DRAFT INTERSECTION CONTROL EVALUATION

(BOURNESIDE BOULEVARD AT SR 70)

Florida Department of Transportation

District 1

SR 70

Limits of Project: from Lorraine Road to CR 675/Waterbury Road

Manatee County, Florida

Financial Management Number: 414506-2

ETDM Number: 14263

Date: JUNE 2019

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by FDOT pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated December 14, 2016 and executed by FHWA and FDOT.

Memorandum

Date:	June 20, 2019		
To:	David C. Turley, PE FDOT District 1	From:	Christopher Benitez, PE, PTOE Stantec Consulting Services, Inc.
Project:	414506-2: SR 70 between Lorraine Road and CR 675		
Subject:	Intersection Control Evaluation (ICE) Bourneside Boulevard at SR 70		

Reference: Intersection Control Evaluation (ICE): Bourneside Boulevard at SR 70

The purpose of this memorandum is to document the Florida Department of Transportation (FDOT) Intersection Control Evaluation (ICE) for the intersection of SR 70 and Bourneside Boulevard. This ICE has been completed as part of the FDOT District 1 project: 414506-2 – SR 70 between Lorraine Road to CR 675. The project proposes to increase capacity along SR 70 by widening from a two-lane undivided to a four-lane divided facility along with traffic operational improvements at the intersections. The ICE analysis was initiated during the Project Development & Environment (PD&E) phase of the project due to the failing traffic operations during future conditions. According to the project Design Traffic Technical Memorandum (dated October 2018), the intersection of Bourneside Boulevard and SR 70 will operate at Level of Service (LOS) F as a two-way stop-controlled intersection.

An FDOT ICE for the intersection of Bourneside Blvd and SR 70 was completed for both Stage 1 and Stage 2 for several alternative intersection configurations. Based on an interpretation of the results of the ICE analysis, the roundabout is the recommended option. The analysis included an evaluation of the traffic operations, safety, cost, multimodal accommodations, and other impacts such as environmental, utility, and right of way. The evaluation focused on the SR 70 future build conditions as a four-lane divided facility with a design speed of 55 mph. The results are provided in the Stage 2 ICE Form in **Attachment A.** The memorandum is organized as follows:

- Attachment A: ICE Stage 2 Form and Results
- Attachment B: Conceptual Plans
- Attachment C: Traffic Operational Analysis
- Attachment D: Safety Performance for Intersection Control Evaluation (SPICE)
- Attachment E: Cost Estimates
- Attachment F: Delay Calculations
- Attachment G: Benefit/Cost Summary
- Attachment H: ICE Stage 1 Form, Capacity Analysis for Planning of Junctions (CAP-X), and Stage 1 SPICE

ATTACHMENT A

FDOT ICE Stage 2 Form and Results

Florida Department of Transportation
Intersection Control Evaluation (ICE) Form
Stage 2: Intial Control Strategy Assessment

To fulfill the requirements of Stage 2 (Intersection Control Strategy) of FDOT's ICE procedures, complete the following form and append all supporting documentation. Completed forms can be submitted to the District Traffic Operations Engineer (DTOE) and District Design Engineer (DDE) for the project's approval.

Project Name	SR 70 from Lorraine Rd to CR 675	FDOT Project #	414506-2-22-01	Date	01/28/19
Submitted By	Nicole Harris, PE	Agency/Company	Stantec	Email	nicole.harris@stantec.com

List all viable intersection control strategies identified in Stage 1 (Screening):

Signalized Control	Roundabout	Displaced Left-Turn
Quadrant Roadway		

Operational Analyses

Summarize the results of the peak hour analysis performed for each control strategy. Select analysis year based on guidance in the ICE procedures document. Refer to Exhibit 19-8 of the *Highway Capacity Manual, 6th Edition* (HCM6) to determine the appropriate LOS based on intersection delay (*hover over this cell for Exhibit 19-8*).

Design Vehicle	Interstate Semitrailer (WB-62)	Control Vehicle	Interstate Semitrailer (WB-62)

Opening Year: 2025

Control Strategy	Peak Hour	Weekday AM Peak		Peak Hour	Weekday PM Peak		Peak Hour	Saturday Midday Peak	
	LOS	Delay (sec.)	All Queues Accommodated?	LOS	Delay (sec.)	All Queues Accommodated?	LOS	Delay (sec.)	All Queues Accommodated?
Signalized Control	B	12.5	Yes	B	13.0	Yes			
Roundabout	A	6.1	Yes	A	6.0	Yes			
Displaced Left-Turn	B	14.6	Yes	B	15.7	Yes			
Quadrant Roadway	D	36.3	Yes	D	38.5	Yes			

Design Year: 2045

Control Strategy	Peak Hour	Weekday AM Peak		Peak Hour	Weekday PM Peak		Peak Hour	Saturday Midday Peak	
	LOS	Delay (sec.)	All Queues Accommodated?	LOS	Delay (sec.)	All Queues Accommodated?	LOS	Delay (sec.)	All Queues Accommodated?
Signalized Control	C	22.0	Yes	C	20.2	Yes			
Roundabout	B	11.3	Yes	B	11.1	Yes			
Displaced Left-Turn	C	25.5	Yes	C	25.0	Yes			
Quadrant Roadway	D	41.1	Yes	D	48.8	Yes			

Provide any additional discussion necessary regarding the results of the operational analysis:	Based on the delay calculations, the roundabout had the best operations. The delay that is shown for the Displaced Left-Turn and Quadrant Roadway were recalculated as Experience Travel Time (ETT) based on guidance from the Highway Capacity Manual (HCM) 6th Edition, Chapter 23. Refer to Attachment F for the Delay Calculations.

Safety Performance

Enter the most recent five (5) years of crash data from the CAR System. | Most recent year of crash data available: 2018

Crash Type		2014	2015	2016	2017	2018	Total
Combined	Total						
	Fatal/Injury						
	PDO						
Single-Vehicle	Total	0	0	0	0	0	0
	Fatal/Injury	0	0	0	0	0	0
	PDO	0	0	0	0	0	0
Multi-Vehicle	Total	0	1	0	1	0	2
	Fatal/Injury	0	1	0	1	0	2
	PDO	0	0	0	0	0	0
Vehicle-Pedestrian	Fatal/Injury	0	0	0	0	0	0
Vehicle-Bicycle	Fatal/Injury	0	0	0	0	0	0
Total	All	0	1	0	1	0	2

Apply the FDOT SPICE Tool to model anticipated safety performance of each control strategy. For intersection types not accommodated in the tool, manually apply crash modification factors detailed in the ICE procedures document or qualitatively describe anticipated safety impacts.

Control Strategy	Anticipated Impact on Safety Performance	Opening Year		Design Year	
		Predicted Total Crashes	Predicted Fatal+Injury Crashes	Predicted Total Crashes	Predicted Fatal+Injury Crashes
Signalized Control	Comparable to the quadrant roadway control.	4.04	1.36	7.57	2.58
Roundabout	Lowest predicted fatal + injury crashes.	5.61	0.51	10.08	0.97
Displaced Left-Turn	Comparable to the signalized control.	3.56	1.20	6.66	2.27
Quadrant Roadway	Due to lack of crash experience, the safety performance of a QR is not known (see FHWA Pub. FHWA-HRT-09-060).	N/A	N/A	N/A	N/A

Costs and Benefit/Cost Ratios

Remaining cognizant of the current level of detail of each control strategy's conceptual design, provide a cost estimate for each. You may want to include costs for preliminary engineering, required right-of-way acquisitions, construction, and a contingency. Apply the FDOT ICE Tool to determine the delay benefit-cost ratio (B/C), safety B/C, overall B/C, and net-present value for each control stratetgy.

Control Strategy	ROW Costs ($)	Construction Costs ($)	FDOT ICE Tool Outputs			
			Delay B/C	Safety B/C	Overall B/C	Net Present Value
Signalized Control	$0	$2,890,000	Base	Base	Base	Base
Roundabout	$0	$2,760,000	Preferred	Preferred	Preferred	$10,849,218
Displaced Left-Turn	$2,320,000	$4,360,000	Less than 0	0.45	Less than 0	-$3,487,929
Quadrant Roadway	$52,800,000	$3,970,000	Less than 0	N/A	Less than 0	-$33,925,166

Multimodal Accomodations								
Note the existing/anticipated level of pedestrian/bicyclist activity at the study intersection during the peak hours of the typical day. See ICE procedures document for activity level thresholds:								
Peak Hour:	Weekday AM Peak		Weekday PM Peak		Saturday Midday Peak		Acitivity Level	
	Major Street	Minor Street	Major Street	Minor Street	Major Street	Minor Street	Ped.	Bicycles
# of ped. crossings (both approaches, if app.):							Low	Low
# of cyclists (both approaches, if app.):								

Summarize the ability of each viable control strategy to accommodate the exisitng/anticipated level of:

Control Strategy	Pedestrians and Bicyclists	Transit Services	Freight Needs
Signalized Control	Crosswalks and bicycle lanes can be accommodated with this option.	There is no transit service in the vicinity of this intersection	This option was designed to accommodate design trucks at the turns.
Roundabout	Crosswalks and bicycle lanes can be accommodated with this option.	There is no transit service in the vicinity of this intersection	This option was designed to accommodate design trucks at the turns.
Displaced Left-Turn	Crosswalks and bicycle lanes can be accommodated with this option.	There is no transit service in the vicinity of this intersection	This option was designed to accommodate design trucks at the turns.
Quadrant Roadway	Crosswalks and bicycle lanes can be accommodated with this option.	There is no transit service in the vicinity of this intersection	This option was designed to accommodate design trucks at the turns.

Environmental, Utility, and Right-of-Way Impacts	
Summarize any issues related to environmental, utility, or right-of-way (including relocation) impacts specific to each control strategy. Be sure to consider the NEPA requirements for each control type.	
Signalized Control	Improvements are within right-of-way and no new environmental impacts are anticipated. The overhead transmission lines on the north side of the corridor are not expected to be impacted.
Roundabout	Improvements are within right-of-way and no new environmental impacts are anticipated. The overhead transmission lines on the north side of the corridor are not expected to be impacted.
Displaced Left-Turn	Right of way acquisition may be needed. Overhead transmission lines on the north side of the roadway may be impacted with westbound displaced left movement.
Quadrant Roadway	Right of way acquisition needed for new quadrant roadway. No impacts are expected to the overhead transmission lines on the north side of the corridor.

Public Input/Feedback (if appropriate)
Summarize any agency or public input regarding the control strategies:
None performed to date.

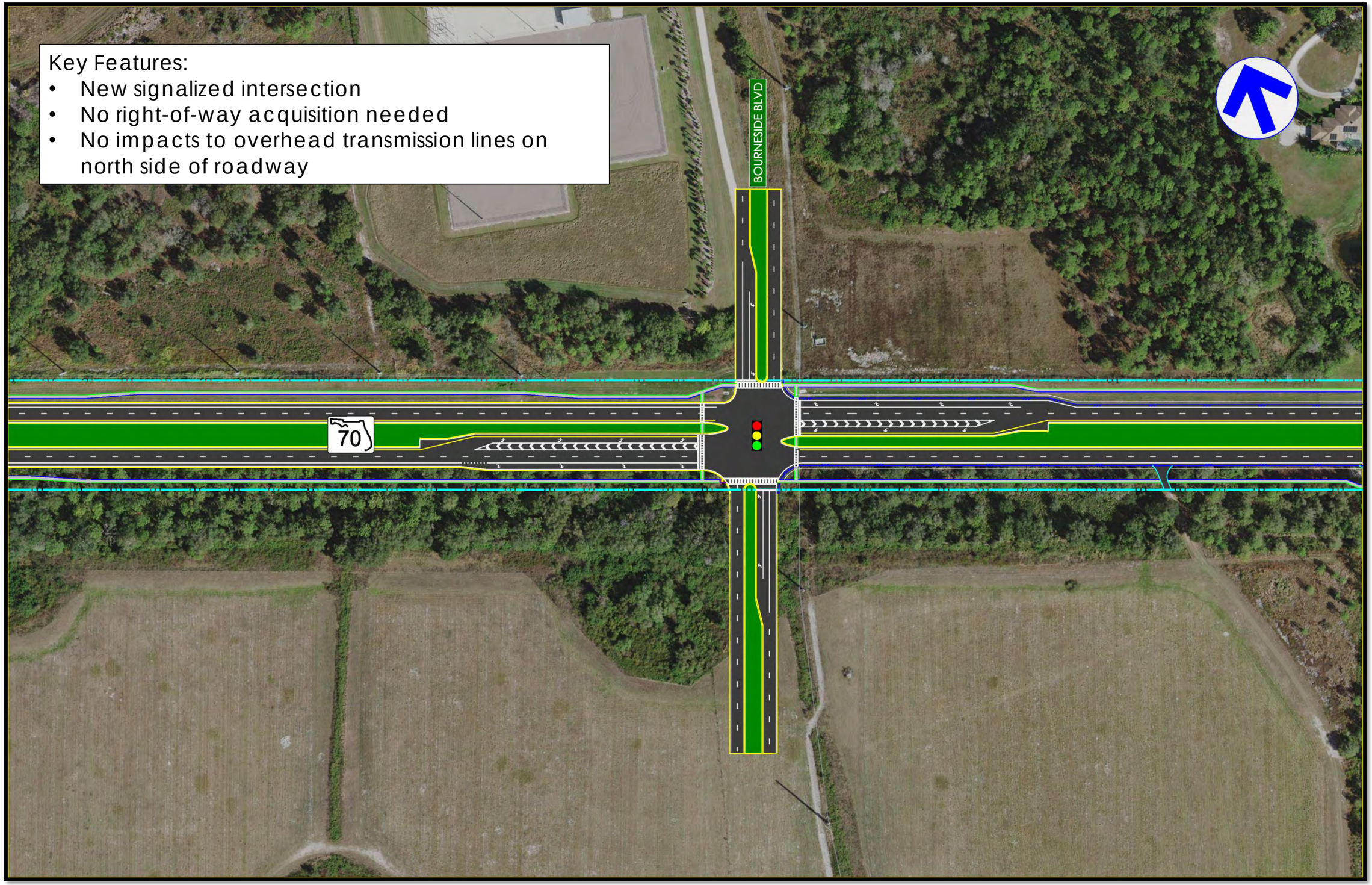
Control Strategy Evaluation		
Provide a brief justification as to why each of the following is either viable or not viable. If a single control strategy is recommended, select it as the only strategy to be advanced.		
Control Strategy	Strategy to be Advanced?	Justification
Signalized Control	No	Second best option however roundabout is preferred.
Roundabout	Yes	1) B/C analysis shows benefits are better than the base option (signalized control) and costs are less; 2) NPV is positive; 3) traffic operations are the best; 4) SPICE analysis shows less severe crashes with this option; and, 5) no ROW impacts
Displaced Left-Turn	No	Control strategy not preferred because benefits are less than the base option (signalized control) and cost is greater than base option (signalized control). Also, this option has a negative NPV compared to the base option (signalized control)
Quadrant Roadway	No	Control strategy not preferred because benefits are less than the base option (signalized control) and cost is greater than base option (signalized control). Also, this option has a negative NPV compared to the base option (signalized control)
	No	
	No	

Resolution					
To be filled out by FDOT District Traffic Operations Engineer and District Design Engineer					
Project Determination					
Comments					
DTOE Name		Signature		Date	
DDE Name		Signature		Date	

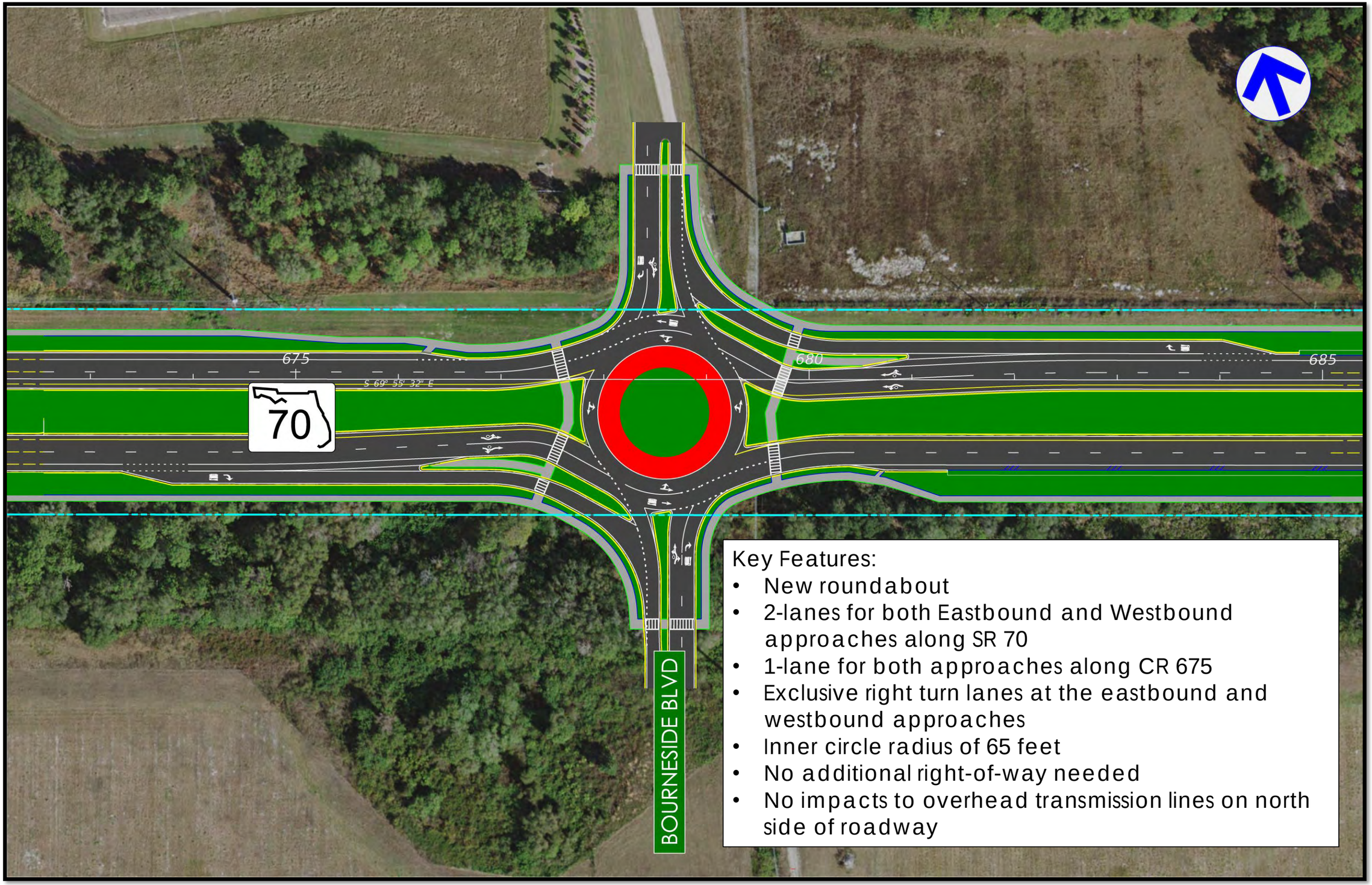
ATTACHMENT B

Conceptual Plans

SR 70 and Bourneside Boulevard
Signalized Intersection



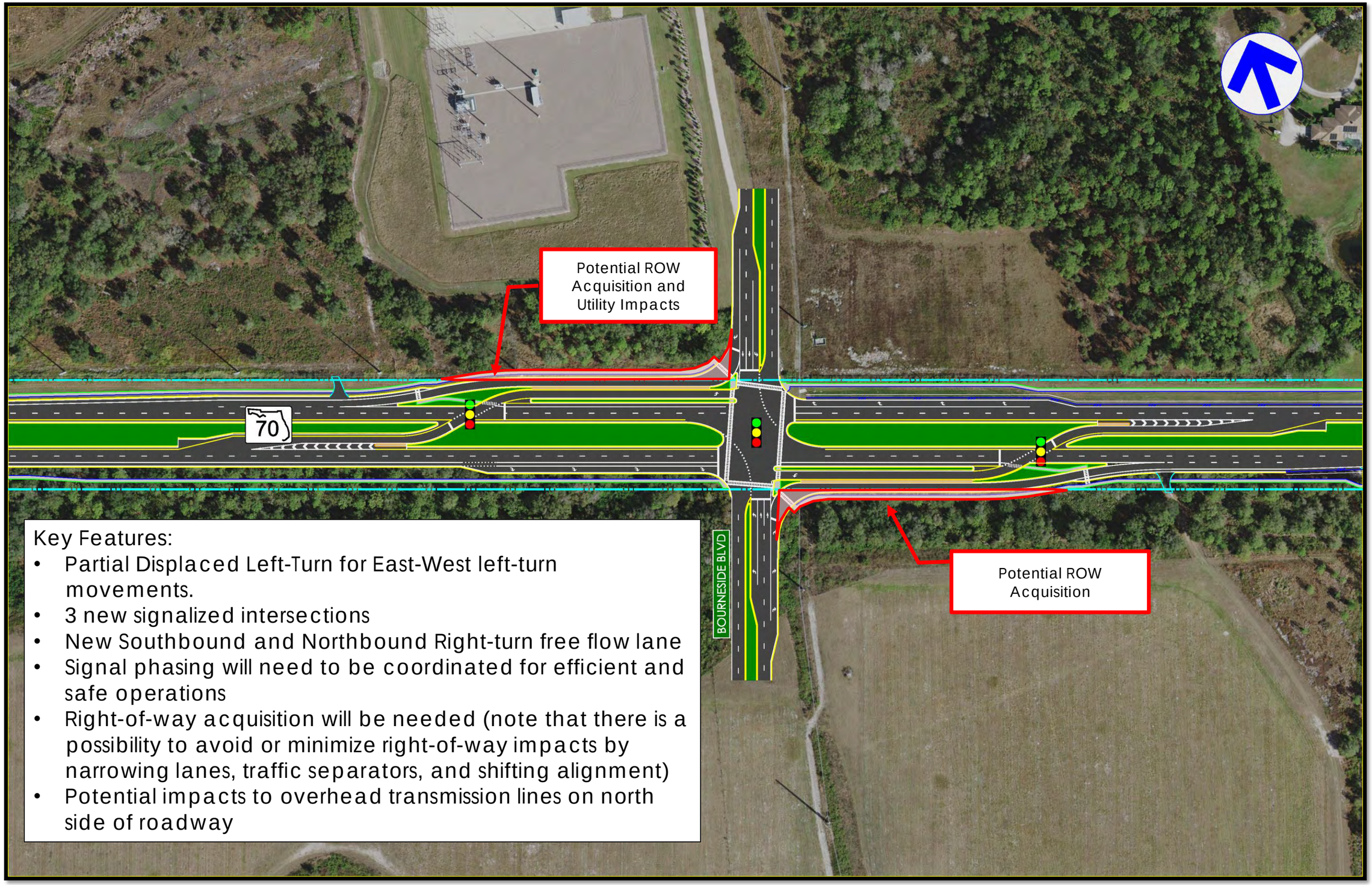
SR 70 and Bourneside Boulevard Roundabout



