10.1	11.4	-1.3	-11.8%	B	B	15	16	-1	-6.9%	204	348	386	-38	-9.8%
		NBR	49	47	41	40	10.5	11.1	-0.6	-5.3%	B	B	31	39	-7	-18.6%	300	393	389	3	0.9%
		NBT	929	923	966	956	10.8	12.1	-1.3	-11.1%	B	B	39	47	-9	-18.0%	300	416	413	3	0.7%
		WBR	21	21	22	22	17.5	21.0	-3.5	-16.8%	B	C	11	11	-1	-5.9%	221	151	156	-6	-3.6%
		WBT	98	96	95	93	31.8	33.6	-1.8	-5.4%	C	C	19	20	-1	-5.2%	221	169	175	-6	-3.2%
		All	**1912**	**1906**	**1917**	**1906**	**19.7**	**20.4**	**-0.7**	**-3.5%**	**B**	**C**	**36**	**38**	**-2**	**-5.6%**		**417**	**415**	**2**	**0.5%**
9	Duke Street at Peabody Street[1] (Unsignalized)	EBL	11	11	17	16	13.1	10.5	2.6	24.3%	B	B	0	0	0	-50.0%	390	19	22	-3	-12.9%
		EBT	3	3	3	3	10.7	10.4	0.3	2.9%	B	B	0	0	0	-50.0%	390	19	22	-3	-12.9%
		NBL	63	62	60	59	0.7	0.6	0.1	7.8%	A	A	0	0	0	0.0%	140	0	0	0	0.0%
		NBR	1	1	1	1	0.3	0.5	-0.3	-49.4%	A	A	0	2	-1	-75.2%	140	83	141	-58	-41.2%
		NBT	1213	1207	1226	1218	2.2	3.1	-0.9	-28.6%	A	A	0	2	-1	-75.2%	140	83	141	-58	-41.2%
		WBR	12	12	13	13	10.6	10.5	0.1	0.5%	B	B	0	0	0	-26.1%	543	31	41	-10	-24.2%
		WBT	33	32	32	31	13.2	14.7	-1.5	-10.2%	B	B	0	0	0	-26.1%	543	31	41	-10	-24.2%
		All	**1336**	**1328**	**1352**	**1341**	**2.6**	**3.5**	**-0.8**	**-24.3%**	**A**	**A**	**0**	**1**	**0**	**-69.1%**		**86**	**141**	**-55**	**-38.8%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
10	Memorial Street at Duke Street[1] (Unsignalized)	EBL1	0	0	0	0	0.7	0.7	-0.1	-7.9%	A	A	5	0	5	0.0%	370	267	0	267	0.0%
		EBL2	4	5	4	5	9.5	8.9	0.6	6.6%	A	A	12	0	12	0.0%	370	361	0	361	0.0%
		NBL	14	15	20	20	4.6	3.6	1.0	26.2%	A	A	9	4	5	116.5%	213	267	209	58	27.6%
		NBT1	63	1265	60	1273	7.3	4.8	2.5	53.0%	A	A	5	4	1	20.5%	213	267	209	57	27.2%
		NBT2	1210		1223		4.6	2.8	1.8	63.6%	A	A	12	4	8	187.3%	213	361	209	151	72.2%
		All	**1291**	**1285**	**1307**	**1298**	**4.8**	**2.9**	**1.8**	**62.4%**	**A**	**A**	**8**	**2**	**6**	**245.2%**		**362**	**209**	**152**	**72.7%**
11	Chapel Hill Street at Duke Street[1]	EBL	200	196	199	193	22.9	20.3	2.6	12.7%	C	C	18	19	-1	-3.4%	220	326	307	19	6.3%
		EBT	670	669	688	690	27.0	15.1	11.9	78.8%	C	B	109	71	38	54.3%	336	385	381	5	1.2%
		NBL	120	115	122	117	27.1	26.4	0.7	2.8%	C	C	79	74	5	6.3%	455	301	293	8	2.8%
		NBR	125	126	130	132	32.8	12.4	20.5	165.7%	C	B	64	61	3	5.3%	455	282	275	7	2.5%
		NBT	1032	1026	1045	1039	28.0	27.8	0.2	0.7%	C	C	79	74	5	6.3%	455	301	293	8	2.8%
		WBR	55	58	58	61	25.6	13.6	12.1	89.0%	C	B	71	30	41	135.0%	275	377	291	86	29.4%
		WBT	360	361	384	383	27.8	16.5	11.3	68.2%	C	B	87	45	42	92.5%	275	406	321	85	26.7%
		All	**2562**	**2551**	**2626**	**2615**	**27.5**	**21.1**	**6.4**	**30.0%**	**C**	**C**	**72**	**53**	**19**	**35.5%**		**410**	**386**	**24**	**6.2%**
12	Chapel Hill Street at Willard Street[1] (Unsignalized)	EBR	138	137	136	137	12.4	1.6	10.8	696.4%	B	A	79	0	79	46522.2%	275	334	41	293	719.5%
		EBT	658	658	683	685	17.9	1.7	16.2	980.4%	C	A	79	0	79	46522.2%	275	334	41	293	719.5%
		NBL	14	13	15	15	31.6	15.5	16.1	104.1%	D	C	4	0	4	2050.0%	460	87	31	56	179.2%
		NBR	85	84	28	29	30.3	11.4	18.9	166.5%	D	B	4	0	4	2050.0%	460	87	31	56	179.2%
		WBL	99	95	51	47	14.3	7.9	6.4	81.8%	B	A	1	0	1	6433.3%	142	120	17	104	617.3%
		WBT	400	406	427	429	5.1	1.0	4.0	393.9%	A	A	0	0	0	2300.0%	205	62	7	54	733.5%
		All	**1394**	**1393**	**1339**	**1342**	**14.3**	**2.0**	**12.3**	**604.9%**	**B**	**A**	**28**	**0**	**28**	**25994.1%**		**334**	**66**	**268**	**407.3%**
13	Pettigrew Street at Chapel Hill Street[1]	EBR	268	270	256	260	7.0	3.6	3.4	95.1%	A	A	85	2	83	3402.3%	206	281	153	128	83.3%
		EBT	475	472	454	454	8.4	3.8	4.6	122.3%	A	A	94	9	84	892.4%	206	297	200	98	48.9%
		EBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL			87	86		17.1				B		9			377		168		
		NBR			69	69		8.9				A		3			377		139		
		WBL	38	37	42	42	30.3	13.7	16.7	122.0%	C	B	56	17	39	233.2%	222	292	206	86	41.7%
		WBT	499	501	391	390	20.5	8.5	12.0	141.7%	C	A	56	17	39	233.2%	275	292	206	86	41.7%
		WBT LRT	6	6	N/A	N/A	5.6	N/A	N/A	N/A	A	N/A	9	N/A	N/A	N/A		247	N/A	N/A	N/A
		All	**1292**	**1280**	**1299**	**1301**	**13.4**	**6.7**	**6.8**	**101.6%**	**B**	**A**	**50**	**10**	**40**	**419.0%**		**299**	**255**	**45**	**17.5%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
14	Blackwell Street at Pettigrew Street[2]	EBL	0	0	14	13	0.0	32.4	-32.4	-100.0%	A	C	36	1	34	2569.6%	150	253	39	214	548.5%
		EBR	117	116	35	36	22.8	11.1	11.7	105.5%	C	B	23	10	13	127.3%	785	226	137	88	64.3%
		EBT	83	83	123	121	36.0	20.8	15.2	72.8%	D	C	36	20	16	83.1%	785	253	159	94	58.8%
		EBT LRT	6	6	N/A	N/A	1.2	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		125	N/A	N/A	N/A
		NBL			21	21		16.8				B		2			100		65		
		NBR	91	89	7	7	4.3	9.2	-5.0	-53.9%	A	A	2	7	-5	-72.9%	148	72	153	-81	-52.8%
		NBT	82	83	140	139	15.1	15.3	-0.2	-1.1%	B	B	7	12	-5	-43.6%	148	96	167	-71	-42.5%
		SBL	6	6	50	51	3.6	3.0	0.7	22.3%	A	A	1	1	0	72.7%	98	57	50	7	14.4%
		SBR			34	33		1.0				A		1			98		50		
		SBT	95	91	171	164	2.2	1.4	0.8	53.2%	A	A	1	1	0	72.7%	98	57	50	7	14.4%
		WBL			7	9		16.6				B		0			143		25		
		WBR			49	51		15.7				B		13			375		278		
		WBT			211	205		14.3				B		18			375		291		
		WBT LRT	6	6	N/A	N/A	0.1	N/A	N/A	N/A	A	N/A	1	N/A	N/A	N/A		64	N/A	N/A	N/A
		All	**500**	**468**	**861**	**850**	**15.3**	**11.9**	**3.4**	**28.3%**	**B**	**B**	**12**	**7**	**5**	**67.9%**		**253**	**291**	**-38**	**-13.1%**
15	Blackwell Street at Ramseur Street[1]	EBL	19	20	15	16	12.6	14.6	-2.0	-13.7%	B	B	22	24	-2	-8.2%	1081	147	155	-9	-5.5%
		EBR	3	2	6	7	4.8	5.0	-0.2	-3.5%	A	A	30	32	-2	-6.1%	263	192	202	-10	-4.9%
		EBT	348	351	384	385	14.8	16.2	-1.4	-8.6%	B	B	22	24	-2	-8.2%	1081	147	155	-9	-5.5%
		NBR	2	2	7	7	0.2	4.0	-3.8	-94.1%	A	A	0	13	-13	-99.0%	98	10	135	-126	-92.7%
		NBT	80	81	196	196	2.8	8.7	-5.9	-68.3%	A	A	1	29	-28	-96.1%	98	34	202	-168	-83.3%
		SBL	34	34	26	27	13.4	16.5	-3.2	-19.1%	B	B	9	28	-20	-69.6%	200	154	284	-130	-45.8%
		SBT	98	95	248	241	11.9	15.0	-3.1	-20.8%	B	B	9	28	-20	-69.6%	200	154	284	-130	-45.8%
		All	**583**	**585**	**883**	**879**	**12.4**	**14.0**	**-1.6**	**-11.2%**	**B**	**B**	**13**	**25**	**-12**	**-48.4%**		**203**	**284**	**-81**	**-28.6%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
16	Main Street at Corcoran Street[2]	EBL	44	42	55	52	30.8	28.2	2.6	9.2%	C	C	50	44	5	12.2%	158	325	301	24	7.9%
		EBR	15	16	50	50	20.2	21.7	-1.5	-7.1%	C	C	40	34	5	15.6%	158	309	285	24	8.3%
		EBT	245	236	180	176	27.2	26.7	0.6	2.1%	C	C	50	44	5	12.2%	158	325	301	24	7.9%
		NBL	6	6	20	20	7.3	7.2	0.1	1.7%	A	A	5	6	-2	-26.2%	202	88	92	-4	-4.5%
		NBR	5	7	8	9	5.0	3.9	1.1	27.8%	A	A	2	3	-1	-38.2%	202	79	83	-4	-4.9%
		NBT	88	88	183	183	9.4	5.7	3.6	63.4%	A	A	5	6	-2	-26.2%	202	88	92	-4	-4.5%
		SBL	46	46	24	24	16.9	12.6	4.3	34.0%	B	B	10	15	-4	-29.7%	172	149	196	-47	-24.1%
		SBR	19	18	23	22	7.9	7.1	0.8	11.3%	A	A	5	9	-4	-41.6%	172	128	176	-47	-26.9%
		SBT	94	91	193	187	12.7	12.5	0.2	1.7%	B	B	10	15	-4	-29.7%	172	149	196	-47	-24.1%
		WBL	22	22	31	31	11.1	11.2	-0.1	-1.3%	B	B	11	10	1	11.5%	310	207	106	102	96.6%
		WBR	76	76	40	42	6.3	6.2	0.1	0.8%	A	A	6	4	2	39.1%	310	186	84	102	121.0%
		WBT	246	240	179	174	7.7	8.7	-1.0	-11.6%	A	A	11	10	1	11.5%	310	207	106	102	96.6%
		All	**905**	**888**	**986**	**970**	**15.4**	**13.9**	**1.5**	**11.1%**	**B**	**B**	**17**	**17**	**0**	**1.6%**		**341**	**301**	**40**	**13.2%**
17	Mangum Street at Main Street[1]	EBR	9	9	7	7	49.0	36.9	12.1	32.7%	D	D	94	43	51	119.6%	311	376	231	145	62.8%
		EBT	286	280	204	202	55.4	42.8	12.6	29.4%	E	D	109	56	53	94.5%	311	394	249	145	58.2%
		SBL	170	172	171	173	35.0	16.6	18.4	111.0%	C	B	188	76	111	146.0%	166	533	465	69	14.8%
		SBR	18	17	7	7	12.5	5.3	7.1	133.8%	B	A	174	65	109	169.3%	166	515	444	71	16.0%
		SBT	1083	1082	1096	1099	34.1	17.7	16.3	92.1%	C	B	188	76	111	146.0%	166	533	465	69	14.8%
		WBL	48	45	88	84	47.1	53.4	-6.3	-11.8%	D	D	12	28	-17	-58.5%	185	92	192	-100	-52.0%
		WBT	326	321	243	240	23.1	23.3	-0.2	-1.0%	C	C	46	33	13	38.3%	342	334	266	68	25.6%
		All	**1939**	**1926**	**1817**	**1812**	**35.7**	**23.0**	**12.7**	**55.0%**	**D**	**C**	**116**	**54**	**62**	**114.4%**		**533**	**465**	**68**	**14.7%**
18	Mangum Street at Ramseur Street[1]	EBR	107	108	116	117	49.9	45.6	4.3	9.3%	D	D	39	40	-1	-3.7%	318	170	143	26	18.3%
		EBT	276	279	298	302	15.7	20.8	-5.1	-24.4%	B	C	39	40	-1	-3.7%	318	170	143	26	18.3%
		SBL	86	89	89	91	29.5	17.8	11.7	65.4%	C	B	134	78	56	71.4%	225	322	317	5	1.5%
		SBT	1052	1047	1101	1099	27.1	16.8	10.3	61.6%	C	B	134	78	56	71.4%	225	322	317	5	1.5%
		All	**1521**	**1523**	**1605**	**1609**	**26.8**	**19.7**	**7.1**	**36.2%**	**C**	**B**	**87**	**59**	**27**	**45.8%**		**322**	**317**	**5**	**1.5%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
19	Mangum Street at Pettigrew Street[1]	EBR	53	52	53	52	7.6	26.1	-18.5	-70.9%	A	C	20	23	-2	-10.7%	375	193	188	5	2.9%
		EBT	126	126	127	127	37.6	40.8	-3.2	-7.8%	D	D	32	43	-11	-26.1%	375	214	224	-10	-4.6%
		EBT LRT	6	6	N/A	N/A	12.7	N/A	N/A	N/A	B	N/A	4	N/A	N/A	N/A		200	N/A	N/A	N/A
		SBL	49	49	55	54	1.6	0.7	0.9	121.2%	A	A	1	0	1	734.8%	82	104	52	52	100.6%
		SBR			67	67		0.5				A		0			82		42		
		SBT	1105	1106	1095	1095	0.7	0.2	0.4	182.1%	A	A	1	0	1	734.8%	82	104	52	52	100.6%
		WBL	53	52	78	77	7.6	58.6	-51.0	-87.1%	A	E	20	27	-7	-24.4%	353	193	168	25	14.7%
		WBT			200	198		37.5				D		44			400		252		
		WBT LRT	6	6	N/A	N/A	0.4	N/A	N/A	N/A	A	N/A	1	N/A	N/A	N/A		84	N/A	N/A	N/A
		All	**1362**	**1333**	**1675**	**1670**	**4.6**	**11.4**	**-6.8**	**-59.8%**	**A**	**B**	**9**	**20**	**-11**	**-55.5%**		**223**	**275**	**-52**	**-18.9%**
20	Pettigrew Street at Dillard Street[2]	EBL	30	27	16	15	12.5	12.4	0.1	0.9%	B	B	2	2	1	60.6%	153	77	67	10	14.1%
		EBR	18	20	24	25	5.5	5.9	-0.4	-7.3%	A	A	0	1	-1	-76.9%	917	43	76	-33	-43.6%
		EBT	49	50	76	75	8.1	9.3	-1.2	-13.4%	A	A	2	3	-2	-47.1%	917	82	105	-23	-21.5%
		EBT LRT	6	6	N/A	N/A	0.5	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		75	N/A	N/A	N/A
		NBL			0	0		0.0				A		0			155		0		
		NBR	8	8	34	34	11.5	8.2	3.4	41.1%	B	A	5	5	-1	-10.5%	822	90	114	-24	-21.0%
		NBT	66	68	100	100	28.2	17.6	10.6	60.6%	C	B	10	11	0	-1.2%	822	104	128	-24	-18.4%
		SBL	39	37	46	45	28.2	21.3	6.9	32.6%	C	C	31	27	4	15.7%	264	222	214	8	3.6%
		SBR			101	98		9.9				A		18			264		187		
		SBT	110	109	110	110	27.5	18.5	9.0	48.7%	C	B	31	27	4	15.7%	264	222	214	8	3.6%
		WBL	36	37	25	25	7.5	6.1	1.5	24.6%	A	A	2	2	0	0.3%	695	96	111	-15	-13.4%
		WBR	45	43	17	18	7.8	3.6	4.2	115.1%	A	A	2	1	1	145.5%	695	96	96	0	-0.5%
		WBT			88	87		6.0				A		2			695		111		
		WBT LRT	6	6	N/A	N/A	5.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**420**	**399**	**638**	**632**	**18.3**	**12.3**	**6.0**	**49.1%**	**B**	**B**	**10**	**8**	**2**	**20.2%**		**224**	**214**	**10**	**4.4%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
21	Fayetteville Street at Pettigrew Street[1]	EBL	10	9	8	7	57.2	61.4	-4.3	-6.9%	E	E	3	2	0	8.9%	210	43	44	-1	-2.3%
		EBR	6	6	26	26	5.0	5.6	-0.6	-10.7%	A	A	0	0	0	0.0%	273	0	0	0	0.0%
		EBT	53	53	59	57	37.7	53.9	-16.2	-30.0%	D	D	11	18	-7	-39.9%	696	104	133	-29	-21.6%
		EBT LRT	6	6	N/A	N/A	5.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL	3	3	35	35	8.6	5.9	2.7	45.7%	A	A	10	4	6	134.1%	70	143	145	-2	-1.5%
		NBR	47	45	58	61	0.4	0.3	0.1	43.9%	A	A	45	46	-2	-3.9%	70	141	140	1	0.7%
		NBT	364	371	382	388	2.7	1.3	1.4	108.8%	A	A	10	4	6	134.1%	70	143	145	-2	-1.5%
		SBL	59	58	42	41	40.9	21.1	19.8	93.5%	D	C	16	5	11	212.4%	250	225	124	101	81.9%
		SBR	1	1	7	7	16.1	13.4	2.8	20.9%	B	B	84	32	52	159.8%	400	343	207	136	65.9%
		SBT	435	432	449	445	41.8	22.4	19.5	87.1%	D	C	84	52	33	63.3%	400	343	250	92	37.0%
		WBL	93	96	87	90	48.7	59.8	-11.0	-18.4%	D	E	22	28	-6	-22.7%	100	214	200	14	6.8%
		WBR	102	108	45	50	32.6	31.3	1.3	4.0%	C	C	48	31	18	57.4%	1570	350	254	96	37.6%
		WBT	94	90	127	127	51.2	47.2	4.0	8.4%	D	D	48	44	4	8.7%	1570	350	277	73	26.2%
		WBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**1277**	**1272**	**1323**	**1334**	**28.9**	**21.3**	**7.6**	**35.7%**	**C**	**C**	**27**	**22**	**5**	**22.1%**		**380**	**292**	**88**	**30.1%**
22	Fayetteville Street at Jackie Robinson Drive[1]	NBL	228	227	186	185	27.5	14.2	13.3	93.7%	C	B	37	13	24	179.9%	277	261	150	111	73.8%
		NBT	322	328	359	367	21.4	11.7	9.7	82.5%	C	B	25	14	11	76.9%	286	235	137	97	70.6%
		SBR	43	44	39	40	0.9	2.1	-1.1	-54.0%	A	A	6	9	-4	-39.4%	70	134	156	-22	-14.1%
		SBT	491	490	524	521	4.4	6.8	-2.4	-35.9%	A	A	10	16	-6	-36.1%	70	149	172	-23	-13.4%
		WBL	172	169	149	144	39.7	40.5	-0.8	-1.9%	D	D	44	39	5	12.5%	345	261	222	39	17.7%
		WBR	91	91	115	117	9.0	6.7	2.3	34.7%	A	A	35	33	1	4.1%	345	249	217	31	14.3%
		WBT	13	13	13	13	38.3	36.8	1.6	4.2%	D	D	44	39	5	12.5%	603	261	222	39	17.7%
		All	**1362**	**1362**	**1385**	**1387**	**17.3**	**12.9**	**4.4**	**34.2%**	**B**	**B**	**29**	**24**	**5**	**21.7%**		**281**	**224**	**58**	**25.7%**
23	Morehead Avenue at Fayetteville Street[1]	EBL	43	44	31	33	48.9	45.3	3.6	8.0%	D	D	13	8	4	53.4%	1260	102	87	15	17.3%
		EBR	143	139	133	130	6.8	6.6	0.2	2.6%	A	A	2	1	1	134.3%	1195	69	53	16	29.1%
		EBT	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	13	8	4	53.4%	1260	102	87	15	17.3%
		NBR	20	20	18	18	2.0	1.8	0.2	13.5%	A	A	1	1	0	19.7%	389	60	63	-3	-4.5%
		NBT	507	511	514	519	2.9	2.6	0.3	13.4%	A	A	3	3	0	6.4%	389	78	81	-3	-3.5%
		SBL	99	93	74	71	4.5	3.2	1.3	41.0%	A	A	1	0	1	196.7%	255	77	53	24	45.0%
		SBT	564	566	598	594	2.3	1.5	0.8	52.9%	A	A	3	2	1	90.3%	275	163	141	22	15.5%
		All	**1376**	**1373**	**1368**	**1365**	**4.6**	**3.5**	**1.1**	**31.6%**	**A**	**A**	**5**	**3**	**2**	**54.4%**		**171**	**141**	**30**	**20.9%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
24	Pettigrew Street at Grant Street[2]	EBL	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	0	5	-5	-100.0%	155	0	107	-107	-100.0%
		EBR	7	7	13	13	7.0	3.2	3.8	120.4%	A	A	5	0	5	86900.0%	1570	120	4	116	2916.7%
		EBT	152	149	145	146	7.6	6.2	1.4	23.2%	A	A	5	5	1	19.0%	1570	120	107	13	12.3%
		EBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	20	7	13	170.4%	625	205	112	94	83.7%
		NBR	104	102	73	73	14.5	9.8	4.7	48.5%	B	A	14	4	10	287.0%	625	191	96	95	98.7%
		NBT	96	93	51	51	26.5	19.6	6.9	35.1%	C	B	20	7	13	170.4%	625	205	112	94	83.7%
		SBL	93	90	89	86	33.2	25.2	8.0	32.0%	C	C	24	16	8	48.9%	266	218	199	19	9.6%
		SBR	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	24	7	18	263.2%	266	218	181	37	20.3%
		SBT	51	50	69	68	31.0	23.0	8.0	34.9%	C	C	24	16	8	48.9%	266	218	199	19	9.6%
		WBL	67	69	127	127	8.9	7.8	1.2	15.1%	A	A	2	4	-2	-47.8%	70	70	86	-16	-18.9%
		WBR	122	123	121	121	11.1	5.4	5.8	107.0%	B	A	21	6	15	271.1%	193	303	163	140	85.8%
		WBT	287	294	259	267	10.7	7.0	3.7	52.1%	B	A	21	8	13	153.3%	193	305	174	131	75.4%
		WBT LRT	6	6	N/A	N/A	5.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**989**	**977**	**948**	**952**	**15.2**	**10.5**	**4.7**	**44.2%**	**B**	**B**	**13**	**7**	**6**	**84.3%**		**315**	**215**	**99**	**46.2%**
25	Gann Street at Pettigrew Street[2] (Unsignalized)	EBR	74	73	72	72	2.2	2.7	-0.5	-17.8%	A	A	0	0	0	0.0%	206	0	0	0	0.0%
		EBT	291	282	290	287	2.4	2.9	-0.5	-17.7%	A	A	0	0	0	0.0%	206	0	0	0	0.0%
		NBL	101	105	99	102	9.6	9.4	0.2	1.8%	A	A	0	0	0	35.7%	248	47	45	2	4.4%
		NBR	11	11	12	12	8.3	7.1	1.3	17.8%	A	A	0	0	0	35.7%	248	47	45	2	4.4%
		WBL	21	21	23	23	8.0	8.4	-0.4	-4.8%	A	A	0	0	0	0.0%	367	7	8	-1	-11.3%
		WBT	421	426	432	437	0.5	0.4	0.0	9.1%	A	A	0	0	0	0.0%	367	0	0	0	0.0%
		All	**919**	**918**	**929**	**933**	**2.5**	**2.6**	**-0.2**	**-5.8%**	**A**	**A**	**0**	**0**	**0**	**-8.3%**		**47**	**45**	**2**	**4.4%**
26	Alston Avenue at Gann Street[1]	EBL	61	63	69	69	60.5	57.6	2.9	5.1%	E	E	25	26	-1	-4.2%	196	215	217	-2	-1.0%
		EBR	183	182	182	182	13.1	13.1	0.0	0.2%	B	B	16	18	-1	-6.9%	196	204	206	-2	-1.1%
		NBL	13	13	14	14	18.6	18.4	0.2	1.1%	B	B	31	33	-2	-7.2%	300	260	261	-1	-0.4%
		NBT	873	870	878	875	11.2	12.0	-0.7	-6.1%	B	B	31	33	-2	-7.2%	528	260	261	-1	-0.4%
		SBR	48	46	48	46	12.3	12.2	0.1	0.7%	B	B	69	74	-5	-6.8%	190	530	579	-49	-8.4%
		SBT	1442	1438	1443	1440	13.4	14.0	-0.6	-4.4%	B	B	71	76	-5	-6.7%	1037	533	582	-49	-8.4%
		WBL	423	457	431	457	61.8	59.5	2.3	3.9%	E	E	372	370	2	0.5%	188	685	685	0	0.0%
		WBR	294	321	294	315	42.8	41.9	0.9	2.2%	D	D	141	128	14	10.7%	1000	652	652	0	0.1%
		WBT	47	52	48	52	61.3	58.9	2.4	4.1%	E	E	156	142	14	10.2%	1000	677	676	0	0.1%
		All	**3384**	**3442**	**3407**	**3450**	**22.9**	**23.1**	**-0.2**	**-0.7%**	**C**	**C**	**101**	**100**	**1**	**1.5%**		**690**	**698**	**-8**	**-1.2%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
27	Roxboro Street at Pettigrew Street[1]	EBL	86	86	90	90	48.4	57.0	-8.6	-15.0%	D	E	30	38	-8	-22.1%	220	211	172	39	22.7%
		EBT	89	89	91	91	37.4	43.3	-5.9	-13.6%	D	D	30	38	-8	-22.1%	288	211	172	39	22.7%
		EBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL			189	188		9.1				A		50			541		439		
		NBR	8	8	25	24	12.9	2.6	10.3	392.6%	B	A	69	38	31	83.0%	541	269	408	-139	-34.1%
		NBT	1950	1973	1501	1524	14.0	9.0	5.1	56.3%	B	A	81	50	31	63.1%	541	291	439	-147	-33.6%
		WBR			100	98		67.6				E		80			916		349		
		WBT			88	87		81.0				F		94			916		368		
		WBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	1	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**2157**	**2156**	**2085**	**2102**	**16.3**	**18.4**	**-2.1**	**-11.6%**	**B**	**B**	**42**	**55**	**-14**	**-24.8%**		**293**	**484**	**-192**	**-39.6%**
28	LRT at Buchanan Boulevard[2]	EBT LRT	6	6			0.0				A		0					0			
		NBT	277	263			3.0				A		4					152			
		SBT	516	445			6.4				A		20					410			
		WBT LRT	6	6			5.1				A		9					234			
		All	805	708			5.2				A		8					410			
	Downtown Durham Corridor	**EB LRT**	6	6			21.5														
	Downtown Durham Corridor	**WB LRT**	6	6			21.4														
		All	40696	40406	40971	41136	18.5	17.2			B	B	31	30	1	3.3%		701	747	-46	-6.2%

