

RESOLUTION 2017-43

A RESOLUTION TO SELECT THE CORRIDOR DESIGN CONCEPT FOR THE COLUMBIA AVENUE WIDENING & IMPROVEMENTS PROJECT

WHEREAS, on December 11, 2013, the Nashville Area Metropolitan Planning Organization (MPO) adopted the Transportation Improvement Program (TIP) for Fiscal Years 2014-2017, allocating \$6,000,000.00 in total funding to the Preliminary Engineering (Environmental), Design, and Right-of-Way phases of this project and reserves an additional \$15,000,000.00 in total funding for the Construction Phase; and

WHEREAS, the transportation improvements associated with the project will generally be funded with 80 percent Federal Funds and 20 percent State Funds; and

WHEREAS, on July 14, 2015, the City of Franklin Board of Mayor and Aldermen unanimously approved the Local Agency Project Agreement (COF Contract No. 2014-0289, TDOT Contract No. 140204), which formally began the Columbia Avenue Widening & Improvements Project; and

WHEREAS, the preliminary engineering/environmental phase includes preparation of a National Environmental Policy Act (NEPA) document, technical study determinations (Archaeological, Natural Resources, Noise, and Air Quality), and the development of functional level roadway concept designs, as required by the Federal Highways Administration (FHWA) and TDOT; and

WHEREAS, as part of the preliminary engineering phase, three public meetings were conducted (May 17, 2016; January 31, 2017; May 16, 2017; and August 30, 2017) to engage the corridor users, business owners, and other stakeholders to gather their input on the roadway design; and

WHEREAS, the roadway design concepts developed for Columbia Avenue generally include the following Options: Option 1— Five-Lane Concept (with Access Management) and Option 2—Roundabout Concept, as conceptual shown on Exhibit A; and

WHEREAS, roadway design concepts for Columbia Avenue Project were presented during a public meeting and special Board of Mayor and Aldermen work session on August 30, 2017.

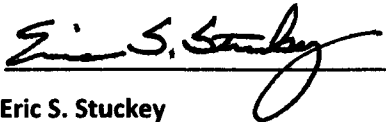
NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF MAYOR AND ALDERMEN OF THE CITY OF FRANKLIN, TENNESSEE, AS FOLLOWS:

Section 1. The Board of Mayor and Aldermen have selected Option 1 ^(one) as the preferred corridor design concept for the Columbia Ave Widening and Improvements Project as conceptually shown in Exhibit A.

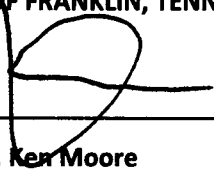
Section 2. City staff is directed to continue to work with impacted property owners and other stakeholders to further develop the preferred corridor design concept and develop recommendations on bike and pedestrian facilities, utility relocation, streetscape improvements, and transit facilities for the proposed project. These options shall be presented back to the Board of Mayor and Aldermen for a final determination prior to proceeding with the design phase of the project.

IT IS SO RESOLVED AND DONE on this 12th day of September 2017

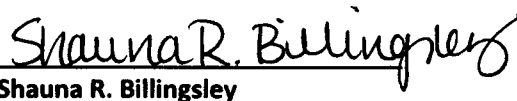
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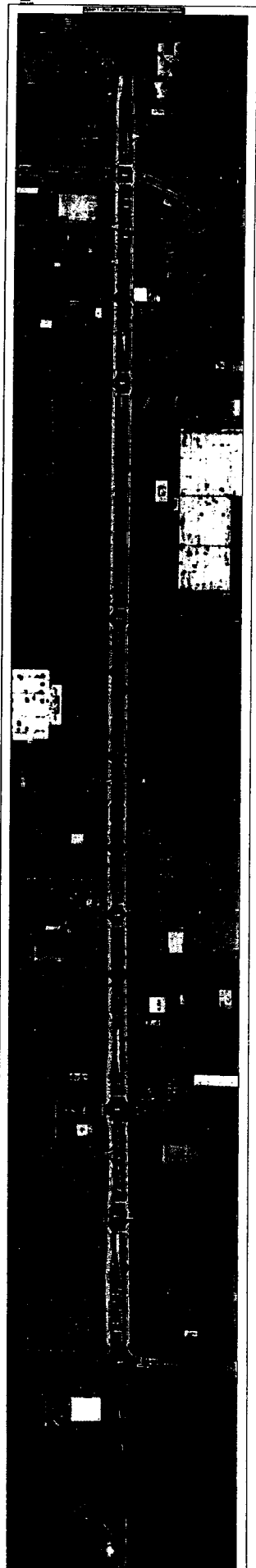
By: 
Eric S. Stuckey
City Administrator

CITY OF FRANKLIN, TENNESSEE:

By: 
Dr. Ken Moore
Mayor

Approved as to Form:

By: 
Shauna R. Billingsley
City Attorney

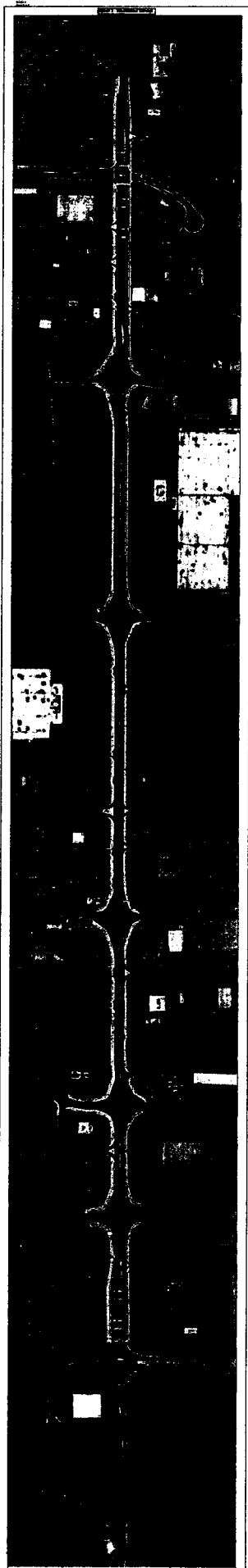


5-Lane Concept
(Access Management)