Key Features:

- New roundabout
- 2-lanes for both Eastbound and Westbound approaches along SR 70
- 1-lane for both approaches along CR 675
- Exclusive right turn lanes at the eastbound and westbound approaches
- Inner circle radius of 65 feet
- No additional right-of-way needed
- No impacts to overhead transmission lines on north side of roadway

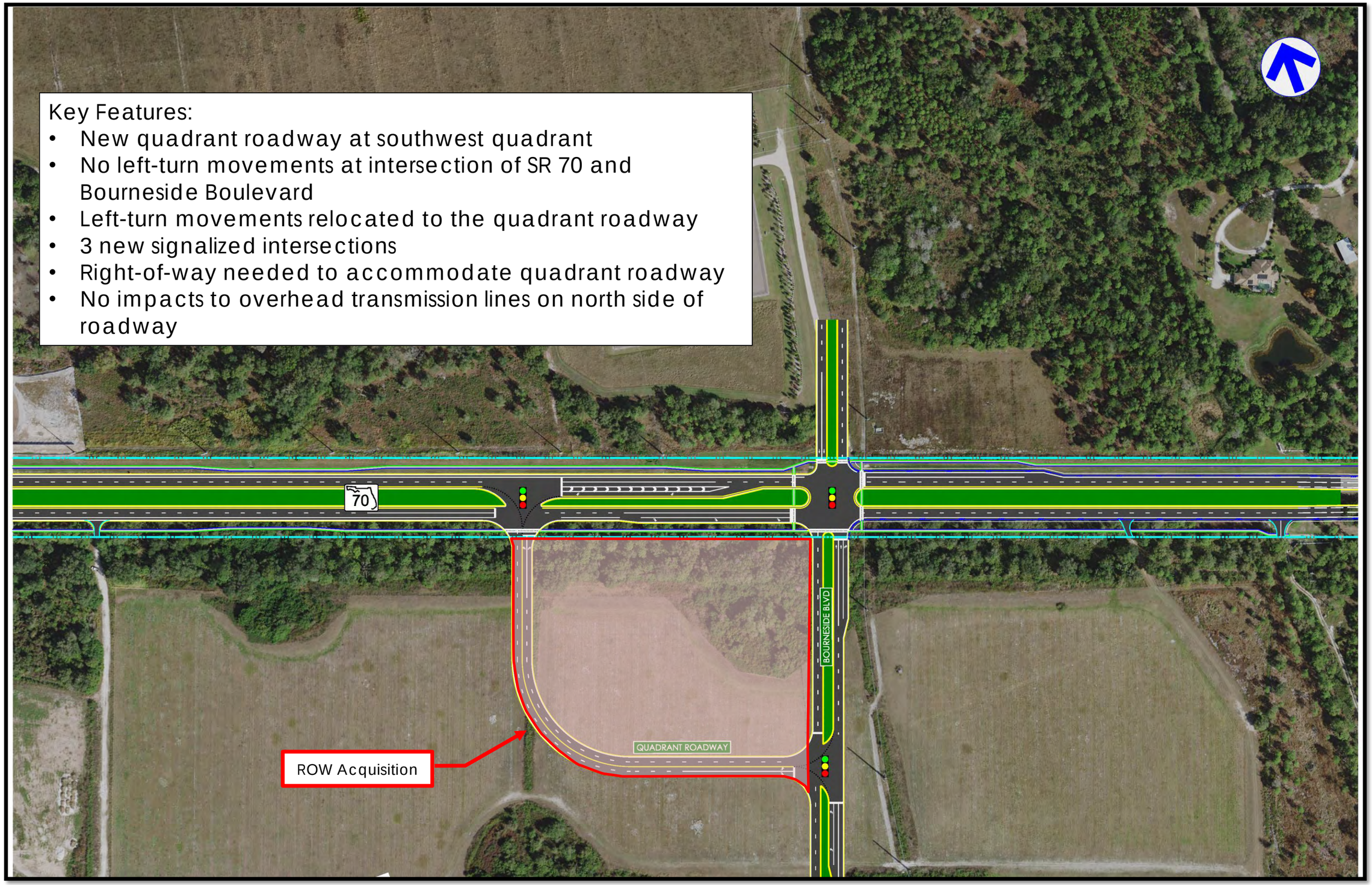
SR 70 and Bourneside Boulevard
Partial Displaced Left-Turn (East-West)



Key Features:

- Partial Displaced Left-Turn for East-West left-turn movements.
- 3 new signalized intersections
- New Southbound and Northbound Right-turn free flow lane
- Signal phasing will need to be coordinated for efficient and safe operations
- Right-of-way acquisition will be needed (note that there is a possibility to avoid or minimize right-of-way impacts by narrowing lanes, traffic separators, and shifting alignment)
- Potential impacts to overhead transmission lines on north side of roadway

SR 70 and Bourneside Boulevard
Quadrant Roadway



ATTACHMENT C

Traffic Operational Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	444	29	29	740	65	54	14	32	34	6	56
Future Volume (veh/h)	65	444	29	29	740	65	54	14	32	34	6	56
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776	1776	1776	1776	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	68	467	31	31	779	68	57	15	34	36	6	59
Adj No. of Lanes	1	2	1	1	2	1	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	7	7	7	7	7	7	2	2	2	2	2	2
Cap, veh/h	255	1202	538	370	1202	538	637	684	612	658	684	612
Arrive On Green	0.36	0.36	0.36	0.36	0.36	0.36	0.39	0.39	0.39	0.39	0.39	0.39
Sat Flow, veh/h	618	3374	1509	854	3374	1509	1331	1770	1583	1351	1770	1583
Grp Volume(v), veh/h	68	467	31	31	779	68	57	15	34	36	6	59
Grp Sat Flow(s),veh/h/ln	618	1687	1509	854	1687	1509	1331	1770	1583	1351	1770	1583
Q Serve(g_s), s	4.8	4.8	0.6	1.3	9.0	1.4	1.3	0.2	0.6	0.8	0.1	1.1
Cycle Q Clear(g_c), s	13.8	4.8	0.6	6.1	9.0	1.4	2.4	0.2	0.6	1.4	0.1	1.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	255	1202	538	370	1202	538	637	684	612	658	684	612
V/C Ratio(X)	0.27	0.39	0.06	0.08	0.65	0.13	0.09	0.02	0.06	0.05	0.01	0.10
Avail Cap(c_a), veh/h	274	1303	583	396	1303	583	637	684	612	658	684	612
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.3	11.2	9.9	13.5	12.6	10.1	9.9	8.8	9.0	9.4	8.8	9.1
Incr Delay (d2), s/veh	0.6	0.2	0.0	0.1	1.0	0.1	0.3	0.1	0.2	0.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	2.2	0.3	0.3	4.3	0.6	0.5	0.1	0.3	0.3	0.1	0.5
LnGrp Delay(d),s/veh	18.9	11.4	9.9	13.6	13.6	10.2	10.2	8.9	9.1	9.6	8.8	9.4
LnGrp LOS	B	B	A	B	B	B	B	A	A	A	A	A
Approach Vol, veh/h		566			878			106			101	
Approach Delay, s/veh		12.2			13.3			9.7			9.4	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		24.0		22.6		24.0		22.6
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		18.0		18.0		18.0		18.0
Max Q Clear Time (g_c+I1), s		4.4		15.8		3.4		11.0
Green Ext Time (p_c), s		0.3		0.8		0.3		3.0

Intersection Summary	
HCM 2010 Ctrl Delay	12.5
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	699	57	32	462	34	30	7	29	64	14	68
Future Volume (veh/h)	59	699	57	32	462	34	30	7	29	64	14	68
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776	1776	1776	1776	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	62	736	60	34	486	36	32	7	31	67	15	72
Adj No. of Lanes	1	2	1	1	2	1	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	7	7	7	7	7	7	2	2	2	2	2	2
Cap, veh/h	329	1078	482	242	1078	482	666	738	660	711	738	660
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	835	3374	1509	648	3374	1509	1305	1770	1583	1364	1770	1583
Grp Volume(v), veh/h	62	736	60	34	486	36	32	7	31	67	15	72
Grp Sat Flow(s),veh/h/ln	835	1687	1509	648	1687	1509	1305	1770	1583	1364	1770	1583
Q Serve(g_s), s	2.9	8.6	1.3	2.2	5.2	0.8	0.7	0.1	0.5	1.4	0.2	1.3
Cycle Q Clear(g_c), s	8.1	8.6	1.3	10.8	5.2	0.8	2.0	0.1	0.5	1.9	0.2	1.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	329	1078	482	242	1078	482	666	738	660	711	738	660
V/C Ratio(X)	0.19	0.68	0.12	0.14	0.45	0.07	0.05	0.01	0.05	0.09	0.02	0.11
Avail Cap(c_a), veh/h	411	1407	629	305	1407	629	666	738	660	711	738	660
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.5	13.5	11.0	18.2	12.3	10.8	8.7	7.8	7.9	8.5	7.8	8.1
Incr Delay (d2), s/veh	0.3	0.9	0.1	0.3	0.3	0.1	0.1	0.0	0.1	0.3	0.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	4.1	0.5	0.4	2.5	0.3	0.3	0.1	0.3	0.6	0.1	0.6
LnGrp Delay(d),s/veh	15.8	14.4	11.1	18.5	12.6	10.9	8.8	7.8	8.0	8.7	7.9	8.4
LnGrp LOS	B	B	B	B	B	B	A	A	A	A	A	A
Approach Vol, veh/h		858			556			70			154	
Approach Delay, s/veh		14.3			12.9			8.4			8.5	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		25.0		20.6		25.0		20.6
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		19.0		19.0		19.0		19.0
Max Q Clear Time (g_c+I1), s		4.0		10.6		3.9		12.8
Green Ext Time (p_c), s		0.2		3.3		0.5		1.7

Intersection Summary	
HCM 2010 Ctrl Delay	13.0
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	211	532	95	93	840	209	173	45	104	180	20	108
Future Volume (veh/h)	211	532	95	93	840	209	173	45	104	180	20	108
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776	1776	1776	1776	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	222	560	100	98	884	220	182	47	109	189	21	114
Adj No. of Lanes	1	2	1	1	2	1	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	7	7	7	7	7	7	2	2	2	2	2	2
Cap, veh/h	313	1109	496	378	996	446	430	534	478	428	534	478
Arrive On Green	0.10	0.33	0.33	0.07	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Sat Flow, veh/h	1691	3374	1509	1691	3374	1509	1249	1770	1583	1226	1770	1583
Grp Volume(v), veh/h	222	560	100	98	884	220	182	47	109	189	21	114
Grp Sat Flow(s),veh/h/ln	1691	1687	1509	1691	1687	1509	1249	1770	1583	1226	1770	1583
Q Serve(g_s), s	5.4	8.0	2.8	2.3	14.9	7.2	7.6	1.1	3.1	8.1	0.5	3.2
Cycle Q Clear(g_c), s	5.4	8.0	2.8	2.3	14.9	7.2	10.9	1.1	3.1	11.2	0.5	3.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	313	1109	496	378	996	446	430	534	478	428	534	478
V/C Ratio(X)	0.71	0.51	0.20	0.26	0.89	0.49	0.42	0.09	0.23	0.44	0.04	0.24
Avail Cap(c_a), veh/h	313	1109	496	406	1019	456	430	534	478	428	534	478
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.0	16.1	14.4	13.2	20.1	17.3	19.7	14.9	15.6	19.8	14.7	15.6
Incr Delay (d2), s/veh	7.2	0.4	0.2	0.4	9.5	0.8	3.0	0.3	1.1	3.3	0.1	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	3.7	1.2	1.1	8.2	3.0	3.0	0.6	1.5	3.1	0.3	1.5
LnGrp Delay(d),s/veh	22.2	16.5	14.6	13.6	29.5	18.2	22.8	15.2	16.7	23.1	14.8	16.8
LnGrp LOS	C	B	B	B	C	B	C	B	B	C	B	B
Approach Vol, veh/h		882			1202			338			324	
Approach Delay, s/veh		17.7			26.2			19.8			20.3	
Approach LOS		B			C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		24.0	10.0	25.6		24.0	12.0	23.6
Change Period (Y+Rc), s		6.0	6.0	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s		18.0	5.0	19.0		18.0	6.0	18.0
Max Q Clear Time (g_c+I1), s		12.9	4.3	10.0		13.2	7.4	16.9
Green Ext Time (p_c), s		0.7	0.0	2.5		0.6	0.0	0.7

Intersection Summary	
HCM 2010 Ctrl Delay	22.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	191	833	183	104	501	108	97	21	92	207	45	219
Future Volume (veh/h)	191	833	183	104	501	108	97	21	92	207	45	219
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1776	1776	1776	1776	1776	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	201	877	193	109	527	114	102	22	97	218	47	231
Adj No. of Lanes	1	2	1	1	2	1	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	7	7	7	7	7	7	2	2	2	2	2	2
Cap, veh/h	405	1036	463	277	927	415	336	550	492	461	550	492
Arrive On Green	0.10	0.31	0.31	0.07	0.27	0.27	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	1691	3374	1509	1691	3374	1509	1097	1770	1583	1268	1770	1583
Grp Volume(v), veh/h	201	877	193	109	527	114	102	22	97	218	47	231
Grp Sat Flow(s),veh/h/ln	1691	1687	1509	1691	1687	1509	1097	1770	1583	1268	1770	1583
Q Serve(g_s), s	4.9	14.1	5.9	2.6	7.8	3.4	4.8	0.5	2.6	8.8	1.1	6.8
Cycle Q Clear(g_c), s	4.9	14.1	5.9	2.6	7.8	3.4	11.6	0.5	2.6	11.4	1.1	6.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	405	1036	463	277	927	415	336	550	492	461	550	492
V/C Ratio(X)	0.50	0.85	0.42	0.39	0.57	0.27	0.30	0.04	0.20	0.47	0.09	0.47
Avail Cap(c_a), veh/h	405	1107	495	302	1049	469	336	550	492	461	550	492
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.4	18.8	15.9	14.9	18.1	16.5	20.8	13.9	14.6	18.8	14.1	16.1
Incr Delay (d2), s/veh	0.9	6.0	0.6	0.9	0.6	0.4	2.3	0.1	0.9	3.4	0.3	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	7.3	2.5	1.3	3.7	1.5	1.7	0.3	1.3	3.5	0.6	3.4
LnGrp Delay(d),s/veh	14.4	24.8	16.5	15.8	18.6	16.8	23.1	14.1	15.5	22.3	14.4	19.3
LnGrp LOS	B	C	B	B	B	B	C	B	B	C	B	B
Approach Vol, veh/h		1271			750			221			496	
Approach Delay, s/veh		21.9			17.9			18.9			20.2	
Approach LOS		C			B			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		24.0	10.1	23.8		24.0	12.0	21.9
Change Period (Y+Rc), s		6.0	6.0	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s		18.0	5.0	19.0		18.0	6.0	18.0
Max Q Clear Time (g_c+I1), s		13.6	4.6	16.1		13.4	6.9	9.8
Green Ext Time (p_c), s		0.4	0.0	1.7		1.1	0.0	2.3

Intersection Summary	
HCM 2010 Ctrl Delay	20.2
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	444	29	0	740	65	54	14	0	34	6	0
Future Volume (vph)	0	444	29	0	740	65	54	14	0	34	6	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		0.95	1.00		0.95	1.00	1.00	0.95		1.00	0.95	
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3463	1549		3463	1549	1816	3632		1816	3632	
Flt Permitted		1.00	1.00		1.00	1.00	0.75	1.00		0.75	1.00	
Satd. Flow (perm)		3463	1549		3463	1549	1441	3632		1428	3632	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	467	31	0	779	68	57	15	0	36	6	0
RTOR Reduction (vph)	0	0	11	0	0	24	0	0	0	0	0	0
Lane Group Flow (vph)	0	467	20	0	779	44	57	15	0	36	6	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	2%	2%	2%	2%	2%	2%
Turn Type		NA	Perm		NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		1 2			1 2		3	8		7	4	
Permitted Phases			1 2			1 2	8			4		
Actuated Green, G (s)		58.7	58.7		58.7	58.7	13.3	9.3		13.3	9.3	
Effective Green, g (s)		58.7	58.7		58.7	58.7	13.3	9.3		13.3	9.3	
Actuated g/C Ratio		0.65	0.65		0.65	0.65	0.15	0.10		0.15	0.10	
Clearance Time (s)							6.0	6.0		6.0	6.0	
Vehicle Extension (s)							3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		2258	1010		2258	1010	229	375		228	375	
v/s Ratio Prot		0.13			c0.22		c0.01	0.00		0.01	0.00	
v/s Ratio Perm			0.01			0.03	c0.03			0.02		
v/c Ratio		0.21	0.02		0.34	0.04	0.25	0.04		0.16	0.02	
Uniform Delay, d1		6.3	5.5		7.0	5.6	33.7	36.3		33.3	36.2	
Progression Factor		1.00	1.00		1.00	1.00	0.36	0.27		0.33	0.28	
Incremental Delay, d2		0.0	0.0		0.1	0.0	0.6	0.0		0.3	0.0	
Delay (s)		6.3	5.5		7.1	5.6	12.7	9.9		11.3	10.1	
Level of Service		A	A		A	A	B	A		B	B	
Approach Delay (s)		6.3			7.0			12.1			11.2	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	65	473	794	0	0	56
Future Volume (vph)	65	473	794	0	0	56
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0	4.0	6.0			6.0
Lane Util. Factor	1.00	0.95	0.95			1.00
Frt	1.00	1.00	1.00			0.86
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1731	3463	3463			1654
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1731	3463	3463			1654
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	498	836	0	0	59
RTOR Reduction (vph)	0	0	0	0	0	54
Lane Group Flow (vph)	68	498	836	0	0	5
Heavy Vehicles (%)	7%	7%	7%	7%	2%	2%
Turn Type	Prot	NA	NA			Over
Protected Phases	1	Free	2			1
Permitted Phases						
Actuated Green, G (s)	7.8	90.0	70.2			7.8
Effective Green, g (s)	7.8	90.0	70.2			7.8
Actuated g/C Ratio	0.09	1.00	0.78			0.09
Clearance Time (s)	6.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	150	3463	2701			143
v/s Ratio Prot	c0.04	0.14	c0.24			0.00
v/s Ratio Perm						
v/c Ratio	0.45	0.14	0.31			0.04
Uniform Delay, d1	39.1	0.0	2.9			37.7
Progression Factor	1.00	1.00	1.35			1.00
Incremental Delay, d2	2.2	0.1	0.3			0.1
Delay (s)	41.2	0.1	4.2			37.8
Level of Service	D	A	A			D
Approach Delay (s)		5.0	4.2		37.8	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	5.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	34.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	65	0	0	79	40	56
Future Volume (vph)	65	0	0	79	40	56
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0			6.0	6.0	4.0
Lane Util. Factor	1.00			0.95	0.91	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	0.95			1.00	1.00	1.00
Satd. Flow (prot)	1816			3632	5219	1625
Flt Permitted	0.95			1.00	1.00	1.00
Satd. Flow (perm)	1816			3632	5219	1625
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	0	0	83	42	59
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	68	0	0	83	42	59
Turn Type	Prot			NA	NA	Free
Protected Phases	2			1 7 8	3 4	
Permitted Phases						Free
Actuated Green, G (s)	34.5			43.5	19.3	90.0
Effective Green, g (s)	34.5			43.5	19.3	90.0
Actuated g/C Ratio	0.38			0.48	0.21	1.00
Clearance Time (s)	6.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	696			1755	1119	1625
v/s Ratio Prot	c0.04			c0.02	0.01	
v/s Ratio Perm						c0.04
v/c Ratio	0.10			0.05	0.04	0.04
Uniform Delay, d1	17.8			12.3	28.0	0.0
Progression Factor	0.16			0.87	1.00	1.00
Incremental Delay, d2	0.3			0.0	0.0	0.0
Delay (s)	3.2			10.7	28.0	0.0
Level of Service	A			B	C	A
Approach Delay (s)	3.2			10.7	11.7	
Approach LOS	A			B	B	