1 - NCDOT Traffic Impact Criteria is applied

2 - City of Durham Traffic Impact Criteria is applied

Indicates LRT Movement

Indicates Traffic Impact

Indicates Traffic Impact below Mid-D

Build Max Queue length exceeds No-Build and Storage Space by more than 10 feet

Table 12: D-O LRT: Downtown Durham Segment – VISSIM Intersection Analysis Output Summary - 2040 Build Option 2 vs. 2040 No-Build PM Peak Hour 5:00 - 6:00 PM

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
1	Main Street at 9th Street[1]	EBL	56	61	52	63	41.6	41.1	0.5	1.2%	D	D	9	8	2	21.6%	625	87	77	10	13.3%
		EBR	48	52	48	58	43.3	50.5	-7.2	-14.3%	D	D	231	284	-53	-18.6%	900	456	453	3	0.6%
		EBT	547	592	498	599	45.8	53.8	-8.1	-15.0%	D	D	244	298	-53	-18.0%	900	473	470	3	0.6%
		NBL	24	47	18	47	26.6	32.4	-5.8	-17.9%	C	C	116	116	0	0.1%	106	185	185	0	0.2%
		NBR	179	305	140	302	23.0	48.9	-25.9	-52.9%	C	D	101	100	1	0.6%	106	166	165	0	0.2%
		NBT	169	288	127	300	33.5	50.8	-17.3	-34.0%	C	D	116	116	0	0.1%	106	185	185	0	0.2%
		SBL	226	237	219	240	43.4	65.2	-21.8	-33.4%	D	E	96	181	-86	-47.3%	330	376	503	-127	-25.2%
		SBR	69	74	65	76	20.1	32.7	-12.7	-38.7%	C	C	74	157	-83	-52.7%	330	345	472	-127	-26.9%
		SBT	178	180	180	198	28.7	39.5	-10.9	-27.5%	C	D	96	181	-86	-47.3%	330	376	503	-127	-25.2%
		WBL	179	204	168	216	50.0	70.0	-20.0	-28.5%	D	E	85	158	-73	-46.4%	190	390	392	-3	-0.7%
		WBR	211	248	187	245	12.9	14.2	-1.3	-9.2%	B	B	116	149	-32	-21.9%	300	374	373	1	0.3%
		WBT	377	441	347	452	16.4	17.7	-1.3	-7.1%	B	B	128	163	-35	-21.4%	300	396	395	1	0.3%
		All	**2262**	**2729**	**2048**	**2796**	**32.7**	**43.4**	**-10.7**	**-24.6%**	**C**	**D**	**118**	**159**	**-42**	**-26.1%**		**497**	**529**	**-32**	**-6.0%**
2	Main Street at Iredell Street[1] (Unsignalized)	EBL	149	174	135	176	12.5	17.9	-5.5	-30.5%	B	C	54	103	-49	-47.2%	60	318	321	-3	-0.9%
		EBT	806	960	726	965	11.8	16.9	-5.2	-30.5%	B	C	54	103	-49	-47.2%	290	318	321	-3	-0.9%
		SBL	30	32	27	33	109.8	225.0	-115.3	-51.2%	F	F	45	117	-72	-61.5%	370	191	203	-12	-6.1%
		SBR	79	80	67	77	81.0	175.0	-94.0	-53.7%	F	F	45	117	-72	-61.5%	370	191	203	-12	-6.1%
		WBR	20	22	20	25	8.0	11.6	-3.6	-30.9%	A	B	38	101	-63	-62.6%	290	417	418	-1	-0.3%
		WBT	686	813	635	836	12.9	15.7	-2.7	-17.4%	B	C	38	101	-63	-62.6%	290	417	418	-1	-0.3%
		All	**1769**	**2081**	**1610**	**2112**	**17.1**	**26.8**	**-9.6**	**-36.0%**	**C**	**D**	**46**	**107**	**-61**	**-57.3%**		**417**	**418**	**-1**	**-0.3%**