Columbia Avenue Roadway Concept
Franklin, Tennessee



BWSC



Roundabout Concept

Columbia Avenue Roadway Concept
Franklin, Tennessee

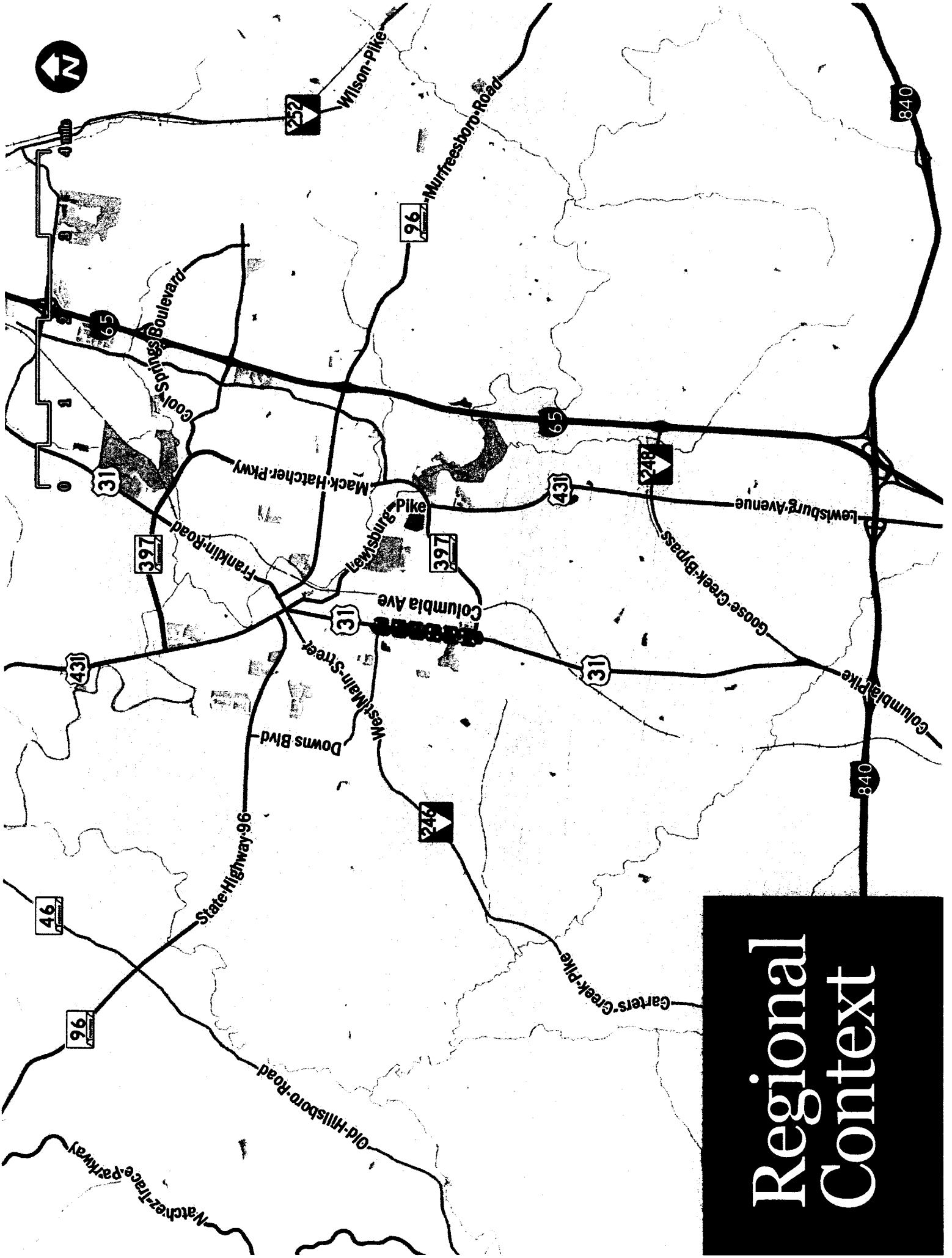


BWSC

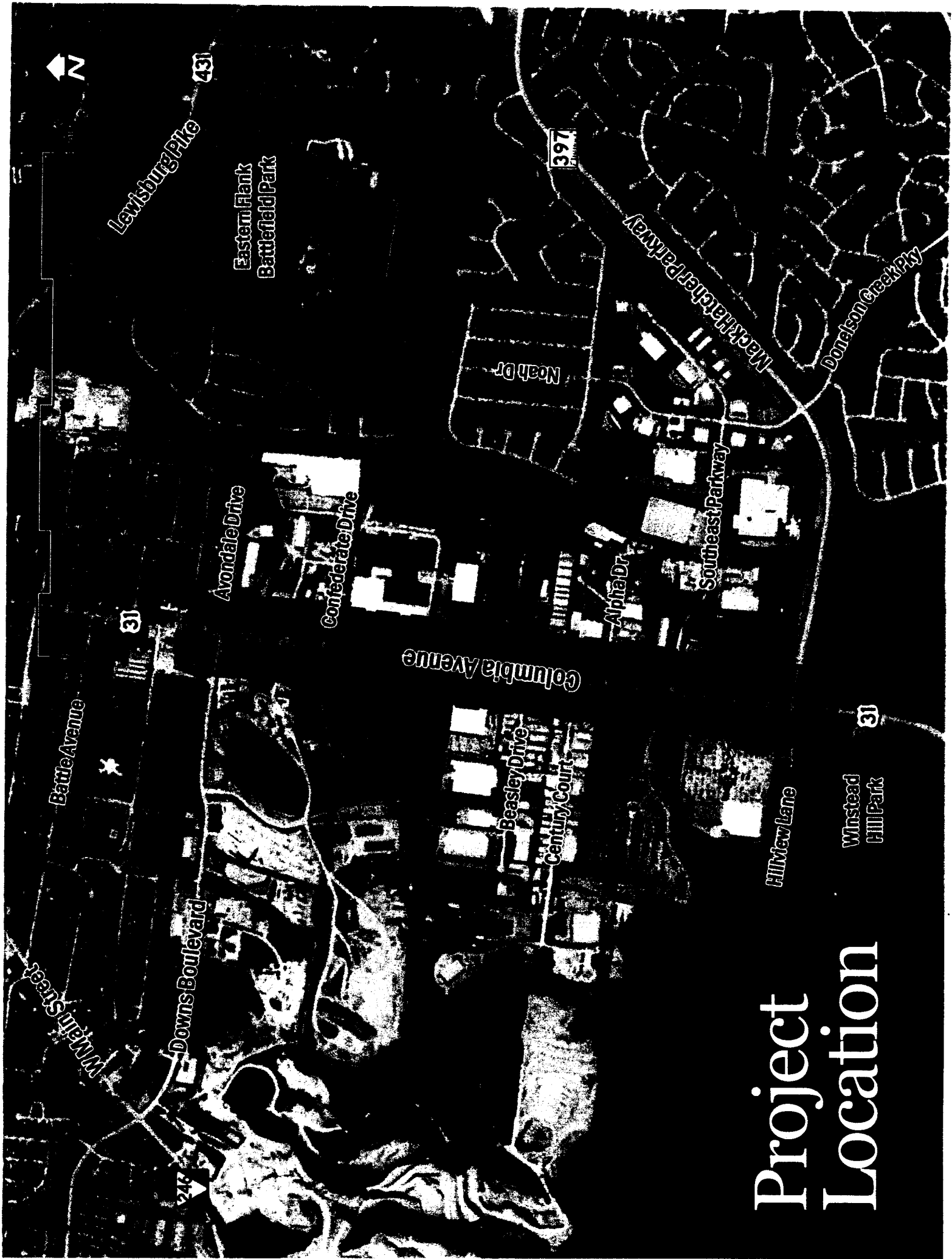
— CITY OF FRANKLIN, TENNESSEE —

Columbia Avenue

Special BOMA Work Session | August 30, 2017



Regional Context



431

Lewisburg Pike

Eastern Flank
Battlefield Park

397

Mackratcher Parkway

Donaldson Creek Pky

Noah Dr

Avondale Drive

Confederate Drive

Alpha Dr

Southeast Parkway

31

Battle Avenue

Columbia Avenue

Beasley Drive

Century Court

31

Hillview Lane

Winstead
Hill Park

Downs Boulevard

Main Street

246

Project Location

May 2016

18,900

vehicles/day

DAILY
TRAFFIC



TRAFFIC
COMPOSITION

Trucks
7%

11% Peak Trucks

TRAFFIC
TYPE

Local
Trips
55%

April 2016 travel time

from Battle Avenue to
Winstead Elementary School,
in minutes.

3:10
with no traffic

5:10
average day

10:20
longest recorded

Future Growth

2016

EXISTING
CONDITIONS

based on data from City and
TDOT count stations

18,900

vehicles/day

2021

BUILD
YEAR

forecast conditions at
project completion

19,800

vehicles/day

2041

DESIGN
YEAR

improvements are designed to
accommodate 20 years of growth

25,400

vehicles/day

3

components of
comparison

Operations

Safety

Physical
Impact

Corridor Concepts

Example: Columbia Avenue at Southeast Parkway



**Five-Lane
Concept**

(Traditional)

**Five-Lane
Concept**

(Access Management)

**Roundabout
Concept**

(Access Management)

Operations

Anticipated Travel Time and Average Speed, 2041 Volumes (Columbia Avenue)

No-Build Conditions	Five-Lane Concept (Traditional)	Five-Lane Concept (Access Mgmt.)	Roundabout Concept
5:50	4:30	4:40	4:30
14.5 mph	18.5 mph	18.1 mph	18.5 mph

Values are based on simulated conditions (20 hours/day)

Results are average lane volume (3,000 simulated vehicles
between 6:00 a.m. and 6:00 p.m.)

Operations

Corridor Delay

Existing Conditions
(2016 volumes)

200 seconds

No-Build Conditions
(2041 volumes)

985 seconds

Five-Lane Concept
(Traditional)
(2041 volumes)

365 seconds

Five-Lane Concept
(Access Management)
(2041 volumes)

375 seconds

Roundabout Concept
(2041 volumes)

240 seconds

Columbia Avenue Traffic

Side Street Traffic

Operations

Delay, Level of Service (LOS), and Queue Length

Signalized Intersections		
Level of Service	Average Control Delay (seconds/vehicle)	General Description
A	≤10	Free Flow
B	11 - 20	
C	>20 - 35	Stable Flow (acceptable delays)
D	36 - 55	
E	>55 - 80	Unstable Flow (intolerable delay)
F	>80	

Operations

Delay, Level of Service (LOS), and Queue Length

Unsignalized Intersections <i>(i.e. All-Way Stop, Two-Way Stop, Roundabout)</i>		
Level of Service	Average Control Delay (seconds/vehicle)	General Description
A	≤10	Free Flow
B	>10 – 15	
C	>15 – 25	Stable Flow (acceptable delays)
D	>25 – 35	
E	>35 – 50	Unstable Flow (intolerable delay)
F	>50	

NOTE: Two way stop controlled intersections are defined in terms of individual movements.