Intersection Summary			
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.08		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	17.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↰	↑↑		↱
Traffic Volume (vph)	478	0	29	805	0	32
Future Volume (vph)	478	0	29	805	0	32
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0		6.0	4.0		6.0
Lane Util. Factor	0.95		1.00	0.95		1.00
Frt	1.00		1.00	1.00		0.86
Flt Protected	1.00		0.95	1.00		1.00
Satd. Flow (prot)	3463		1731	3463		1654
Flt Permitted	1.00		0.95	1.00		1.00
Satd. Flow (perm)	3463		1731	3463		1654
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	503	0	31	847	0	34
RTOR Reduction (vph)	0	0	0	0	0	32
Lane Group Flow (vph)	503	0	31	847	0	2
Heavy Vehicles (%)	7%	7%	7%	7%	2%	2%
Turn Type	NA		Prot	NA		Over
Protected Phases	2		1	Free		1
Permitted Phases						
Actuated Green, G (s)	73.2		4.8	90.0		4.8
Effective Green, g (s)	73.2		4.8	90.0		4.8
Actuated g/C Ratio	0.81		0.05	1.00		0.05
Clearance Time (s)	6.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	2816		92	3463		88
v/s Ratio Prot	0.15		0.02	0.24		0.00
v/s Ratio Perm						
v/c Ratio	0.18		0.34	0.24		0.02
Uniform Delay, d1	1.8		41.1	0.0		40.4
Progression Factor	0.91		1.00	1.00		1.00
Incremental Delay, d2	0.1		2.2	0.2		0.1
Delay (s)	1.8		43.2	0.2		40.5
Level of Service	A		D	A		D
Approach Delay (s)	1.8			1.7	40.5	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	2.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	26.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	29	0	68	32	0	35
Future Volume (vph)	29	0	68	32	0	35
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0		6.0	4.0		6.0
Lane Util. Factor	1.00		0.91	1.00		0.95
Frt	1.00		1.00	0.85		1.00
Flt Protected	0.95		1.00	1.00		1.00
Satd. Flow (prot)	1816		5219	1625		3632
Flt Permitted	0.95		1.00	1.00		1.00
Satd. Flow (perm)	1816		5219	1625		3632
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	31	0	72	34	0	37
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	31	0	72	34	0	37
Turn Type	Prot		NA	Free		NA
Protected Phases	2		3 4			1 7 8
Permitted Phases				Free		
Actuated Green, G (s)	34.5		19.3	90.0		43.5
Effective Green, g (s)	34.5		19.3	90.0		43.5
Actuated g/C Ratio	0.38		0.21	1.00		0.48
Clearance Time (s)	6.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	696		1119	1625		1755
v/s Ratio Prot	c0.02		c0.01			0.01
v/s Ratio Perm				c0.02		
v/c Ratio	0.04		0.06	0.02		0.02
Uniform Delay, d1	17.4		28.2	0.0		12.1
Progression Factor	0.21		1.00	1.00		0.86
Incremental Delay, d2	0.1		0.0	0.0		0.0
Delay (s)	3.8		28.2	0.0		10.5
Level of Service	A		C	A		B
Approach Delay (s)	3.8		19.2			10.5
Approach LOS	A		B			B

Intersection Summary			
HCM 2000 Control Delay	14.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.05		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	17.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	699	57	0	462	34	30	7	0	64	14	0
Future Volume (vph)	0	699	57	0	462	34	30	7	0	64	14	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		0.95	1.00		0.95	1.00	1.00	0.95		1.00	0.95	
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3463	1549		3463	1549	1816	3632		1816	3632	
Flt Permitted		1.00	1.00		1.00	1.00	0.75	1.00		0.75	1.00	
Satd. Flow (perm)		3463	1549		3463	1549	1428	3632		1439	3632	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	736	60	0	486	36	32	7	0	67	15	0
RTOR Reduction (vph)	0	0	21	0	0	13	0	0	0	0	0	0
Lane Group Flow (vph)	0	736	39	0	486	23	32	7	0	67	15	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	2%	2%	2%	2%	2%	2%
Turn Type		NA	Perm		NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		1 2			1 2		3	8		7	4	
Permitted Phases			1 2			1 2	8			4		
Actuated Green, G (s)		58.7	58.7		58.7	58.7	13.3	9.3		13.3	9.3	
Effective Green, g (s)		58.7	58.7		58.7	58.7	13.3	9.3		13.3	9.3	
Actuated g/C Ratio		0.65	0.65		0.65	0.65	0.15	0.10		0.15	0.10	
Clearance Time (s)							6.0	6.0		6.0	6.0	
Vehicle Extension (s)							3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		2258	1010		2258	1010	228	375		229	375	
v/s Ratio Prot		c0.21			0.14		0.01	0.00		c0.01	0.00	
v/s Ratio Perm			0.03			0.02	0.01			c0.03		
v/c Ratio		0.33	0.04		0.22	0.02	0.14	0.02		0.29	0.04	
Uniform Delay, d1		6.9	5.6		6.3	5.5	33.3	36.3		33.9	36.3	
Progression Factor		1.00	1.00		1.00	1.00	0.36	0.29		0.35	0.27	
Incremental Delay, d2		0.1	0.0		0.0	0.0	0.3	0.0		0.7	0.0	
Delay (s)		7.0	5.6		6.4	5.5	12.3	10.4		12.5	9.8	
Level of Service		A	A		A	A	B	B		B	A	
Approach Delay (s)		6.9			6.3			12.0			12.0	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	59	756	492	0	0	68
Future Volume (vph)	59	756	492	0	0	68
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0	4.0	6.0			6.0
Lane Util. Factor	1.00	0.95	0.95			1.00
Frt	1.00	1.00	1.00			0.86
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1731	3463	3463			1654
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1731	3463	3463			1654
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	62	796	518	0	0	72
RTOR Reduction (vph)	0	0	0	0	0	66
Lane Group Flow (vph)	62	796	518	0	0	6
Heavy Vehicles (%)	7%	7%	7%	7%	2%	2%
Turn Type	Prot	NA	NA			Over
Protected Phases	1	Free	2			1
Permitted Phases						
Actuated Green, G (s)	7.5	90.0	70.5			7.5
Effective Green, g (s)	7.5	90.0	70.5			7.5
Actuated g/C Ratio	0.08	1.00	0.78			0.08
Clearance Time (s)	6.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	144	3463	2712			137
v/s Ratio Prot	c0.04	0.23	0.15			0.00
v/s Ratio Perm						
v/c Ratio	0.43	0.23	0.19			0.04
Uniform Delay, d1	39.2	0.0	2.5			38.0
Progression Factor	1.00	1.00	1.98			1.00
Incremental Delay, d2	2.1	0.2	0.2			0.1
Delay (s)	41.3	0.2	5.1			38.1
Level of Service	D	A	A			D
Approach Delay (s)		3.1	5.1		38.1	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	5.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	59	0	0	41	78	68
Future Volume (vph)	59	0	0	41	78	68
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0			6.0	6.0	4.0
Lane Util. Factor	1.00			0.95	0.91	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	0.95			1.00	1.00	1.00
Satd. Flow (prot)	1816			3632	5219	1625
Flt Permitted	0.95			1.00	1.00	1.00
Satd. Flow (perm)	1816			3632	5219	1625
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	62	0	0	43	82	72
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	62	0	0	43	82	72
Turn Type	Prot			NA	NA	Free
Protected Phases	2			1 7 8	3 4	
Permitted Phases						Free
Actuated Green, G (s)	35.2			42.8	19.3	90.0
Effective Green, g (s)	35.2			42.8	19.3	90.0
Actuated g/C Ratio	0.39			0.48	0.21	1.00
Clearance Time (s)	6.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	710			1727	1119	1625
v/s Ratio Prot	c0.03			0.01	c0.02	
v/s Ratio Perm						c0.04
v/c Ratio	0.09			0.02	0.07	0.04
Uniform Delay, d1	17.3			12.5	28.2	0.0
Progression Factor	0.30			0.86	1.00	1.00
Incremental Delay, d2	0.2			0.0	0.0	0.1
Delay (s)	5.4			10.8	28.2	0.1
Level of Service	A			B	C	A
Approach Delay (s)	5.4			10.8	15.1	
Approach LOS	A			B	B	

Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.08		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	17.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↰	↑↑		↱
Traffic Volume (vph)	763	0	32	496	0	29
Future Volume (vph)	763	0	32	496	0	29
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0		6.0	4.0		6.0
Lane Util. Factor	0.95		1.00	0.95		1.00
Frt	1.00		1.00	1.00		0.86
Flt Protected	1.00		0.95	1.00		1.00
Satd. Flow (prot)	3463		1731	3463		1654
Flt Permitted	1.00		0.95	1.00		1.00
Satd. Flow (perm)	3463		1731	3463		1654
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	803	0	34	522	0	31
RTOR Reduction (vph)	0	0	0	0	0	29
Lane Group Flow (vph)	803	0	34	522	0	2
Heavy Vehicles (%)	7%	7%	7%	7%	2%	2%
Turn Type	NA		Prot	NA		Over
Protected Phases	2		1	Free		1
Permitted Phases						
Actuated Green, G (s)	73.0		5.0	90.0		5.0
Effective Green, g (s)	73.0		5.0	90.0		5.0
Actuated g/C Ratio	0.81		0.06	1.00		0.06
Clearance Time (s)	6.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	2808		96	3463		91
v/s Ratio Prot	c0.23		c0.02	0.15		0.00
v/s Ratio Perm						
v/c Ratio	0.29		0.35	0.15		0.02
Uniform Delay, d1	2.1		40.9	0.0		40.2
Progression Factor	1.38		1.00	1.00		1.00
Incremental Delay, d2	0.2		2.2	0.1		0.1
Delay (s)	3.1		43.2	0.1		40.3
Level of Service	A		D	A		D
Approach Delay (s)	3.1			2.7	40.3	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	32	0	37	29	0	71
Future Volume (vph)	32	0	37	29	0	71
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0		6.0	4.0		6.0
Lane Util. Factor	1.00		0.91	1.00		0.95
Frt	1.00		1.00	0.85		1.00
Flt Protected	0.95		1.00	1.00		1.00
Satd. Flow (prot)	1816		5219	1625		3632
Flt Permitted	0.95		1.00	1.00		1.00
Satd. Flow (perm)	1816		5219	1625		3632
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	34	0	39	31	0	75
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	34	0	39	31	0	75
Turn Type	Prot		NA	Free		NA
Protected Phases	2		3 4			1 7 8
Permitted Phases				Free		
Actuated Green, G (s)	35.2		19.3	90.0		42.8
Effective Green, g (s)	35.2		19.3	90.0		42.8
Actuated g/C Ratio	0.39		0.21	1.00		0.48
Clearance Time (s)	6.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	710		1119	1625		1727
v/s Ratio Prot	c0.02		0.01			c0.02
v/s Ratio Perm				0.02		
v/c Ratio	0.05		0.03	0.02		0.04
Uniform Delay, d1	17.0		28.0	0.0		12.6
Progression Factor	0.12		1.00	1.00		0.85
Incremental Delay, d2	0.1		0.0	0.0		0.0
Delay (s)	2.2		28.0	0.0		10.7
Level of Service	A		C	A		B
Approach Delay (s)	2.2		15.6			10.7
Approach LOS	A		B			B

Intersection Summary			
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.05		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	17.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	532	95	0	840	209	173	45	0	108	20	0
Future Volume (vph)	0	532	95	0	840	209	173	45	0	108	20	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		0.95	1.00		0.95	1.00	1.00	0.95		1.00	0.95	
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3463	1549		3463	1549	1816	3632		1816	3632	
Flt Permitted		1.00	1.00		1.00	1.00	0.74	1.00		0.72	1.00	
Satd. Flow (perm)		3463	1549		3463	1549	1420	3632		1386	3632	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	560	100	0	884	220	182	47	0	114	21	0
RTOR Reduction (vph)	0	0	38	0	0	83	0	0	0	0	0	0
Lane Group Flow (vph)	0	560	62	0	884	137	182	47	0	114	21	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	2%	2%	2%	2%	2%	2%
Turn Type		NA	Perm		NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		1 2			1 2		3	8		7	4	
Permitted Phases			1 2			1 2	8			4		
Actuated Green, G (s)		55.9	55.9		55.9	55.9	16.1	11.1		16.1	11.1	
Effective Green, g (s)		55.9	55.9		55.9	55.9	16.1	11.1		16.1	11.1	
Actuated g/C Ratio		0.62	0.62		0.62	0.62	0.18	0.12		0.18	0.12	
Clearance Time (s)							6.0	6.0		6.0	6.0	
Vehicle Extension (s)							3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		2150	962		2150	962	276	447		271	447	
v/s Ratio Prot		0.16			c0.26		c0.04	0.01		0.02	0.01	
v/s Ratio Perm			0.04			0.09	c0.08			0.05		
v/c Ratio		0.26	0.06		0.41	0.14	0.66	0.11		0.42	0.05	
Uniform Delay, d1		7.7	6.7		8.7	7.1	33.9	35.0		32.4	34.8	
Progression Factor		1.00	1.00		1.00	1.00	0.85	0.25		0.43	0.26	
Incremental Delay, d2		0.1	0.0		0.1	0.1	5.6	0.1		1.1	0.0	
Delay (s)		7.8	6.8		8.8	7.2	34.4	8.7		14.9	9.1	
Level of Service		A	A		A	A	C	A		B	A	
Approach Delay (s)		7.6			8.5			29.1			14.0	
Approach LOS		A			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	211	627	1013	0	0	180
Future Volume (vph)	211	627	1013	0	0	180
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0	4.0	6.0			6.0
Lane Util. Factor	1.00	0.95	0.95			1.00
Frt	1.00	1.00	1.00			0.86
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1731	3463	3463			1654
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1731	3463	3463			1654
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	222	660	1066	0	0	189
RTOR Reduction (vph)	0	0	0	0	0	69
Lane Group Flow (vph)	222	660	1066	0	0	120
Heavy Vehicles (%)	7%	7%	7%	7%	2%	2%
Turn Type	Prot	NA	NA			Over
Protected Phases	1	Free	2			1
Permitted Phases						
Actuated Green, G (s)	16.8	90.0	61.2			16.8
Effective Green, g (s)	16.8	90.0	61.2			16.8
Actuated g/C Ratio	0.19	1.00	0.68			0.19
Clearance Time (s)	6.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	323	3463	2354			308
v/s Ratio Prot	c0.13	0.19	c0.31			0.07
v/s Ratio Perm						
v/c Ratio	0.69	0.19	0.45			0.39
Uniform Delay, d1	34.1	0.0	6.7			32.1
Progression Factor	1.00	1.00	1.75			1.00
Incremental Delay, d2	6.0	0.1	0.6			0.8
Delay (s)	40.1	0.1	12.2			32.9
Level of Service	D	A	B			C
Approach Delay (s)		10.2	12.2		32.9	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	211	0	0	254	128	180
Future Volume (vph)	211	0	0	254	128	180
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0			6.0	6.0	4.0
Lane Util. Factor	1.00			0.95	0.91	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	0.95			1.00	1.00	1.00
Satd. Flow (prot)	1816			3632	5219	1625
Flt Permitted	0.95			1.00	1.00	1.00
Satd. Flow (perm)	1816			3632	5219	1625
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	222	0	0	267	135	189
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	222	0	0	267	135	189
Turn Type	Prot			NA	NA	Free
Protected Phases	2			1 7 8	3 4	
Permitted Phases						Free
Actuated Green, G (s)	22.8			55.2	22.1	90.0
Effective Green, g (s)	22.8			55.2	22.1	90.0
Actuated g/C Ratio	0.25			0.61	0.25	1.00
Clearance Time (s)	6.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	460			2227	1281	1625
v/s Ratio Prot	c0.12			c0.07	0.03	
v/s Ratio Perm						c0.12
v/c Ratio	0.48			0.12	0.11	0.12
Uniform Delay, d1	28.6			7.3	26.3	0.0
Progression Factor	0.42			0.86	1.00	1.00
Incremental Delay, d2	3.3			0.0	0.0	0.1
Delay (s)	15.4			6.2	26.3	0.1
Level of Service	B			A	C	A
Approach Delay (s)	15.4			6.2	11.1	
Approach LOS	B			A	B	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	28.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↰	↑↑		↱
Traffic Volume (vph)	640	0	93	1049	0	104
Future Volume (vph)	640	0	93	1049	0	104
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0		6.0	4.0		6.0
Lane Util. Factor	0.95		1.00	0.95		1.00
Frt	1.00		1.00	1.00		0.86
Flt Protected	1.00		0.95	1.00		1.00
Satd. Flow (prot)	3463		1731	3463		1654
Flt Permitted	1.00		0.95	1.00		1.00
Satd. Flow (perm)	3463		1731	3463		1654
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	674	0	98	1104	0	109
RTOR Reduction (vph)	0	0	0	0	0	96
Lane Group Flow (vph)	674	0	98	1104	0	13
Heavy Vehicles (%)	7%	7%	7%	7%	2%	2%
Turn Type	NA		Prot	NA		Over
Protected Phases	2		1	Free		1
Permitted Phases						
Actuated Green, G (s)	67.6		10.4	90.0		10.4
Effective Green, g (s)	67.6		10.4	90.0		10.4
Actuated g/C Ratio	0.75		0.12	1.00		0.12
Clearance Time (s)	6.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	2601		200	3463		191
v/s Ratio Prot	0.19		0.06	0.32		0.01
v/s Ratio Perm						
v/c Ratio	0.26		0.49	0.32		0.07
Uniform Delay, d1	3.5		37.3	0.0		35.5
Progression Factor	1.75		1.00	1.00		1.00
Incremental Delay, d2	0.2		1.9	0.2		0.1
Delay (s)	6.3		39.2	0.2		35.6
Level of Service	A		D	A		D
Approach Delay (s)	6.3			3.4	35.6	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	6.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	33.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	93	0	218	104	0	115
Future Volume (vph)	93	0	218	104	0	115
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0		6.0	4.0		6.0
Lane Util. Factor	1.00		0.91	1.00		0.95
Frt	1.00		1.00	0.85		1.00
Flt Protected	0.95		1.00	1.00		1.00
Satd. Flow (prot)	1816		5219	1625		3632
Flt Permitted	0.95		1.00	1.00		1.00
Satd. Flow (perm)	1816		5219	1625		3632
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	98	0	229	109	0	121
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	98	0	229	109	0	121
Turn Type	Prot		NA	Free		NA
Protected Phases	2		3 4			1 7 8
Permitted Phases				Free		
Actuated Green, G (s)	22.8		22.1	90.0		55.2
Effective Green, g (s)	22.8		22.1	90.0		55.2
Actuated g/C Ratio	0.25		0.25	1.00		0.61
Clearance Time (s)	6.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	460		1281	1625		2227
v/s Ratio Prot	c0.05		c0.04			0.03
v/s Ratio Perm				c0.07		
v/c Ratio	0.21		0.18	0.07		0.05
Uniform Delay, d1	26.5		26.8	0.0		7.0
Progression Factor	0.36		1.00	1.00		0.85
Incremental Delay, d2	1.0		0.1	0.1		0.0
Delay (s)	10.5		26.9	0.1		5.9
Level of Service	B		C	A		A
Approach Delay (s)	10.5		18.2			5.9
Approach LOS	B		B			A