Node	Intersection	Movement	Volume (VPH) Build		Volume (VPH) No-Build		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Model	Demand	Model	Demand	Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
3	Main Street at Broad Street[1]	EBL	101	118	87	113	39.8	37.9	1.9	4.9%	D	D	171	271	-100	-36.9%	198	455	454	1	0.2%
		EBR	228	268	196	255	4.2	7.9	-3.7	-46.7%	A	A	26	3	23	877.1%	317	126	114	12	10.5%
		EBT	513	606	477	630	28.6	34.4	-5.7	-16.7%	C	C	231	318	-87	-27.4%	317	471	469	2	0.4%
		NBL	185	263	175	283	75.6	51.0	24.6	48.1%	E	D	196	209	-13	-6.1%	121	268	267	1	0.3%
		NBR	134	174	131	185	9.8	1.5	8.3	547.7%	A	A	178	101	78	77.1%	116	253	251	2	0.8%
		NBT	332	439	318	448	24.4	16.1	8.3	51.6%	C	B	196	209	-13	-6.1%	121	268	267	1	0.3%
		SBL	84	112	80	116	116.2	107.6	8.6	8.0%	F	F	71	86	-16	-18.1%	130	482	561	-79	-14.1%
		SBR	42	62	42	65	70.8	78.8	-7.9	-10.1%	E	E	334	339	-5	-1.5%	450	529	528	1	0.2%
		SBT	442	630	437	625	92.0	93.0	-1.0	-1.1%	F	F	373	375	-2	-0.5%	450	570	569	1	0.2%
		WBL	162	171	146	167	47.1	49.3	-2.2	-4.5%	D	D	75	49	26	52.7%	412	314	348	-34	-9.8%
		WBR	85	89	77	87	35.4	48.9	-13.6	-27.7%	D	D	152	263	-111	-42.2%	560	589	591	-2	-0.3%
		WBT	483	510	443	513	40.9	53.7	-12.9	-24.0%	D	D	204	326	-121	-37.2%	560	672	673	-2	-0.3%
		All	**2792**	**3442**	**2609**	**3487**	**45.4**	**47.3**	**-1.9**	**-4.0%**	**D**	**D**	**184**	**212**	**-28**	**-13.4%**		**672**	**674**	**-2**	**-0.3%**
4	Pettigrew Street at 9th Street[1] (Unsignalized)	EBT LRT	6	6	N/A	N/A	2.8	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBR	47	79	35	82	99.9	128.0	-28.0	-21.9%	F	F	260	278	-17	-6.2%	720	365	362	2	0.6%
		NBT	331	587	257	596	109.0	141.6	-32.6	-23.0%	F	F	260	278	-17	-6.2%	720	365	362	2	0.6%
		SBL	34	38	33	42	2.8	12.4	-9.6	-77.2%	A	B	2	22	-20	-90.9%	105	81	180	-99	-54.9%
		SBT	370	398	362	430	0.4	1.9	-1.6	-81.6%	A	A	2	22	-20	-90.9%	105	81	180	-99	-54.9%
		WBL	21	27	18	26	22.3	19.7	2.7	13.5%	C	C	2	1	1	52.1%	185	80	63	17	26.3%
		WBR	40	53	38	53	49.1	46.6	2.4	5.2%	E	E	2	1	1	52.1%	185	80	63	17	26.3%
		WBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**856**	**1182**	**743**	**1229**	**50.5**	**59.4**	**-8.8**	**-14.9%**	**F**	**F**	**66**	**100**	**-34**	**-34.2%**		**365**	**362**	**2**	**0.6%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
5	Pettigrew Street at Swift Avenue[1]	EBL	33	47	29	53	296.4	373.3	-76.9	-20.6%	F	F	452	638	-186	-29.1%	506	783	840	-57	-6.8%
		EBR	112	157	89	166	227.3	316.2	-88.9	-28.1%	F	F	452	638	-186	-29.1%	506	783	840	-57	-6.8%
		EBT	2	2	2	3	175.8	345.7	-169.8	-49.1%	F	F	452	638	-186	-29.1%	506	783	840	-57	-6.8%
		EBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL	36	49	33	48	134.6	118.5	16.2	13.6%	F	F	66	187	-121	-64.6%	443	392	395	-3	-0.7%
		NBR	7	8	7	9	56.8	67.0	-10.2	-15.3%	F	F	629	658	-29	-4.3%	443	785	784	1	0.1%
		NBT	595	789	574	820	114.4	122.4	-8.0	-6.5%	F	F	686	715	-29	-4.0%	443	842	841	1	0.1%
		SBL	11	14	11	16	40.8	133.0	-92.2	-69.3%	E	F	19	30	-11	-36.8%	137	163	222	-60	-26.8%
		SBR	32	43	32	45	1.0	1.3	-0.3	-23.7%	A	A	19	30	-11	-36.8%	137	163	222	-60	-26.8%
		SBT	792	1012	734	986	0.6	1.0	-0.4	-42.1%	A	A	19	30	-11	-36.8%	137	163	222	-60	-26.8%
		WBL	9	16	9	17	532.1	854.1	-322.0	-37.7%	F	F	238	369	-132	-35.7%	515	470	502	-31	-6.2%
		WBR	25	40	22	43	563.1	941.6	-378.5	-40.2%	F	F	238	369	-132	-35.7%	515	470	502	-31	-6.2%
		WBT	4	5	3	6	642.6	928.8	-286.2	-30.8%	F	F	238	369	-132	-35.7%	515	470	502	-31	-6.2%
		WBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**1669**	**2182**	**1544**	**2212**	**77.8**	**92.5**	**-14.7**	**-15.9%**	**F**	**F**	**250**	**389**	**-139**	**-35.6%**		**845**	**847**	**-3**	**-0.3%**
6	Main Street at Buchanan Boulevard[1]	EBL	182	184	183	187	118.6	118.9	-0.3	-0.2%	F	F	339	343	-4	-1.1%	215	610	610	0	0.0%
		EBR	64	65	68	69	11.5	12.4	-0.9	-6.9%	B	B	0	0	0	0.0%	267	0	0	0	0.0%
		EBT	541	549	541	554	24.2	24.5	-0.3	-1.2%	C	C	16	16	0	-2.6%	607	457	462	-5	-1.0%
		NBL	77	94	72	97	120.8	117.9	2.9	2.5%	F	F	93	83	9	11.1%	70	195	211	-16	-7.5%
		NBR	55	66	52	67	16.8	18.6	-1.7	-9.3%	B	B	0	0	0	-100.0%	120	1	8	-7	-87.6%
		NBT	274	339	256	350	56.8	60.1	-3.4	-5.6%	E	E	110	109	1	1.2%	433	206	222	-17	-7.5%
		SBL	101	109	98	107	153.5	154.1	-0.6	-0.4%	F	F	169	165	3	1.9%	130	471	475	-4	-0.8%
		SBR	174	180	170	179	41.9	43.1	-1.2	-2.8%	D	D	9	10	-1	-10.9%	130	291	255	36	14.1%
		SBT	280	310	280	312	92.5	95.5	-3.0	-3.1%	F	F	267	277	-10	-3.6%	400	472	474	-2	-0.5%
		WBL	32	34	35	36	93.9	93.5	0.4	0.4%	F	F	34	44	-10	-22.9%	382	481	516	-35	-6.7%
		WBR	182	183	181	181	26.0	26.1	-0.1	-0.5%	C	C	231	229	2	1.0%	530	621	621	0	0.0%
		WBT	699	685	701	689	27.4	27.2	0.2	0.6%	C	C	231	229	2	1.0%	530	621	621	0	0.0%
		All	**2662**	**2798**	**2636**	**2828**	**51.5**	**52.0**	**-0.5**	**-1.0%**	**D**	**D**	**125**	**125**	**-1**	**-0.5%**		**623**	**622**	**1**	**0.1%**

Node	Intersection	Movement	Volume (VPH) Build		Volume (VPH) No-Build		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Model	Demand	Model	Demand	Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
7	Maxwell Street at Buchanan Boulevard[2] (Unsignalized)	EBL	8	37	12	40	1341.8	1273.0	68.8	5.4%	F	F	434	510	-76	-14.8%	465	553	615	-61	-10.0%
		EBR	12	48	13	49	1083.3	984.3	99.0	10.1%	F	F	161	192	-31	-16.1%	465	188	218	-30	-13.6%
		EBT			0	0		0.0				A		192			465		218		
		NBL	48	55	44	57	84.0	96.3	-12.3	-12.8%	F	F	294	383	-89	-23.3%	558	450	516	-66	-12.7%
		NBR			0	0		0.0				A		383			558		516		
		NBT	396	462	367	474	108.9	107.1	1.7	1.6%	F	F	434	383	51	13.4%	558	553	516	38	7.3%
		SBL			0	0		0.0				A		1			432		153		
		SBR	45	48	46	50	3.6	2.3	1.4	60.9%	A	A	1	1	0	27.7%	432	134	153	-20	-12.8%
		SBT	333	361	336	367	2.0	1.3	0.7	53.8%	A	A	1	1	0	27.7%	432	134	153	-20	-12.8%
		WBL			0	0		0.0				A		0			295		0		
		WBR			0	0		0.0				A		510			295		615		
		WBT			0	0		0.0				A		0			295		0		
		All	**841**	**1011**	**818**	**1037**	**82.3**	**85.8**	**-3.5**	**-4.0%**	**F**	**F**	**221**	**213**	**8**	**3.8%**		**553**	**615**	**-61**	**-10.0%**
8	Duke Street at Main Street[1]	EBL	175	178	168	172	48.8	49.1	-0.4	-0.8%	D	D	57	53	4	7.5%	198	310	311	0	-0.1%
		EBT	443	449	440	446	37.3	37.8	-0.5	-1.2%	D	D	117	118	-1	-0.8%	323	331	334	-3	-0.8%
		NBL	247	246	274	274	13.4	13.9	-0.5	-3.4%	B	B	20	25	-5	-19.5%	204	401	408	-7	-1.6%
		NBR	27	27	29	28	14.6	12.8	1.8	14.2%	B	B	74	64	10	15.0%	300	403	400	3	0.7%
		NBT	1181	1167	1143	1133	14.7	14.1	0.6	4.1%	B	B	83	73	10	13.3%	300	426	423	3	0.7%
		WBR	26	27	23	24	27.9	28.9	-1.0	-3.5%	C	C	54	53	1	1.8%	221	253	255	-2	-0.9%
		WBT	285	276	278	270	34.8	35.2	-0.4	-1.2%	C	D	65	64	1	1.3%	221	271	273	-2	-0.8%
		All	**2383**	**2370**	**2355**	**2347**	**23.8**	**23.6**	**0.2**	**0.8%**	**C**	**C**	**67**	**64**	**3**	**4.3%**		**429**	**425**	**4**	**0.9%**
9	Duke Street at Peabody Street[1] (Unsignalized)	EBL	30	28	31	28	14.4	16.0	-1.6	-10.1%	B	C	0	1	0	-43.3%	390	53	56	-4	-6.5%
		EBT	12	11	16	15	18.3	20.6	-2.3	-11.3%	C	C	0	1	0	-43.3%	390	53	56	-4	-6.5%
		NBL	103	102	105	104	0.8	0.8	0.0	4.1%	A	A	0	0	0	0.0%	140	0	0	0	0.0%
		NBR	3	3	4	4	0.8	3.1	-2.2	-73.3%	A	A	12	17	-5	-29.0%	140	157	272	-115	-42.2%
		NBT	1415	1405	1407	1399	6.0	6.2	-0.2	-3.9%	A	A	12	17	-5	-29.0%	140	157	272	-115	-42.2%
		WBR	7	7	8	8	16.0	13.2	2.8	21.0%	C	B	0	0	0	-60.9%	543	26	38	-13	-33.2%
		WBT	29	27	31	30	16.0	17.1	-1.0	-6.1%	C	C	0	0	0	-60.9%	543	26	38	-13	-33.2%
		All	**1599**	**1583**	**1601**	**1588**	**6.1**	**6.4**	**-0.3**	**-5.0%**	**A**	**A**	**4**	**5**	**-2**	**-29.8%**		**157**	**272**	**-115**	**-42.2%**

Node	Intersection	Movement	Volume (VPH) Build Model	Volume (VPH) Build Demand	Volume (VPH) No-Build Model	Volume (VPH) No-Build Demand	Delay (Seconds) Build	Delay (Seconds) No-Build	Delay (Seconds) Difference	Delay (Seconds) Difference %	LOS Build	LOS No-Build	Avg Queue Length (ft) Build	Avg Queue Length (ft) No-Build	Avg Queue Length (ft) Difference	Avg Queue Length (ft) Difference %	Max Queue Length (ft) Storage Space Available	Max Queue Length (ft) Build	Max Queue Length (ft) No-Build	Max Queue Length (ft) Difference	Max Queue Length (ft) Difference %
10	Memorial Street at Duke Street[1] (Unsignalized)	EBL1	1	0	1	0	5.2	3.5	1.7	48.0%	A	A	7	0	7	115900.0%	370	343	3	340	10907.6%
		EBL2	9	10	13	15	14.8	15.5	-0.7	-4.2%	B	C	22	0	22	346000.0%	370	372	3	368	11839.0%
		NBL	9	10	10	10	8.3	6.8	1.5	22.6%	A	A	29	22	8	35.2%	213	292	287	4	1.5%
		NBT1	103	1500	104	1492	9.6	8.4	1.2	14.2%	A	A	7	22	-14	-66.4%	213	343	287	55	19.2%
		NBT2	1404		1394		8.2	6.9	1.3	18.3%	A	A	22	22	0	0.3%	213	372	287	84	29.3%
		All	**1526**	**1520**	**1522**	**1517**	**8.3**	**7.1**	**1.2**	**17.2%**	**A**	**A**	**17**	**13**	**4**	**34.3%**		**381**	**287**	**93**	**32.4%**
11	Chapel Hill Street at Duke Street[1]	EBL	152	149	163	161	48.1	61.5	-13.5	-21.9%	D	E	43	67	-23	-35.0%	220	343	350	-7	-2.0%
		EBT	366	365	389	388	16.7	17.0	-0.3	-2.0%	B	B	33	35	-2	-4.7%	336	345	365	-20	-5.5%
		NBL	222	221	189	189	38.5	38.0	0.5	1.3%	D	D	158	147	11	7.5%	455	569	520	50	9.6%
		NBR	113	113	111	111	9.0	7.7	1.2	15.8%	A	A	142	131	11	8.5%	455	550	500	50	10.0%
		NBT	1341	1343	1320	1318	41.2	40.8	0.3	0.7%	D	D	158	147	11	7.5%	455	569	520	50	9.6%
		WBR	18	18	23	23	20.4	15.7	4.7	30.2%	C	B	177	121	56	46.6%	275	398	397	1	0.4%
		WBT	712	717	747	749	22.7	17.2	5.5	31.9%	C	B	197	140	57	40.9%	275	428	427	1	0.3%
		All	**2925**	**2926**	**2943**	**2939**	**32.4**	**31.3**	**1.1**	**3.6%**	**C**	**C**	**130**	**112**	**17**	**15.5%**		**569**	**520**	**50**	**9.6%**
12	Chapel Hill Street at Willard Street[1] (Unsignalized)	EBR	59	57	55	52	5.9	1.3	4.6	358.5%	A	A	12	0	12	2782.6%	275	304	72	232	322.8%
		EBT	420	421	446	447	11.4	1.6	9.9	629.1%	B	A	12	0	12	2782.6%	275	304	72	232	322.8%
		NBL	42	43	40	42	130.7	47.4	83.3	175.9%	F	E	102	18	84	477.0%	460	301	203	99	48.7%
		NBR	120	118	97	93	100.1	26.3	73.8	280.3%	F	D	102	18	84	477.0%	460	301	203	99	48.7%
		WBL	81	79	59	57	4.5	4.0	0.5	11.2%	A	A	24	6	18	330.6%	142	240	271	-31	-11.4%
		WBT	688	692	729	730	18.1	9.5	8.6	90.5%	C	A	47	20	27	133.8%	205	237	278	-41	-14.8%
		All	**1410**	**1410**	**1426**	**1421**	**25.1**	**8.7**	**16.4**	**188.8%**	**D**	**A**	**50**	**10**	**40**	**385.1%**		**310**	**284**	**26**	**9.2%**
13	Pettigrew Street at Chapel Hill Street[1]	EBR	137	141	164	167	6.3	3.3	3.0	93.5%	A	A	51	3	48	1728.3%	206	277	193	84	43.4%
		EBT	402	398	379	373	7.8	4.1	3.7	91.4%	A	A	57	9	48	528.1%	206	293	240	54	22.3%
		EBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL			248	246		47.3				D		78			377		384		
		NBR			40	41		36.5				D		58			377		355		
		WBL	24	25	38	37	36.7	15.1	21.6	143.6%	D	B	119	33	86	257.1%	222	300	244	56	23.1%
		WBT	770	771	542	541	38.7	13.9	24.7	177.4%	D	B	119	33	86	257.1%	275	300	244	56	23.1%
		WBT LRT	6	6	N/A	N/A	5.7	N/A	N/A	N/A	A	N/A	10	N/A	N/A	N/A		247	N/A	N/A	N/A
		All	**1345**	**1335**	**1410**	**1405**	**25.8**	**16.6**	**9.2**	**55.6%**	**C**	**B**	**59**	**36**	**24**	**66.1%**		**301**	**387**	**-87**	**-22.4%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
14	Blackwell Street at Pettigrew Street[2]	EBL	16	15	25	26	27.3	26.4	0.9	3.5%	C	C	28	3	25	902.4%	150	260	59	201	338.6%
		EBR	104	107	53	53	17.1	11.9	5.2	43.8%	B	B	17	10	7	76.1%	785	232	198	34	17.0%
		EBT	106	108	142	143	26.6	18.1	8.5	46.7%	C	B	28	17	11	65.1%	785	260	223	37	16.8%
		EBT LRT	6	6	N/A	N/A	2.3	N/A	N/A	N/A	A	N/A	1	N/A	N/A	N/A		175	N/A	N/A	N/A
		NBL			42	43		20.1				C		4			100		142		
		NBR	68	67	49	47	8.1	12.1	-4.0	-32.8%	A	B	7	16	-8	-52.5%	148	135	176	-41	-23.3%
		NBT	210	204	206	200	16.7	16.2	0.5	3.1%	B	B	16	22	-5	-24.2%	148	159	190	-31	-16.5%
		SBL	29	29	72	74	13.3	12.8	0.5	4.0%	B	B	30	10	20	188.0%	98	159	96	63	65.0%
		SBR			43	44		2.4				A		10			98		96		
		SBT	216	219	185	187	7.4	7.1	0.3	4.3%	A	A	30	10	20	188.0%	98	159	96	63	65.0%
		WBL			35	35		5.8				A		1			143		30		
		WBR			48	49		10.9				B		2			375		103		
		WBT			130	126		6.3				A		5			375		117		
		WBT LRT	6	6	N/A	N/A	0.2	N/A	N/A	N/A	A	N/A	1	N/A	N/A	N/A		71	N/A	N/A	N/A
		All	**778**	**749**	**1029**	**1027**	**14.3**	**12.2**	**2.2**	**17.9%**	**B**	**B**	**18**	**9**	**9**	**93.5%**		**260**	**230**	**30**	**13.0%**
15	Blackwell Street at Ramseur Street[1]	EBL	38	40	107	111	16.2	18.6	-2.4	-12.9%	B	B	28	31	-3	-9.9%	1081	168	192	-24	-12.5%
		EBR	185	186	185	190	19.0	14.3	4.8	33.5%	B	B	28	59	-31	-52.9%	263	170	260	-90	-34.6%
		EBT	348	348	376	371	14.9	17.0	-2.1	-12.2%	B	B	28	31	-3	-9.9%	1081	168	192	-24	-12.5%
		NBR	91	88	59	57	1.6	2.7	-1.1	-41.3%	A	A	0	11	-11	-99.4%	98	18	129	-111	-86.2%
		NBT	134	131	220	218	4.2	6.8	-2.6	-38.9%	A	A	3	24	-21	-88.8%	98	47	195	-148	-75.7%
		SBL	41	42	80	81	12.9	14.7	-1.8	-12.5%	B	B	5	13	-8	-59.4%	200	103	171	-68	-39.7%
		SBT	61	62	114	115	10.7	13.3	-2.6	-19.9%	B	B	5	13	-8	-59.4%	200	103	171	-68	-39.7%
		All	**897**	**897**	**1141**	**1143**	**12.5**	**13.5**	**-1.0**	**-7.3%**	**B**	**B**	**14**	**26**	**-12**	**-46.5%**		**170**	**263**	**-93**	**-35.4%**