Safety

Collision Data (2013–2016)

7.72
collisions/
MVM

MVM = Million Vehicle-Miles

2.76
collisions/
MVM

1.23
collisions/
MVM

0.68
collisions/
MVM

All Collisions

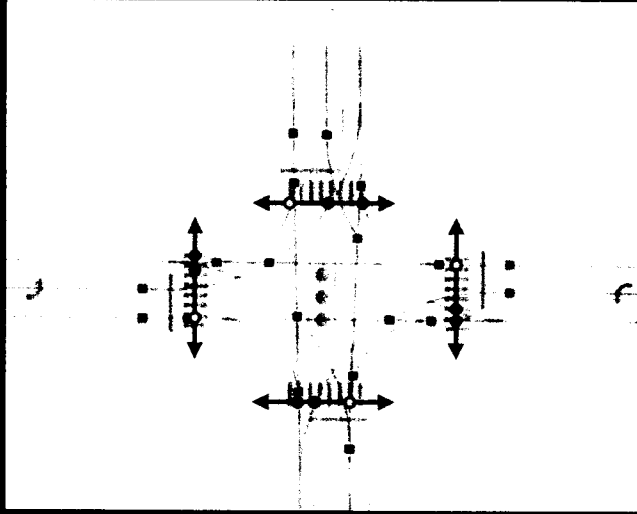
Columbia Avenue Actual Crash History

Fatal/Injury Collisions

Statewide Averages

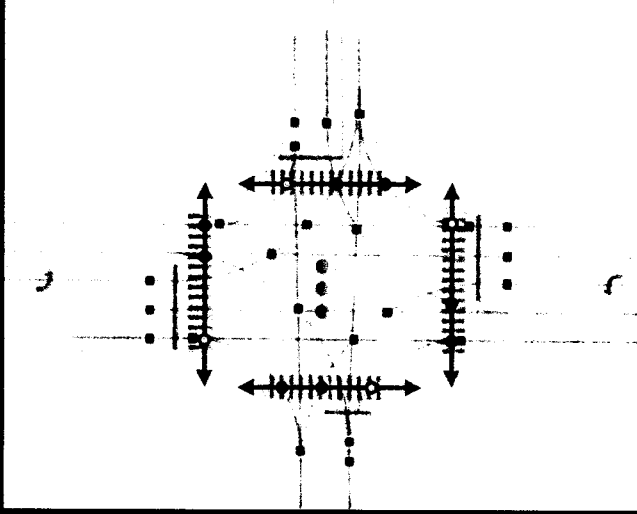
Safety

Columbia Avenue Conflict Points



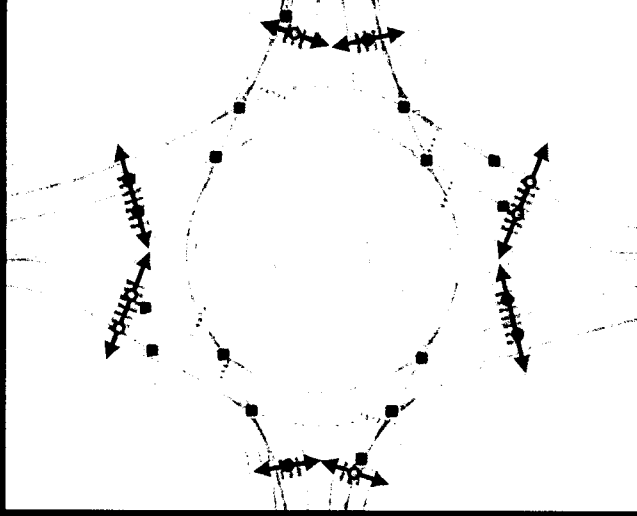
**No-Build
Conditions**

504*



**Five-Lane Concepts
(Traditional) (Acc. Mgmt.)**

583* 385*



**Roundabout
Concept**

258*

*NOTE: Vehicle Conflict Points

Safety

2041 Anticipated Change in Traffic Collisions

Between Intersections

+41%

+26%

-10%

**No-Build:
+49% over
2016 conditions**

**No-Build:
+43% over
2016 conditions**

+2%

+1%

-26%

No-Build Condition (2041)

Five-Lane Concept (Traditional)

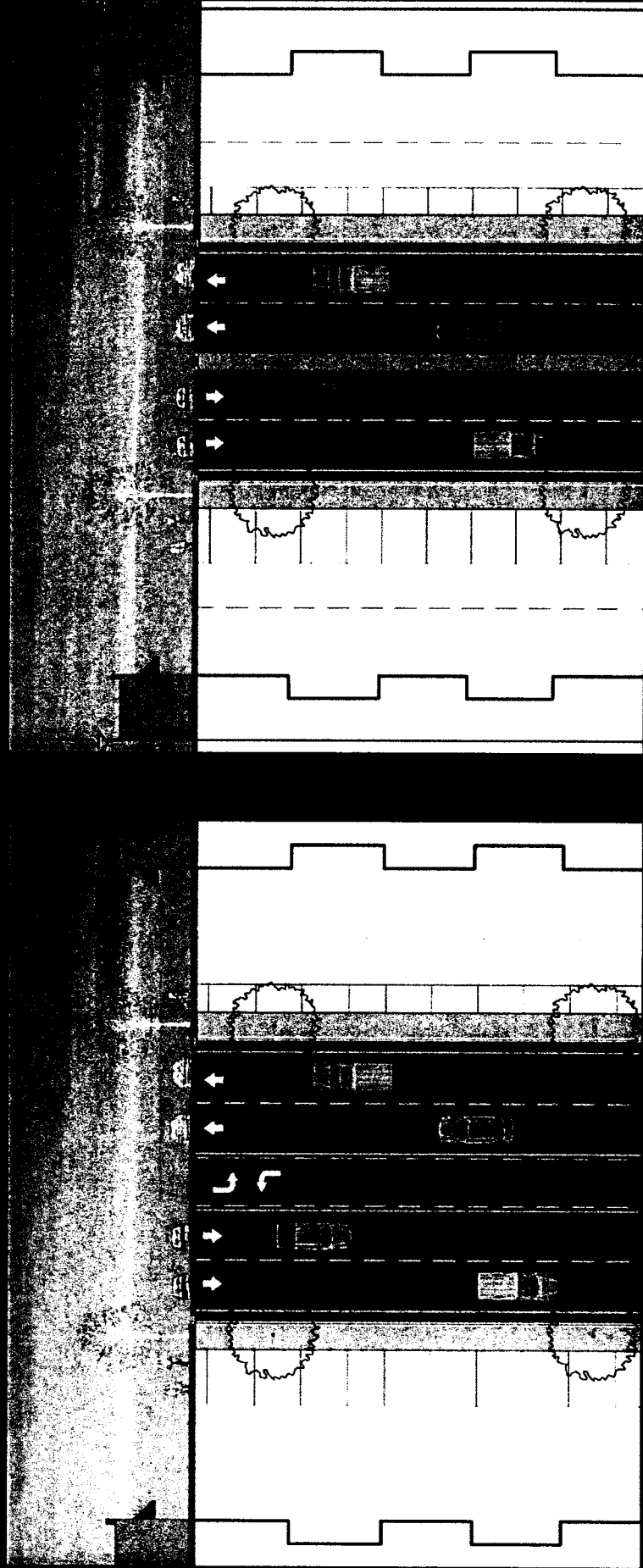
Five-Lane Concept (Access Management)

Roundabout Concept

At Intersections

Physical Impact

Typical Sections



Five-Lane Concepts

91' wide (back of walk to back of walk)

Roundabout Concept

83' wide (back of walk to back of walk)

Physical Impact



Five-Lane Concepts

Roundabout Concept

Data Summary

	No-Build Conditions (2041 volumes)	5-Lane Concept (Traditional)	5-Lane Concept (Access Mgmt.)	Roundabout Concept
Operational Performance	Through Traffic Delay		145 (sec/veh)	
	Side Street Delay	230 (sec/veh)	230 (sec/veh)	
	Average Travel Time			
Safety Performance	Between Intersections	BASELINE (+49% from 2016)		
	At Intersections	BASELINE (+43% from 2016)		
	Between Intersections			83' (total width)
Physical Impact	At Intersections	AVERAGE footprint	AVERAGE footprint	

next step

BOMA selects
preferred concept
to bring forward to
detailed design.

