



TOWN OF CARRBORO
NORTH CAROLINA

TRANSMITTAL

PLANNING DEPARTMENT

DELIVERED VIA: *HAND* *MAIL* *FAX* *EMAIL*

To: David Andrews, Town Manager
Mayor and Town Council

From: Zachary Hallock, Transportation Planner

Date: March 10, 2020

Subject: Summary of East Main Street Operational Analysis

Overview

This staff report is a summary of the East Main Street Operational Analysis memo, which was developed by the engineering firm Stantec to assess traffic conditions along the corridor (as associated with the conceptual restriping plan). This was submitted to NCDOT Division 7 for review and approval. There are three key parts to this analysis: volume development, traffic safety, and synchro analysis. A map of the project study area is below:



Volume development primarily focuses on using traffic counts collected for the current or base year (2017) and developing growth rates in order to forecast volumes to the future year (2030). These growth rates are determined by using historical annual average daily traffic (AADT) volumes collected by NCDOT, data from traffic impact analyses for developments along the

corridor (300 E Main), and traffic volumes from the Triangle Regional Model (as established by the DCHC MPO & CAMPO). The established growth rate, which was approved by NCDOT, is 0.75 percent per year or a total increase of about 10 percent between 2017 and 2030.

Safety analysis involves a review of data from NCDOT's Traffic Engineering Accident Analysis System (TEAAS) as available over the past five years (2/1/2014 to 1/31/2019). This review indicated there were 52 crashes over this period, no fatalities, and 13 crashes involving moderate or severe injury. The overall crash rate for each Main Street is much greater than the state average, but the severity of the crashes is lower than the state average. About 40 percent of the crashes observed in that 5 year period could have been potentially prevented or made less severe with a change to the cross-section. The proposal to reduce the cross section from 4 lanes to 3 lanes including center turn lane would also help reduce the risk of crashes with people crossing the street (about 10 percent of the total) as there would be fewer lanes to cross.

The Synchro Analysis utilizes NCDOT's standard Congestion Management Guidelines to ensure consistent outputs and comparable results across multiple scenarios. The AM and PM peak hours are analyzed for the 2017 No Build (Existing Conditions) 2017 Build, 2030 No Build, and 2030 Build scenarios.

During both AM and PM analysis periods for both the 2017 & 2030 scenarios, the proposed changes between the Existing Conditions and Build result in a net neutral change to the overall intersection Delay and Level of Service experienced when driving in downtown Carrboro.

Some intersections or individual approaches to intersections may see increases in delay, but overall the sum total of intersection delay will decrease due to the proposed changes under the build scenario. The changes in total intersection delay for all scenarios are summarized below:

Peak	2017 No Build (delay in sec)	2017 Build (delay in sec)	Change (%)	2030 No Build (delay in sec)	2030 Build (delay in sec)	Change (%)
AM	147.9	126.9	-14%	165.8	139.2	-16%
PM	164.8	130.4	-21%	169.1	146.4	-13%

The Synchro analysis is also cable of assessing the queuing which results due to the delay imposed by traffic signals. The proposed changes in restriping and signal timing for both the 2017 and 2030 Build Scenarios result in minimal changes to queue lengths beyond those shown in the corresponding No Build scenarios. Two addition summaries of the outputs from the Synchro analysis have been included. The first, Average Signal Delay, describes the total changes in delay experienced by vehicles when traveling in a specific direction through downtown across the different peak periods and scenarios. The second, Level of Traffic Stress (LTS) and Worst Peak LOS compares the Bicycle LTS and the worst LOS experienced (AM or PM peak) at each intersection.

Average Signal Delay

The Average Signal Delay is the time in seconds, which a vehicle will wait on average, when passing through an intersection within the study area. By adding up the Average Signal Delay for each intersection in a single direction through the corridor, (Eastbound/Westbound for E Main Street and Northbound/Southbound for Greensboro Street) you can establish an estimate for the overall level over service for the corridor. The delay associated with each Level of Service (LOS) grade is defined below this table, and a visual depiction of each LOS grade is shown on the next page.

Direction	Base Year 2017 (Delay in Sec)				Future Year 2030 (Delay in Sec)			
	AM NB	AM Build	PM NB	PM Build	AM NB	AM Build	PM NB	PM Build
Eastbound (Main from Greensboro to Merritt Mill)	84.3	78.5	79.9	69.8	84.9	89.0	85.1	85.7
Westbound (Main from Merritt Mill to Greensboro)	54.6	58.5	77.7	72.2	64.5	92.7	63.4	103.6
Northbound (Greensboro from Main to Weaver)	46.2	58.8	62.0	60.0	47.1	74.2	54.3	77.7
Southbound (Greensboro from Weaver to Main)	68.4	43.9	90.6	39.7	86.8	41.5	84.4	40.6

LOS A: < 10 seconds delay per vehicle per intersection
LOS B: 10 to 20 seconds delay per vehicle per intersection
LOS C: 20 to 35 seconds delay per vehicle per intersection
LOS D: 35 to 55 seconds delay per vehicle per intersection
LOS E: 55 to 80 seconds delay per vehicle per intersection
LOS F: > 80 seconds delay per vehicle per intersection

Bicycle Level of Traffic Stress and Worst Peak Level of Service

Level of Traffic Street (LTS) is a metric used to define the stress experienced by people riding bikes on a transportation facility such as a bike lane, road, or greenway. LTS 1 generally corresponds with a place where children would be comfortable and safe riding, such as a greenway. LTS 4 corresponds with a place where few people would feel safe or confident riding a bicycle, such as in mixed traffic on a rural, 55 MPH roadway, with no shoulder or bike lane. A visual depiction of LTS can be found on the next page.