Node	Intersection	Movement	Volume (VPH) Build		Volume (VPH) No-Build		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Model	Demand	Model	Demand	Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
16	Main Street at Corcoran Street[2]	EBL	48	46	43	41	34.4	33.3	1.1	3.4%	C	C	66	57	9	16.4%	158	348	353	-5	-1.4%
		EBR	10	10	23	24	22.6	24.7	-2.1	-8.5%	C	C	55	46	9	19.6%	158	332	337	-5	-1.5%
		EBT	262	253	231	223	32.9	31.6	1.3	4.1%	C	C	66	57	9	16.4%	158	348	353	-5	-1.4%
		NBL	13	14	38	38	10.5	9.8	0.7	6.9%	B	A	7	16	-9	-57.0%	202	114	182	-67	-37.0%
		NBR	6	7	15	16	10.4	7.4	3.1	41.3%	B	A	4	12	-8	-70.1%	202	105	172	-67	-39.0%
		NBT	152	150	274	275	7.4	8.8	-1.3	-15.3%	A	A	7	16	-9	-57.0%	202	114	182	-67	-37.0%
		SBL	75	72	56	57	16.3	14.9	1.4	9.2%	B	B	11	13	-2	-16.4%	172	169	188	-19	-10.1%
		SBR	34	33	37	35	7.7	8.0	-0.4	-4.4%	A	A	6	8	-2	-22.5%	172	149	168	-19	-11.4%
		SBT	86	82	158	154	11.1	11.0	0.2	1.5%	B	B	11	13	-2	-16.4%	172	169	188	-19	-10.1%
		WBL	7	12	13	18	33.8	32.8	1.0	3.1%	C	C	38	30	8	26.3%	310	312	279	32	11.6%
		WBR	78	122	46	66	25.6	21.2	4.4	20.7%	C	C	29	21	7	34.4%	310	290	258	32	12.6%
		WBT	123	190	118	165	31.6	30.8	0.7	2.4%	C	C	38	30	8	26.3%	310	312	279	32	11.6%
		All	**893**	**991**	**1053**	**1112**	**22.9**	**19.1**	**3.7**	**19.6%**	**C**	**B**	**28**	**27**	**2**	**5.7%**		**383**	**381**	**1**	**0.4%**
17	Mangum Street at Main Street[1]	EBR	32	29	25	24	38.8	36.9	1.9	5.2%	D	D	68	48	20	41.8%	311	390	357	33	9.2%
		EBT	309	303	278	272	36.0	31.8	4.2	13.2%	D	C	81	61	21	33.9%	311	408	375	33	8.7%
		SBL	78	84	92	92	78.8	34.5	44.3	128.7%	E	C	380	135	245	182.2%	166	540	510	30	5.8%
		SBR	15	15	14	14	23.4	8.7	14.7	168.4%	C	A	362	120	242	202.0%	166	521	491	30	6.1%
		SBT	919	974	982	985	71.9	33.4	38.5	115.1%	E	C	380	135	245	182.2%	166	540	510	30	5.8%
		WBL	189	298	200	281	178.8	179.1	-0.3	-0.2%	F	F	279	282	-3	-1.1%	185	374	375	-1	-0.2%
		WBT	193	309	162	235	72.0	79.9	-8.0	-9.9%	E	E	63	57	6	10.4%	342	366	361	5	1.3%
		All	**1734**	**2012**	**1752**	**1903**	**76.3**	**53.6**	**22.7**	**42.3%**	**E**	**D**	**230**	**120**	**111**	**92.8%**		**540**	**512**	**28**	**5.4%**
18	Mangum Street at Ramseur Street[1]	EBR	151	147	176	176	54.3	46.6	7.7	16.6%	D	D	56	54	2	3.5%	318	240	224	16	7.2%
		EBT	327	331	335	333	9.7	9.4	0.3	3.1%	A	A	56	54	2	3.5%	318	240	224	16	7.2%
		SBL	62	73	56	61	41.5	29.3	12.2	41.7%	D	C	245	213	32	15.1%	225	331	335	-4	-1.2%
		SBT	1076	1228	1151	1229	39.3	28.2	11.1	39.5%	D	C	245	213	32	15.1%	225	331	335	-4	-1.2%
		All	**1617**	**1779**	**1718**	**1799**	**34.9**	**26.5**	**8.4**	**31.7%**	**C**	**C**	**150**	**133**	**17**	**12.8%**		**333**	**335**	**-2**	**-0.5%**

Node	Intersection	Movement	Volume (VPH) Build		Volume (VPH) No-Build		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Model	Demand	Model	Demand	Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
19	Mangum Street at Pettigrew Street[1]	EBR	100	101	119	122	5.0	15.8	-10.7	-68.1%	A	B	5	15	-9	-63.4%	375	157	254	-97	-38.1%
		EBT	104	103	143	142	19.9	23.5	-3.6	-15.4%	B	C	12	29	-17	-59.0%	375	178	290	-112	-38.8%
		EBT LRT	6	6	N/A	N/A	7.9	N/A	N/A	N/A	A	N/A	2	N/A	N/A	N/A		187	N/A	N/A	N/A
		SBL	42	47	56	58	2.0	0.6	1.4	216.0%	A	A	2	0	2	3712.5%	82	118	44	75	171.1%
		SBR			28	29		0.3				A		0			82		34		
		SBT	1182	1328	1243	1318	0.8	0.3	0.6	195.6%	A	A	2	0	2	3712.5%	82	118	44	75	171.1%
		WBL	100	101	122	123	5.0	68.3	-63.2	-92.6%	A	E	5	55	-50	-90.3%	353	157	302	-145	-47.9%
		WBT			185	181		33.7				C		36			400		241		
		WBT LRT	6	6	N/A	N/A	0.7	N/A	N/A	N/A	A	N/A	3	N/A	N/A	N/A		112	N/A	N/A	N/A
		All	**1456**	**1579**	**1897**	**1973**	**2.7**	**10.7**	**-8.0**	**-74.7%**	**A**	**B**	**4**	**19**	**-15**	**-78.8%**		**218**	**382**	**-163**	**-42.8%**
20	Pettigrew Street at Dillard Street[2]	EBL	154	155	25	26	16.8	11.6	5.2	44.7%	B	B	15	2	13	744.4%	153	186	57	130	229.1%
		EBR	9	9	27	27	6.9	9.7	-2.7	-28.2%	A	A	1	4	-3	-83.3%	917	67	150	-82	-55.1%
		EBT	99	103	195	197	11.0	12.2	-1.2	-9.8%	B	B	5	12	-7	-58.7%	917	105	179	-74	-41.5%
		EBT LRT	6	6	N/A	N/A	0.9	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		125	N/A	N/A	N/A
		NBL			53	51		25.0				C		6			155		89		
		NBR	4	4	72	69	19.4	14.1	5.3	37.5%	B	B	19	21	-2	-8.6%	822	212	231	-19	-8.1%
		NBT	193	188	251	251	23.0	16.6	6.4	38.6%	C	B	26	28	-2	-6.8%	822	224	245	-21	-8.5%
		SBL	137	133	97	96	35.5	24.6	10.9	44.6%	D	C	64	46	18	39.8%	264	292	252	40	15.8%
		SBR			16	16		13.4				B		33			264		225		
		SBT	221	217	244	238	23.5	16.9	6.7	39.4%	C	B	64	46	18	39.8%	264	292	252	40	15.8%
		WBL	9	9	67	69	21.8	17.8	4.0	22.6%	C	B	9	10	-2	-15.7%	695	133	183	-49	-27.0%
		WBR	87	89	32	32	23.3	11.7	11.6	99.5%	C	B	9	6	2	39.3%	695	133	168	-35	-20.7%
		WBT			78	78		16.3				B		10			695		183		
		WBT LRT	6	6	N/A	N/A	5.2	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**932**	**907**	**1158**	**1150**	**22.3**	**16.5**	**5.8**	**35.4%**	**C**	**B**	**23**	**19**	**4**	**22.7%**		**296**	**277**	**19**	**6.9%**

Node	Intersection	Movement	Volume (VPH)		Volume (VPH)		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
			Model	Demand	Model	Demand															
21	Fayetteville Street at Pettigrew Street[1]	EBL	5	5	10	10	42.9	38.7	4.3	11.0%	D	D	1	2	-1	-41.7%	210	25	38	-13	-33.3%
		EBR	67	66	126	124	10.4	29.3	-18.9	-64.6%	B	C	0	17	-17	-99.7%	273	12	156	-144	-92.3%
		EBT	124	125	180	180	42.0	45.2	-3.2	-7.1%	D	D	30	48	-18	-38.0%	696	233	281	-47	-16.9%
		EBT LRT	6	6	N/A	N/A	5.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL	6	6	20	19	8.8	5.2	3.7	70.9%	A	A	7	2	5	232.2%	70	138	64	74	115.6%
		NBR	146	146	128	133	0.4	0.5	-0.1	-27.7%	A	A	8	2	6	322.4%	70	133	64	69	107.2%
		NBT	364	372	429	436	2.4	1.1	1.3	118.6%	A	A	7	2	5	232.2%	70	138	64	74	115.6%
		SBL	76	75	43	42	61.1	25.8	35.4	137.4%	E	C	36	6	30	538.7%	250	384	148	236	160.0%
		SBR	2	2	4	4	47.4	24.9	22.5	90.4%	D	C	190	91	99	107.9%	400	414	405	10	2.4%
		SBT	693	692	670	667	63.7	27.0	36.6	135.5%	E	C	190	91	99	107.9%	400	414	405	10	2.4%
		WBL	119	125	123	131	72.4	143.1	-70.7	-49.4%	E	F	49	133	-84	-63.5%	100	299	474	-176	-37.0%
		WBR	62	60	39	40	23.4	65.4	-41.9	-64.2%	C	E	19	62	-42	-69.0%	1570	210	378	-168	-44.4%
		WBT	47	46	84	83	48.0	64.0	-16.0	-25.1%	D	E	19	62	-42	-69.0%	1570	210	378	-168	-44.4%
		WBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**1723**	**1720**	**1855**	**1869**	**39.7**	**31.1**	**8.6**	**27.7%**	**D**	**C**	**40**	**43**	**-3**	**-8.1%**		**415**	**500**	**-85**	**-17.0%**
22	Fayetteville Street at Jackie Robinson Drive[1]	NBL	381	385	309	308	43.3	17.8	25.6	144.2%	D	B	120	29	92	321.1%	277	375	275	100	36.5%
		NBT	511	519	560	567	26.4	10.8	15.6	144.4%	C	B	78	20	58	287.6%	286	381	240	141	58.8%
		SBR	4	5	30	31	3.6	6.9	-3.2	-46.9%	A	A	21	40	-19	-47.1%	70	178	195	-17	-8.7%
		SBT	875	878	889	891	6.1	7.2	-1.0	-14.4%	A	A	27	40	-13	-31.8%	70	198	195	3	1.7%
		WBL	158	155	157	151	45.2	43.9	1.3	3.1%	D	D	45	44	0	0.9%	345	241	239	2	0.7%
		WBR	5	5	17	21	8.1	41.5	-33.4	-80.4%	A	D	35	44	-9	-21.4%	345	228	239	-11	-4.7%
		WBT	5	5	8	8	38.7	42.9	-4.3	-9.9%	D	D	45	44	0	0.9%	603	241	239	2	0.7%
		All	**1940**	**1952**	**1970**	**1977**	**22.1**	**13.2**	**8.8**	**66.8%**	**C**	**B**	**53**	**37**	**16**	**41.9%**		**381**	**288**	**93**	**32.4%**
23	Morehead Avenue at Fayetteville Street[1]	EBL	120	123	129	130	54.6	54.5	0.0	0.1%	D	D	39	43	-4	-9.4%	1260	205	214	-9	-4.2%
		EBR	0	0	18	17	0.0	6.7	-6.7	-100.0%	A	A	18	21	-3	-14.6%	1195	172	181	-9	-5.0%
		EBT	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	39	43	-4	-9.4%	1260	205	214	-9	-4.2%
		NBR	0	0	3	3	0.0	2.6	-2.6	-100.0%	A	A	5	3	2	84.6%	389	120	101	19	18.8%
		NBT	774	781	739	745	7.4	3.2	4.2	133.0%	A	A	9	6	3	55.9%	389	138	119	19	16.0%
		SBL	131	131	147	146	11.6	6.2	5.4	86.9%	B	A	6	2	3	160.4%	255	171	86	86	100.1%
		SBT	903	902	899	896	5.7	2.4	3.3	136.0%	A	A	17	5	12	233.7%	275	355	109	246	225.9%
		All	**1927**	**1937**	**1935**	**1937**	**9.9**	**6.5**	**3.3**	**51.2%**	**A**	**A**	**19**	**18**	**1**	**8.0%**		**355**	**214**	**141**	**66.1%**