Level of Service (LOS) for No-Build Condition

Cross-Street	Traffic Control	Geometry	Level of Service (LOS) for No-Build Condition																									
			[AM] Peak Hour						[PM] Peak Hour						[PM] Peak Hour						[SAT] Peak Hour							
			2018 Existing	2021 Future	2041 Design	2018 Existing	2021 Future	2041 Design	2018 Existing	2021 Future	2041 Design	2018 Existing	2021 Future	2041 Design	2018 Existing	2021 Future	2041 Design	2018 Existing	2021 Future	2041 Design	2018 Existing	2021 Future	2041 Design					
1 Mack Hatcher Parkway / Hillview Lane	Signal	OVERALL	27.8 C	29.3 C	40.8 D	38.6 C	34.3 C	36.5 D	49.3 D	27.3 C	30.5 C	38.0 D	46.2 D	32.9 C	35.1 C	47.2 D	34.2 C	36.4 D	48.3 D	27.3 C	30.5 C	38.0 D	46.2 D	32.9 C	35.1 C	47.2 D		
		EASTBOUND (EB)	55.5 E	56.0 E	56.7 E	50.9 D	53.0 D	65.1 E	54.0 D	55.9 E	69.0 E	99.0 D	40.1 D	46.2 D	52.9 C	54.9 E	57.8 E	71.2 F	89.9 D	42.2 D	47.9 D	55.5 E	56.0 E	56.7 E	50.9 D	53.0 D	65.1 E	
		EB Left	31.7 D	32.0 D	32.1 D	38.7 D	39.8 D	41.9 D	42.9 D	43.2 D	25.9 C	27.9 C	29.9 C	25.9 C	27.9 C	28.9 C	29.9 C	30.9 C	31.9 C	32.9 C	25.9 C	27.9 C	28.9 C	29.9 C	30.9 C	31.9 C	32.9 C	33.9 C
		EB Thru/Right	55.5 E	56.0 E	56.7 E	50.9 D	53.0 D	65.1 E	54.0 D	55.9 E	69.0 E	99.0 D	40.1 D	46.2 D	52.9 C	54.9 E	57.8 E	71.2 F	89.9 D	42.2 D	47.9 D	55.5 E	56.0 E	56.7 E	50.9 D	53.0 D	65.1 E	
		WESTBOUND (WB)	35.2 D	37.2 D	41.1 D	34.4 C	34.8 C	39.2 C	31.9 C	28.0 C	29.5 C	43.8 D	20.8 C	22.8 C	35.2 D	35.7 D	36.6 D	24.4 F	24.1 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G
		WB Left	42.5 D	43.0 D	45.7 D	34.4 C	34.8 C	39.2 C	31.9 C	28.0 C	29.5 C	43.8 D	20.8 C	22.8 C	35.2 D	35.7 D	36.6 D	24.4 F	24.1 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G
		WB Thru	45.3 D	45.7 D	45.7 D	34.4 C	34.8 C	39.2 C	31.9 C	28.0 C	29.5 C	43.8 D	20.8 C	22.8 C	35.2 D	35.7 D	36.6 D	24.4 F	24.1 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G
		WB Right	32.8 C	33.5 C	37.5 D	34.4 C	34.8 C	39.2 C	31.9 C	28.0 C	29.5 C	43.8 D	20.8 C	22.8 C	35.2 D	35.7 D	36.6 D	24.4 F	24.1 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G	24.4 G
		NORTHBOUND (NB)	24.4 C	29.1 C	49.6 D	26.1 C	30.1 C	31.5 C	35.8 D	38.6 D	44.6 D	30.9 C	37.9 D	64.5 E	28.4 C	29.5 C	30.6 C	28.4 C	29.5 C	30.6 C	28.4 C	29.5 C	30.6 C	28.4 C	29.5 C	30.6 C	28.4 C	29.5 C
		NB Left	15.4 B	16.3 B	16.8 B	24.1 C	26.8 C	27.5 C	34.2 D	34.8 D	40.1 D	33.9 C	34.8 C	36.5 C	24.1 C	26.8 C	27.5 C	34.2 D	34.8 D	40.1 D	33.9 C	34.8 C	36.5 C	24.1 C	26.8 C	27.5 C	34.2 D	34.8 D
		NB Thru	29.7 C	35.6 D	63.6 E	29.5 C	34.1 C	36.5 C	40.1 D	43.3 D	51.3 D	35.9 C	38.9 C	44.7 D	29.5 C	34.1 C	36.5 C	40.1 D	43.3 D	51.3 D	35.9 C	38.9 C	44.7 D	29.5 C	34.1 C	36.5 C	40.1 D	43.3 D
		NB Right	9.3 A	9.7 A	9.7 A	16.0 B	16.5 B	16.5 B	17.0 B	17.0 B	17.0 B	17.0 B	17.0 B	17.0 B	16.0 B	16.5 B	16.5 B	17.0 B	17.0 B	17.0 B	17.0 B	16.0 B	16.5 B	16.5 B	17.0 B	17.0 B	17.0 B	17.0 B
		SOUTHBOUND (SB)	20.9 C	21.7 C	21.7 C	21.9 C	24.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C
		SB Left	20.9 C	21.7 C	21.7 C	21.9 C	24.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C
		SB Thru	20.9 C	21.7 C	21.7 C	21.9 C	24.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C
		SB Right	20.9 C	21.7 C	21.7 C	21.9 C	24.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C	34.7 C

Delay Reduction Color Code:

NOTE: (1) No-Build results updated 8/25/2017 to assume consistent signal timings/offsets with 2016 existing conditions. Previous data had assumed improvements to signal timings in future conditions.
(2) Delay of "999.9" seconds indicates maximum limit of model.