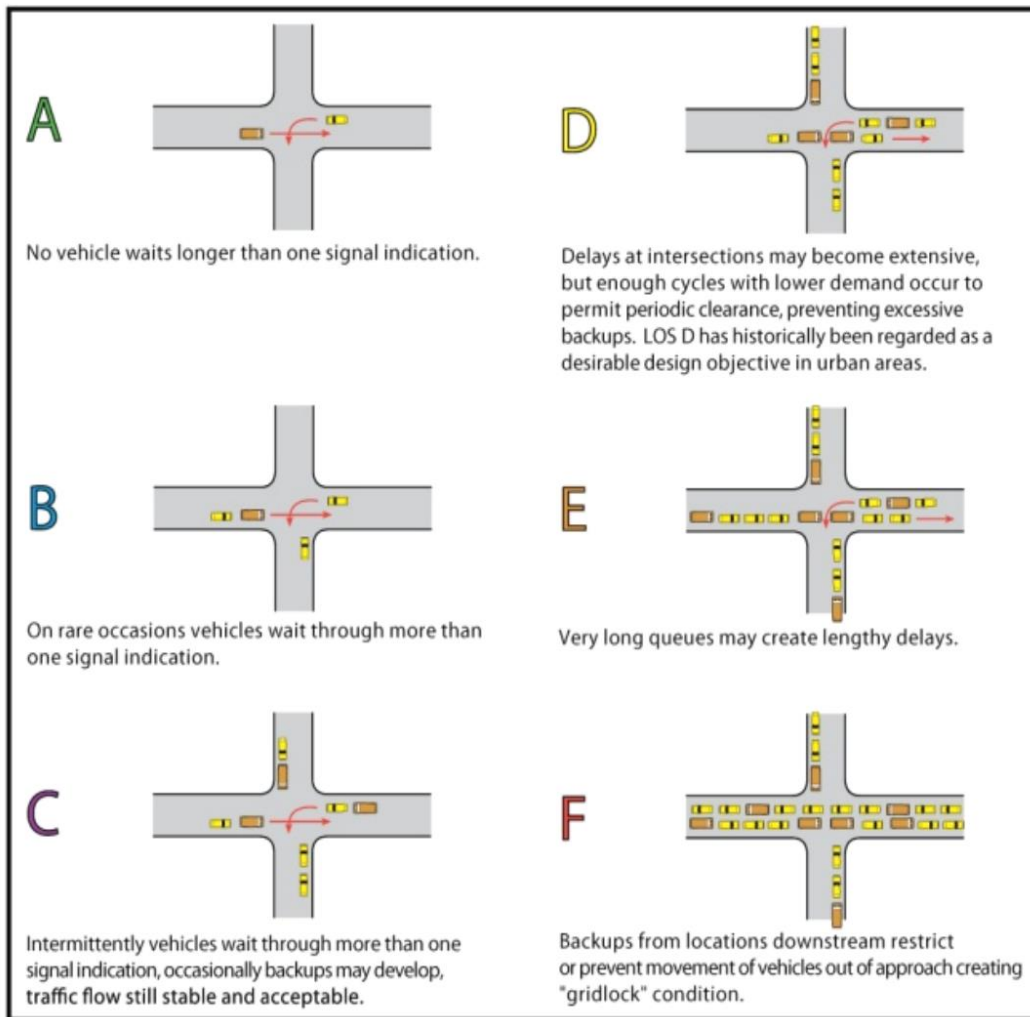
Intersection	Intersection LTS		2017 Worst Peak Intersection LOS		2030 Worst Peak Intersection LOS	
	No Build	Build	No Build	Build LOS	No Build	Build LOS
Weaver @ Greensboro	3	3	D-PM	C-PM	C-PM	C-PM
Main @ Greensboro	3	3	C-AM	C-AM	C-AM	C-AM
E Main @ E Weaver	3	1 or 2*	C-AM	C-AM	C-AM	C-AM
E Main @ Lloyd	3	1 or 2*	B-AM	B-AM	B-AM	B-AM
E Main @ Rosemary	3	1 or 2*	C-PM	C-PM	C-PM	C-PM
E Main @ Merritt Mill	3	1 or 2*	D-PM	C-PM	D-PM	C-PM

*Difference between LTS 1 & 2 is dependent on the width of the bicycle lane + buffer

Level of Traffic Stress (LTS) for Bicycles



Intersection Level of Service (LOS) for Vehicles



Source: North I-25 Environmental Impact Statement, Colorado Department of Transportation/Federal Transit Administration/Federal Highway Administration, August 17, 2008.