Node	Intersection	Movement	Volume (VPH) Build		Volume (VPH) No-Build		Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Model	Demand	Model	Demand	Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Difference	Difference %	Storage Space Available	Build	No-Build	Difference	Difference %
24	Pettigrew Street at Grant Street[2]	EBL	37	39	25	27	16.6	17.5	-0.9	-5.0%	B	B	3	32	-30	-91.9%	155	59	291	-232	-79.9%
		EBR	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	17	0	17	0.0%	1570	210	0	210	0.0%
		EBT	308	307	324	328	11.0	15.9	-4.9	-31.0%	B	B	17	32	-15	-47.0%	1570	210	291	-80	-27.6%
		EBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL	59	58	53	54	28.6	25.5	3.2	12.4%	C	C	31	44	-13	-30.0%	625	255	306	-51	-16.5%
		NBR	97	97	188	185	18.6	21.4	-2.8	-13.1%	B	C	23	35	-11	-33.0%	625	241	290	-49	-17.0%
		NBT	87	83	123	119	27.8	25.0	2.8	11.3%	C	C	31	44	-13	-30.0%	625	255	306	-51	-16.5%
		SBL	123	118	137	134	35.4	25.9	9.6	37.0%	D	C	47	23	23	99.1%	266	315	255	60	23.6%
		SBR	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	47	14	33	236.6%	266	315	241	75	31.0%
		SBT	109	107	61	59	32.5	21.4	11.1	52.1%	C	C	47	23	23	99.1%	266	315	255	60	23.6%
		WBL	214	215	137	140	17.0	16.2	0.8	4.9%	B	B	16	9	7	82.8%	70	184	118	66	56.1%
		WBR	92	92	92	92	10.7	8.3	2.4	29.2%	B	A	12	7	5	76.1%	193	197	140	57	40.7%
		WBT	168	173	193	200	11.1	11.0	0.2	1.6%	B	B	13	11	2	20.7%	193	199	151	48	32.0%
		WBT LRT	6	6	N/A	N/A	5.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**1306**	**1289**	**1334**	**1338**	**18.7**	**18.0**	**0.6**	**3.5%**	**B**	**B**	**22**	**23**	**-1**	**-5.5%**		**330**	**332**	**-2**	**-0.7%**
25	Gann Street at Pettigrew Street[2] (Unsignalized)	EBR	157	157	121	121	4.0	2.9	1.1	37.1%	A	A	0	0	0	0.0%	206	4	0	4	0.0%
		EBT	413	410	501	496	4.3	2.8	1.5	52.2%	A	A	0	0	0	0.0%	206	4	0	4	0.0%
		NBL	125	128	169	172	15.6	15.7	-0.1	-0.4%	C	C	3	3	0	-0.2%	248	125	122	3	2.5%
		NBR	88	87	44	43	13.4	13.1	0.3	1.9%	B	B	3	3	0	-0.2%	248	125	122	3	2.5%
		WBL	27	26	64	63	8.8	10.1	-1.3	-13.2%	A	B	0	0	0	-100.0%	367	13	39	-26	-66.7%
		WBT	414	420	350	357	0.6	0.5	0.1	21.5%	A	A	0	0	0	0.0%	367	0	0	0	0.0%
		All	**1225**	**1228**	**1249**	**1252**	**4.9**	**4.7**	**0.3**	**5.4%**	**A**	**A**	**1**	**1**	**0**	**-0.6%**		**125**	**122**	**3**	**2.5%**
26	Alston Avenue at Gann Street[1]	EBL	33	34	30	31	52.8	56.0	-3.2	-5.8%	D	E	10	10	0	-3.9%	196	130	156	-26	-16.8%
		EBR	176	175	188	186	6.9	7.2	-0.3	-4.4%	A	A	4	6	-2	-28.6%	196	119	151	-33	-21.5%
		NBL	128	128	136	137	19.0	18.6	0.4	2.1%	B	B	45	47	-2	-4.9%	300	426	395	31	7.8%
		NBT	1474	1484	1490	1500	8.9	9.7	-0.8	-8.2%	A	A	45	47	-2	-4.9%	528	426	395	31	7.8%
		SBR	21	20	23	22	13.1	10.2	2.9	28.5%	B	B	70	51	19	36.1%	190	521	208	313	150.3%
		SBT	1359	1346	1360	1355	14.9	13.4	1.5	10.8%	B	B	72	59	13	22.4%	1037	524	223	301	134.7%
		WBL	154	153	151	150	39.4	55.3	-16.0	-28.8%	D	E	36	52	-16	-31.2%	188	234	300	-67	-22.2%
		WBR	153	150	150	147	11.6	11.9	-0.3	-2.8%	B	B	1	1	0	9.2%	1000	78	80	-2	-2.1%
		WBT	1	1	1	1	34.2	24.4	9.7	39.8%	C	C	4	4	0	12.7%	1000	102	103	-1	-0.6%
		All	**3500**	**3491**	**3529**	**3529**	**13.4**	**13.8**	**-0.4**	**-2.9%**	**B**	**B**	**32**	**31**	**1**	**3.4%**		**534**	**409**	**125**	**30.6%**

Node	Intersection	Movement	Volume (VPH) Build Model	Volume (VPH) Build Demand	Volume (VPH) No-Build Model	Volume (VPH) No-Build Demand	Delay (Seconds) Build	Delay (Seconds) No-Build	Delay (Seconds) Difference	Delay (Seconds) Difference %	LOS Build	LOS No-Build	Avg Queue Length (ft) Build	Avg Queue Length (ft) No-Build	Avg Queue Length (ft) Difference	Avg Queue Length (ft) Difference %	Max Queue Length (ft) Storage Space Available	Max Queue Length (ft) Build	Max Queue Length (ft) No-Build	Max Queue Length (ft) Difference	Max Queue Length (ft) Difference %
27	Roxboro Street at Pettigrew Street[1]	EBL	35	36	77	77	29.9	26.4	3.5	13.3%	C	C	15	15	0	0.7%	220	165	139	26	18.6%
		EBT	111	114	122	123	24.3	14.7	9.6	65.2%	C	B	15	15	0	0.7%	288	165	139	26	18.6%
		EBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL			206	205		20.9				C		110			541		474		
		NBR	151	153	127	127	17.7	7.9	9.8	124.8%	B	A	83	99	-16	-15.8%	541	273	458	-185	-40.5%
		NBT	1561	1577	1228	1244	18.3	20.5	-2.2	-10.8%	B	C	94	110	-16	-14.6%	541	290	474	-184	-38.9%
		WBR			46	46		19.5				B		13			916		163		
		WBT			101	99		28.5				C		20			916		178		
		WBT LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	1	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	**1883**	**1880**	**1907**	**1921**	**18.7**	**20.0**	**-1.3**	**-6.5%**	**B**	**B**	**43**	**54**	**-11**	**-20.7%**		**290**	**474**	**-184**	**-38.9%**
28	LRT at Buchanan Boulevard[2]	EBT LRT	6	6			0.0				A		0					0			
		NBT	452	462			51.6				F		128					215			
		SBT	345	361			3.4				A		7					299			
		WBT LRT	6	6			5.1				A		9					235			
		All	809	823			30.3				D		36					301			
	Downtown Durham Corridor	**EB LRT**	6	6			19.0														
	Downtown Durham Corridor	**WB LRT**	6	6			22.0														
		All	46659	49803	46792	50848	29.5	27.7			C	C	77	88	-10	-11.6%		845	851	-6	-0.7%

1 - NCDOT Traffic Impact Criteria is applied

2 - City of Durham Traffic Impact Criteria is applied

Indicates LRT Movement

Indicates Traffic Impact

Indicates Traffic Impact below Mid-D

Build Max Queue length exceeds No-Build and Storage Space by more than 10 feet

Table 13: D-O LRT: Downtown Durham – Synchro Intersection Analysis - 2040 Build One-Way Pettigrew VS 2040 No-Build AM Peak Hour 8:00 AM – 9:00 AM

Node	Intersection	Movement	Delay (Seconds)				LOS		V/C		95% Queue Length				
			Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Storage Space	Build	No-Build	Difference	Difference %
1	Downtown Loop at Chapel Hill Street[1]	EBT	4.2	9.3	-5.1	-54.8%	A	A	0.16	0.38	239	28	188	-160	-85.1%
		EBR	0.1	0.1	0	0.0%	A	A	0.09	0.06	239	0	0	0	-
		WBLT	3.8	5.9	-2.1	-35.6%	A	A	0.04	0.11	232	11	43	-32	-74.4%
		SBT	16.4	16.5	-0.1	-0.6%	B	B	0.13	0.25	185	26	43	-17	-39.5%
		SBR	0.9	1.8	-0.9	-50.0%	A	A	0.22	0.25	185	23	76	-53	-69.7%
		Overall	4.8	8.2	-3.4	-41.5%	A	A							
2	Great Jones Street at W Main Street[1]	SBLTR	17.2	16.6	0.6	3.6%	B	B	0.33	0.29	441	111	97	14	14.4%
		EBT	10.6	10.6	0	0.0%	B	B	0.24	0.24	306	108	108	0	0.0%
		EBR	4.6	2	2.6	130.0%	A	A	0.22	0.18	148	51	26	25	96.2%
		WLT	14.8	18.9	-4.1	-21.7%	B	B	0.13	0.12	298	108	125	-17	-13.6%
		Overall	14	13.7	0.3	2.2%	B	B							
3	Great Jones Street at Morris Street[1]	WBTR	7.3	5.2	2.1	40.4%	A	A	0.31	0.25	557	28	50	-22	-44.0%
		NBL	28.2	29.8	-1.6	-5.4%	C	C	0.45	0.27	360	110	72	38	52.8%
		NBT	26.3	29.6	-3.3	-11.1%	C	C	0.30	0.26	360	81	73	8	11.0%
		SBR	7.8	2.4	5.4	225.0%	A	A	0.41	0.36	227	94	31	63	203.2%
		Overall	11.7	8.8	2.9	33.0%	B	A							
4	E Chapel Hill Street/ Main Street at Morris Street[2]	EBLTR	25.7	20.3	5.4	26.6%	C	C	0.54	0.64	232	242	320	-78	-24.4%
		WBLTR	10.9	10.7	0.2	1.9%	B	B	0.16	0.13	461	66	54	12	22.2%
		SBLT	46.4	35.1	11.3	32.2%	D	D	0.77	0.54	298	321	231	90	39.0%
		NBLTR	14.2	9.3	4.9	52.7%	B	A	0.61	0.40	460	241	48	193	402.1%
		Overall	27	20.6	6.4	31.1%	C	C							
5	Morgan Street at Foster Street[1]	WBLTR	4.3	4.9	-0.6	-12.2%	A	A	0.39	0.34	454	24	25	-1	-4.0%
		NBL	8.1	7.9	0.2	2.5%	A	A	0.04	0.08	360	14	25	-11	-44.0%
		NBT	10.5	9.2	1.3	14.1%	B	A	0.22	0.31	360	117	132	-15	-11.4%
		SBTR	9.5	10.6	-1.1	-10.4%	A	B	0.31	0.33	365	120	137	-17	-12.4%
		Overall	6.3	7	-0.7	-10.0%	A	A							

Node	Intersection	Movement	Delay (Seconds)				LOS		V/C		95% Queue Length				
			Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Storage Space	Build	No-Build	Difference	Difference %
6	Blackwell Street at Jackie Robinson Drive[1]	EBLTR	13.2	16.1	-2.9	-18.0%	B	B	0.06	0.04	341	28	26	2	7.7%
		EBR	13.3	16.1	-2.8	-17.4%	B	B	0.06	0.04	341	33	28	5	17.9%
		WBL	1.3	1.4	-0.1	-7.1%	A	A	0.13	0.16	750	6	5	1	20.0%
		WBT	1.9	1.8	0.1	5.6%	A	A	0.38	0.31	750	18	10	8	80.0%
		WBR	1.2	1.1	0.1	9.1%	A	A	0.11	0.08	750	6	3	3	100.0%
		NBL	25.7	26.2	-0.5	-1.9%	C	C	0.32	0.34	201	104	112	-8	-7.1%
		NBT	24.6	24.5	0.1	0.4%	C	C	0.29	0.29	201	126	125	1	0.8%
		SBTR	25.6	31.6	-6	-19.0%	C	C	0.16	0.15	768	85	89	-4	-4.5%
		Overall	11.4	12.8	-1.4	-10.9%	B	B							
7	Morgan Street at Rigsbee Avenue[1]	WBLTR	1.7	1.9	-0.2	-10.5%	A	A	0.34	0.30	418	16	15	1	6.7%
		NBLT	16.1	17	-0.9	-5.3%	B	B	0.09	0.17	352	47	78	-31	-39.7%
		SBTR	9.5	14.4	-4.9	-34.0%	A	B	0.18	0.19	314	60	80	-20	-25.0%
		Overall	3.2	4.7	-1.5	-31.9%	A	A							
8	Morgan Street at Mangum Street[1]	NBLT	24.1	23.4	0.7	3.0%	C	C	0.64	0.59	206	243	213	30	14.1%
		WBT	9.7	9.5	0.2	2.1%	A	A	0.54	0.54	215	235	240	-5	-2.1%
		WBR	6.7	6.2	0.5	8.1%	A	A	0.21	0.20	215	74	67	7	10.4%
		Overall	16.7	15.8	0.9	5.7%	B	B							
9	Mangum Street at Jackie Robinson Drive[1]	WBLT	29.3	29	0.3	1.0%	C	C	0.60	0.60	506	239	223	16	7.2%
		SBT	13.7	11.1	2.6	23.4%	B	B	0.24	0.24	458	198	182	16	8.8%
		SBR	11.1	7.7	3.4	44.2%	B	A	0.21	0.18	228	161	111	50	45.0%
		Overall	20.7	18.8	1.9	10.1%	C	B							
10	Holloway Street at Roxboro Street[1]	WBT	29.9	30.9	-1	-3.2%	C	C	0.65	0.64	913	274	269	5	1.9%
		WBR	0.1	0.1	0	0.0%	A	A	0.08	0.08	913	0	0	0	-
		NBLTR	10.9	10.3	0.6	5.8%	B	B	0.22	0.22	225	100	99	1	1.0%
		Overall	16.3	16	0.3	1.9%	B	B							
11	Liberty Loop at Roxboro Street[1]	EBL	33.9	33.8	0.1	0.3%	C	C	0.46	0.46	276	118	116	2	1.7%
		EBT	32.6	32.7	-0.1	-0.3%	C	C	0.33	0.34	326	81	81	0	0.0%
		NBL	0.8	0.7	0.1	14.3%	A	A	0.21	0.15	460	15	11	4	36.4%
		NBTR	0.8	0.7	0.1	14.3%	A	A	0.15	0.16	460	11	12	-1	-8.3%
		Overall	8.5	9.3	-0.8	-8.6%	A	A							

Node	Intersection	Movement	Delay (Seconds)				LOS		V/C		95% Queue Length				
			Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Storage Space	Build	No-Build	Difference	Difference %
12	Main Street at Roxboro Street[1]	EBL	15.9	22.2	-6.3	-28.4%	B	C	0.32	0.25	148	55	52	3	5.8%
		EBT	15.7	22.2	-6.5	-29.3%	B	C	0.43	0.40	293	192	184	8	4.3%
		WBT	18.9	19	-0.1	-0.5%	B	B	0.45	0.42	497	221	208	13	6.3%
		WBR	6.5	6.1	0.4	6.6%	A	A	0.20	0.22	108	55	53	2	3.8%
		NBLTR	21.1	12.3	8.8	71.5%	C	B	0.90	0.78	386	142	298	-156	-52.3%
		Overall	19.1	14.5	4.6	31.7%	B	B							
13	Dillard Street at Roxboro Street[1]	EBL	41.4	46.8	-5.4	-11.5%	D	D	0.40	0.46	345	59	74	-15	-
		EBT	30.4	36.2	-5.8	-16.0%	C	D	0.10	0.16	564	38	44	-6	-13.6%
		WBTR	48.1	44.1	4	9.1%	D	D	0.75	0.57	826	181	111	70	63.1%
		NBLT	5.5	3.8	1.7	44.7%	A	A	0.60	0.55	465	161	124	37	29.8%
		NBR	0.4	0.3	0.1	33.3%	A	A	0.11	0.10	307	0	0	0	-
		Overall	10	7.2	2.8	38.9%	A	A							
14	Jackie Robinson Drive at Roxboro Street[1]	WBT	8.3	8	0.3	3.8%	A	A	0.36	0.32	1342	133	116	17	14.7%
		WBR	79.3	80.5	-1.2	-1.5%	E	F	1.10	1.10	1342	940	944	-4	-0.4%
		NBL	4.5	4.6	-0.1	-2.2%	A	A	0.29	0.27	265	47	45	2	4.4%
		NBT	30.5	30.1	0.4	1.3%	C	C	0.74	0.73	265	275	268	7	2.6%
		Overall	39.5	40.8	-1.3	-3.2%	D	D							
15	Dillard Street at Holloway Street[1]	EBLTR	6.9	7.4	-0.5	-6.8%	A	A	0.22	0.22	916	50	54	-4	-7.4%
		WBLTR	13.5	13.7	-0.2	-1.5%	B	B	0.47	0.48	715	226	228	-2	-0.9%
		NBL	19.4	22.7	-3.3	-14.5%	B	C	0.38	0.39	485	145	156	-11	-7.1%
		NBTR	6.4	9	-2.6	-28.9%	A	A	0.04	0.05	485	25	25	0	0.0%
		SBLTR	13.9	14.2	-0.3	-2.1%	B	B	0.12	0.11	310	50	47	3	6.4%
		Overall	13	13.9	-0.9	-6.5%	B	B							
16	Dillard Street at Liberty Street[1]	NBTR	17.8	18.2	-0.4	-2.2%	B	B	0.07	0.10	384	41	51	-10	-19.6%
		SBLT	13.8	13.4	0.4	3.0%	B	B	0.13	0.13	486	47	50	-3	-6.0%
		EBL	1.7	2.1	-0.4	-19.0%	A	A	0.03	0.10	378	4	11	-7	-63.6%
		EBT	1.7	2	-0.3	-15.0%	A	A	0.06	0.06	378	7	8	-1	-12.5%
		EBR	0.2	0.1	0.1	100.0%	A	A	0.09	0.02	378	1	0	1	-
		WBL	9.5	9.9	-0.4	-4.0%	A	A	0.10	0.15	397	40	55	-15	-27.3%
		WBR	2.3	2.3	0	0.0%	A	A	0.10	0.10	397	20	19	1	5.3%
		Overall	8.5	9.2	-0.7	-7.6%	A	A							

Node	Intersection	Movement	Delay (Seconds)				LOS		V/C		95% Queue Length				
			Build	No-Build	Difference	Difference %	Build	No-Build	Build	No-Build	Storage Space	Build	No-Build	Difference	Difference %
17	Dillard Street at Main Street[2]	EBL	6.7	6.8	-0.1	-1.5%	A	A	0.04	0.05	100	8	12	-4	-33.3%
		EBT	7.3	7.1	0.2	2.8%	A	A	0.09	0.08	365	51	50	1	2.0%
		EBR	3.6	3.6	0	0.0%	A	A	0.10	0.10	100	28	30	-2	-6.7%
		WBL	6.6	6.6	0	0.0%	A	A	0.06	0.06	555	23	23	0	0.0%
		WBTR	10.1	9.9	0.2	2.0%	B	A	0.48	0.47	555	218	212	6	2.8%
		NBL	23.3	23.8	-0.5	-2.1%	C	C	0.14	0.16	147	41	42	-1	-2.4%
		NBTR	16.7	17.7	-1	-5.6%	B	B	0.07	0.09	396	35	42	-7	-16.7%
		SBL	21	17.8	3.2	18.0%	C	B	0.15	0.17	385	62	60	2	3.3%
		SBTR	15.7	14.1	1.6	11.3%	B	B	0.35	0.42	385	123	135	-12	-8.9%
		Overall	11.3	11.1	0.2	1.8%	B	B							