Queue Length for No-Build Condition

Cross-Street	Traffic Control Device	Geometry	Storage Length	[AM] Peak Hour			[MD] Peak Hour			[PM] Peak Hour			[SAT] Peak Hour						
				Queue Length (Feet)			Queue Length (Feet)			Queue Length (Feet)			Queue Length (Feet)						
				2016	2021	2041	2016	2021	2041	2016	2021	2041	2016	2021	2041				
1 Mack Hatcher Parkway / Hillview Lane	Signal	EASTBOUND (EB)																	
		EB Left	150'	(6 veh)	13'	13'	15'	56'	62'	73'	28'	29'	32'	28'	29'	33'			
		EB Thru/Right	450'	(18 veh)	58'	60'	68'	205'	268'	353'	211'	234'	321'	202'	212'	305'			
		WESTBOUND (WB)																	
		WB Left	640'	(25 veh)	147'	155'	185'	96'	107'	127'	214'	224'	349'	86'	89'	106'			
		WB Thru	999'	(40 veh)	81'	86'	96'	110'	116'	139'	108'	112'	133'	109'	113'	136'			
		WB Right	325'	(13 veh)	60'	116'	230'	89'	45'	154'	42'	79'	167'	32'	35'	73'			
		NORTHBOUND (NB)																	
		NB Left	200'	(8 veh)	36'	37'	44'	57'	55'	61'	53'	53'	61'	81'	84'	100'			
		NB Thru	775'	(31 veh)	587'	678'	1012'	325'	362'	419'	416'	493'	643'	355'	468'	613'			
		NB Right	200'	(8 veh)	15'	18'	27'	15'			14'	14'	19'	15'	15'	21'			
		SOUTHBOUND (SB)																	
		SB Left	300'	(12 veh)	161'	214'	277'	210'	252'	323'	164'	184'	214'	169'	194'	204'			
		SB Thru	560'	(22 veh)	9'	17'	75'	992'	476'	556'	762'	823'	1117'	420'	474'	607'			
		SB Right	400'	(16 veh)	0'	0'	0'			1'	0'	0'	0'	0'					
2 Parkway Commons / Cemetery	Signal	EASTBOUND																	
		EB Left/Thru	175'	(7 veh)	106'	112'	131'	292'	313'	413'	198'	218'	276'	176'	185'	224'			
		EB Right	175'	(7 veh)	0'	0'	0'	21'	28'	38'	32'	36'	43'	25'	30'	33'			
		WESTBOUND																	
		WB Left/Thru/Right	250'	(10 veh)	12'	12'	12'	45'	47'	52'	12'	12'	12'	18'	18'	20'			
		NORTHBOUND																	
		NB Left	50'	(2 veh)	23'	23'	25'	41'	46'	55'	41'	42'	48'	25'	26'	27'			
		NB Thru/Right	150'	(6 veh)	1003'	1188'	1530'	286'	306'	955'	245'	282'	1046'	217'	261'	900'			
		SOUTHBOUND																	
		SB Left	150'	(6 veh)	0'					0'			1'			3'			
		SB Thru/Right	150'	(6 veh)	290'	354'	364'	385'	476'	589'	465'	656'	700'	378'	422'	519'			
		3 Southeast Parkway / Shadow Green Drive	Signal	EASTBOUND															
				EB Left	100'	(4 veh)	83'	100'	208'	146'	227'	286'	77'	111'	128'	97'	132'	155'	
				EB Thru	200'	(8 veh)	41'	68'	73'	44'	70'	77'	31'	47'	48'	35'	48'	52'	
				EB Right	75'	(3 veh)	47'	66'	70'	53'	99'	186'	49'	57'	121'	53'	82'	157'	
WESTBOUND																			
WB Left	125'			(5 veh)	85'	96'	41'	110'	114'	135'	62'	65'	75'	38'	38'	44'			
WB Thru/Right	800'			(12 veh)	79'	86'	98'	112'	176'	262'	87'	164'	225'	66'	78'	87'			
NORTHBOUND																			
NB Left	150'			(6 veh)	41'			20'			27'	82'	164'	87'	150'	161'			
NB Thru/Right	150'			(6 veh)	612'	1030'	1360'	188'	382'	1131'	292'	349'	434'	602'	666'	956'			
SOUTHBOUND																			
SB Left	120'			(4 veh)	9'	20'	101'			39'	22'					61'			
SB Thru	580'			(23 veh)				252'	273'	288'	250'	402'	447'	209'	283'	244'			
SB Right	100'			(4 veh)							3'	25'	27'	29'					
4 Alpha Drive	Stop			WESTBOUND															
		WB Left/Thru/Right	200'	(8 veh)	26'	43'	167'	116'	192'	457'	84'	158'	999'	37'	55'	174'			
		SOUTHBOUND																	
5 Century Court	Signal	EASTBOUND																	
		EB Left	125'	(5 veh)	124'	151'	178'	121'	147'	172'	99'	114'	132'	59'	73'	82'			
		EB Thru/Right	225'	(9 veh)	46'	47'	51'	59'	60'	66'	57'	57'	61'	32'	32'	34'			
6 Beasley Drive / Lumber Drive	Two-Way Stop Control (TWSC)	WESTBOUND																	
		WB Left/Thru/Right	200'	(8 veh)	3'	4'	15'	35'	68'	104'	26'	52'	82'	23'	49'	999'			
		NORTHBOUND																	
		NB Left	75'	(3 veh)	9'	10'	18'	9'	11'	32'	4'	5'	13'	3'	4'	10'			
		SOUTHBOUND																	
		SB Left	25'	(1 veh)	1'	2'	5'	5'	7'	19'	3'	3'	11'	4'	9'	17'			
		7 Franklin Business Park (North) / Future Werthan Circle	Signal	EASTBOUND															
				EB Left	150'	(6 veh)	83'	38'	37'	62'	66'	78'	48'	50'	58'	124'	129'	153'	
				EB Right	150'	(6 veh)	30'	31'	34'	33'	33'	37'	31'	31'	34'	41'	42'	46'	
				WESTBOUND															
				WB Left/Thru/Right	275'	(11 veh)	363'	556'	1328'	638'	795'	1325'	696'	817'	1156'	508'	651'	1158'	
				SOUTHBOUND															
				SB Left	150'	(6 veh)	7'			3'	5'	5'	4'	5'	10'				
				SB Thru	999'	(40 veh)	193'	214'	319'	205'	310'	553'	248'	409'	463'	641'	774'	848'	
				8 Confederate Drive / Werthan Circle	TWSC	EASTBOUND													
EB Left	100'	(4 veh)	16'			61'	999'	0'	18'	78'	3'	10'	21'	0'	20'	75'			
EB Thru/Right	150'	(6 veh)	5'			18'	175'	2'	13'	35'	1'	8'	14'	1'	16'	34'			
WESTBOUND																			
WB Left	100'	(4 veh)	17'			32'	117'	15'	26'	81'	5'	7'	17'	5'	10'	37'			
WB Thru/Right	200'	(8 veh)	6'			11'	24'	9'	16'	34'	4'	6'	11'	7'	12'	31'			
NORTHBOUND																			
NB Left	100'	(4 veh)	5'			8'	13'	0'	4'	5'	0'	3'	4'	0'	5'	7'			
SB Left	100'	(4 veh)	7'			9'	22'	7'	9'	21'	1'	1'	2'	4'	5'	11'			
9 Carr Avenue	Stop	WESTBOUND																	
		WB Left/Thru/Right	175'	(7 veh)	9'	11'	20'	22'	29'	64'	20'	27'	59'	20'	26'	58'			
		SOUTHBOUND																	
10 Downs Boulevard	Signal	EASTBOUND																	
		EB Left/Thru	350'	(14 veh)	104'	107'	119'	101'	105'	120'	118'	114'	132'	108'	113'	135'			
		EB Right	350'	(14 veh)	107'	111'	274'	92'	96'	104'	95'	99'	107'	101'	149'	412'			
		WESTBOUND																	
		WB Left/Thru/Right	50'	(2 veh)	14'	14'	16'	23'	23'	27'	22'	22'	26'	21'	21'	25'			
		NORTHBOUND																	
		NB Left	150'	(6 veh)	166'	195'	245'	148'	198'	303'	311'	387'	586'	289'	347'	464'			
		NB Thru/Right	175'	(7 veh)	490'	572'	627'	425'	493'	674'	355'	414'	581'	316'	350'	352'			
		SOUTHBOUND																	
SB Left	50'	(2 veh)	5'	5'	8'	6'	8'	10'	7'	9'	10'	7'	8'	8'					
SB Thru/Right	125'	(5 veh)	801'	374'	596'	480'	685'	1031'	554'	826'	1099'	418'	493'	716'					
11 James Avenue	Stop	WESTBOUND																	
		WB Left/Thru/Right	125'	(5 veh)	7'	9'	15'	8'	10'	16'	8'	9'	14'	9'	11'	17'			
		SOUTHBOUND																	
SB Left	200'	(8 veh)	0'	0'	1'	1'	1'	1'	1'	1'	1'	1'	1'	2'					

Queue Reduction Color Code:

NOTES: (1) No-Build results updated 8/25/2017 to assume consistent signal timings/offsets with 2016 existing conditions. Previous data had assumed improvements to signal timings in future conditions.

(2) Queue length of "9999" feet indicates maximum limit of model.