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.17		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	19.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	833	183	0	501	108	97	21	0	207	45	0
Future Volume (vph)	0	833	183	0	501	108	97	21	0	207	45	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		0.95	1.00		0.95	1.00	1.00	0.95		1.00	0.95	
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3463	1549		3463	1549	1816	3632		1816	3632	
Flt Permitted		1.00	1.00		1.00	1.00	0.72	1.00		0.74	1.00	
Satd. Flow (perm)		3463	1549		3463	1549	1386	3632		1419	3632	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	877	193	0	527	114	102	22	0	218	47	0
RTOR Reduction (vph)	0	0	73	0	0	43	0	0	0	0	0	0
Lane Group Flow (vph)	0	877	120	0	527	71	102	22	0	218	47	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	2%	2%	2%	2%	2%	2%
Turn Type		NA	Perm		NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		1 2			1 2		3	8		7	4	
Permitted Phases			1 2			1 2	8			4		
Actuated Green, G (s)		55.9	55.9		55.9	55.9	16.1	11.1		16.1	11.1	
Effective Green, g (s)		55.9	55.9		55.9	55.9	16.1	11.1		16.1	11.1	
Actuated g/C Ratio		0.62	0.62		0.62	0.62	0.18	0.12		0.18	0.12	
Clearance Time (s)							6.0	6.0		6.0	6.0	
Vehicle Extension (s)							3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		2150	962		2150	962	271	447		275	447	
v/s Ratio Prot		c0.25			0.15		0.02	0.01		c0.04	0.01	
v/s Ratio Perm			0.08			0.05	0.05			c0.10		
v/c Ratio		0.41	0.12		0.25	0.07	0.38	0.05		0.79	0.11	
Uniform Delay, d1		8.7	7.0		7.6	6.8	32.1	34.8		34.8	35.0	
Progression Factor		1.00	1.00		1.00	1.00	0.38	0.26		0.90	0.24	
Incremental Delay, d2		0.1	0.1		0.1	0.0	0.9	0.0		14.4	0.1	
Delay (s)		8.8	7.1		7.7	6.8	13.0	9.2		45.9	8.5	
Level of Service		A	A		A	A	B	A		D	A	
Approach Delay (s)		8.5			7.5			12.4			39.3	
Approach LOS		A			A			B			D	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	191	1016	598	0	0	219
Future Volume (vph)	191	1016	598	0	0	219
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0	4.0	6.0			6.0
Lane Util. Factor	1.00	0.95	0.95			1.00
Frt	1.00	1.00	1.00			0.86
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1731	3463	3463			1654
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1731	3463	3463			1654
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	201	1069	629	0	0	231
RTOR Reduction (vph)	0	0	0	0	0	167
Lane Group Flow (vph)	201	1069	629	0	0	64
Heavy Vehicles (%)	7%	7%	7%	7%	2%	2%
Turn Type	Prot	NA	NA			Over
Protected Phases	1	Free	2			1
Permitted Phases						
Actuated Green, G (s)	15.9	90.0	62.1			15.9
Effective Green, g (s)	15.9	90.0	62.1			15.9
Actuated g/C Ratio	0.18	1.00	0.69			0.18
Clearance Time (s)	6.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	305	3463	2389			292
v/s Ratio Prot	c0.12	0.31	0.18			0.04
v/s Ratio Perm						
v/c Ratio	0.66	0.31	0.26			0.22
Uniform Delay, d1	34.5	0.0	5.3			31.7
Progression Factor	1.00	1.00	1.42			1.00
Incremental Delay, d2	5.1	0.2	0.3			0.4
Delay (s)	39.6	0.2	7.8			32.1
Level of Service	D	A	A			C
Approach Delay (s)		6.5	7.8		32.1	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	39.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	191	0	0	129	252	219
Future Volume (vph)	191	0	0	129	252	219
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0			6.0	6.0	4.0
Lane Util. Factor	1.00			0.95	0.91	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	0.95			1.00	1.00	1.00
Satd. Flow (prot)	1816			3632	5219	1625
Flt Permitted	0.95			1.00	1.00	1.00
Satd. Flow (perm)	1816			3632	5219	1625
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	201	0	0	136	265	231
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	201	0	0	136	265	231
Turn Type	Prot			NA	NA	Free
Protected Phases	2			1 7 8	3 4	
Permitted Phases						Free
Actuated Green, G (s)	23.5			54.5	22.1	90.0
Effective Green, g (s)	23.5			54.5	22.1	90.0
Actuated g/C Ratio	0.26			0.61	0.25	1.00
Clearance Time (s)	6.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	474			2199	1281	1625
v/s Ratio Prot	c0.11			0.04	c0.05	
v/s Ratio Perm						c0.14
v/c Ratio	0.42			0.06	0.21	0.14
Uniform Delay, d1	27.6			7.3	27.0	0.0
Progression Factor	0.60			0.86	1.00	1.00
Incremental Delay, d2	2.7			0.0	0.1	0.2
Delay (s)	19.3			6.2	27.1	0.2
Level of Service	B			A	C	A
Approach Delay (s)	19.3			6.2	14.5	
Approach LOS	B			A	B	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	25.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↰	↑↑		↱
Traffic Volume (vph)	1040	0	104	609	0	92
Future Volume (vph)	1040	0	104	609	0	92
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0		6.0	4.0		6.0
Lane Util. Factor	0.95		1.00	0.95		1.00
Frt	1.00		1.00	1.00		0.86
Flt Protected	1.00		0.95	1.00		1.00
Satd. Flow (prot)	3463		1731	3463		1654
Flt Permitted	1.00		0.95	1.00		1.00
Satd. Flow (perm)	3463		1731	3463		1654
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1095	0	109	641	0	97
RTOR Reduction (vph)	0	0	0	0	0	85
Lane Group Flow (vph)	1095	0	109	641	0	12
Heavy Vehicles (%)	7%	7%	7%	7%	2%	2%
Turn Type	NA		Prot	NA		Over
Protected Phases	2		1	Free		1
Permitted Phases						
Actuated Green, G (s)	67.0		11.0	90.0		11.0
Effective Green, g (s)	67.0		11.0	90.0		11.0
Actuated g/C Ratio	0.74		0.12	1.00		0.12
Clearance Time (s)	6.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	2578		211	3463		202
v/s Ratio Prot	c0.32		c0.06	0.19		0.01
v/s Ratio Perm						
v/c Ratio	0.42		0.52	0.19		0.06
Uniform Delay, d1	4.3		37.0	0.0		34.9
Progression Factor	1.44		1.00	1.00		1.00
Incremental Delay, d2	0.5		2.1	0.1		0.1
Delay (s)	6.6		39.1	0.1		35.0
Level of Service	A		D	A		D
Approach Delay (s)	6.6			5.8	35.0	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	104	0	118	92	0	228
Future Volume (vph)	104	0	118	92	0	228
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0		6.0	4.0		6.0
Lane Util. Factor	1.00		0.91	1.00		0.95
Frt	1.00		1.00	0.85		1.00
Flt Protected	0.95		1.00	1.00		1.00
Satd. Flow (prot)	1816		5219	1625		3632
Flt Permitted	0.95		1.00	1.00		1.00
Satd. Flow (perm)	1816		5219	1625		3632
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	109	0	124	97	0	240
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	109	0	124	97	0	240
Turn Type	Prot		NA	Free		NA
Protected Phases	2		3 4			1 7 8
Permitted Phases				Free		
Actuated Green, G (s)	23.5		22.1	90.0		54.5
Effective Green, g (s)	23.5		22.1	90.0		54.5
Actuated g/C Ratio	0.26		0.25	1.00		0.61
Clearance Time (s)	6.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	474		1281	1625		2199
v/s Ratio Prot	c0.06		0.02			c0.07
v/s Ratio Perm				0.06		
v/c Ratio	0.23		0.10	0.06		0.11
Uniform Delay, d1	26.1		26.2	0.0		7.5
Progression Factor	0.24		1.00	1.00		0.84
Incremental Delay, d2	1.1		0.0	0.1		0.0
Delay (s)	7.3		26.3	0.1		6.3
Level of Service	A		C	A		A
Approach Delay (s)	7.3		14.8			6.3
Approach LOS	A		B			A

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.17		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	21.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	478	29	0	769	65	0	79	32	0	40	56
Future Volume (veh/h)	0	478	29	0	769	65	0	79	32	0	40	56
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1776	1776	0	1776	1776	0	1863	1863	0	1863	1900
Adj Flow Rate, veh/h	0	503	31	0	809	68	0	83	34	0	42	59
Adj No. of Lanes	0	2	1	0	2	1	0	2	1	0	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	7	7	0	2	2	0	2	2
Cap, veh/h	0	1050	470	0	1050	470	0	1588	710	0	794	710
Arrive On Green	0.00	0.31	0.31	0.00	0.31	0.31	0.00	0.45	0.45	0.00	0.45	0.45
Sat Flow, veh/h	0	3463	1509	0	3463	1509	0	3632	1583	0	1863	1583
Grp Volume(v), veh/h	0	503	31	0	809	68	0	83	34	0	42	59
Grp Sat Flow(s),veh/h/ln	0	1687	1509	0	1687	1509	0	1770	1583	0	1770	1583
Q Serve(g_s), s	0.0	6.0	0.7	0.0	10.9	1.6	0.0	0.7	0.6	0.0	0.7	1.1
Cycle Q Clear(g_c), s	0.0	6.0	0.7	0.0	10.9	1.6	0.0	0.7	0.6	0.0	0.7	1.1
Prop In Lane	0.00		1.00	0.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	0	1050	470	0	1050	470	0	1588	710	0	794	710
V/C Ratio(X)	0.00	0.48	0.07	0.00	0.77	0.14	0.00	0.05	0.05	0.00	0.05	0.08
Avail Cap(c_a), veh/h	0	1282	574	0	1282	574	0	1588	710	0	794	710
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.84	0.84	0.00	1.00	1.00	0.00	0.99	0.99	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	13.9	12.1	0.0	15.6	12.4	0.0	7.8	7.8	0.0	7.8	7.9
Incr Delay (d2), s/veh	0.0	0.3	0.0	0.0	2.4	0.1	0.0	0.1	0.1	0.0	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.8	0.3	0.0	5.4	0.7	0.0	0.3	0.3	0.0	0.4	0.5
LnGrp Delay(d),s/veh	0.0	14.2	12.2	0.0	18.0	12.6	0.0	7.8	7.9	0.0	7.9	8.1
LnGrp LOS		B	B		B	B		A	A		A	A
Approach Vol, veh/h		534			877			117			101	
Approach Delay, s/veh		14.1			17.5			7.9			8.0	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		28.4		21.6		28.4		21.6
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		19.0		19.0		19.0		19.0
Max Q Clear Time (g_c+I1), s		2.7		8.0		3.1		12.9
Green Ext Time (p_c), s		0.4		2.3		0.4		2.7

Intersection Summary	
HCM 2010 Ctrl Delay	15.1
HCM 2010 LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	29	54	46	35	34
Future Volume (veh/h)	65	29	54	46	35	34
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	68	31	57	48	37	36
Adj No. of Lanes	1	1	1	2	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	119	107	966	2593	1054	900
Arrive On Green	0.07	0.07	0.05	0.73	0.58	0.58
Sat Flow, veh/h	1774	1583	1774	3632	1905	1547
Grp Volume(v), veh/h	68	31	57	48	36	37
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1770	1770	1590
Q Serve(g_s), s	2.2	1.1	0.7	0.2	0.5	0.6
Cycle Q Clear(g_c), s	2.2	1.1	0.7	0.2	0.5	0.6
Prop In Lane	1.00	1.00	1.00			0.97
Lane Grp Cap(c), veh/h	119	107	966	2593	1029	925
V/C Ratio(X)	0.57	0.29	0.06	0.02	0.03	0.04
Avail Cap(c_a), veh/h	532	475	1023	2593	1029	925
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.1	26.6	3.5	2.2	5.4	5.4
Incr Delay (d2), s/veh	4.2	1.5	0.0	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	1.0	0.3	0.1	0.3	0.3
LnGrp Delay(d),s/veh	31.3	28.1	3.5	2.2	5.4	5.5
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	99			105	73	
Approach Delay, s/veh	30.3			2.9	5.4	
Approach LOS	C			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		50.0		10.0	9.1	40.9		
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		
Max Green Setting (Gmax), s		30.0		18.0	5.0	19.0		
Max Q Clear Time (g_c+I1), s		2.2		4.2	2.7	2.6		
Green Ext Time (p_c), s		0.2		0.2	0.0	0.3		

Intersection Summary	
HCM 2010 Ctrl Delay	13.4
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	473	65	29	796	54	34
Future Volume (veh/h)	473	65	29	796	54	34
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1900	1776	1776	1863	1863
Adj Flow Rate, veh/h	498	68	31	838	57	36
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	7	7	7	7	2	2
Cap, veh/h	653	89	226	1189	794	709
Arrive On Green	0.22	0.22	0.03	0.35	0.45	0.45
Sat Flow, veh/h	3074	406	1691	3463	1774	1583
Grp Volume(v), veh/h	281	285	31	838	57	36
Grp Sat Flow(s),veh/h/ln	1687	1704	1691	1687	1774	1583
Q Serve(g_s), s	9.4	9.4	0.8	12.8	1.1	0.8
Cycle Q Clear(g_c), s	9.4	9.4	0.8	12.8	1.1	0.8
Prop In Lane		0.24	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	369	373	226	1189	794	709
V/C Ratio(X)	0.76	0.77	0.14	0.70	0.07	0.05
Avail Cap(c_a), veh/h	506	511	310	1631	794	709
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.64	0.64	1.00	1.00
Uniform Delay (d), s/veh	22.0	22.0	16.7	16.7	9.5	9.4
Incr Delay (d2), s/veh	4.5	4.6	0.2	0.5	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	4.9	0.4	6.0	0.6	0.4
LnGrp Delay(d),s/veh	26.4	26.6	16.9	17.3	9.6	9.5
LnGrp LOS	C	C	B	B	A	A
Approach Vol, veh/h	566			869	93	
Approach Delay, s/veh	26.5			17.3	9.6	
Approach LOS	C			B	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		32.9	8.0	19.1				27.1
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		19.0	5.0	18.0				29.0
Max Q Clear Time (g_c+I1), s		3.1	2.8	11.4				14.8
Green Ext Time (p_c), s		0.2	0.0	1.7				4.6

Intersection Summary	
HCM 2010 Ctrl Delay	20.2
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑	↱		↑↑	↱		↑↑	
Traffic Volume (veh/h)	0	763	57	0	494	34	0	66	29	0	78	68
Future Volume (veh/h)	0	763	57	0	494	34	0	66	29	0	78	68
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1776	1776	0	1776	1776	0	1863	1863	0	1863	1900
Adj Flow Rate, veh/h	0	803	60	0	520	36	0	69	31	0	82	72
Adj No. of Lanes	0	2	1	0	2	1	0	2	1	0	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	7	7	0	2	2	0	2	2
Cap, veh/h	0	1044	467	0	1044	467	0	1594	713	0	845	672
Arrive On Green	0.00	0.31	0.31	0.00	0.31	0.31	0.00	0.45	0.45	0.00	0.45	0.45
Sat Flow, veh/h	0	3463	1509	0	3463	1509	0	3632	1583	0	1970	1492
Grp Volume(v), veh/h	0	803	60	0	520	36	0	69	31	0	77	77
Grp Sat Flow(s),veh/h/ln	0	1687	1509	0	1687	1509	0	1770	1583	0	1770	1599
Q Serve(g_s), s	0.0	10.8	1.4	0.0	6.3	0.8	0.0	0.5	0.5	0.0	1.2	1.4
Cycle Q Clear(g_c), s	0.0	10.8	1.4	0.0	6.3	0.8	0.0	0.5	0.5	0.0	1.2	1.4
Prop In Lane	0.00		1.00	0.00		1.00	0.00		1.00	0.00		0.93
Lane Grp Cap(c), veh/h	0	1044	467	0	1044	467	0	1594	713	0	797	720
V/C Ratio(X)	0.00	0.77	0.13	0.00	0.50	0.08	0.00	0.04	0.04	0.00	0.10	0.11
Avail Cap(c_a), veh/h	0	1282	574	0	1282	574	0	1594	713	0	797	720
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.57	0.57	0.00	1.00	1.00	0.00	0.99	0.99	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	15.6	12.4	0.0	14.1	12.2	0.0	7.7	7.7	0.0	7.9	7.9
Incr Delay (d2), s/veh	0.0	1.3	0.1	0.0	0.4	0.1	0.0	0.1	0.1	0.0	0.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.2	0.6	0.0	2.9	0.4	0.0	0.3	0.3	0.0	0.7	0.7
LnGrp Delay(d),s/veh	0.0	17.0	12.5	0.0	14.5	12.3	0.0	7.8	7.8	0.0	8.1	8.2
LnGrp LOS		B	B		B	B		A	A		A	A
Approach Vol, veh/h		863			556			100			154	
Approach Delay, s/veh		16.7			14.3			7.8			8.2	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		28.5		21.5		28.5		21.5
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		19.0		19.0		19.0		19.0
Max Q Clear Time (g_c+I1), s		2.5		12.8		3.4		8.3
Green Ext Time (p_c), s		0.4		2.7		0.7		2.4

Intersection Summary	
HCM 2010 Ctrl Delay	14.6
HCM 2010 LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	59	32	30	36	71	64
Future Volume (veh/h)	59	32	30	36	71	64
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	62	34	32	38	75	67
Adj No. of Lanes	1	1	1	2	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	118	105	902	2596	1117	900
Arrive On Green	0.07	0.07	0.03	0.73	0.60	0.60
Sat Flow, veh/h	1774	1583	1774	3632	1958	1502
Grp Volume(v), veh/h	62	34	32	38	71	71
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1770	1770	1598
Q Serve(g_s), s	2.0	1.2	0.4	0.2	1.0	1.1
Cycle Q Clear(g_c), s	2.0	1.2	0.4	0.2	1.0	1.1
Prop In Lane	1.00	1.00	1.00			0.94
Lane Grp Cap(c), veh/h	118	105	902	2596	1060	957
V/C Ratio(X)	0.53	0.32	0.04	0.01	0.07	0.07
Avail Cap(c_a), veh/h	532	475	988	2596	1060	957
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.1	26.7	3.5	2.2	5.0	5.0
Incr Delay (d2), s/veh	3.6	1.8	0.0	0.0	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	1.1	0.2	0.1	0.5	0.5
LnGrp Delay(d),s/veh	30.7	28.5	3.5	2.2	5.1	5.2
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	96			70	142	
Approach Delay, s/veh	29.9			2.8	5.2	
Approach LOS	C			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		50.0		10.0	8.1	41.9		
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		
Max Green Setting (Gmax), s		30.0		18.0	5.0	19.0		
Max Q Clear Time (g_c+I1), s		2.2		4.0	2.4	3.1		
Green Ext Time (p_c), s		0.2		0.2	0.0	0.6		