1 - NCDOT Traffic Impact Criteria is applied
2 - City of Durham Traffic Impact Criteria is applied
Indicates Traffic Impact
Indicates Traffic Impact below Mid-D
Build Max Queue length exceeds No-Build and Storage Space by more than 10 feet

Table 14: D-O LRT: Downtown Durham – Synchro Intersection Analysis - 2040 Build One-Way Pettigrew VS 2040 No-Build PM Peak Hour 5:00 PM – 6:00 PM

Node	Intersection	Movement	Delay (Seconds)				LOS		V/C		95% Queue Length				
			Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Storage Space	Build	No-Build	Difference Absolute	Difference %
1	Downtown Loop at Chapel Hill Street[1]	EBT	5.8	7.3	-1.5	-20.5%	A	A	0.27	0.37	239	89	126	-37	-29.4%
		EBR	0.1	0.0	0.1	-	A	A	0.07	0.00	239	0	0	0	-
		WBLT	14.0	6.3	7.7	122.2%	B	A	0.19	0.15	232	122	47	75	159.6%
		SBT	11.9	12.8	-0.9	-7.0%	B	B	0.29	0.30	185	38	43	-5	-11.6%
		SBR	4.2	1.9	2.3	121.1%	A	A	0.45	0.33	185	185	76	109	143.4%
		Overall	7.3	7.0	0.3	4.3%	A	A							
2	Great Jones Street at W Main Street[1]	SBLTR	15.9	14.6	1.3	8.9%	B	B	0.47	0.40	441	134	108	26	24.1%
		EBT	9.8	9.8	0.0	0.0%	A	A	0.35	0.35	306	137	136	1	0.7%
		EBR	7.0	5.5	1.5	27.3%	A	A	0.25	0.25	148	71	62	9	14.5%
		WLT	9.2	9.0	0.2	2.2%	A	A	0.28	0.27	298	88	100	-12	-12.0%
		Overall	12.9	11.7	1.2	10.3%	B	B							
3	Great Jones Street at Morris Street[1]	WBTR	9.7	9.4	0.3	3.2%	A	A	0.33	0.31	557	56	51	5	9.8%
		NBL	36.6	32.2	4.4	13.7%	D	C	0.49	0.36	360	111	86	25	29.1%
		NBT	33.1	31.8	1.3	4.1%	C	C	0.34	0.35	360	80	87	-7	-8.0%
		SBR	12.4	11.2	1.2	10.7%	B	B	0.48	0.51	227	134	134	0	0.0%
		Overall	14.4	13.1	1.3	9.9%	B	B							
4	E Chapel Hill Street/ Main Street at Morris Street[2]	EBLTR	20.8	87.4	-66.6	-76.2%	C	F	0.61	1.07	232	234	324	-90	-27.8%
		WBLTR	17.7	15.7	2.0	12.7%	B	B	0.58	0.33	461	216	81	135	166.7%
		SBLT	18.4	17.3	1.1	6.4%	B	B	0.57	0.67	298	112	182	-70	-38.5%
		NBLTR	16.8	8.6	8.2	95.3%	B	A	0.34	0.35	460	128	89	39	43.8%
		Overall	18.5	39.7	-21.2	-53.4%	B	D							
5	Morgan Street at Foster Street[1]	WBLTR	3.8	5.7	-1.9	-33.3%	A	A	0.34	0.28	454	13	28	-15	-53.6%
		NBL	10.5	11.8	-1.3	-11.0%	B	B	0.12	0.20	360	24	39	-15	-38.5%
		NBT	12.4	13.4	-1.0	-7.5%	B	B	0.39	0.46	360	160	194	-34	-17.5%
		SBTR	12.2	12.7	-0.5	-3.9%	B	B	0.51	0.51	365	194	196	-2	-1.0%
		Overall	7.9	9.7	-1.8	-18.6%	A	A							

Node	Intersection	Movement	Delay (Seconds)				LOS		V/C		95% Queue Length				
			Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Storage Space	Build	No-Build	Difference Absolute	Difference %
6	Blackwell Street at Jackie Robinson Drive[1]	EBLTR	20.2	19.4	0.8	4.1%	C	B	0.60	0.57	341	234	220	14	6.4%
		EBR	20.2	19.1	1.1	5.8%	C	B	0.60	0.56	341	237	215	22	10.2%
		WBL	20.5	19.5	1.0	5.1%	C	B	0.49	0.46	750	108	104	4	3.8%
		WBT	13.2	12.8	0.4	3.1%	B	B	0.21	0.16	750	84	67	17	25.4%
		WBR	12.5	12.2	0.3	2.5%	B	B	0.12	0.09	750	46	37	9	24.3%
		NBL	15.6	15.7	-0.1	-0.6%	B	B	0.19	0.19	201	50	52	-2	-3.8%
		NBT	14.6	14.7	-0.1	-0.7%	B	B	0.16	0.17	201	68	69	-1	-1.4%
		SBTR	17.0	16.7	0.3	1.8%	B	B	0.37	0.34	768	142	134	8	6.0%
		Overall	18.0	17.5	0.5	2.9%	B	B							
7	Morgan Street at Rigsbee Avenue[1]	WBLTR	11.5	11.0	0.5	4.5%	B	B	0.37	0.30	418	108	86	22	25.6%
		NBLT	12.5	13.6	-1.1	-8.1%	B	B	0.23	0.32	352	81	111	-30	-27.0%
		SBTR	9.0	9.4	-0.4	-4.3%	A	A	0.15	0.16	314	54	57	-3	-5.3%
		Overall	11.4	11.3	0.1	0.9%	B	B							
8	Morgan Street at Mangum Street[1]	NBLT	21.4	21.0	0.4	1.9%	C	C	0.58	0.52	206	173	138	35	25.4%
		WBT	7.5	6.8	0.7	10.3%	A	A	0.45	0.44	215	160	163	-3	-1.8%
		WBR	5.1	3.8	1.3	34.2%	A	A	0.15	0.13	215	45	35	10	28.6%
		Overall	14.5	13.2	1.3	9.8%	B	B							
9	Mangum Street at Jackie Robinson Drive[1]	WBLT	23.8	22.8	1.0	4.4%	C	C	0.55	0.57	506	138	154	-16	-10.4%
		SBT	4.7	5.9	-1.2	-20.3%	A	A	0.30	0.33	458	92	110	-18	-16.4%
		SBR	4.1	7.3	-3.2	-43.8%	A	A	0.28	0.41	228	67	143	-76	-53.1%
		Overall	10.8	11.7	-0.9	-7.7%	B	B							
10	Holloway Street at Roxboro Street[1]	WBT	34.2	32.8	1.4	4.3%	C	C	0.76	0.74	913	274	249	25	10.0%
		WBR	0.2	0.1	0.1	100.0%	A	A	0.15	0.11	913	0	0	0	-
		NBLTR	3.0	3.7	-0.7	-18.9%	A	A	0.42	0.45	225	82	105	-23	-21.9%
		Overall	8.6	8.6	0.0	0.0%	A	A							
11	Liberty Loop at Roxboro Street[1]	EBL	22.8	22.8	0.0	0.0%	C	C	0.56	0.54	276	147	142	5	3.5%
		EBT	19.7	20.3	-0.6	-3.0%	B	C	0.40	0.42	326	95	98	-3	-3.1%
		NBL	1.5	1.4	0.1	7.1%	A	A	0.24	0.15	460	16	10	6	60.0%
		NBTR	1.6	1.5	0.1	6.7%	A	A	0.38	0.43	460	24	26	-2	-7.7%
		Overall	7.2	7.2	0.0	0.0%	A	A							

Node	Intersection	Movement	Delay (Seconds)				LOS		V/C		95% Queue Length				
			Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Storage Space	Build	No-Build	Difference Absolute	Difference %
12	Main Street at Roxboro Street[1]	EBL	21.8	17.9	3.9	21.8%	C	B	0.53	0.42	148	104	84	20	23.8%
		EBT	15.3	14.7	0.6	4.1%	B	B	0.46	0.42	293	179	161	18	11.2%
		WBT	15.0	14.2	0.8	5.6%	B	B	0.52	0.47	497	212	187	25	13.4%
		WBR	2.5	2.5	0.0	0.0%	A	A	0.19	0.21	108	27	28	-1	-3.6%
		NBLTR	45.6	35.7	9.9	27.7%	D	D	1.01	0.97	386	538	504	34	6.7%
		Overall	32.6	26.5	6.1	23.0%	C	C							
13	Dillard Street at Roxboro Street[1]	EBL	70.3	66.2	4.1	6.2%	E	E	0.92	0.87	345	169	143	26	18.2%
		EBT	21.9	24.0	-2.1	-8.8%	C	C	0.37	0.44	564	105	115	-10	-8.7%
		WBTR	28.9	30.5	-1.6	-5.2%	C	C	0.67	0.70	826	182	177	5	2.8%
		NBLT	7.5	6.6	0.9	13.6%	A	A	0.64	0.56	465	131	114	17	14.9%
		NBR	0.7	0.6	0.1	16.7%	A	A	0.10	0.13	307	0	2	-2	-100.0%
		Overall	15.3	14.7	0.6	4.1%	B	B							
14	Jackie Robinson Drive at Roxboro Street[1]	WBT	7.9	8.7	-0.8	-9.2%	A	A	0.31	0.32	1342	82	82	0	0.0%
		WBR	21.7	19.7	2.0	10.2%	C	B	0.83	0.79	1342	351	288	63	21.9%
		NBL	3.8	3.6	0.2	5.6%	A	A	0.32	0.33	265	45	47	-2	-4.3%
		NBT	20.3	18.9	1.4	7.4%	C	B	0.61	0.56	265	200	195	5	2.6%
		Overall	16.3	15.1	1.2	7.9%	B	B							
15	Dillard Street at Holloway Street[1]	EBLTR	6.4	5.9	0.5	8.5%	A	A	0.43	0.36	916	114	94	20	21.3%
		WBLTR	6.3	6.2	0.1	1.6%	A	A	0.36	0.35	715	96	93	3	3.2%
		NBL	22.8	18.3	4.5	24.6%	C	B	0.62	0.47	485	142	101	41	40.6%
		NBTR	6.8	7.1	-0.3	-4.2%	A	A	0.13	0.19	485	34	41	-7	-17.1%
		SBLTR	12.5	13.2	-0.7	-5.3%	B	B	0.10	0.11	310	32	33	-1	-3.0%
		Overall	10.2	8.7	1.5	17.2%	B	A							
16	Dillard Street at Liberty Street[1]	NBTR	13.7	11.9	1.8	15.1%	B	B	0.17	0.15	384	40	35	5	14.3%
		SBLT	8.8	9.1	-0.3	-3.3%	A	A	0.15	0.11	486	24	22	2	9.1%
		EBL	7.2	7.7	-0.5	-6.5%	A	A	0.08	0.15	378	30	49	-19	-38.8%
		EBT	8.7	9.1	-0.4	-4.4%	A	A	0.29	0.33	378	92	106	-14	-13.2%
		EBR	2.0	2.3	-0.3	-13.0%	A	A	0.18	0.10	378	22	16	6	37.5%
		WBL	7.6	7.8	-0.2	-2.6%	A	A	0.10	0.12	397	23	25	-2	-8.0%
		WBR	2.4	2.5	-0.1	-4.0%	A	A	0.08	0.06	397	14	12	2	16.7%
		Overall	8.2	8.5	-0.3	-3.5%	A	A							

Node	Intersection	Movement	Delay (Seconds)				LOS		V/C		95% Queue Length				
			Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Storage Space	Build	No-Build	Difference Absolute	Difference %
17	Dillard Street at Main Street[2]	EBL	11.7	11.3	0.4	3.5%	B	B	0.14	0.10	100	28	21	7	33.3%
		EBT	14.1	14.2	-0.1	-0.7%	B	B	0.44	0.45	365	147	150	-3	-2.0%
		EBR	3.7	2.6	1.1	42.3%	A	A	0.08	0.05	100	16	11	5	45.5%
		WBL	10.7	10.8	-0.1	-0.9%	B	B	0.06	0.07	555	15	17	-2	-11.8%
		WBTR	13.4	13.9	-0.5	-3.6%	B	B	0.46	0.49	555	144	156	-12	-7.7%
		NBL	10.8	9.6	1.2	12.5%	B	A	0.29	0.21	147	61	48	13	27.1%
		NBTR	7.6	6.6	1.0	15.2%	A	A	0.26	0.22	396	69	56	13	23.2%
		SBL	8.0	8.5	-0.5	-5.9%	A	A	0.32	0.33	385	66	74	-8	-10.8%
		SBTR	2.8	2.8	0.0	0.0%	A	A	0.28	0.21	385	18	21	-3	-14.3%
		Overall	9.9	10.3	-0.4	-3.9%	A	B							

1 - NCDOT Traffic Impact Criteria is applied

2 - City of Durham Traffic Impact Criteria is applied

Indicates Traffic Impact

Indicates Traffic Impact below Mid-D

Build Max Queue length exceeds No-Build and Storage Space by more than 10 feet

7.1 Analysis of LOS Thresholds in Primary Study Area

Each of the two 2040 Build LRT Options were compared to the respective No-Build scenario at each intersection by overall and individual movement levels. While the LRT is at-grade between Case Street and east of Swift Avenue for Build Option 1 and the LRT is elevated in this section for Build LRT Option 2, both options have a consistent LRT alignment and roadway configuration east of Buchanan Boulevard. Therefore, any MOE differences between the two build options at locations east of Buchanan Boulevard would be due to the change in the LRV travel times. Under LRT Option 2, the LRV would operate at a higher speed along the elevated track section near Swift Avenue, which would cause the train to arrive at the various at-grade intersections at different phases compared to Option 1. As the train generally maintains a consistent travel time, the signal preemption events would occur during the same signal phase at intersections using fixed time signal operations. For the purposes of the traffic impact analysis, the worst LOS, highest delay, and longest maximum queue length among both build options has been selected for discussion below.

The following section discusses the intersections where LRT impacts have been identified. The identified impacts are discussed below in regards to the NCDOT thresholds.

7.1.1 Main Street at 9th Street

The NCDOT traffic impact criteria are applied to the intersection of Main Street and 9th Street as Main Street is under NCDOT jurisdiction. The two Build LRT Options report different delays, LOS, and queue lengths at this intersection. For the 2040 LRT At-Grade Swift Avenue Option 1, the overall intersection delay at Main Street and 9th Street exceeds the NCDOT thresholds in the PM peak hour by experiencing LOS degradation. The 2040 LRT Elevated Swift Avenue Option 2 reports that the overall intersection delays meet NCDOT criteria in both AM and PM peak hours. Similarly, all of the individual intersection movements are expected to meet the NCDOT thresholds in the AM peak hour for both LRT options; however, in the PM peak hour LRT Option 1 reports multiple movements that exceed NCDOT LOS thresholds while Option 2 does not report any movements that would exceed LOS or delay impact criteria.

In the PM peak hour, LRT Option 1 reports that five individual movements are expected to operate with degraded LOS of middle D or worse including the eastbound Main Street right turn, the eastbound Main Street through movement, the southbound 9th Street left turn, the southbound 9th Street right turn, and the southbound 9th Street through movement.

For the 2040 LRT At-Grade Swift Avenue Option 1, the maximum queue length for the following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Northbound 9th Street left turn exceeds storage space by 131 feet in AM and 149 feet in PM
- Northbound 9th Street right turn exceeds the shared through/right lane storage space by 107 feet in AM and 125 feet in PM
- Northbound 9th Street through movement exceeds the shared through/right lane storage space by 131 AM and 149 feet in PM
- Southbound 9th Street left turn exceeds storage space by 184 feet in AM and 279 feet in PM

- Southbound 9th Street right turn exceeds the shared through/right lane storage space by 154 in AM and 250 feet in PM
- Southbound 9th Street through movement exceeds the shared through/right lane storage space by 184 feet in AM and 279 feet in PM
- Westbound Main Street left turn exceeds storage space by 36 feet in AM
- Westbound Main Street right turn exceeds the shared through/right lane storage space by 65 feet in AM only
- Westbound Main Street through movement exceeds the shared through/right lane storage space by 87 feet in AM only

Under the LRT At-Grade Swift Avenue Option 1, the southbound 9th Street approach would be impacted due to the traffic detoured from the closed section of Pettigrew Street. Due to significant right-of-way constraints including the NCRR corridor to the south, there are no practical geometric mitigations that could resolve the movement delay and maximum queue impacts for Option 1.