Queue Length for Five-Lane (Traditional) Concept

Cross-Street	Traffic Control Device	Geometry	Storage Length	[AM] Peak Hour		[MD] Peak Hour		[PM] Peak Hour		[SAT] Peak Hour			
				Queue Length (Feet)		Queue Length (Feet)		Queue Length (Feet)		Queue Length (Feet)			
				2021	2041	2021	2041	2021	2041	2021	2041		
1 Mack Hatcher Parkway / Hillview Lane	Signal	EASTBOUND (EB)											
		EB Left	150' (6 veh)	10'	11'	44'	52'	29'	26'	27'	30'		
		EB Thru	450' (18 veh)	36'	45'	106'	126'	85'	99'	118'	141'		
		EB Right	40' (1 veh)	0'	0'	0'	0'	17'	34'	0'	0'		
		WESTBOUND (WB)											
		WB Left	640' (25 veh)	109'	129'	75'	89'	178'	198'	82'	97'		
		WB Thru	999' (40 veh)	64'	73'	87'	104'	91'	107'	104'	124'		
		WB Right	525' (18 veh)	108'	182'	66'	145'	87'	161'	74'	144'		
		NORTHBOUND (NB)											
		NB Left	200' (8 veh)	20'	24'	27'	32'	22'	26'	42'	50'		
		NB Thru	775' (31 veh)	228'	291'	135'	162'	160'	196'	157'	180'		
		NB Right	40' (1 veh)	40'	57'	6'	17'	1'	8'	11'	28'		
		SOUTHBOUND (SB)											
		SB Left	800' (12 veh)	153'	175'	100'	114'	116'	127'	91'	140'		
SB Thru	560' (22 veh)	265'	315'	184'	242'	608'	804'	418'	508'				
SB Right	400' (14 veh)	0'	0'	0'	0'	0'	0'	0'	0'				
2 Parkway Commons / Cemetery	Signal	EASTBOUND											
		EB Left	175' (7 veh)	102'	120'	228'	308'	175'	242'	188'	244'		
		EB Thru/Right	175' (7 veh)	0'	0'	0'	0'	0'	0'	0'	8'		
		WESTBOUND											
		WB Left/Thru/Right	250' (10 veh)	10'	10'	35'	39'	10'	10'	17'	18'		
		NORTHBOUND											
		NB Left	150' (6 veh)	74'	74'	93'	119'	105'	140'	80'	92'		
		NB Thru/Right	150' (6 veh)	95'	125'	234'	274'	275'	315'	254'	291'		
		SOUTHBOUND											
		SB Left	150' (6 veh)	1'	1'	3'	3'	0'	1'	2'	2'		
		SB Thru/Right	150' (6 veh)	52'	57'	152'	148'	60'	78'	79'	98'		
		3 Southeast Parkway / Shadow Green Drive	Signal	EASTBOUND									
				EB Left	100' (4 veh)	99'	124'	121'	137'	78'	86'	108'	119'
				EB Thru	200' (8 veh)	46'	52'	47'	52'	85'	37'	40'	43'
EB Right	75' (3 veh)			48'	48'	82'	124'	50'	80'	78'	121'		
WESTBOUND													
WB Left	125' (5 veh)			24'	28'	70'	83'	46'	54'	52'	56'		
WB Thru/Right	300' (12 veh)			68'	73'	86'	104'	87'	105'	68'	75'		
NORTHBOUND													
NB Left	200' (8 veh)			4'	4'	24'	61'	102'	177'	70'	120'		
NB Thru/Right	385' (15 veh)			50'	59'	92'	113'	82'	44'	72'	91'		
SOUTHBOUND													
SB Left	100' (4 veh)			75'	114'	43'	73'	21'	22'	32'	46'		
SB Thru	380' (23 veh)			147'	208'	143'	193'	113'	176'	101'	117'		
SB Right	100' (4 veh)			0'	0'	0'	0'	1'	1'	7'	7'		
4 Alpha Drive	Two-Way Stop Control (TWSC)	EASTBOUND											
		EB Left/Thru/Right	50' (2 veh)	1'	1'	2'	3'	2'	4'	2'	3'		
		WESTBOUND											
		WB Left/Thru/Right	200' (8 veh)	11'	16'	43'	74'	34'	60'	16'	23'		
		NORTHBOUND											
		NB Left	175' (7 veh)	1'	1'	2'	2'	2'	3'	0'	1'		
5 Century Court	Signal	EASTBOUND											
		EB Left	125' (5 veh)	107'	124'	107'	125'	84'	98'	64'	70'		
		EB Thru/Right	225' (9 veh)	37'	40'	50'	54'	47'	52'	29'	31'		
		WESTBOUND											
		WB Left/Thru/Right	50' (2 veh)	8'	8'	9'	9'	9'	9'	11'	12'		
		NORTHBOUND											
		NB Left	75' (3 veh)	23'	47'	37'	66'	8'	15'	4'	8'		
		NB Thru/Right	200' (8 veh)	71'	82'	82'	137'	43'	100'	45'	111'		
		SOUTHBOUND											
		SB Left	100' (4 veh)			2'	2'	1'	1'	1'	1'		
		SB Thru/Right	225' (9 veh)	262'	327'	130'	152'	97'	128'	263'	364'		
		6 Beasley Drive / Lumber Drive	TWSC	EASTBOUND									
				EB Left/Thru/Right	325' (11 veh)	11'	15'	18'	24'	25'	31'	14'	23'
				WESTBOUND									
WB Left/Thru/Right	200' (8 veh)			2'	3'	20'	32'	14'	24'	13'	20'		
NORTHBOUND													
NB Left	25' (1 veh)			10'	14'	10'	14'	4'	6'	3'	4'		
7 Franklin Business Park (North) / Future Werthan Circle	Signal	WESTBOUND											
		WB Left	150' (6 veh)	28'	28'	48'	55'	37'	43'	108'	128'		
		WB Right	150' (6 veh)	25'	28'	27'	30'	25'	28'	37'	41'		
		NORTHBOUND											
		NB Thru/Right	275' (11 veh)	72'	170'	235'	358'	118'	255'	197'	193'		
		SOUTHBOUND											
		SB Left	150' (6 veh)	9'	9'	4'	4'	9'	12'	23'	53'		
		SB Thru	998' (40 veh)	90'	91'	70'	76'	50'	69'	121'	137'		
8 Confederate Drive / Werthan Circle	Signal	EASTBOUND											
		EB Left	100' (4 veh)	62'	68'	36'	34'	35'	37'	39'	39'		
		EB Thru/Right	130' (6 veh)	37'	39'	35'	36'	26'	27'	34'	34'		
		WESTBOUND											
		WB Left	100' (4 veh)	47'	53'	52'	60'	28'	31'	26'	30'		
		WB Thru/Right	200' (8 veh)	29'	31'	36'	39'	25'	26'	31'	32'		
		NORTHBOUND											
		NB Left	100' (4 veh)	0'	0'			3'	3'				
		NB Thru/Right	115' (4 veh)	8'	12'	78'	95'	84'	96'	101'	128'		
		SOUTHBOUND											
		SB Left	100' (4 veh)	6'	10'	5'	10'						
		SB Thru/Right	325' (13 veh)	154'	224'	116'	139'	116'	155'	135'	223'		
		9 Carr Avenue	Stop	WESTBOUND									
				WB Left/Thru/Right	175' (7 veh)	6'	8'	13'	20'	13'	20'	11'	15'
SOUTHBOUND													
SB Left	150' (6 veh)	3'	4'	4'	5'	3'	5'	2'	4'				
10 Downs Boulevard	Signal	EASTBOUND											
		EB Left	150' (6 veh)	85'	100'	76'	89'	86'	102'	100'	119'		
		EB Thru	350' (14 veh)	8'	10'	5'	5'	8'	10'	5'	5'		
		EB Right	350' (14 veh)	192'	334'	115'	218'	163'	269'	279'	308'		
		WESTBOUND											
		WB Left	100' (4 veh)	8'	10'	9'	11'	12'	13'	14'	16'		
		WB Thru/Right	250' (10 veh)	9'	10'	14'	18'	13'	15'	11'	14'		
		NORTHBOUND											
		NB Left	300' (12 veh)	94'	102'	134'	135'	103'	139'	145'	184'		
		NB Thru/Right	175' (7 veh)	32'	38'	106'	169'	75'	94'	108'	366'		
		SOUTHBOUND											
		SB Left	150' (6 veh)	5'	7'	5'	7'	6'	7'	7'	8'		
		SB Thru	450' (18 veh)	292'	416'	346'	482'	377'	551'	570'	529'		
		SB Right	300' (12 veh)	24'	28'	21'	23'	24'	27'	27'	29'		
11 James Avenue	Stop	WESTBOUND											
		WB Right	125' (5 veh)	9'	15'	9'	15'	8'	12'	10'	16'		