Intersection Summary	
HCM 2010 Ctrl Delay	12.3
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	756	59	32	530	30	64
Future Volume (veh/h)	756	59	32	530	30	64
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1900	1776	1776	1863	1863
Adj Flow Rate, veh/h	796	62	34	558	32	67
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	7	7	7	7	2	2
Cap, veh/h	928	72	215	1446	659	588
Arrive On Green	0.29	0.29	0.04	0.43	0.37	0.37
Sat Flow, veh/h	3261	247	1691	3463	1774	1583
Grp Volume(v), veh/h	423	435	34	558	32	67
Grp Sat Flow(s),veh/h/ln	1687	1732	1691	1687	1774	1583
Q Serve(g_s), s	14.2	14.2	0.8	6.8	0.7	1.7
Cycle Q Clear(g_c), s	14.2	14.2	0.8	6.8	0.7	1.7
Prop In Lane		0.14	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	494	507	215	1446	659	588
V/C Ratio(X)	0.86	0.86	0.16	0.39	0.05	0.11
Avail Cap(c_a), veh/h	534	549	295	1687	659	588
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.89	0.89	1.00	1.00
Uniform Delay (d), s/veh	20.0	20.0	14.8	11.7	12.1	12.4
Incr Delay (d2), s/veh	12.4	12.2	0.3	0.2	0.1	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.3	8.5	0.4	3.1	0.4	0.8
LnGrp Delay(d),s/veh	32.4	32.2	15.1	11.9	12.2	12.8
LnGrp LOS	C	C	B	B	B	B
Approach Vol, veh/h	858			592	99	
Approach Delay, s/veh	32.3			12.1	12.6	
Approach LOS	C			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		28.3	8.2	23.6				31.7
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		18.0	5.0	19.0				30.0
Max Q Clear Time (g_c+I1), s		3.7	2.8	16.2				8.8
Green Ext Time (p_c), s		0.2	0.0	1.3				3.4

Intersection Summary	
HCM 2010 Ctrl Delay	23.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	640	95	0	933	209	0	256	104	0	128	180
Future Volume (veh/h)	0	640	95	0	933	209	0	256	104	0	128	180
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1776	1776	0	1776	1776	0	1863	1863	0	1863	1900
Adj Flow Rate, veh/h	0	674	100	0	982	220	0	269	109	0	135	189
Adj No. of Lanes	0	2	1	0	2	1	0	2	1	0	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	7	7	0	2	2	0	2	2
Cap, veh/h	0	1197	536	0	1197	536	0	1811	810	0	906	810
Arrive On Green	0.00	0.71	0.71	0.00	0.35	0.35	0.00	1.00	1.00	0.00	0.51	0.51
Sat Flow, veh/h	0	3463	1509	0	3463	1509	0	3632	1583	0	1863	1583
Grp Volume(v), veh/h	0	674	100	0	982	220	0	269	109	0	135	189
Grp Sat Flow(s),veh/h/ln	0	1687	1509	0	1687	1509	0	1770	1583	0	1770	1583
Q Serve(g_s), s	0.0	8.7	2.0	0.0	23.8	9.9	0.0	0.0	0.0	0.0	3.6	6.0
Cycle Q Clear(g_c), s	0.0	8.7	2.0	0.0	23.8	9.9	0.0	0.0	0.0	0.0	3.6	6.0
Prop In Lane	0.00		1.00	0.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	0	1197	536	0	1197	536	0	1811	810	0	906	810
V/C Ratio(X)	0.00	0.56	0.19	0.00	0.82	0.41	0.00	0.15	0.13	0.00	0.15	0.23
Avail Cap(c_a), veh/h	0	1499	671	0	1499	671	0	1811	810	0	906	810
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.77	0.77	0.00	1.00	1.00	0.00	0.91	0.91	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	9.7	8.7	0.0	26.4	21.9	0.0	0.0	0.0	0.0	11.6	12.2
Incr Delay (d2), s/veh	0.0	0.3	0.1	0.0	3.0	0.5	0.0	0.2	0.3	0.0	0.3	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.0	0.8	0.0	11.6	4.2	0.0	0.0	0.1	0.0	1.9	2.7
LnGrp Delay(d),s/veh	0.0	10.0	8.8	0.0	29.4	22.4	0.0	0.2	0.3	0.0	12.0	12.9
LnGrp LOS		B	A		C	C		A	A		B	B
Approach Vol, veh/h		774			1202			378			324	
Approach Delay, s/veh		9.9			28.2			0.2			12.5	
Approach LOS		A			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		52.1		37.9		52.1		37.9
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		38.0		40.0		38.0		40.0
Max Q Clear Time (g_c+I1), s		2.0		10.7		8.0		25.8
Green Ext Time (p_c), s		2.2		4.9		2.1		6.1

Intersection Summary	
HCM 2010 Ctrl Delay	17.0
HCM 2010 LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	211	93	173	149	115	108
Future Volume (veh/h)	211	93	173	149	115	108
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	222	98	182	157	121	114
Adj No. of Lanes	1	1	1	2	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	272	243	867	2524	1285	1110
Arrive On Green	0.15	0.15	0.71	0.71	0.71	0.71
Sat Flow, veh/h	1774	1583	1141	3632	1895	1556
Grp Volume(v), veh/h	222	98	182	157	119	116
Grp Sat Flow(s),veh/h/ln	1774	1583	1141	1770	1770	1588
Q Serve(g_s), s	10.9	5.0	5.3	1.2	1.9	2.0
Cycle Q Clear(g_c), s	10.9	5.0	7.3	1.2	1.9	2.0
Prop In Lane	1.00	1.00	1.00			0.98
Lane Grp Cap(c), veh/h	272	243	867	2524	1262	1132
V/C Ratio(X)	0.81	0.40	0.21	0.06	0.09	0.10
Avail Cap(c_a), veh/h	670	598	867	2524	1262	1132
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.99	0.99
Uniform Delay (d), s/veh	36.8	34.4	5.1	3.9	4.0	4.0
Incr Delay (d2), s/veh	5.9	1.1	0.6	0.0	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	2.3	1.8	0.6	0.9	0.9
LnGrp Delay(d),s/veh	42.7	35.4	5.7	3.9	4.1	4.2
LnGrp LOS	D	D	A	A	A	A
Approach Vol, veh/h	320			339	235	
Approach Delay, s/veh	40.5			4.9	4.1	
Approach LOS	D			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		70.2		19.8		70.2		
Change Period (Y+Rc), s		6.0		6.0		6.0		
Max Green Setting (Gmax), s		44.0		34.0		44.0		
Max Q Clear Time (g_c+I1), s		9.3		12.9		4.0		
Green Ext Time (p_c), s		1.8		0.9		1.5		

Intersection Summary	
HCM 2010 Ctrl Delay	17.4
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	627	211	93	1020	173	108
Future Volume (veh/h)	627	211	93	1020	173	108
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1900	1776	1776	1863	1863
Adj Flow Rate, veh/h	660	222	98	1074	182	114
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	7	7	7	7	2	2
Cap, veh/h	1048	352	207	1425	788	703
Arrive On Green	0.42	0.42	0.42	0.42	0.44	0.44
Sat Flow, veh/h	2570	834	598	3463	1774	1583
Grp Volume(v), veh/h	449	433	98	1074	182	114
Grp Sat Flow(s),veh/h/ln	1687	1628	598	1687	1774	1583
Q Serve(g_s), s	18.8	18.9	13.9	24.3	5.7	3.9
Cycle Q Clear(g_c), s	18.8	18.9	32.7	24.3	5.7	3.9
Prop In Lane		0.51	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	713	688	207	1425	788	703
V/C Ratio(X)	0.63	0.63	0.47	0.75	0.23	0.16
Avail Cap(c_a), veh/h	750	724	220	1499	788	703
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.56	0.56	1.00	1.00
Uniform Delay (d), s/veh	20.5	20.5	33.3	22.0	15.5	15.0
Incr Delay (d2), s/veh	1.6	1.6	0.9	1.2	0.7	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.0	8.7	2.3	11.4	2.9	1.8
LnGrp Delay(d),s/veh	22.0	22.1	34.3	23.2	16.2	15.5
LnGrp LOS	C	C	C	C	B	B
Approach Vol, veh/h	882			1172	296	
Approach Delay, s/veh	22.1			24.1	15.9	
Approach LOS	C			C	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		46.0		44.0				44.0
Change Period (Y+Rc), s		6.0		6.0				6.0
Max Green Setting (Gmax), s		38.0		40.0				40.0
Max Q Clear Time (g_c+I1), s		7.7		20.9				34.7
Green Ext Time (p_c), s		0.9		5.1				3.3

Intersection Summary	
HCM 2010 Ctrl Delay	22.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1040	183	0	605	108	0	211	92	0	252	219
Future Volume (veh/h)	0	1040	183	0	605	108	0	211	92	0	252	219
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1776	1776	0	1776	1776	0	1863	1863	0	1863	1900
Adj Flow Rate, veh/h	0	1095	193	0	637	114	0	222	97	0	265	231
Adj No. of Lanes	0	2	1	0	2	1	0	2	1	0	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	7	7	0	2	2	0	2	2
Cap, veh/h	0	1293	579	0	1293	579	0	1711	765	0	882	743
Arrive On Green	0.00	0.38	0.38	0.00	0.38	0.38	0.00	0.48	0.48	0.00	0.48	0.48
Sat Flow, veh/h	0	3463	1509	0	3463	1509	0	3632	1583	0	1918	1537
Grp Volume(v), veh/h	0	1095	193	0	637	114	0	222	97	0	257	239
Grp Sat Flow(s),veh/h/ln	0	1687	1509	0	1687	1509	0	1770	1583	0	1770	1592
Q Serve(g_s), s	0.0	26.7	8.1	0.0	12.9	4.5	0.0	3.1	3.0	0.0	7.9	8.2
Cycle Q Clear(g_c), s	0.0	26.7	8.1	0.0	12.9	4.5	0.0	3.1	3.0	0.0	7.9	8.2
Prop In Lane	0.00		1.00	0.00		1.00	0.00		1.00	0.00		0.97
Lane Grp Cap(c), veh/h	0	1293	579	0	1293	579	0	1711	765	0	855	769
V/C Ratio(X)	0.00	0.85	0.33	0.00	0.49	0.20	0.00	0.13	0.13	0.00	0.30	0.31
Avail Cap(c_a), veh/h	0	1499	671	0	1499	671	0	1711	765	0	855	769
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.57	0.57	0.00	1.00	1.00	0.00	0.90	0.90	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	25.3	19.6	0.0	21.1	18.5	0.0	12.8	12.8	0.0	14.1	14.1
Incr Delay (d2), s/veh	0.0	2.5	0.2	0.0	0.3	0.2	0.0	0.1	0.3	0.0	0.9	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	12.8	3.4	0.0	6.1	1.9	0.0	1.5	1.4	0.0	4.1	3.8
LnGrp Delay(d),s/veh	0.0	27.8	19.8	0.0	21.4	18.7	0.0	13.0	13.1	0.0	15.0	15.2
LnGrp LOS		C	B		C	B		B	B		B	B
Approach Vol, veh/h		1288			751			319			496	
Approach Delay, s/veh		26.6			21.0			13.0			15.1	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		49.5		40.5		49.5		40.5
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		38.0		40.0		38.0		40.0
Max Q Clear Time (g_c+I1), s		5.1		28.7		10.2		14.9
Green Ext Time (p_c), s		1.8		5.8		3.3		4.5

Intersection Summary	
HCM 2010 Ctrl Delay	21.6
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	190	104	97	113	228	207
Future Volume (veh/h)	190	104	97	113	228	207
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	200	109	102	119	240	218
Adj No. of Lanes	1	1	1	2	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	246	220	691	2628	1142	994
Arrive On Green	0.14	0.14	0.05	0.74	0.64	0.64
Sat Flow, veh/h	1774	1583	1774	3632	1887	1563
Grp Volume(v), veh/h	200	109	102	119	237	221
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1770	1770	1587
Q Serve(g_s), s	11.1	6.4	1.8	0.9	5.7	6.0
Cycle Q Clear(g_c), s	11.1	6.4	1.8	0.9	5.7	6.0
Prop In Lane	1.00	1.00	1.00			0.98
Lane Grp Cap(c), veh/h	246	220	691	2628	1126	1010
V/C Ratio(X)	0.81	0.50	0.15	0.05	0.21	0.22
Avail Cap(c_a), veh/h	843	752	854	2628	1126	1010
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.97	0.97
Uniform Delay (d), s/veh	42.2	40.2	5.1	3.5	7.7	7.8
Incr Delay (d2), s/veh	6.4	1.7	0.1	0.0	0.4	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	5.8	0.9	0.4	2.9	2.7
LnGrp Delay(d),s/veh	48.6	42.0	5.2	3.5	8.1	8.2
LnGrp LOS	D	D	A	A	A	A
Approach Vol, veh/h	309			221	458	
Approach Delay, s/veh	46.2			4.3	8.2	
Approach LOS	D			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		81.0		20.0	10.7	70.3		
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		
Max Green Setting (Gmax), s		41.0		48.0	14.0	21.0		
Max Q Clear Time (g_c+I1), s		2.9		13.1	3.8	8.0		
Green Ext Time (p_c), s		0.8		1.0	0.2	2.3		

Intersection Summary	
HCM 2010 Ctrl Delay	19.2
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1016	190	104	720	97	207
Future Volume (veh/h)	1016	190	104	720	97	207
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1900	1776	1776	1863	1863
Adj Flow Rate, veh/h	1069	200	109	758	102	218
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	7	7	7	7	2	2
Cap, veh/h	1231	230	197	1839	596	532
Arrive On Green	0.43	0.43	0.05	0.54	0.34	0.34
Sat Flow, veh/h	2928	530	1691	3463	1774	1583
Grp Volume(v), veh/h	634	635	109	758	102	218
Grp Sat Flow(s),veh/h/ln	1687	1682	1691	1687	1774	1583
Q Serve(g_s), s	34.4	34.7	3.4	13.3	4.1	10.7
Cycle Q Clear(g_c), s	34.4	34.7	3.4	13.3	4.1	10.7
Prop In Lane		0.31	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	731	729	197	1839	596	532
V/C Ratio(X)	0.87	0.87	0.55	0.41	0.17	0.41
Avail Cap(c_a), veh/h	869	866	259	2238	596	532
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.88	0.88	1.00	1.00
Uniform Delay (d), s/veh	26.0	26.0	22.0	13.5	23.6	25.8
Incr Delay (d2), s/veh	8.1	8.5	2.2	0.1	0.6	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.7	17.8	1.7	6.2	2.1	5.0
LnGrp Delay(d),s/veh	34.1	34.5	24.2	13.6	24.2	28.1
LnGrp LOS	C	C	C	B	C	C
Approach Vol, veh/h	1269			867	320	
Approach Delay, s/veh	34.3			14.9	26.9	
Approach LOS	C			B	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		40.0	11.3	49.8				61.0
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		22.0	9.0	52.0				67.0
Max Q Clear Time (g_c+I1), s		12.7	5.4	36.7				15.3
Green Ext Time (p_c), s		0.7	0.1	7.1				5.6

Intersection Summary	
HCM 2010 Ctrl Delay	26.5
HCM 2010 LOS	C

SR 70 @ BOURNESIDE BLVD ROUNDABOUT ANALYSIS

2025 OPENING YEAR (HCM 6th Edition)

Approach	Delay (s)		Level of Service		v/c Ratio		95th % Queue (ft)	
	AM	PM	AM	PM	AM	PM	AM	PM
Overall	**6.1**	**6.0**	**A**	**A**				
SR 70 EB	5.0	6.5	A	A	0.23	0.35	25	50
SR 70 WB	6.7	5.1	A	A	0.37	0.23	50	25
Bourneside Blvd NB	5.6	7.3	A	A	0.09	0.07	25	25
Bourneside Blvd SB	7.6	5.9	A	A	0.10	0.11	25	25

2025 OPENING YEAR (Sidra Standard)

Approach	Delay (s)		Level of Service		v/c Ratio		95th % Queue (ft)	
	AM	PM	AM	PM	AM	PM	AM	PM
Overall	**4.9**	**5.0**	**A**	**A**				
SR 70 EB	4.5	4.6	A	A	0.18	0.29	30	50
SR 70 WB	4.3	4.4	A	A	0.29	0.19	50	30
Bourneside Blvd NB	8.8	8.9	A	A	0.07	0.04	25	25
Bourneside Blvd SB	8.2	8.4	A	A	0.06	0.09	25	25

2045 DESIGN YEAR (HCM 6th Edition)

Approach	Delay (s)		Level of Service		v/c Ratio		95th % Queue (ft)	
	AM	PM	AM	PM	AM	PM	AM	PM
Overall	**11.3**	**11.1**	**B**	**B**				
SR 70 EB	7.4	12.3	A	B	0.39	0.62	50	160
SR 70 WB	12.7	7.3	B	A	0.61	0.35	145	40
Bourneside Blvd NB	11.9	15.8	B	C	0.41	0.32	50	30
Bourneside Blvd SB	16.3	11.5	C	B	0.43	0.40	50	50

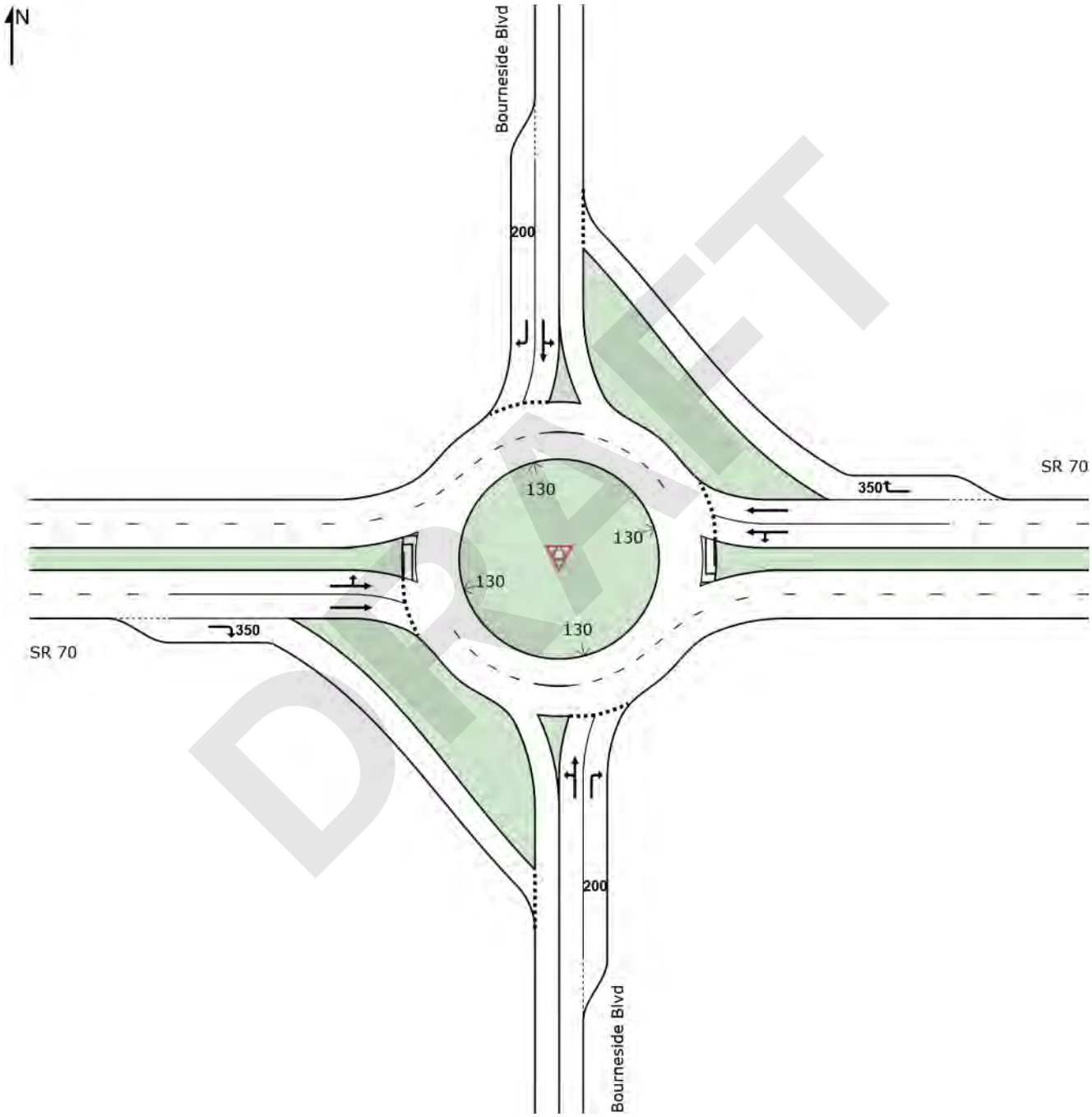
2045 DESIGN YEAR (Sidra Standard)