For the 2040 LRT Elevated Swift Avenue Option 2, there are no queue impacts at the intersection of Main Street and 9th Street in the AM and PM peak hours.

7.1.2 Main Street at Iredell Street

The NCDOT traffic impact criteria are applied to the intersection of Main Street and Iredell Street, as Main Street is under NCDOT jurisdiction. For both 2040 Build LRT Options, the overall intersection delays at Main Street and Iredell Street meet the NCDOT thresholds in both AM and PM peak hours. All movements are expected to meet the NCDOT thresholds as well in both LRT options and peak hours.

The two Build LRT Options report different delays, LOS, and queue lengths at this intersection.

For the 2040 LRT At-Grade Swift Avenue Option 1, the maximum queue length for the following movements will exceed both their available storage space and their AM peak hour No-Build maximum queue length by more than 10 feet:

- Eastbound Main Street left turn exceeds storage space by 108 feet in AM
- Westbound Main Street right turn exceeds the shared through/right lane storage space by 26 feet in AM
- Westbound Main Street through movement exceeds the shared through/right lane storage space by 26 feet in AM

In AM peak hour under Option 1, the maximum queues along the eastbound and westbound movements would increase due to the diverted traffic from the Pettigrew Street closure between Case Street and Swift Avenue. The average queues are within the available storage space, except for the westbound Main Street left turn. Due to significant right-of-way constraints including the NCRR corridor to the south, there are no practical geometric mitigations that could resolve the movement delay and maximum queue impacts for Option 1.

For the LRT Option 2, Pettigrew Street is open between Case Street and east of Swift Avenue, and therefore all movements' maximum queues are expected to meet the NCDOT thresholds in both AM and PM peak hours.

7.1.3 Main Street at Broad Street

The NCDOT traffic impact criteria are applied to the intersection of Main Street and Broad Street, as Main Street is under NCDOT jurisdiction. For both 2040 LRT Options, the overall intersection delays at Main Street and Broad Street meet the NCDOT thresholds in both AM and PM peak hours.

The two Build LRT Options report different delays, LOS, and queue lengths at this intersection. Under the LRT At-Grade Swift Avenue Option 1, several individual movements are expected to operate with degraded LOS of middle D or worse including the eastbound Main Street left turn in the AM and PM peak hours, the westbound Main Street left turn in the AM and PM peak hours, the westbound Main Street right turn in the AM peak hour only, and the westbound Main Street through movement in the AM and PM peak hours. For Option 2, the following movements reported a degraded LOS: the eastbound Main Street left turn during the AM peak hour only and the northbound Broad Street left turn in the PM peak hour only.

In the AM peak hour under Option 1, the delays for the eastbound left and westbound left and through movements would increase due to the detoured traffic from a closed Pettigrew Street between Case Street and east of Swift Avenue. In the PM peak hour under Option 1, the delay has increased for eastbound and westbound Main Street left turns due to the same traffic diversions expected in the AM.

In the AM peak hour under Option 2, although the eastbound Main Street left turn LOS degrades, this movement's volume is forecasted to be less than 15 vehicles per hour. During the PM peak hour under Option 2, the northbound Broad Street left turn movement would experience an LOS degradation as a result of signal timing changes that were made to favor the east/west coordination of streets along the LRT project, which has an east/west alignment in Downtown Durham. The signal offset or phase times could potentially be modified to alleviate the northbound left movement degradation, however, these changes would potentially cause more significant impacts to the adjacent intersections. Overall, this intersection operates slightly better under Option 2 when compared to the No-Build PM due to signal timing modifications.

For the 2040 LRT At-Grade Swift Avenue Option 1, the maximum queue length for the following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Westbound Main Street left turn exceeds storage space by 265 feet in AM and by 264 feet in PM
- Westbound Main Street right turn exceeds the shared through/right lane storage space by 16 feet in AM
- Westbound Main Street through movement exceeds the shared through/right lane storage space by 97 feet in AM

Under the 2040 LRT Elevated Swift Avenue Option 2, only the northbound Broad Street right turn would experience a maximum queue length that would exceed the storage space and No-Build maximum queue space, with a maximum queue in excess of the available storage space by 42 feet in the AM peak hour only. However, this maximum queue is considered a very rare occurrence as the average queue for this movement is only 2 feet. For the LRT Option 2, Pettigrew Street is open between Case Street and east of Swift Avenue, and therefore the majority of vehicular movements are expected to meet the NCDOT thresholds in both AM and PM peak hours.

7.1.4 Pettigrew Street at 9th Street

The NCDOT traffic impact criteria are applied to the unsignalized intersection of Pettigrew Street and 9th Street, as this section of 9th Street is under NCDOT jurisdiction. For both 2040 LRT Build Options, the overall intersection delays at Pettigrew Street and 9th Street meet the NCDOT thresholds in the AM peak hour. However, under the PM peak hour in Option 1, the overall intersection experiences an increase in delay greater than 25% thereby exceeding NCDOT criteria. During the PM peak hour, Option 2 meets the NCDOT criteria for overall intersection delay.

The two Build LRT Options report different delays, LOS, and queue lengths at this intersection. Under the LRT At-Grade Swift Avenue Option 1, two individual movements are expected to operate with degraded LOS of middle D or worse including the westbound Pettigrew Street left turn in the PM peak hour and the westbound Pettigrew Street right turn in the PM peak hour. For Option 2, all movements meet the NCDOT delay and LOS criteria for both AM and PM peak hours.

For the 2040 LRT At-Grade Swift Avenue Option 1, the maximum queue length for the following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Westbound Pettigrew Street left turn exceeds the shared left/right turn lane storage space by 138 feet in PM
- Westbound Main Street right turn exceeds the shared left/right lane storage space by 138 feet in PM

In PM peak hour under Option 1, both delays and the maximum queues are expected to increase beyond NCDOT thresholds for the westbound approach due to the detoured traffic. These westbound movements have relatively low forecast volumes with 87 vehicles per hour expected for the westbound Pettigrew Street left turn and only 15 vehicles per hour expected for the westbound right turn. Due to significant right-of-way constraints including the NCRR corridor to the north, there are no practical geometric mitigations that could resolve the movement delay and maximum queue impacts for Option 1.This location is also physically constrained by the NCRR bridge over Erwin Road/9th Street.

For the 2040 LRT Elevated Swift Avenue Option 2, there are no maximum queue length impacts expected at any movement.

7.1.5 Pettigrew Street at Swift Avenue

The NCDOT traffic impact criteria are applied to the unsignalized intersection of Pettigrew Street and Swift Avenue, as this section of Swift Avenue is under NCDOT jurisdiction. In 2040 LRT Option 1, due to the closure of Pettigrew Street between Case Street and east of Swift Avenue, only the northbound and southbound Swift Avenue through movements are allowed. The LRT crossing at Swift Avenue would be controlled by gates. For LRT Option 2, the LRT is elevated and the intersection would remain the same as the No-Build Conditions.

For 2040 LRT At-Grade Swift Avenue Option 1, the overall intersection delay at Pettigrew Street and Swift Avenue exceeds the NCDOT thresholds in the AM peak hour. The additional delay experienced is partially caused by the LRT crossing, and added congestion at the intersection of Main Street and Broad Street to the north caused by the detoured traffic from the Pettigrew Street closure.

The 2040 LRT Option 2 meets the NCDOT criteria for overall intersection and all individual movement delays in both AM and PM peak hours.

In 2040 LRT Option 1 during the AM peak hour, the Vissim model indicates the northbound through movement will degrade LOS.

For the 2040 LRT At-Grade Swift Avenue Option 1, the maximum queue length for the following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Northbound Swift Avenue through movement exceeds storage space by 408 feet in AM
- Southbound Swift Avenue through movement exceeds storage space by 64 feet in AM

The queuing and delays experienced in Option 1 are primarily due to the increased congestion at the intersection of Main Street and Broad Street to the north. Due to the right-of-way constraints and adjacent NCRR corridor, there are no practical mitigations to reduce delays and queues for the northbound and southbound Swift Avenue approaches.

In Build Option 2 due to elevated LRT tracks, there are no traffic impacts in either peak hour.

7.1.6 Main Street at Buchanan Boulevard

The NCDOT traffic impact criteria are applied to the intersection of Main Street and Buchanan Boulevard, as Main Street is under NCDOT jurisdiction. The alignment and roadway configurations for LRT At-Grade Swift Avenue Option 1 and LRT Elevated Swift Avenue Option 2 are consistent at this intersection. For both 2040 LRT Options, the overall intersection delays at Main Street and Buchanan Boulevard meet the NCDOT thresholds in both AM and PM peak. None of the movements experience delay or LOS impacts in either LRT Option.

For both 2040 LRT Options during the AM and PM peak hours, the southbound Buchanan Boulevard right turn maximum queue exceeds the available storage space. For both Build Options, the maximum queue length exceeds the right turn bay storage space by 60 feet in the AM and 161 feet in the PM peak hour, but the maximum queue is contained within the southbound approach and would not reach the upstream intersection. Additionally, average queue lengths are well below the available storage length for both peak hours under both options with an average length of 5 feet in the AM and 9 feet in the PM peak hour. The Build Options' maximum queue exceeds the respective No-Build movement by only 14 feet in the AM and 36 feet in the PM peak hour

7.1.7 Memorial Street at Duke Street

The NCDOT traffic impact criteria are applied to the intersection of Memorial Street and Duke Street, as Duke Street is under NCDOT jurisdiction. The alignment and roadway configurations for LRT At-Grade Swift Avenue Option 1 and LRT Elevated Swift Avenue Option 2 are consistent at this intersection. For both 2040 LRT options, there are no overall intersection or movement delay impacts at Memorial Street and Duke Street.

For both 2040 LRT options, the maximum queue length for the following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Eastbound Memorial Street left turn exceeds the storage space by 31 feet in PM only
- Northbound Duke Street left turn exceeds storage space by 54 feet in AM only
- Northbound Duke Street through movement to the northbound left turn bay at Peabody Street exceeds storage space by 96 feet in AM peak and 130 feet in PM
- Northbound Duke Street through movement exceeds storage space by 148 feet in AM peak and 188 feet in PM

The average queue lengths for the movements above are all expected to be 30 feet or less, which are well below the available storage length for both peak hours in both Build options. There are no practical mitigations due to right-of-way constraints and proximity of the adjacent signalized intersections.

7.1.8 Chapel Hill Street at Duke Street

The NCDOT traffic impact criteria are applied to the intersection of Chapel Hill Street and Duke Street, as both roadways are under NCDOT jurisdiction. The alignment and roadway configurations for LRT At-Grade Swift Avenue Option 1 and LRT Elevated Swift Avenue Option 2 are consistent at this intersection. For both 2040 LRT options, there are no overall intersection or movement delay impacts at Chapel Hill Street and Duke Street.

For both 2040 LRT options, the maximum queue lengths are generally consistent between alternatives. The following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Eastbound Chapel Hill Street left turn exceeds the left turn bay storage space by 106 feet for in AM only, however, the movement maximum queue length will be contained by the eastbound approach
- Northbound Duke Street left turn exceeds the shared left/through lane storage space by 127 feet in PM only
- Northbound Duke Street right turn exceeds storage space by 108 feet in PM only
- Northbound Duke Street through movement exceeds the shared left/through lane storage space by 127 feet in PM only
- Westbound Chapel Hill Street right turn exceeds the shared through/right turn lane storage space by 103 feet in AM only
- Westbound Chapel Hill Street through movement exceeds the shared through/right turn lane storage space by 133 feet in AM only

The maximum queue length events are considered to occur infrequently and the average queue lengths are well below the available storage length for both peak hours in both scenarios, and there are no practical mitigations due to right-of-way constraints and proximity of the adjacent signalized intersections.

7.1.9 Chapel Hill Street at Willard Street

The NCDOT traffic impact criteria are applied to the intersection of Chapel Hill Street and Willard Street, as Chapel Hill Street is under NCDOT jurisdiction. The alignment and roadway configurations for LRT At-Grade Swift Avenue Option 1 and LRT Elevated Swift Avenue Option 2 are consistent at this intersection. For both 2040 LRT Options, the overall intersection delays at Chapel Hill Street and Willard Street meet the NCDOT thresholds in both the AM and PM peak hours.

Under both LRT Options, several movements are expected to operate with degraded LOS of middle D or worse including the northbound Willard Street left turn in the PM peak hour and the northbound Willard Street right turn in the PM peak hour.

For both 2040 LRT Options, the maximum queue lengths are generally consistent. The following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Eastbound Chapel Hill Street right turn exceeds the shared through/right lane storage space by 65 feet in AM and by 29 feet in PM
- Eastbound Chapel Hill Street through movement exceeds the shared through/right lane storage space by 65 feet in AM and 29 feet in PM

For both 2040 Build Options during the AM peak hour, the eastbound maximum queue length would extend longer than the available storage space. However the average queue lengths are well below the storage length.

7.1.10 Pettigrew Street at Chapel Hill Street

The NCDOT traffic impact criteria are applied to the intersection of Pettigrew Street and Chapel Hill Street, as Chapel Hill Street is under NCDOT jurisdiction. The alignment and roadway configurations for LRT At-Grade Swift Avenue Option 1 and LRT Elevated Swift Avenue Option 2 are consistent at this intersection. For both 2040 LRT Options, the overall intersection delays at Pettigrew Street and Chapel Hill Street meet the NCDOT thresholds in both the AM and PM peak hours. Under both LRT options, Pettigrew Street would be converted to one-way eastbound operation for vehicular traffic between Chapel Hill Street and Dillard Street. Although the removal of the westbound Pettigrew Street approach would eliminate vehicular conflicts with the north and southbound Chapel Hill Street movements, the traffic signal will be maintained to provide for the safe crossing of pedestrians across Chapel Hill Street.

For both LRT options in both peak hours, the overall intersection and all movement delays and LOS at Pettigrew Street and Chapel Hill Street meet the NCDOT thresholds.

For both 2040 LRT scenarios, the maximum queue lengths are generally consistent. The following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Eastbound Chapel Hill Street right turn exceeds the shared through/right lane storage space by 78 feet in AM and 72 feet in PM
- Eastbound Chapel Hill Street through movement exceeds the shared through/right lane storage space by 95 feet in AM and 89 feet in PM
- Westbound Chapel Hill Street left turn exceeds storage space by 70 feet in AM and 78 feet in PM
- Westbound Chapel Hill Street through movement exceeds storage space by 17 feet in AM and 25 feet in PM

The maximum queue lengths along eastbound and westbound Chapel Hill Street approaches have increased due to detoured westbound traffic from Pettigrew Street. However, the average queues are well below the available storage lengths for these affected movements.

7.1.11 Pettigrew Street at Blackwell Street

The City of Durham traffic impact criteria are applied to the intersection of Pettigrew Street and Blackwell Street, as both roadways are under city jurisdiction. The alignment and roadway configurations for LRT At-Grade Swift Avenue Option 1 and LRT Elevated Swift Avenue Option 2 are consistent at this intersection. Under both LRT options, Pettigrew Street would be converted to one-way eastbound operation for vehicular traffic between Chapel Hill Street and Dillard Street. For both 2040 LRT options, the LRT crosses Blackwell Street at the north side of the intersection of Pettigrew Street and Blackwell Street.

For both 2040 LRT Options, the overall intersection and individual movement delays at Pettigrew Street and Blackwell Street meet the City of Durham thresholds in both the AM and PM peak hours.

For both 2040 LRT Options, the maximum queue lengths are generally consistent. The following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Eastbound Pettigrew Street left turn exceeds the shared left/through/right lane storage space by 103 feet in AM and 113 feet in PM for both Options
- Southbound Blackwell Street left turn exceeds storage space by 66 feet in PM only
- Southbound Blackwell Street through movement exceeds storage space by 66 feet in PM only

The maximum queue lengths at this intersection are primarily due to the LRT signal preemption events. However, the average queue lengths are well below the storage length. The LRT crossing of Blackwell Street does not cause significant impacts to this intersection.

7.1.12 Main Street at Corcoran Street

The City of Durham traffic impact criteria are applied to the intersection of Main Street and Corcoran Street, as both roadways are under city jurisdiction. The alignment and roadway configurations for LRT At-Grade Swift Avenue Option 1 and LRT Elevated Swift Avenue Option 2 are consistent at this intersection. Under both LRT options, Pettigrew Street would be converted to one-way eastbound operation for vehicular traffic between Chapel Hill Street and Dillard Street. For both 2040 LRT options, the LRT crosses Blackwell Street at the north side of the intersection of Pettigrew Street and Blackwell Street, which is located to the south of Main Street and Corcoran Street.

For both 2040 LRT options, the overall intersection and individual movement delays at Main Street and Corcoran Street meet the City of Durham thresholds in both the AM and PM peak hours.

For both 2040 LRT options, the maximum queue lengths are generally consistent between options. The following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Eastbound Main Street left turn exceeds the shared left/through/right lane storage space by 167 feet in AM only
- Eastbound Main Street right turn exceeds the shared left/through/right lane storage space by 151 feet in AM only
- Eastbound Main Street through movement exceeds the shared left/through/right lane storage space by 167 feet in AM only

The increased maximum queue lengths at this intersection are primarily due to the LRT signal preemption events occurring two intersections to the south at Pettigrew Street. However, the average queue lengths are well below the available storage length. Additionally, the Build maximum queues are expected to be slightly longer than the No-Build maximum queue length by 24 feet for all three of the impacted eastbound Main Street movements.