Queue Length for Five-Lane (Access Management) Concept

Cross-Street	Traffic Control Device	Geometry	Storage Length	[AM] Peak Hour		[MD] Peak Hour		[PM] Peak Hour		[SAT] Peak Hour	
				Queue Length (Feet)		Queue Length (Feet)		Queue Length (Feet)		Queue Length (Feet)	
				2021	2041	2021	2041	2021	2041	2021	2041
1 Mack Hatcher Parkway / Hillview Lane	Signal	EASTBOUND (EB)									
		EB Left	150' (6 veh)	10'	11'	44'	52'	29'	26'	27'	30'
		EB Thru	430' (18 veh)	38'	43'	106'	126'	85'	99'	118'	141'
		EB Right	40' (1 veh)	0'	0'	0'	0'	17'	34'	0'	0'
		WESTBOUND (WB)									
		WB Left	640' (25 veh)	109'	129'	75'	89'	178'	198'	82'	97'
		WB Thru	999' (40 veh)	64'	73'	87'	104'	91'	107'	104'	124'
		WB Right	325' (13 veh)	109'	182'	66'	145'	87'	161'	74'	144'
		NORTHBOUND (NB)									
		NB Left	200' (8 veh)	20'	24'	27'	32'	22'	26'	42'	50'
		NB Thru	775' (31 veh)	228'	291'	155'	162'	160'	196'	157'	190'
		NB Right	40' (1 veh)	40'	57'	6'	17'	1'	8'	11'	23'
		SOUTHBOUND (SB)									
		SB Left	300' (12 veh)	153'	175'	100'	114'	116'	127'	91'	140'
SB Thru	560' (22 veh)	285'	314'	184'	248'	603'	804'	418'	509'		
SB Right	400' (16 veh)	0'	0'	0'	0'	0'	0'	0'	0'		
2 Parkway Commons / Cemetery	Signal	EASTBOUND									
		EB Left	175' (7 veh)	102'	120'	229'	308'	175'	242'	183'	244'
		EB Thru/Right	175' (7 veh)	0'	0'	0'	0'	0'	0'	0'	0'
		WESTBOUND									
		WB Left/Thru/Right	250' (10 veh)	10'	10'	35'	39'	10'	10'	17'	18'
		NORTHBOUND									
		NB Left	150' (6 veh)	74'	74'	93'	119'	105'	140'	80'	92'
		NB Thru/Right	150' (6 veh)	95'	125'	234'	274'	275'	315'	254'	291'
		SOUTHBOUND									
		SB Left	150' (6 veh)	1'	1'	5'	3'	0'	1'	2'	2'
		SB Thru/Right	150' (6 veh)	52'	57'	132'	148'	60'	78'	79'	88'
		SOUTHBOUND									
		SB Left	100' (4 veh)	99'	124'	121'	137'	78'	86'	108'	118'
		SB Thru	200' (8 veh)	48'	52'	47'	52'	35'	37'	40'	43'
SB Right	75' (3 veh)	46'	48'	82'	124'	50'	80'	78'	121'		
3 Southeast Parkway / Shadow Green Drive	Signal	EASTBOUND									
		EB Left	100' (4 veh)	99'	124'	121'	137'	78'	86'	108'	118'
		EB Thru	200' (8 veh)	48'	52'	47'	52'	35'	37'	40'	43'
		EB Right	75' (3 veh)	46'	48'	82'	124'	50'	80'	78'	121'
		WESTBOUND									
		WB Left	125' (5 veh)	24'	28'	70'	83'	46'	54'	32'	34'
		WB Thru/Right	300' (12 veh)	66'	73'	86'	104'	87'	108'	68'	75'
		NORTHBOUND									
		NB Left	200' (8 veh)	4'	4'	24'	61'	102'	177'	70'	120'
		NB Thru/Right	385' (15 veh)	50'	59'	92'	118'	32'	44'	72'	91'
		SOUTHBOUND									
		SB Left	100' (4 veh)	75'	114'	43'	73'	21'	21'	34'	46'
		SB Thru	580' (23 veh)	147'	205'	145'	193'	112'	174'	116'	177'
		SB Right	100' (4 veh)	0'	0'	0'	0'	1'	1'	7'	7'
4 Alpha Drive	Two-Way Stop Control (TWSC)	EASTBOUND									
		EB Left/Thru/Right	50' (2 veh)	1'	1'	2'	3'	2'	4'	2'	3'
		WESTBOUND									
		WB Left/Thru/Right	200' (8 veh)	11'	18'	48'	74'	34'	60'	16'	23'
		NORTHBOUND									
		NB Left	175' (7 veh)	1'	1'	2'	2'	2'	3'	0'	1'
		SOUTHBOUND									
		SB Left	75' (3 veh)	4'	6'	5'	7'	3'	4'	2'	3'
		SOUTHBOUND									
		SB Left	100' (4 veh)	261'	325'	181'	153'	99'	130'	253'	374'
5 Century Court	Signal	EASTBOUND									
		EB Left	125' (5 veh)	107'	124'	107'	125'	84'	88'	64'	70'
		EB Thru/Right	225' (9 veh)	37'	40'	50'	54'	47'	52'	29'	31'
		WESTBOUND									
		WB Left/Thru/Right	50' (2 veh)	8'	8'	9'	9'	9'	9'	11'	12'
		NORTHBOUND									
		NB Left	75' (3 veh)	25'	47'	37'	66'	8'	15'	4'	8'
		NB Thru/Right	200' (8 veh)	71'	82'	82'	137'	43'	100'	45'	111'
		SOUTHBOUND									
		SB Left	100' (4 veh)	1'	1'	1'	2'	1'	1'	0'	1'
		SB Thru/Right	225' (9 veh)	261'	325'	181'	153'	99'	130'	253'	374'
		SOUTHBOUND									
		SB Left	100' (4 veh)	62'	68'	36'	36'	35'	37'	39'	39'
		EB Thru/Right	150' (6 veh)	37'	38'	35'	36'	26'	27'	34'	34'
6 Beasley Drive / Lumber Drive	TWSC	EASTBOUND									
		EB Left/Thru/Right	325' (13 veh)	11'	15'	18'	24'	22'	29'	14'	25'
		WESTBOUND									
		WB Left/Thru/Right	200' (8 veh)	2'	5'	20'	32'	14'	23'	19'	20'
		NORTHBOUND									
		NB Left	25' (1 veh)	10'	14'	10'	14'	4'	6'	3'	4'
		SOUTHBOUND									
		SB Left	200' (8 veh)	1'	2'	5'	8'	3'	4'	4'	5'
		SOUTHBOUND									
		SB Left	100' (4 veh)	9'	9'	6'	6'	10'	14'	24'	65'
SB Thru	999' (40 veh)	89'	91'	70'	76'	49'	68'	121'	136'		
7 Franklin Business Park (North) / Future Werthan Circle	Signal	WESTBOUND									
		WB Left	150' (6 veh)	88'	37'	35'	62'	45'	52'	132'	157'
		WB Right	150' (6 veh)	25'	28'	27'	29'	25'	28'	37'	41'
		NORTHBOUND									
		NB Thru/Right	275' (11 veh)	72'	170'	252'	339'	118'	260'	137'	193'
		SOUTHBOUND									
		SB Left	150' (6 veh)	9'	9'	6'	6'	10'	14'	24'	65'
		SB Thru	999' (40 veh)	89'	91'	70'	76'	49'	68'	121'	136'
		SOUTHBOUND									
		SB Left	100' (4 veh)	0'	0'	8'	8'			8'	8'
NB Thru/Right	115' (4 veh)	8'	12'	78'	106'	84'	100'	101'	128'		
8 Confederate Drive / Werthan Circle	Signal	EASTBOUND									
		EB Left	100' (4 veh)	62'	68'	36'	36'	35'	37'	39'	39'
		EB Thru/Right	150' (6 veh)	37'	38'	35'	36'	26'	27'	34'	34'
		WESTBOUND									
		WB Left	100' (4 veh)	47'	55'	52'	60'	28'	31'	26'	30'
		WB Thru/Right	200' (8 veh)	29'	31'	36'	39'	25'	26'	31'	32'
		NORTHBOUND									
		NB Left	100' (4 veh)	0'	0'	8'	8'			8'	8'
		NB Thru/Right	115' (4 veh)	8'	12'	78'	106'	84'	100'	101'	128'
		SOUTHBOUND									
SB Left	100' (4 veh)	6'	10'	5'	10'						
SB Thru/Right	325' (13 veh)	134'	224'	116'	183'	116'	155'	195'	223'		
9 Carr Avenue	Stop	WESTBOUND									
		WB Left/Thru/Right	175' (7 veh)	6'	8'	13'	20'	13'	20'	11'	15'
		SOUTHBOUND									
		SB Left	150' (6 veh)	3'	4'	4'	5'	3'	5'	2'	4'
10 Downs Boulevard	Signal	EASTBOUND									
		EB Left	150' (6 veh)	85'	100'	76'	89'	86'	102'	100'	119'
		EB Thru	350' (14 veh)	8'	10'	5'	5'	8'	10'	5'	5'
		EB Right	350' (14 veh)	192'	334'	113'	218'	163'	269'	279'	508'
		WESTBOUND									
		WB Left	100' (4 veh)	8'	10'	9'	11'	12'	13'	14'	16'
		WB Thru/Right	250' (10 veh)	9'	10'	14'	18'	13'	15'	11'	14'
		NORTHBOUND									
		NB Left	300' (12 veh)	94'	102'	137'	195'	104'	159'	144'	184'
		NB Thru/Right	175' (7 veh)	32'	38'	106'	569'	78'	100'	109'	366'
		SOUTHBOUND									
		SB Left	150' (6 veh)	5'	7'	5'	7'	6'	7'	7'	8'
		SB Thru	450' (18 veh)	292'	416'	346'	482'	377'	551'	370'	529'
		SB Right	300' (12 veh)	24'	28'	21'	25'	24'	27'	27'	29'
11 James Avenue	Stop	WESTBOUND									
		WB Left/Thru/Right	125' (5 veh)	5'	9'	6'	9'	4'	7'	6'	9'