Approach	Delay (s)		Level of Service		v/c Ratio		95th % Queue (ft)	
	AM	PM	AM	PM	AM	PM	AM	PM
Overall	**7.1**	**7.3**	**A**	**A**				
SR 70 EB	6.2	6.7	A	A	0.31	0.48	55	100
SR 70 WB	6.4	6.1	A	A	0.45	0.27	90	50
Bourneside Blvd NB	9.8	10.4	A	B	0.25	0.18	30	25
Bourneside Blvd SB	9.3	9.4	A	A	0.25	0.33	30	40

SITE LAYOUT

Site: [SR 70 & Bourneside Blvd]

Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: [SR 70 & Bourneside Blvd]

2025 AM Peak-Hour
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Bourneside Blvd												
3	L2	57	2.0	0.093	5.6	LOS A	0.3	8.3	0.52	0.47	0.52	33.5
8	T1	15	2.0	0.093	5.6	LOS A	0.3	8.3	0.52	0.47	0.52	33.1
18	R2	34	2.0	0.048	5.6	LOS A	0.2	4.3	0.52	0.45	0.52	34.2
Approach		105	2.0	0.093	5.6	LOS A	0.3	8.3	0.52	0.46	0.52	33.6
East: SR 70												
1	L2	31	7.0	0.368	7.0	LOS A	1.9	49.2	0.36	0.23	0.36	34.9
8	T1	779	7.0	0.368	7.0	LOS A	1.9	49.2	0.36	0.23	0.36	34.8
16	R2	68	7.0	0.059	3.6	LOS A	0.2	5.8	0.20	0.09	0.20	35.1
Approach		878	7.0	0.368	6.7	LOS A	1.9	49.2	0.35	0.22	0.35	34.8
North: Bourneside Blvd												
7	L2	36	2.0	0.082	8.0	LOS A	0.3	7.0	0.61	0.61	0.61	32.2
4	T1	6	2.0	0.082	8.0	LOS A	0.3	7.0	0.61	0.61	0.61	31.9
14	R2	59	2.0	0.101	7.4	LOS A	0.3	8.7	0.60	0.60	0.60	33.3
Approach		101	2.0	0.101	7.6	LOS A	0.3	8.7	0.61	0.61	0.61	32.8
West: SR 70												
5	L2	68	7.0	0.228	5.1	LOS A	1.0	26.8	0.22	0.10	0.22	35.2
4	T1	467	7.0	0.228	5.1	LOS A	1.0	26.8	0.22	0.10	0.22	35.6
12	R2	31	7.0	0.025	3.2	LOS A	0.1	2.4	0.12	0.03	0.12	35.3
Approach		566	7.0	0.228	5.0	LOS A	1.0	26.8	0.21	0.10	0.21	35.5
All Vehicles		1651	6.4	0.368	6.1	LOS A	1.9	49.2	0.33	0.21	0.33	34.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [SR 70 & Bourneside Blvd]

2025 AM Peak-Hour
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Bourneside Blvd												
3	L2	57	2.0	0.067	11.6	LOS B	0.3	6.4	0.45	0.68	0.45	35.2
8	T1	15	2.0	0.067	4.7	LOS A	0.3	6.4	0.45	0.68	0.45	34.8
18	R2	34	2.0	0.042	5.8	LOS A	0.1	3.8	0.48	0.60	0.48	36.0
Approach		105	2.0	0.067	8.8	LOS A	0.3	6.4	0.46	0.66	0.46	35.4
East: SR 70												
1	L2	31	7.0	0.292	11.0	LOS B	1.8	47.6	0.37	0.43	0.37	37.5
8	T1	779	7.0	0.292	4.0	LOS A	1.8	48.6	0.35	0.41	0.35	37.5
16	R2	68	7.0	0.043	3.9	LOS A	0.2	5.7	0.21	0.42	0.21	36.6
Approach		878	7.0	0.292	4.3	LOS A	1.8	48.6	0.34	0.41	0.34	37.4
North: Bourneside Blvd												
7	L2	36	2.0	0.056	12.8	LOS B	0.2	5.4	0.56	0.77	0.56	34.7
4	T1	6	2.0	0.056	5.9	LOS A	0.2	5.4	0.56	0.77	0.56	34.3
14	R2	59	2.0	0.063	5.7	LOS A	0.3	6.4	0.55	0.66	0.55	35.8
Approach		101	2.0	0.063	8.2	LOS A	0.3	6.4	0.56	0.71	0.56	35.3
West: SR 70												
5	L2	68	7.0	0.183	10.5	LOS B	1.1	27.9	0.24	0.45	0.24	37.3
4	T1	467	7.0	0.183	3.6	LOS A	1.1	28.4	0.23	0.38	0.23	37.7
12	R2	31	7.0	0.019	3.8	LOS A	0.1	2.5	0.13	0.41	0.13	36.8
Approach		566	7.0	0.183	4.5	LOS A	1.1	28.4	0.23	0.39	0.23	37.6
All Vehicles		1651	6.4	0.292	4.9	LOS A	1.8	48.6	0.32	0.44	0.32	37.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [SR 70 & Bourneside Blvd]

2025 PM Peak-Hour
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Bourneside Blvd												
3	L2	32	2.0	0.067	7.0	LOS A	0.2	5.6	0.59	0.59	0.59	32.6
8	T1	7	2.0	0.067	7.0	LOS A	0.2	5.6	0.59	0.59	0.59	32.4
18	R2	31	2.0	0.059	7.7	LOS A	0.2	5.0	0.61	0.61	0.61	33.0
Approach		69	2.0	0.067	7.3	LOS A	0.2	5.6	0.60	0.60	0.60	32.7
East: SR 70												
1	L2	34	7.0	0.228	5.2	LOS A	1.0	26.5	0.26	0.14	0.26	35.3
8	T1	486	7.0	0.228	5.2	LOS A	1.0	26.5	0.26	0.14	0.26	35.4
16	R2	36	7.0	0.030	3.3	LOS A	0.1	2.9	0.18	0.07	0.18	35.0
Approach		556	7.0	0.228	5.1	LOS A	1.0	26.5	0.26	0.13	0.26	35.4
North: Bourneside Blvd												
7	L2	67	2.0	0.105	5.7	LOS A	0.4	9.5	0.51	0.47	0.51	33.2
4	T1	15	2.0	0.105	5.7	LOS A	0.4	9.5	0.51	0.47	0.51	32.9
14	R2	72	2.0	0.100	6.1	LOS A	0.4	9.2	0.53	0.49	0.53	33.8
Approach		154	2.0	0.105	5.9	LOS A	0.4	9.5	0.52	0.48	0.52	33.4
West: SR 70												
5	L2	62	7.0	0.354	6.7	LOS A	1.8	47.1	0.32	0.19	0.32	34.4
4	T1	736	7.0	0.354	6.7	LOS A	1.8	47.1	0.32	0.19	0.32	34.6
12	R2	60	7.0	0.050	3.4	LOS A	0.2	4.9	0.15	0.05	0.15	35.0
Approach		858	7.0	0.354	6.5	LOS A	1.8	47.1	0.31	0.18	0.31	34.6
All Vehicles		1637	6.3	0.354	6.0	LOS A	1.8	47.1	0.32	0.21	0.32	34.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [SR 70 & Bourneside Blvd]

2025 PM Peak-Hour
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Bourneside Blvd												
3	L2	32	2.0	0.042	12.0	LOS B	0.2	4.2	0.54	0.72	0.54	34.7
8	T1	7	2.0	0.042	5.5	LOS A	0.2	4.2	0.54	0.72	0.54	34.4
18	R2	31	2.0	0.040	6.4	LOS A	0.2	3.8	0.55	0.67	0.55	35.6
Approach		69	2.0	0.042	8.9	LOS A	0.2	4.2	0.55	0.70	0.55	35.1
East: SR 70												
1	L2	34	7.0	0.185	10.6	LOS B	1.0	27.1	0.28	0.43	0.28	37.3
8	T1	486	7.0	0.185	4.0	LOS A	1.0	27.6	0.27	0.40	0.27	37.5
16	R2	36	7.0	0.023	4.0	LOS A	0.1	3.1	0.20	0.43	0.20	36.4
Approach		556	7.0	0.185	4.4	LOS A	1.0	27.6	0.27	0.40	0.27	37.4
North: Bourneside Blvd												
7	L2	67	2.0	0.090	11.8	LOS B	0.3	8.7	0.48	0.72	0.48	34.8
4	T1	15	2.0	0.090	5.3	LOS A	0.3	8.7	0.48	0.72	0.48	34.6
14	R2	72	2.0	0.084	5.8	LOS A	0.3	8.0	0.48	0.63	0.48	35.8
Approach		154	2.0	0.090	8.4	LOS A	0.3	8.7	0.48	0.68	0.48	35.3
West: SR 70												
5	L2	62	7.0	0.287	10.7	LOS B	1.8	48.1	0.34	0.46	0.34	37.0
4	T1	736	7.0	0.287	4.1	LOS A	1.9	49.1	0.33	0.42	0.33	37.2
12	R2	60	7.0	0.038	3.9	LOS A	0.2	4.9	0.15	0.43	0.15	36.5
Approach		858	7.0	0.287	4.6	LOS A	1.9	49.1	0.32	0.42	0.32	37.1
All Vehicles		1637	6.3	0.287	5.0	LOS A	1.9	49.1	0.33	0.45	0.33	36.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [SR 70 & Bourneside Blvd]

2045 AM Peak-Hour
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Bourneside Blvd												
3	L2	182	2.0	0.405	12.6	LOS B	1.9	47.0	0.70	0.78	0.96	30.4
8	T1	47	2.0	0.405	12.6	LOS B	1.9	47.0	0.70	0.78	0.96	30.2
18	R2	109	2.0	0.218	10.2	LOS B	0.8	19.7	0.66	0.66	0.66	31.9
Approach		339	2.0	0.405	11.9	LOS B	1.9	47.0	0.69	0.74	0.86	30.8
East: SR 70												
1	L2	98	7.0	0.610	14.2	LOS B	5.4	142.9	0.72	0.91	1.22	31.1
8	T1	884	7.0	0.610	14.2	LOS B	5.4	142.9	0.72	0.91	1.22	31.3
16	R2	220	7.0	0.229	6.0	LOS A	1.0	25.1	0.43	0.33	0.43	33.8
Approach		1202	7.0	0.610	12.7	LOS B	5.4	142.9	0.67	0.81	1.08	31.7
North: Bourneside Blvd												
7	L2	114	2.0	0.353	16.3	LOS C	1.4	34.9	0.78	0.84	1.01	29.0
4	T1	21	2.0	0.353	16.3	LOS C	1.4	34.9	0.78	0.84	1.01	28.7
14	R2	189	2.0	0.431	16.4	LOS C	1.9	47.1	0.78	0.87	1.12	29.3
Approach		324	2.0	0.431	16.3	LOS C	1.9	47.1	0.78	0.86	1.07	29.2
West: SR 70												
5	L2	222	7.0	0.390	7.8	LOS A	1.9	50.7	0.47	0.35	0.47	32.9
4	T1	560	7.0	0.390	7.8	LOS A	1.9	50.7	0.47	0.35	0.47	34.0
12	R2	100	7.0	0.089	4.0	LOS A	0.3	9.0	0.25	0.13	0.25	34.8
Approach		882	7.0	0.390	7.4	LOS A	1.9	50.7	0.44	0.33	0.44	33.8
All Vehicles		2747	5.8	0.610	11.3	LOS B	5.4	142.9	0.61	0.65	0.85	31.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [SR 70 & Bourneside Blvd]

2045 AM Peak-Hour
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Bourneside Blvd												
3	L2	182	2.0	0.254	12.5	LOS B	1.2	29.5	0.63	0.81	0.63	34.7
8	T1	47	2.0	0.254	5.7	LOS A	1.2	29.5	0.63	0.81	0.63	34.4
18	R2	109	2.0	0.165	7.0	LOS A	0.7	17.0	0.62	0.78	0.62	35.5
Approach		339	2.0	0.254	9.8	LOS A	1.2	29.5	0.63	0.80	0.63	34.9
East: SR 70												
1	L2	98	7.0	0.452	13.4	LOS B	3.2	83.3	0.71	0.69	0.71	35.7
8	T1	884	7.0	0.452	6.1	LOS A	3.4	90.2	0.70	0.62	0.70	36.0
16	R2	220	7.0	0.161	4.7	LOS A	1.0	25.4	0.45	0.52	0.45	35.9
Approach		1202	7.0	0.452	6.4	LOS A	3.4	90.2	0.65	0.61	0.65	35.9
North: Bourneside Blvd												
7	L2	114	2.0	0.234	14.1	LOS B	1.1	26.9	0.72	0.88	0.72	34.0
4	T1	21	2.0	0.234	7.2	LOS A	1.1	26.9	0.72	0.88	0.72	33.7
14	R2	189	2.0	0.253	6.7	LOS A	1.3	31.9	0.73	0.77	0.73	35.3
Approach		324	2.0	0.253	9.3	LOS A	1.3	31.9	0.73	0.82	0.73	34.7
West: SR 70												
5	L2	222	7.0	0.306	11.6	LOS B	2.0	51.8	0.49	0.62	0.49	35.4
4	T1	560	7.0	0.306	4.4	LOS A	2.1	54.1	0.47	0.47	0.47	36.7
12	R2	100	7.0	0.066	4.1	LOS A	0.4	10.0	0.29	0.44	0.29	36.3
Approach		882	7.0	0.306	6.2	LOS A	2.1	54.1	0.46	0.50	0.46	36.3
All Vehicles		2747	5.8	0.452	7.1	LOS A	3.4	90.2	0.60	0.62	0.60	35.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [SR 70 & Bourneside Blvd]

2045 PM Peak-Hour
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Bourneside Blvd												
3	L2	102	2.0	0.320	15.2	LOS C	1.2	29.7	0.78	0.83	0.96	29.2
8	T1	22	2.0	0.320	15.2	LOS C	1.2	29.7	0.78	0.83	0.96	29.1
18	R2	97	2.0	0.290	16.6	LOS C	1.0	26.0	0.80	0.83	0.93	29.2
Approach		221	2.0	0.320	15.8	LOS C	1.2	29.7	0.79	0.83	0.95	29.2
East: SR 70												
1	L2	109	7.0	0.349	7.8	LOS A	1.6	41.7	0.52	0.44	0.52	33.3
8	T1	527	7.0	0.349	7.8	LOS A	1.6	41.7	0.52	0.44	0.52	33.8
16	R2	114	7.0	0.113	4.6	LOS A	0.4	11.4	0.36	0.24	0.36	34.3
Approach		751	7.0	0.349	7.3	LOS A	1.6	41.7	0.49	0.41	0.49	33.8
North: Bourneside Blvd												
7	L2	218	2.0	0.403	11.1	LOS B	1.9	49.3	0.67	0.74	0.89	30.8
4	T1	47	2.0	0.403	11.1	LOS B	1.9	49.3	0.67	0.74	0.89	30.6
14	R2	231	2.0	0.391	11.9	LOS B	1.8	46.6	0.68	0.75	0.89	31.1
Approach		496	2.0	0.403	11.5	LOS B	1.9	49.3	0.68	0.74	0.89	30.9
West: SR 70												
5	L2	201	7.0	0.618	13.6	LOS B	6.0	159.2	0.70	0.84	1.14	30.7
4	T1	877	7.0	0.618	13.6	LOS B	6.0	159.2	0.70	0.84	1.14	31.1
12	R2	193	7.0	0.179	5.0	LOS A	0.7	19.4	0.32	0.19	0.32	34.2
Approach		1271	7.0	0.618	12.3	LOS B	6.0	159.2	0.64	0.74	1.02	31.5
All Vehicles		2738	5.7	0.618	11.1	LOS B	6.0	159.2	0.62	0.66	0.85	31.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [SR 70 & Bourneside Blvd]

2045 PM Peak-Hour
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Bourneside Blvd												
3	L2	102	2.0	0.181	13.4	LOS B	0.9	22.3	0.74	0.88	0.74	34.1
8	T1	22	2.0	0.181	6.8	LOS A	0.9	22.3	0.74	0.88	0.74	33.9
18	R2	97	2.0	0.183	8.2	LOS A	0.8	20.8	0.73	0.85	0.73	34.7
Approach		221	2.0	0.183	10.4	LOS B	0.9	22.3	0.73	0.86	0.73	34.3
East: SR 70												
1	L2	109	7.0	0.274	12.0	LOS B	1.7	45.1	0.56	0.62	0.56	35.6
8	T1	527	7.0	0.274	5.2	LOS A	1.8	47.8	0.55	0.53	0.55	36.2
16	R2	114	7.0	0.083	4.6	LOS A	0.5	12.9	0.41	0.50	0.41	35.9
Approach		751	7.0	0.274	6.1	LOS A	1.8	47.8	0.53	0.54	0.53	36.1
North: Bourneside Blvd												
7	L2	218	2.0	0.330	12.8	LOS B	1.5	38.8	0.64	0.84	0.64	34.4
4	T1	47	2.0	0.330	6.2	LOS A	1.5	38.8	0.64	0.84	0.64	34.2
14	R2	231	2.0	0.314	6.9	LOS A	1.4	35.8	0.64	0.79	0.64	35.4
Approach		496	2.0	0.330	9.4	LOS A	1.5	38.8	0.64	0.82	0.64	34.8
West: SR 70												
5	L2	201	7.0	0.481	12.8	LOS B	3.5	93.5	0.70	0.70	0.70	35.0
4	T1	877	7.0	0.481	5.8	LOS A	3.8	99.9	0.68	0.60	0.68	35.7
12	R2	193	7.0	0.133	4.4	LOS A	0.8	20.0	0.34	0.48	0.34	36.1
Approach		1271	7.0	0.481	6.7	LOS A	3.8	99.9	0.63	0.59	0.63	35.6
All Vehicles		2738	5.7	0.481	7.3	LOS A	3.8	99.9	0.61	0.64	0.61	35.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

ATTACHMENT D

Safety Performance for Intersection Control Evaluation (SPICE)

Federal Highway Administration (FHWA)
Safety Performance for Intersection Control Evaluation Tool

Results

Summary of crash prediction results for each alternative

Project Information

Project Name:	SR 70 from Lorraine Rd to CR 675	**Intersection Type**	At-Grade Intersections
Intersection:	SR 70 @ Bourneside	**Opening Year**	2025
Agency:	D1	**Design Year**	2045
Project Reference:	414506-2-22-01	**Facility Type**	On Urban and Suburban Arterial
City:	Unincorporated Manatee County	**Number of Legs**	4-leg
State:	FL	**1-Way/2-Way**	2-way Intersecting 2-way
Date:	6/14/2019	**# of Major Street Lanes (both directions)**	5 or fewer
Analyst:	Nicole Harris, PE	**Major Street Approach Speed**	Less than 55 mph

Crash Prediction Summary

Control Strategy	Crash Type	Opening Year	Design Year	Total Project Life Cycle	Rank	AADT Within Prediction Range?	Source of Prediction
Traffic Signal	Total	4.04	7.57	122.35	3	Yes	Calibrated SPF
	Fatal & Injury	1.36	2.58	41.45			
2-lane Roundabout	Total	5.61	10.08	164.15	1	N/A	Uncalibrated SPF
	Fatal & Injury	0.51	0.97	15.40			
Displaced Left Turn (DLT)	Total	3.56	6.66	107.67	2	N/A	CMF
	Fatal & Injury	1.20	2.27	36.47			
Quadrant Roadway	Total	--	--	--	-	-	Due to lack of crash experience nationwide, the safety performance of a QR is not known (see FHWA Publication FHWA-HRT-09-060)
	Fatal & Injury	--	--	--			