7.1.13 Main Street at Mangum Street

The NCDOT traffic impact criteria are applied to the intersection of Main Street and Mangum Street, as Mangum Street is under NCDOT jurisdiction. The alignment and roadway configurations for LRT At-Grade Swift Avenue Option 1 and LRT Elevated Swift Avenue Option 2 are consistent at this intersection. For both 2040 LRT Options, the overall intersection delay at Main Street and Mangum Street exceeds the NCDOT thresholds in the PM peak hour by experiencing degradation of LOS. The LRV travel times have an impact at this intersection due to the poor operations expected in the No-Build PM peak hour. Therefore, due to alignment differences at Swift Avenue there are MOE variations between Build Option 1 and Build Option 2.

Under the LRT At-Grade Swift Avenue Option 1, several individual movements are expected to operate with degraded LOS of middle D or worse including the eastbound Main Street through movement in the AM peak hour, the southbound Mangum Street left turn in the PM peak hour, the southbound Mangum Street through movement in the PM peak hour, and the westbound Main Street through movement in the PM peak hour. For Option 1, the eastbound Main Street right turn movement will maintain its LOS but experiences an increase in delay greater than 25% thereby exceeding NCDOT criteria.

For Build Option 2, the following movements are expected to operate with a degraded LOS of middle D or worse: the eastbound Main Street right turn in the AM peak hour only, the southbound Mangum Street left turn in the PM peak hour only, and the southbound Mangum Street through movement in the PM peak hour only.

For both 2040 LRT options, the maximum queue lengths are generally consistent. The following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Eastbound Main Street right turn exceeds the shared through/right lane storage space by 65 feet in AM and by 79 feet in PM
- Eastbound Main Street through movement exceeds the shared through/right lane storage space by 83 feet in AM and by 97 feet in PM
- Southbound Mangum Street left turn exceeds the shared left/through lane storage space by 367 feet in AM and 374 feet in PM
- Southbound Mangum Street right turn exceeds the storage space by 348 feet in AM and 355 feet in PM
- Southbound Mangum Street right turn exceeds the shared left/through storage space by 367 feet in AM and by 374 feet in PM

The maximum queue lengths along eastbound Main Street and Southbound Chapel Hill Street approaches would increase due to detoured westbound traffic from Pettigrew Street and LRT signal preemption activities occurring to the south. The average queue lengths for the eastbound Main Street are contained within the available storage space; however, the southbound average queues will also exceed the storage

space and extend beyond the upstream signalized intersection of Parrish Street and Mangum Street. Compared to the No-Build PM, the Build PM maximum queue lengths are only 30 feet longer. Due to right-of-way constraints and the close proximity of adjacent signalized intersections, the only practical mitigation would require the removal of parking along the western curbface of Mangum Street between Parrish Street and Ramseur Street to provide a third southbound through lane. With approval from the City of Durham, this mitigation can be analyzed during the Engineering phase of the project.

7.1.14 Pettigrew Street at Magnum Street

The NCDOT traffic impact criteria are applied to the intersection of Pettigrew Street and Mangum Street, as Mangum Street is under NCDOT jurisdiction. The alignment and roadway configurations for LRT At-Grade Swift Avenue Option 1 and LRT Elevated Swift Avenue Option 2 are consistent at this intersection. Under both LRT options, Pettigrew Street would be converted to one-way eastbound operation for vehicular traffic between Chapel Hill Street and Dillard Street. For both 2040 Build Conditions, the LRT crosses Magnum Street at the north side of the intersection with Pettigrew Street.

For both 2040 LRT options during both peak hours, the overall intersection delays and all vehicular movements meet the NCDOT thresholds in both AM and PM peak hours.

For both 2040 LRT options, the maximum queue lengths are generally consistent. The following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Southbound Mangum Street left turn exceeds the shared left/through lane storage space by 22 feet in AM and by 44 feet in PM
- Southbound Mangum Street through movement exceeds the shared left/through lane storage space by 22 feet in AM and by 44 feet in PM

For both 2040 LRT options during both peak hours, the maximum queue length along southbound approach would be increased due to the extra delay caused by the LRT signal preemption events. However, the average queue length is well below the storage length. The overall intersection operates at LOS A in both peak hours under both LRT Alternatives due to the reduced conflicts from the westbound Pettigrew Street closure.

7.1.15 Pettigrew Street at Dillard Street

The City of Durham traffic impact criteria are applied to the intersection of Pettigrew Street and Dillard Street, as both roadways are under city jurisdiction. The alignment and roadway configurations for LRT At-Grade Swift Avenue Option 1 and LRT Elevated Swift Avenue Option 2 are consistent at this intersection. Under both LRT options, Pettigrew Street would be converted to one-way eastbound operation for vehicular traffic between Chapel Hill Street and Dillard Street. For both 2040 LRT options, the LRT crosses Dillard Street at the north side of the intersection with Pettigrew Street.

For both 2040 LRT options, the overall intersection and all vehicular movements meet the City of Durham LOS thresholds in both AM and PM peak hours.

For both 2040 LRT options, the maximum queue lengths are generally consistent. The following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Eastbound Pettigrew Street left turn exceeds storage space by 62 feet in PM only
- Southbound Dillard Street left turn exceeds storage space by 28 feet in PM only
- Southbound Dillard Street through movement exceeds storage space 28 feet in PM only

In the PM peak hour, the maximum queue length along the southbound Dillard Street approach would be increased due to the extra delay caused by the LRT crossing. However the average queue lengths are well below the storage length. The eastbound Pettigrew Street left turn maximum queue would be contained within the eastbound approach storage space and would not spill back to the upstream intersection.

7.1.16 Pettigrew Street at Fayetteville Street

The NCDOT traffic impact criteria are applied to the intersection of Pettigrew Street and Fayetteville Street, as Fayetteville Street is under NCDOT jurisdiction. Under both LRT options, Pettigrew Street would be converted to one-way eastbound operation for vehicular traffic between Chapel Hill Street and Dillard Street. For both 2040 Build Options, the LRT crosses Fayetteville Street at the north side of the intersection with Pettigrew Street. For both 2040 LRT options during both peak hours, the overall intersection delays meet the NCDOT thresholds in both AM and PM peak hours.

Under the LRT Option 1, the southbound Fayetteville left turn, through movement and right turn all experience degradation of LOS in the PM peak hour. For Option 1, the eastbound Pettigrew Street left turn would also experience an increase in delay greater than 25%; however, this movement's demand is only 5 vehicles per hour.

For LRT Option 2, the southbound Fayetteville left turn and right turn would experience degradation of LOS in the PM peak hour.

For both 2040 LRT Options, the maximum queue length for the following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Northbound Fayetteville Street left turn exceeds storage space by 68 feet in PM only
- Northbound Fayetteville Street right turn exceeds the shared through/right storage space by 63 feet in PM only
- Northbound Fayetteville Street through movement exceeds the shared through/right storage space by 68 feet in PM only
- Southbound Fayetteville Street left turn exceeds storage space by 159 feet in the PM only; however the maximum queue would be contained by the southbound approach
- Westbound Pettigrew Street left turn exceeds storage space by 114 feet in AM; however, the maximum queue length would be contained by the eastbound approach

The eastbound Pettigrew Street left turn and southbound Fayetteville Street right turn are impacted in the PM peak hour under Option 1 only, however, the volume for both of these movements are 5 and 2 vehicles per hour, respectively. During the PM peak hour for both LRT options, the maximum queue lengths would be increased on the northbound and southbound approaches. However the average queue lengths are well below the storage length.

7.1.17 Jackie Robinson Drive at Fayetteville Street

The NCDOT traffic impact criteria are applied to the intersection of Jackie Robinson Drive and Fayetteville Street, as both roadways are under NCDOT jurisdiction.

For both 2040 LRT options during both peak hours, the overall intersection delays and all vehicular movements meet the NCDOT thresholds in both AM and PM peak hours.

For both 2040 LRT options, the maximum queue lengths are generally consistent. The following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Northbound Fayetteville Street left turn exceeds storage space by 98 feet in PM only
- Northbound Fayetteville Street through movement exceeds storage space by 95 feet in PM only

In the PM peak hour, the maximum queue length along the northbound Fayetteville Street approach would be increased due to the extra delay caused by the LRT crossing to the north and the close proximity of signalized intersections. However the average queue lengths for these impacted movements are well below the storage length.

7.1.18 Morehead Avenue at Fayetteville Street

The NCDOT traffic impact criteria are applied to the intersection of Morehead Avenue and Fayetteville Street, as both roadways are under NCDOT jurisdiction. The alignment and roadway configurations for LRT At-Grade Swift Avenue Option 1 and LRT Elevated Swift Avenue Option 2 are consistent at this intersection. For both 2040 LRT options, the overall intersection delays and individual movements at Morehead Avenue and Fayetteville Street meet the NCDOT thresholds in both the AM and PM peak hours.

The maximum queue length for the southbound Fayetteville Street through movement is expected to exceed the available storage space by 85 feet in the PM peak hour only under both LRT options. However, the maximum queue events are infrequent, and the average queue length is well below the available storage space.

7.1.19 Pettigrew Street at Grant Street

The City of Durham traffic impact criteria are applied to the intersection of Pettigrew Street and Grant Street, as both roadways are under city jurisdiction. The alignment and roadway configurations for LRT At-Grade Swift Avenue Option 1 and LRT Elevated Swift Avenue Option 2 are consistent at this intersection. For both 2040 LRT options, the LRT crosses Grant Street at the north side of the intersection with Pettigrew Street.

For both 2040 LRT options, the overall intersection and individual movement delays meet the City of Durham thresholds in both AM and PM peak. The LRT crossing does not bring significant impacts to the intersection, as the overall intersection maintains LOS B in both future LRT options.

For both 2040 LRT options, the maximum queue lengths are generally consistent. The following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Southbound Grant Street left turn exceeds the shared left/through/right storage space by 50 feet in PM only

- Southbound Grant Street right turn exceeds the shared left/through/right storage space by 50 feet in PM only
- Southbound Grant Street through movement exceeds the shared left/through/right storage space by 50 feet in PM only
- Westbound Pettigrew Street left turn exceeds the storage space by 137 feet in PM only
- Westbound Pettigrew Street right turn exceeds the shared through/right lane storage space by 110 feet in the AM only
- Westbound Pettigrew Street through movement exceeds the shared through/ right lane storage space by 112 feet in the AM only

During the AM peak, the westbound maximum queue lengths would be increased due to volume increase along that approach. During the PM peak, the southbound maximum queue lengths would be extended due to the delays caused by the LRT crossing. However, for both approaches the average queues are well below the storage length.

7.1.20 Alston Avenue at Gann Street

The NCDOT traffic impact criteria are applied to the intersection of Alston Avenue and Gann Street, as Alston Avenue is under NCDOT jurisdiction.

For both 2040 LRT options during both peak hours, the overall intersection and all vehicular movement delays meet the NCDOT thresholds in both AM and PM peak hours.

For both 2040 LRT options, the maximum queue lengths are generally consistent. The following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Northbound Alston Avenue left turn exceeds the storage space by 114 feet in PM only
- Southbound Alston Avenue right turn exceeds storage space by 360 feet in PM only

During the PM peak hour for both LRT options, the maximum queue lengths would be increased on the northbound and southbound approaches. However, the average queue lengths are well below the storage lengths. Additionally, the northbound and southbound Alston Avenue left turns' maximum queue lengths would be contained by the northbound and southbound approaches storage space, respectively, which would avoid blocking of the upstream intersections.

7.2 Analysis of LOS Thresholds in Secondary Study Area

Based on the secondary study 2040 Synchro models, all intersections that lie outside of the primary LRT corridor that may be affected by the detoured westbound Pettigrew Street traffic are expected to operate at LOS E or better which meets the threshold set forth by the City of Durham. In addition, after optimizing the signal timing, the delays would be reduced at many intersections. Most overall intersections operate at delays of LOS C or better under the LRT options.

There are three lane groups that would experience minor traffic impacts. The only movement expected to experience an impact in delay would be the northbound Roxboro Street shared left/through/right lane at the intersection of Main Street and Roxboro Street during the PM peak hour. This lane group reports a Build condition increase in delay greater than 25% when compared to the No-Build, however, the resulting delay is barely over 45 seconds with an exact value of 45.6 seconds of delay in the PM peak hour.

The following lane groups 95% queue length will exceed both their available storage space and their respective peak hour No-Build 95% queue length by more than 10 feet:

- At the intersection of Chapel Hill Street/Main Street and Morris Street, the southbound Main Street shared left/through lane exceeds the storage space by 23 feet in the AM only
- At the intersection of Morgan Street and Rigsbee Avenue, the northbound Rigsbee Avenue shared left/through lane exceeds the storage space by 30 feet in the AM only
- At the intersection of Main Street and Roxboro Street, the northbound Roxboro Street shared left/through/right lane group by 34 feet in the PM only

The future build traffic impacts expected in the secondary study area do not represent a significant difference in operations from the No-Build conditions. The single lane group that would report a delay increase of 25% would still have a delay just barely over 45 seconds and would maintain the same LOS D in the No-Build scenario. For the three lane groups that would experience 95% queue lengths in excess of their storage space the corresponding No-Build 95% queue lengths, the excess queue length would be less than 35 feet.

8. Conclusions/Recommendations

When comparing the Build options to the No-Build Alternative, it was observed that although the LRT at-grade crossings may cause extra delay to the north/south aligned streets, generally the future roadway capacities are sufficient to accommodate the additional delays under the future LRT Build conditions. The additional LRT delays were also mitigated by the reduced number of conflicts at the intersections where Pettigrew Street would be converted to a one-way eastbound operation.

Under the 2040 LRT At-Grade Swift Avenue Option 1, traffic impacts were observed in the area bounded by Main Street, Pettigrew Street, 9th Street and Broad Street. As this subarea is composed of short blocks arranged in a grid network that would already experience significant congestion under No-Build Conditions, several movements would be impacted significantly in Option 1. These traffic impacts are due to the at-grade crossing of the LRT at Broad Street/Swift Avenue which causes additional delays to the north/south running streets. The closure of Pettigrew Street between Case Street and east of Swift Avenue requires traffic to be rerouted to these already congested roadways to reach their destinations. In Option 2, when the LRT is elevated and Pettigrew Street is open between Case Street and east of Swift Avenue, most of these impacts would be removed. At Main Street and Broad Street under Option 2, the northbound Broad Street left turn would experience a degradation of LOS from D to E due to network signal timing changes.

In the downtown area east of Swift Avenue for both Build Options, all intersections would operate in accordance with applicable level of service thresholds with the exception of the following locations:

- Mangum Street and Main Street would experience an overall LOS degradation in the PM peak hour by worsening from LOS D to E.
- Pettigrew Street & Fayetteville Street would meet the overall delay/LOS intersection criteria, however, two movements would experience degradation of LOS in the PM peak hour with the southbound Pettigrew Street left and through movements both worsening from LOS C to E.
- Chapel Hill Street &Willard Street, which is an unsignalized intersection, would meet the overall/delay LOS intersection criteria; however, the stop-controlled Willard Street approach would degrade from LOS E to LOS F in the PM peak hour.

All three intersections would experience LOS impacts due to LRV signal preemption events and the network signal timing changes aimed at providing better east/west progression for the LRT. Mangum Street and Main Street is expected to operate at a high LOS D in the No-Build PM peak hour, and with preemption events the overall delay increases to LOS E. If the loss of parking along Mangum Street is deemed acceptable, a third southbound Mangum Street travel lane could be tested during the Engineering phase of the project to determine if traffic impacts would be mitigated at Mangum Street and Main Street.

The LOS movement impacts at Pettigrew Street and Fayetteville cannot be practically mitigated with roadway modifications due to right-of-way constraints and the location of the NCRR corridor that crosses the southbound approach upstream of the stop bar.

Due to preemption events, there are fewer acceptable gaps for vehicles on the stop-controlled Willard Street approach at Chapel Hill Street. The signalization of Willard Street and Chapel Hill Street was

discussed with the City of Durham. However, due to the proximity of signals along Chapel Hill Street at Duke Street and Pettigrew Street, the city requested that the intersection remain stop-controlled.

Maximum queues would exceed available storage in several locations; however this is an infrequent occurrence and additional roadway modifications are not recommended at these locations due to the limited operational benefits that would require large capital expenditures via impractical right-of-way acquisitions and the reconstruction of bridges. Many of the turn bay maximum queues would also be contained within their overall approaches' storage space and therefore would not impact upstream intersections.

The expected average queues would be accommodated by the available storage at all locations except the southbound approach of Main Street at Mangum Street. The addition of a third southbound travel lane can be studied during the Engineering phase of the project if the City of Durham were to allow the existing parking lane to be rededicated as a travel lane.

D-O LRT: Downtown Durham Traffic Simulation Report Appendices