Queue Length for Roundabout Concept

Cross-Street	Traffic Control Device	Geometry	Storage Length	[AM] Peak Hour		[MD] Peak Hour		[PM] Peak Hour		[SAT] Peak Hour			
				Queue Length (Feet)		Queue Length (Feet)		Queue Length (Feet)		Queue Length (Feet)			
				2021	2041	2021	2041	2021	2041	2021	2041		
1 Mack Hatcher Parkway / Hillview Lane	Signal	EASTBOUND (EB)											
		EB Left	150' (6 veh)	10'	11'	43'	51'	23'	26'	27'	30'		
		EB Thru	450' (18 veh)	38'	43'	104'	123'	85'	101'	121'	144'		
		EB Right	40' (1 veh)	0'	0'	0'	0'	17'	34'	6'	19'		
		WESTBOUND (WB)											
		WB Left	640' (25 veh)	108'	128'	73'	87'	178'	215'	83'	99'		
		WB Thru	999' (40 veh)	64'	73'	86'	102'	91'	108'	106'	126'		
		WB Right	325' (13 veh)	106'	176'	61'	134'	87'	163'	82'	155'		
		NORTHBOUND (NB)											
		NB Left	200' (8 veh)	20'	24'	26'	31'	22'	25'	43'	53'		
		NB Thru	999' (40 veh)	223'	282'	131'	158'	160'	192'	162'	196'		
		NB Right	40' (1 veh)	40'	56'	5'	16'	1'	8'	12'	24'		
		SOUTHBOUND (SB)											
		SB Left	300' (12 veh)	130'	153'	152'	182'	114'	135'	158'	189'		
SB Thru	560' (22 veh)	182'	222'	267'	333'	547'	784'	358'	513'				
SB Right	400' (16 veh)	0'	0'	0'	0'	0'	0'	0'	0'				
2 Parkway Commons / Cemetery	Roundabout	EASTBOUND											
		EB Left/Thru/U-Turn	175' (7 veh)	13'	18'	47'	78'	35'	57'	33'	52'		
		EB Right	175' (7 veh)	4'	6'	13'	19'	19'	30'	16'	23'		
		WESTBOUND											
		WB Left/Thru/Right/U-Turn	250' (10 veh)	1'	1'	5'	7'	1'	1'	2'	2'		
		NORTHBOUND											
		NB Left/Thru/U-Turn	150' (6 veh)	70'	99'	53'	79'	55'	74'	52'	71'		
		NB Thru/Right	150' (6 veh)	70'	99'	53'	79'	55'	74'	52'	71'		
		SOUTHBOUND											
		SB Left/Thru/U-Turn	150' (6 veh)	40'	52'	63'	86'	73'	104'	60'	83'		
		SB Thru/Right	150' (6 veh)	40'	52'	63'	86'	73'	104'	60'	83'		
		3 Southeast Parkway / Shadow Green Drive	Roundabout	EASTBOUND									
				EB Left/Thru/U-Turn	200' (8 veh)	27'	37'	55'	93'	23'	36'	32'	49'
				EB Right	200' (8 veh)	29'	41'	54'	87'	32'	50'	48'	77'
WESTBOUND													
WB Left/Thru/U-Turn	125' (5 veh)			8'	12'	32'	53'	16'	24'	11'	16'		
WB Right	300' (12 veh)			31'	52'	34'	56'	25'	40'	18'	28'		
NORTHBOUND													
NB Left/Thru/U-Turn	450' (18 veh)			102'	185'	89'	153'	65'	95'	71'	119'		
NB Thru/Right	450' (18 veh)			102'	185'	89'	153'	65'	95'	71'	119'		
SOUTHBOUND													
SB Left/Thru/U-Turn	450' (18 veh)			48'	66'	96'	175'	123'	230'	92'	164'		
SB Thru/Right	450' (18 veh)			48'	66'	96'	175'	123'	230'	92'	164'		
4 Alpha Drive	Two-Way Stop Control (TWSC)			EASTBOUND									
				EB Left/Thru/Right	50' (2 veh)	0'	0'	2'	3'	2'	3'	1'	2'
		WESTBOUND											
WB Left/Thru/Right	150' (6 veh)	13'	21'	46'	87'	27'	44'	19'	31'				
5 Century Court	Roundabout	EASTBOUND											
		EB Left/Thru/U-Turn	125' (5 veh)	17'	23'	24'	39'	17'	27'	10'	14'		
		EB Right	225' (9 veh)	13'	19'	29'	47'	23'	38'	8'	12'		
		WESTBOUND											
		WB Left/Thru/Right/U-Turn	50' (2 veh)	1'	1'	1'	1'	1'	1'	1'	1'		
		NORTHBOUND											
		NB Left/Thru/U-Turn	200' (8 veh)	90'	146'	98'	187'	71'	101'	71'	101'		
		NB Thru/Right	200' (8 veh)	90'	146'	98'	187'	71'	101'	71'	101'		
		SOUTHBOUND											
		SB Left/Thru/U-Turn	275' (11 veh)	56'	76'	79'	141'	85'	128'	82'	120'		
		SB Thru/Right	275' (11 veh)	56'	76'	79'	141'	85'	128'	82'	120'		
		6 Beasley Drive / Lumber Drive	TWSC	EASTBOUND									
				EB Right	325' (13 veh)	16'	24'	30'	52'	39'	70'	29'	50'
				WESTBOUND									
WB Right	200' (8 veh)	2'	3'	16'	25'	9'	14'	12'	18'				
7 Franklin Business Park (North) / Future Werthan Circle	Roundabout	WESTBOUND											
		WB Left/Right/U-Turn	150' (6 veh)	9'	13'	15'	22'	9'	13'	39'	66'		
		NORTHBOUND											
		NB Thru/U-Turn	275' (11')	73'	103'	70'	97'	59'	75'	63'	88'		
		NB Thru/Right	275' (11')	73'	103'	70'	97'	59'	75'	63'	88'		
		SOUTHBOUND											
		SB Left/Thru/U-Turn	999' (40 veh)	50'	69'	55'	76'	60'	83'	71'	102'		
		SB Thru	999' (40 veh)	50'	69'	55'	76'	60'	83'	71'	102'		
8 Confederate Drive / Werthan Circle	Roundabout	EASTBOUND											
		EB Left/Thru/Right/U-Turn	150' (6 veh)	17'	23'	11'	14'	7'	9'	11'	11'		
		WESTBOUND											
		WB Left/Thru/Right/U-Turn	200' (8 veh)	14'	21'	19'	30'	9'	12'	9'	13'		
		NORTHBOUND											
		NB Left/Thru/U-Turn	115' (4 veh)	71'	100'	66'	90'	54'	73'	65'	90'		
		NB Thru/Right	115' (4 veh)	71'	100'	66'	90'	54'	73'	65'	90'		
		SOUTHBOUND											
SB Left/Thru/U-Turn	325' (13 veh)	56'	76'	54'	74'	59'	80'	66'	71'				
SB Thru/Right	325' (13 veh)	56'	76'	54'	74'	59'	80'	66'	71'				
9 Carr Avenue	Stop	WESTBOUND											
		WB Right	175' (7 veh)	2'	3'	6'	9'	5'	7'	6'	9'		
10 Downs Boulevard	Signal	EASTBOUND											
		EB Left	150' (6 veh)	82'	94'	76'	88'	83'	96'	100'	116'		
		EB Thru	150' (6 veh)	7'	9'	5'	5'	7'	9'	5'	5'		
		EB Right	350' (14 veh)	203'	237'	101'	152'	151'	257'	283'	517'		
		WESTBOUND											
		WB Left	80' (3 veh)	7'	9'	9'	11'	11'	12'	13'	16'		
		WB Thru/Right	80' (3 veh)	8'	10'	14'	17'	12'	14'	11'	14'		
		NORTHBOUND											
		NB Left	900' (36 veh)	100'	106'	138'	167'	175'	252'	182'	227'		
		NB Thru/Right	900' (36 veh)	192'	287'	176'	264'	150'	217'	198'	283'		
		SOUTHBOUND											
		SB Left	150' (6 veh)	6'	9'	5'	7'	5'	7'	7'	8'		
		SB Thru	450' (18 veh)	332'	547'	327'	433'	359'	480'	377'	541'		
		SB Right	300' (12 veh)	27'	36'	20'	23'	23'	25'	27'	29'		
11 James Avenue	Roundabout	WESTBOUND											
		WB Left/Thru/Right	125' (5 veh)	5'	9'	5'	8'	4'	7'	6'	10'		