ATTACHMENT E

Cost Estimates

SR 70 and Bourneside
Signalized Intersection
Cost Estimate

Pay Item	Description	Total Quantity	Unit	Weighted Avg. Unit Price	Total Amount	Notes
ROADWAY:Area of influence of intersection is 3000-ft or 0.57 miles along SR 70						Conventional Intersection is a full median opening at Bourneside with retuns ended at SR 70 Right of way line
101-1	MOBILIZATION	10.00	%		$ 219,189.21	
102-1	MAINTENANCE OF TRAFFIC	10.00	%		$ 219,189.21	
110-1-1	CLEARING & GRUBBING	13.77	AC	$ 11,000.00	$ 151,470.00	Clearing and Grubbing for areas to be constructed, including sidestreet returns: 13.77 AC
120-1	REGULAR EXCAVATION	5,517.60	CY	$ 5.10	$ 28,139.76	Cost per mile from model @ 0.57 miles
160-4	TYPE B STABILIZATION	27,373.33	SY	$ 3.80	$ 104,018.65	Area to be paved
285-709	OPTIONAL BASE,BASE GROUP 09	24,266.67	SY	$ 17.00	$ 412,533.39	Paved area to be constructed
327-70-4	MILLING EXIST ASPH PAVT, 3" AVG DEPTH	-	SY	$ 2.40	$ -	No milling - This area is new construction and full reconstruction
334-1-24	SUPERPAVE ASPH CONC, TRAF D, PG76-22,PMA	4,853.33	TN	$ 100.00	$ 485,333.40	Assume Traffic C for mainline and side street 4 in: (24266.67 SY*400)/2000
337-7-41	ASPH CONC FC,TRAFFIC B,FC-12.5,PG 76-22	970.67	TN	$ 105.00	$ 101,920.01	Assume Traffic C: 24266.67 SY*80)/2000
430-175-112	PIPE CULV, OPT MATL, ROUND, 12"S/CD	1,103.52	LF	$ 91.00	$ 100,420.32	Cost per mile from model @ 0.57 miles
520-1-10	CONCRETE CURB & GUTTER, TYPE E	6,019.20	LF	$ 20.00	$ 120,384.00	Cost per mile from model @ 0.57 miles
522-2	CONCRETE SIDEWALK AND DRIVEWAYS, 6"	3,343.62	SY	$ 38.00	$ 127,057.56	Cost per mile from model @ 0.57 miles
570-1-2	PERFORMANCE TURF, SOD	7,440.40	SY	$ 2.60	$ 19,345.04	Cost per mile from model @ 0.57 miles
715-511-140	LIGHT POLE COMP,F&I,SGL ARM SM, AL,40'	19.95	EA	$ 14,600.00	$ 291,270.00	Cost per mile from model @ 0.57 miles
	Signalization	1.00	PI		$ 250,000.00	One signalized intersection
	Partial Total				$ 2,191,892.13	
	Roadway Total				$ 2,630,270.56	
999-25	INITIAL CONTINGENCY AMOUNT (DO NOT BID)	10%			$ 263,027.06	
Intersection Grand Total					$ 2,893,298	
Notes:						
PAY ITEM list was created based on FDOT LRE Cost per Mile: MODEL WUUA24-U-19-BB. Contingency covers all other items not shown in						
Pavement design was assumed to be 4-in for travel lanes and 2-in for shoulders						
MOT and MOBILIZATION 10% EACH						
No right of way impacts. Potential minor utility impacts to be covered by contingency pay item						

SR 70 and Bourneside
Roundabout Intersection
Cost Estimate

Pay Item	Description	Total Quantity	Unit	Weighted Avg. Unit Price	Total Amount	Notes
ROADWAY: Area of influence of intersection is 3000-ft or 0.57 miles along SR 70						
101-1	MOBILIZATION	10.00	%		$ 209,198.85	
102-1	MAINTENANCE OF TRAFFIC	10.00	%		$ 209,198.85	
110-1-1	CLEARING & GRUBBING	14.70	AC	$ 11,000.00	$ 161,700.00	Area to be constructed, including sidestreet returns: 14.70 AC
120-1	REGULAR EXCAVATION	5,517.60	CY	$ 5.10	$ 28,139.76	Cost per mile from model @ 0.57 miles
160-4	TYPE B STABILIZATION	29,547.00	SY	$ 3.80	$ 112,278.60	Area to be constructed, including sidestreet returns: 29547 SY
285-709	OPTIONAL BASE,BASE GROUP 09	27,461.00	SY	$ 17.00	$ 466,837.00	Paved area to be constructed, including sidestreet returns: 27461 SY
327-70-4	MILLING EXIST ASPH PAVT, 3" AVG DEPTH	-	SY	$ 2.40	$ -	No milling - This area is new construction and full reconstruction
334-1-24	SUPERPAVE ASPH CONC, TRAF D, PG76-22,PMA	5,492.20	TN	$ 100.00	$ 549,220.00	Assume Traffic C for mainline and side street 4 in: (27461 SY*400)/2000
337-7-41	ASPH CONC FC,TRAFFIC B,FC-12.5,PG 76-22	1,098.44	TN	$ 105.00	$ 115,336.20	Assume Traffic C: (27461)*80/2000
430-175-112	PIPE CULV, OPT MATL, ROUND, 12"S/CD	1,103.52	LF	$ 91.00	$ 100,420.32	Cost per mile from model @ 0.57 miles
520-1-10	CONCRETE CURB & GUTTER, TYPE E	6,019.20	LF	$ 20.00	$ 120,384.00	Cost per mile from model @ 0.57 miles
522-2	CONCRETE SIDEWALK AND DRIVEWAYS, 6"	3,343.62	SY	$ 38.00	$ 127,057.56	Cost per mile from model @ 0.57 miles
570-1-2	PERFORMANCE TURF, SOD	7,440.40	SY	$ 2.60	$ 19,345.04	Cost per mile from model @ 0.57 miles
715-511-140	LIGHT POLE COMP,F&I,SGL ARM SM, AL,40'	19.95	EA	$ 14,600.00	$ 291,270.00	Cost per mile from model @ 0.57 miles
	Partial Total				$ 2,091,988.48	
	Roadway Total				$ 2,510,386.17	
999-25	INITIAL CONTINGENCY AMOUNT (DO NOT BID)	10%			$ 251,038.62	
Intersection Grand Total					$ 2,761,425	

Notes:

PAY ITEM list was created based on FDOT LRE Cost per Mile: MODEL WUUA24-U-19-BB. Contingency covers all other items not shown in Table

Pavement design was assumed to be 4-in for travel lanes and 2-in for shoulders

MOT and MOBILIZATION 10% EACH

No right of way impacts. Potential minor utility impacts to be covered by contingency pay item

SR 70 and Bourneside
Quadrant Intersection
Cost Estimate

Pay Item	Description	Total Quantity	Unit	Weighted Avg. Unit Price	Total Amount	Notes
ROADWAY:Area of influence of intersection is 3000-ft or 0.57 miles along SR 70						
101-1	MOBILIZATION	10.00	%		$ 300,396.85	
102-1	MAINTENANCE OF TRAFFIC	10.00	%		$ 300,396.85	
110-1-1	CLEARING & GRUBBING	17.60	AC	$ 11,000.00	$ 193,600.00	Clearing and Grubbing for areas to be constructed, including sidestreet returns: 17.6 AC
120-1	REGULAR EXCAVATION	5,517.60	CY	$ 5.10	$ 28,139.76	Cost per mile from model @ 0.57 miles
160-4	TYPE B STABILIZATION	41,119.00	SY	$ 3.80	$ 156,252.20	Area to be paved, including new quadrant road
285-709	OPTIONAL BASE,BASE GROUP 09	34,405.33	SY	$ 17.00	$ 584,890.61	Area to be constructed and stabilized, including new quadrant road: 34405.33 SY
327-70-4	MILLING EXIST ASPH PAVT, 3" AVG DEPTH	-	SY	$ 2.40	$ -	No milling - This area is new construction and full reconstruction
334-1-24	SUPERPAVE ASPH CONC, TRAF D, PG76-22,PMA	6,881.07	TN	$ 100.00	$ 688,106.60	Assume Traffic C for mainline and side street 4 in: (34405.33 SY*400)/2000
337-7-41	ASPH CONC FC,TRAFFIC B,FC-12.5,PG 76-22	1,376.21	TN	$ 105.00	$ 144,502.39	Assume Traffic C: (34405.33 SY*80)/2000
430-175-112	PIPE CULV, OPT MATL, ROUND, 12"S/CD	1,103.52	LF	$ 91.00	$ 100,420.32	Cost per mile from model @ 0.57 miles
520-1-10	CONCRETE CURB & GUTTER, TYPE E	6,019.20	LF	$ 20.00	$ 120,384.00	Cost per mile from model @ 0.57 miles
522-2	CONCRETE SIDEWALK AND DRIVEWAYS, 6"	3,343.62	SY	$ 38.00	$ 127,057.56	Cost per mile from model @ 0.57 miles
570-1-2	PERFORMANCE TURF, SOD	7,440.40	SY	$ 2.60	$ 19,345.04	Cost per mile from model @ 0.57 miles
715-511-140	LIGHT POLE COMP,F&I,SGL ARM SM, AL,40'	19.95	EA	$ 14,600.00	$ 291,270.00	Cost per mile from model @ 0.57 miles
	Signalization	3.00	PI		$ 550,000.00	$250,000 for SR 70 @ Bourneside main crossing and $150,000 for 2 quadrant road intersections = $550,000
	Partial Total				$ 3,003,968.47	
	Roadway Total				$ 3,604,762.17	
999-25	INITIAL CONTINGENCY AMOUNT (DO NOT BID)	10%			$ 360,476.22	
-	Right of Way Cost Estimate	-	-	-	$ 52,800,000.00	Details of the right of way estimate are included in Attachment E.
Intersection Grand Total					$ 56,765,238	

Notes:

PAY ITEM list was created based on FDOT LRE Cost per Mile: MODEL WUUA24-U-19-BB. Contingency covers all other items not shown in

Pavement design was assumed to be 4-in for travel lanes and 2-in for shoulders

MOT and MOBILIZATION 10% EACH

Right of way impacts are anticipated. Potential minor utility impacts to be covered by contingency pay item

SR 70 and Bourneside
Displaced Left-turn Intersection
Cost Estimate

Pay Item	Description	Total Quantity	Unit	Weighted Avg. Unit Price	Total Amount	Notes
ROADWAY: Area of influence of intersection is 3000-ft or 0.57 miles along SR 70						
101-1	MOBILIZATION	10.00	%		$ 330,223.99	
102-1	MAINTENANCE OF TRAFFIC	10.00	%		$ 330,223.99	
110-1-1	CLEARING & GRUBBING	15.05	AC	$ 11,000.00	$ 165,550.00	Clearing and Grubbing for areas to be constructed, including sidestreet returns: Use linear dimension (3000 ft*200ft) plus shapes from DGN for side street
120-1	REGULAR EXCAVATION	5,517.60	CY	$ 5.10	$ 28,139.76	Cost per mile from model @ 0.57 miles
160-4	TYPE B STABILIZATION	54,713.90	SY	$ 3.80	$ 207,912.82	Area to be constructed - Use shapes from DGN
285-709	OPTIONAL BASE,BASE GROUP 09	40,213.50	SY	$ 17.00	$ 683,629.50	Paved area to be constructed
327-70-4	MILLING EXIST ASPH PAVT, 3" AVG DEPTH	-	SY	$ 2.40	$ -	No milling - This area is new construction and full reconstruction
334-1-24	SUPERPAVE ASPH CONC, TRAF D, PG76-22,PMA	8,042.70	TN	$ 100.00	$ 804,270.00	Assume Traffic C: Area to be contructed +Area to be millied: (40213.5*400)/2000 - Use Optional Base Group Area for new construction
337-7-41	ASPH CONC FC,TRAFFIC B,FC-12.5,PG 76-22	1,608.54	TN	$ 105.00	$ 168,896.70	Assume Traffic C: (40213.5*80)/2000
430-175-112	PIPE CULV, OPT MATL, ROUND, 12"S/CD	1,103.52	LF	$ 91.00	$ 100,420.32	Cost per mile from model @ 0.57 miles
520-1-10	CONCRETE CURB & GUTTER, TYPE E	6,019.20	LF	$ 20.00	$ 120,384.00	Cost per mile from model @ 0.57 miles
520-70	CONCRETE TRAFFIC SEPARATOR - VARIABLE WIDTH	335.33	SY	$ 105.46	$ 35,364.22	Traffic separator for DLT movements
522-2	CONCRETE SIDEWALK AND DRIVEWAYS, 6"	3,343.62	SY	$ 38.00	$ 127,057.56	Cost per mile from model @ 0.57 miles
570-1-2	PERFORMANCE TURF, SOD	7,440.40	SY	$ 2.60	$ 19,345.04	Cost per mile from model @ 0.57 miles
715-511-140	LIGHT POLE COMP,F&I,SGL ARM SM, AL,40'	19.95	EA	$ 14,600.00	$ 291,270.00	Cost per mile from model @ 0.57 miles
	Signalization	3.00	PI	$ 550,000.00	$ 550,000.00	$250,000 for SR 70 @ Bourneside main crossing and $150,000 for 2 displaced left intersections (one along SR 70 = $550,000
	Partial Total				$ 3,302,239.91	
	Roadway Total				$ 3,962,687.90	
999-25	INITIAL CONTINGENCY AMOUNT (DO NOT BID)	10%			$ 396,268.79	
-	Right of Way Cost Estimate	-	-	-	$ 2,320,000.00	Details of the right of way estimate are included in Attachment E.
Intersection Grand Total					$ 6,678,957	

Notes:

PAY ITEM list was created based on FDOT LRE Cost per Mile: MODEL WUUA24-U-19-BB. Contingency covers all other items not shown in Table

Pavement design was assumed to be 4-in for travel lanes and 2-in for shoulders

MOT and MOBILIZATION 10% EACH

Minor utility impacts - 2 transmission poles may be impacted.

Right of way impacts are anticipated.

SR 70 - ROW Cost Estimates for the Intersection Control Evaluation

Intersection	Configuration	Square footage or ROW Aquisition	ROW Cost Per Square Foot	ROW Cost Estimate
Uihlein at SR 70	Partial Displaced Left-Turn (DLT)	15178	$120	$ 1,820,000
Del Webb at SR 70	Partial Displaced Left-Turn (DLT)	3456	$120	$ 410,000
Bourneside at SR 70	Partial Displaced Left-Turn (DLT)	9921	$120	$ 1,190,000
		9430	$120	$ 1,130,000
	Quadrant roadway	439976	$120	$ 52,800,000
CR 675 at SR 70 (2)	Quadrant roadway	68504	$2,750	$ 10,000

(1) ROW cost estimates are based on the table below

(2) For ROW needs for CR 675, it is assumed that the property will require a full take. The actual property value was used for this estimate.

Property Value Estimates

Folio	Total Just Value as of 2018	Property Size (sq ft.)	Cost Per Sq. Ft.	Inflated cost (factor by 3)	Recommended Cost/Sq Ft to Apply to ROW
586104409	$ 291,876.00	7640.424	$ 38.20	114.6046345	120
586109109	$ 425,015.00	10672.2	$ 39.82	119.4734919	

(1) Property cost estimates were obtained from 2 residential properties near the Lakewood Ranch area. Currently, the Lakewood Ranch residential area is under development and there are no property values from the Manatee County Property Appraiser. The alternative intersection ROW needs are impacting the residential area under development; therefore, there are no property values that could be use for ROW estimates.

(2) These property estimates are used for the intersections of Uihlein, Del Webb, and Bourneside. Since CR 675 is a full take, the property appraised value for that property will be used.

ATTACHMENT F

Delay Calculations

Delay Information

Use this sheet to enter the delay information for each of the included control strategies.

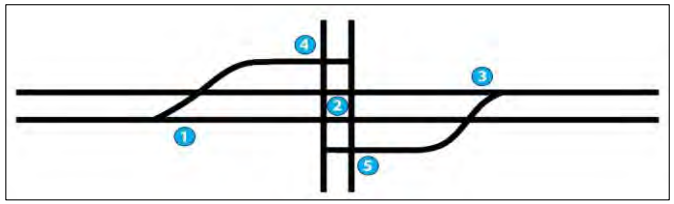
Note: Delay calculations for Displaced Left-Turn and Quadrant Roadway have been adjusted to account for Experienced Travel Time (ETT) based on guidance from the Highway Capacity Manual, Chapter 23, Ramp Terminals and Alternative Intersections. The ETT method accounts for origin-destination (O-D) path of a distributed network of closely space intersections that operate in a cluster. This method results in a single LOS/delay for an alternative intersection configuration with multiple signalized intersections which include multiple LOS/delay results (e.g. Displaced left turns are modeled as multiple signalized intersections with separate LOS/delay results for each; this method computes the LOS/delay as one intersection).

				Opening Year			Design Year		
At-Grade Intersections				Average vehicle delay			Average vehicle delay		
Control Strategy		Delay Type	Units	AM peak	PM peak	Weekend peak	AM peak	PM peak	Weekend peak
Traffic Signal	Single Input	Single Input	sec/veh	12.5	13.0		22.0	20.2	
Roundabout	Single Input	Single Input	sec/veh	6.1	6.0		11.3	11.1	
Displaced Left Turn (DLT)	Single Input	Worksheet (Partial E-W)	sec/veh	14.6	15.7		25.5	25.0	
Quadrant Roadway Intersection	Single Input	View Instructions	sec/veh	36.3	38.5		41.1	48.8	

DLT E-W

Use this sheet to enter the delay information for a partial DLT with the displaced lefts on the East-West street. (Requires turning movement count demand inputs)

User must enter value on this sheet



Note: Intersections 2, 4, and 5 are a single intersection at an actual DTL.
Modeling in SYNCHRO requires 3 separate intersections

Movement nomenclature refers to equivalent movement at conventional intersection.

Opening Year AM Peak — TEV: 1568

Intersection 1	EB Left	WB Thru*	SB Right
Volume	65	740	56
Delay	41.2	4.2	37.8

Intersection 2	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	NB Left&U	NB Thru	SB Left&U	SB Thru
Volume	65	444	29	29	740	65	54	14	34	6
Delay (Intx 2)		6.3	5.5		7.1	5.6	12.7	9.9	11.3	10.1
Delay (Intx 4)	3.2								11.7	11.7
Delay (Intx 5)				3.8			28.2	28.2		

Intersection 3	EB Thru**	WB Left	NB Right
Volume	444	29	32
Delay	1.8	43.2	40.5

* Delay entered for this movement also applied to NB Left Turn movement
** Delay entered for this movement also applied to SB Left Turn movment

Average delay for DLT: 14.6

Opening Year PM Peak — TEV: 1555

Intersection 1	EB Left	WB Thru*	SB Right
Volume	59	462	68
Delay	41.3	5.1	38.1

Intersection 2	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	NB Left&U	NB Thru	SB Left&U	SB Thru
Volume	59	699	57	32	462	34	30	7	64	14
Delay (Intx 2)		7	5.6		6.4	5.5	12.3	10.4	12.5	9.8
Delay (Intx 4)	5.4								28.2	28.2
Delay (Intx 5)				2.2			28	28		

Intersection 3	EB Thru**	WB Left	NB Right
Volume	699	32	29
Delay	3.1	43.2	40.3

* Delay entered for this movement also applied to NB Left Turn movement
** Delay entered for this movement also applied to SB Left Turn movment

Average delay for DLT: 15.7

Design Year AM Peak — TEV: 2610

Intersection 1	EB Left	WB Thru*	SB Right
Volume	211	840	108
Delay	40.1	12.2	32.9

Intersection 2	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	NB Left&U	NB Thru	SB Left&U	SB Thru
Volume	211	532	95	93	840	209	173	45	180	20
Delay (Intx 2)		7.8	6.8		8.8	7.2	34.4	8.7	14.9	9.1
Delay (Intx 4)	15.4								26.3	26.3
Delay (Intx 5)				10.5			26.9	26.9		

Intersection 3	EB Thru**	WB Left	NB Right
Volume	532	93	104
Delay	6.3	39.2	35.6

* Delay entered for this movement also applied to NB Left Turn movement
** Delay entered for this movement also applied to SB Left Turn movment

Average delay for DLT: 25.5

Design Year PM Peak — TEV: 2601

Intersection 1	EB Left	WB Thru*	SB Right
Volume	191	501	219
Delay	39.6	7.8	32.1

Intersection 2	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	NB Left&U	NB Thru	SB Left&U	SB Thru
Volume	191	833	183	104	501	108	97	21	207	45
Delay (Intx 2)		8.8	7.1		7.7	6.8	13	9.2	45.9	8.5
Delay (Intx 4)	19.3								27.1	27.1
Delay (Intx 5)				7.3			26.3	26.3		

Intersection 3	EB Thru**	WB Left	NB Right
Volume	833	104	92
Delay	6.6	39.1	35

* Delay entered for this movement also applied to NB Left Turn movement
** Delay entered for this movement also applied to SB Left Turn movment

Average delay for DLT: 25.0

This worksheet computes a DLT delay value in a manner consistent with the Highway Capacity Manual 6th Edition. This worksheet assumes coordination of certain movements within the DLT and relies in SYNCHRO to capture the delay-related effects of coordination.

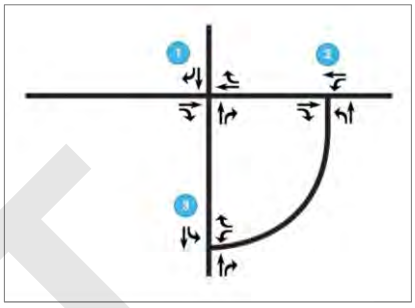
Quadrant Roadway

This sheet provides guidance on how to compute the intersection delay for a Quadrant Roadway. (Requires turning movement count demand inputs)

The Highway Capacity Manual 6th Edition provides a framework for computing delay at alternative intersections where some movements are relocated from the main intersection to outlying intersections, and it provides specific methodologies for some alternative intersection forms that account for both control delay at intersections and extra distance travel time (EDTT) to and from outlying intersections. EDTT can be computed by dividing distance (in feet) by speed (in feet per second). Unlike RCUT, MUT, and DLT intersections, the FDOT ICE Tool does not provide a worksheet for quadrant roadways due to the number of variations possible and the relative ease of computing delay manually on a project-by-project basis. Although the HCM 6th Edition does not provide a quadrant roadway methodology, the overall alternative intersection framework can be used to compute delay as follows:

If a quadrant roadway creates new intersections:

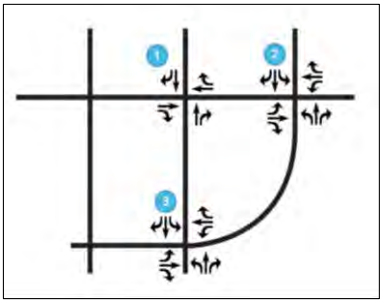
If a quadrant roadway creates two new intersections to redirect some movements away from an existing main intersection, the delay computed for the quadrant roadway should include delay at the main intersection, EDTT for movements redirected away from the main intersection (i.e. the four left turn movements), and delay at the outlying intersections for all movements. Similar to a conventional intersection, delay is computed with a weighted of the individual movement delays, where the "weight" is the volume of each movement.



In the figure below, for example, eastbound through traffic experiences delay at intersection 1 and intersection 2, and the sum of these two delay values is multiplied by the eastbound through volume to compute the average delay for the quadrant roadway intersection. EDTT is computed for the four re-routed left-turn movements and added to the delay associated with those movements to compute the overall quadrant roadway intersection delay. For any given movement, EDTT is defined as the out-of-direction travel time minus the travel time to make a direct movement at the main intersection (if it were permitted). For example, EDTT for a northbound left turn in the figure below would be computed as the travel time from intersection 3 to 2 plus the travel time from intersection two to one minus the travel time from intersection 3 to 1.

If the quadrant roadway redirects traffic through existing intersections:

If a quadrant roadway redirects movements away from an existing main intersection via an existing roadway network and utilizes existing intersections to accommodate these movements, there is delay occurring at outlying intersections not associated with the quadrant roadway itself. In this case, all delay at intersection 1 (including EDTT) is included in the quadrant roadway delay calculation, but not all delay at intersections 2 and 3 is included. At intersections 2 and 3, delay for each movement should be recorded with and without the quadrant roadway. The difference between these values represents delay associated with the quadrant roadway and that difference should be included in the quadrant roadway delay computation.



Intersection Delay Calculation
Quadrant Roadway - Southwest Quadrant
Bournside at SR 70

Intersection 1 Bournside and SR 70
Intersection 2 SR 70 and Quadrant Roadway
Intersection 3 Bournside and Quadrant Roadway

DESIGN YEAR (2045)

TEV: 3130

AM Peak Hour (volumes and delay from Synchro output)

Intersection 1	Movements	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR				
	Volumes		256	104		128	180		640	95		933	209				
	Delay		0.2	0.3		12	12.9		10	8.8		29.4	22.4				
Intersection 2	Movements	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR				
	Volumes	173		108					627	211	93	1020					
	Delay	16.2		15.5					22	22.1	34.3	23.2					
Intersection 3	Movements	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR				
	Volumes	173	149			115	108	211		93							
	Delay	5.7	3.9			4.1	4.2	42.7		35.4							

EBTT (Extra Distance Travel Time)

Distance (feet) — Speed limit (mph) — Extra Distance Travel Time (EBTT) (seconds)

Total delay 128565.1
Int. Delay 41.0751

	Intersection 1	2	3	1	2	3	1	2	3
Intersection 1	0	650	480		40	30	#DIV/0!	11.07955	10.90909
Intersection 2	650	0	1051	40		30	11.07955	#DIV/0!	23.88636
Intersection 3	480	1051	0	30	30		10.90909	23.88636	#DIV/0!

Movement	EBTT	Volume (left-turns at main intersection)	Travel Time
EBL	34.79545	211	7341.841
WBL	45.875	93	4266.375
NBL	23.88636	173	4132.341
SBL	45.875	108	4954.5

PM Peak Hour (volumes and delay from synchro output)

Intersection 1	Movement	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR				
	Volumes		211	92		252	219		1040	183		605	108				
	Delay		13	13.1		15	15.2		27.8	19.8		21.4	18.7				
Intersection 2	Movement	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR				
	Volumes	97		207					1016	190	104	720					
	Delay	24.2		28.1					34.1	34.5	24.2	13.6					
Intersection 3	Movement	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT					
	Volumes	97	113			228	207	190		104							
	Delay	5.2	3.5			8.1	8.2	48.6		42							

Total delay 161508.6
Int. Delay 48.8089

Movement	EBTT	Volume (left-turns at main intersection)	Travel Time
EBL	34.79545	191	6645.932
WBL	45.875	104	4771
NBL	23.88636	97	2316.977
SBL	45.875	207	9496.125

OPENING YEAR (2025)

TEV: 1730

AM Peak Hour (volumes and delay from Synchro output)

Intersection 1	Movements	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR				
	Volumes		79	32		40	56		478	29		769	65				
	Delay		7.8	7.9		7.9	8.1		14.2	12.2		18	12.6				
Intersection 2	Movements	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR				
	Volumes	54		34					473	65	29	796					
	Delay	9.6		9.5					26.4	26.6	16.9	17.3					
Intersection 3	Movements	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR				
	Volumes	54	46			35	34	65		29							
	Delay	3.5	2.2			5.4	5.5	31.6		28.1							

EBTT (Extra Distance Travel Time)

Distance (feet) — Speed limit (mph) — Extra Distance Travel Time (EBTT) (seconds)

Total delay 62736.29
Int. Delay 36.26375

	Intersection 1	2	3	1	2	3	1	2	3
Intersection 1	0	650	480		40	30	#DIV/0!	11.07955	10.90909
Intersection 2	650	0	1051	40		30	11.07955	#DIV/0!	23.88636
Intersection 3	480	1051	0	30	30		10.90909	23.88636	#DIV/0!

Movement	EBTT	Volume (left-turns at main intersection)	Travel Time
EBL	34.79545	65	2261.705
WBL	45.875	29	1330.375
NBL	23.88636	54	1289.864
SBL	45.875	34	1559.75

PM Peak Hour (volumes and delay from synchro output)

Intersection 1	Movement	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR				
	Volumes		66	29		78	68		763	57		494	34				
	Delay		7.8	7.8		8.1	8.2		17	12.5		14.5	12.3				
Intersection 2	Movement	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR				
	Volumes	30		64					756	59	32	530					
	Delay	12.2		12.8					32.4	32.2	15.1	11.9					
Intersection 3	Movement	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT					
	Volumes	30	36			71	64	59		32							
	Delay	3.5	2.2			5.1	5.2	30.7		28.5							

Total delay 68340.62
Int. Delay 38.52346

Movement	EBTT	Volume (left-turns at main intersection)	Travel Time
EBL	34.79545	59	2052.932
WBL	45.875	32	1468
NBL	23.88636	30	716.5909
SBL	45.875	64	2936

ATTACHMENT G

Benefit / Cost Summary

Outputs

This sheet compiles the data from summary tables in individual alternatives sheets. To populate the output sheet press the "Setup Worksheets" button in the Alternatives_MasterList tab.

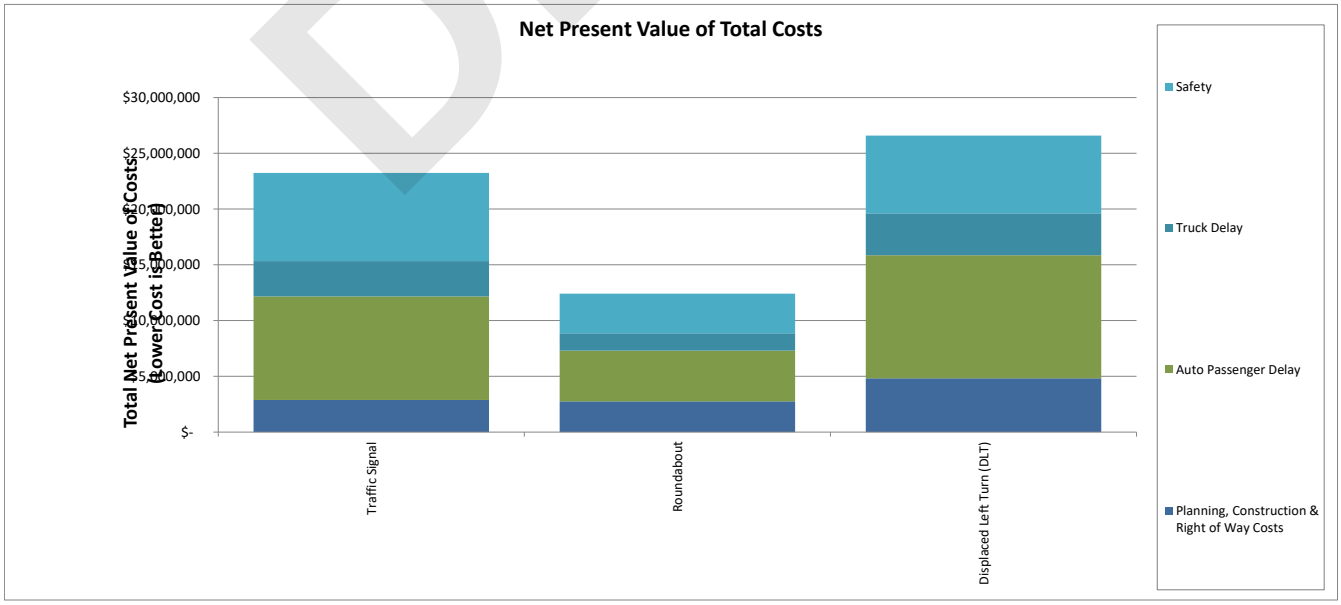
Agency:	FDOT District 1
Project Name:	SR 70 from Lorraine Rd to CR 675
Project Reference:	FDOT Project #414506-2-22-01
Intersection:	SR 70 and Bourneside Blvd
City:	Unincorporated Manatee County
State:	Florida
Performing Department or Organization:	Florida Department of Transportation District 1
Date:	6/14/2019
Analyst:	CB
Analysis Type	At-Grade Intersection

Analysis Summary

Cost Categories	Net Present Value of Costs			
	Traffic Signal	Roundabout	Displaced Left Turn (DLT)	Quadrant Roadway Intersection
Planning, Construction & Right of Way Costs	$ 2,890,000	$ 2,760,000	$ 4,824,000	$ 14,530,000
Auto Passenger Delay	$ 9,281,154	$ 4,550,730	$ 11,036,068	$ 25,728,155
Truck Delay	$ 3,167,984	$ 1,551,616	$ 3,766,701	$ 8,809,691
Safety	$ 7,902,657	$ 3,555,508	$ 6,962,906	--
Total cost	**$23,340,023**	**$12,490,805**	**$26,827,952**	**$49,362,533**

Select Base Case for Benefit-Cost Comparison: (Choose from list)	Traffic Signal

Benefit Categories	Net Present Value of Benefits Relative to Base Case			
	Traffic Signal	Roundabout	Displaced Left Turn (DLT)	Quadrant Roadway Intersection
Auto Passenger Delay		$ 4,730,424	$ (1,754,915)	$ (16,447,002)
Truck Delay		$ 1,616,369	$ (598,717)	$ (5,641,707)
Safety		$ 4,347,149	$ 939,750	
Net Present Value of Benefits		**$ 10,693,941**	**$ (1,413,881)**	**$ (22,088,709)**
Net Present Value of Costs		**$ (155,277)**	**$ 2,074,048**	**$ 11,836,457**
Net Present Value of Improvement		**$ 10,849,218**	**$ (3,487,929)**	**$ (33,925,166)**
Benefit-Cost (B/C) Ratio		**Control strategy preferred. Benefits are greater than base case and cost is less than base case.**	**Control Strategy not preferred. Benefits are less than base case and cost is greater than base case.**	**Control Strategy not preferred. Benefits are less than base case and cost is greater than base case.**
Delay B/C		**Control strategy preferred. Benefits are greater than base case and cost is less than base case.**	**Control Strategy not preferred. Benefits are less than base case and cost is greater than base case.**	**Control Strategy not preferred. Benefits are less than base case and cost is greater than base case.**
Safety B/C		**Control strategy preferred. Benefits are greater than base case and cost is less than base case.**	**0.45**	



ATTACHMENT H

FDOT ICE Stage 1 Form, Capacity Analysis for Planning of Junctions (CAP-X), and Stage 1 SPICE

Florida Department of Transportation
Intersection Control Evaluation (ICE) Form
Stage 1: Screening

To fulfill the requirements of Stage 1 (Screening) of FDOT's ICE procedures, complete the following form and append all supporting documentation. Completed forms can be submitted to the District Traffic Operations Engineer (DTOE) and District Design Engineer (DDE) for the project's approval.

Project Name	SR 70 from Lorraine Rd to CR 675	FDOT Project #	414506-2-22-01	Date	06/14/19
Submitted By	Nicole Harris, PE	Agency/Company	Stantec	Email	nicole.harris@stantec.com
FDOT Context Classification	C3R - Suburban Residential	FDOT District	District 1	County	Manatee
Project Locality (*City/Town/Village*)	Unincorporated Manatee County	Project Type	Corridor Improvement Project		
Project Purpose (*What is the catalyst for this project and why is it being undertaken?*)	A PD&E Study is being completed with the purpose of increasing capacity and improving traffic operational conditions along the SR 70 corridor from Lorraine Road to CR 675/Waterbury Road. The Intersection Control Evaluation (ICE) is based on the future build improvements of the project which widen SR 70 to 4-lanes. This ICE will focus on the intersection with Bourneside Blvd.				
Project Setting Description (*Describe the area surrounding the intersection*)	SR 70 at Bourneside Blvd: Future Land Use is comprised of Mixed Use -Commerical / Residential. There is a major residential development that is changing the setting from rural to suburban/residential.				
Multimodal Context (*Describe the pedestrian, bicycle, and transit activity in the area and the potential for activity based on surrounding land uses and development patterns*)	SR 70, there are proposed sidewalks and paved shoulders on both sides of the road. Bourneside is not currenlty build.				

Major Street Information								
Route #:	SR 70	Route Name(s)				Milepost		
Existing Control Type	Two-way Stop-Control	Existing AADT	14,000			Design Year AADT	21,000	
Design Vehicle	Interstate Semitrailer (WB-62)	Control Vehicle	Interstate Semitrailer (WB-62)					
Primary Functional Classification	Urban Principal Arterial					Design Speed (mph)	55	
Secondary Functional Classification (if app.)						Target Speed (mph) [if app.]		

Approach #1	Direction	Eastbound	Number of Lanes		Study Period #1 Traffic Volumes		Study Period #2 Traffic Volumes	
	Sidewalks along	Both sides of the approach	Left-Turn	1				
	Crosswalk on Approach?	No	Left-Through		Weekday AM Peak		Weekday PM Peak	
	On-Street Bike Facilities?	Yes	Through	2	Left	211	Left	191
	Multi-Use Path?	No	Left-Through-Right		Through	532	Through	833
	Scheduled Bus Service?	No	Through-Right		Right	95	Right	183
	Bus Stop on Approach?	No	Right-Turn	1	Daily Truck %		14.0%	
Approach #2	Direction	Westbound	Number of Lanes		Study Period #1 Traffic Volumes		Study Period #2 Traffic Volumes	
	Sidewalks along:	Both sides of the approach	Left-Turn	1				
	Crosswalk on Approach?	No	Left-Through		Weekday AM Peak		Weekday PM Peak	
	On-Street Bike Facilities?	Yes	Through	2	Left	93	Left	104
	Multi-Use Path?	No	Left-Through-Right		Through	840	Through	501
	Scheduled Bus Service?	No	Through-Right		Right	209	Right	108
	Bus Stop on Approach?	No	Right-Turn	1	Daily Truck %		14.0%	

Minor Street Information

Route #:		Route Name(s)	Bourneside Blvd				Milepost (if app.)		
Existing Control Type	Two-way Stop-Control		Existing AADT	2,000		Design Year AADT	8,200		
Design Vehicle	Interstate Semitrailer (WB-62)		Control Vehicle	Interstate Semitrailer (WB-62)					
Primary Functional Classification	Urban Local					Design Speed (mph)			
Secondary Functional Classification (if app.)						Target Speed (mph) [if app.]	45		

Approach #1	Direction	Southbound	Number of Lanes		Study Period #1 Traffic Volumes		Study Period #2 Traffic Volumes	
	Sidewalks along:	Neither side of the approach	Left-Turn	1				
	Crosswalk on Approach?	No	Left-Through		Weekday AM Peak		Weekday PM Peak	
	On-Street Bike Facilities?	No	Through	1	Left	108	Left	207
	Multi-Use Path?	No	Left-Through-Right		Through	20	Through	45
	Scheduled Bus Service?	No	Through-Right		Right	180	Right	219
	Bus Stop on Approach?	No	Right-Turn	1	Daily Truck %		4.0%	
Approach #2	Direction	Northbound	Number of Lanes		Study Period #1 Traffic Volumes		Study Period #2 Traffic Volumes	
	Sidewalks along:	Neither side of the approach	Left-Turn	1				
	Crosswalk on Approach?	No	Left-Through		Weekday AM Peak		Weekday PM Peak	
	On-Street Bike Facilities?	No	Through	1	Left	173	Left	97
	Multi-Use Path?	No	Left-Through-Right		Through	45	Through	21
	Scheduled Bus Service?	No	Through-Right		Right	104	Right	92
	Bus Stop on Approach?	No	Right-Turn	1	Daily Truck %		4.0%	
Approach #3	Direction		Number of Lanes		Study Period #1 Traffic Volumes		Study Period #2 Traffic Volumes	
	Sidewalks along:		Left-Turn					
	Crosswalk on Approach?		Left-Through		Weekday AM Peak		Weekday PM Peak	
	On-Street Bike Facilities?		Through		Left		Left	
	Multi-Use Path?		Left-Through-Right		Through		Through	
	Scheduled Bus Service?		Through-Right		Right		Right	
	Bus Stop on Approach?		Right-Turn		Daily Truck %			

Crash History (Existing Intersections Only)

Append the most recent five-years of crash data for the intersection from the CAR System. If the crash data evidences any issues relating to safety performance, discuss briefly here:

The crash history was not included in the analysis since the future conditions of SR 70 changes significantly from a 2 lane undivided to a 4-lane divided. Instead, a predictive crash model was used for the analysis.

Control Strategy Evaluation						
Provide a brief justification as to why each of the following control strategies should be advanced or not. Justification should consider potential environmental impacts.						
	CAP-X Outputs					
	V/C Ratio					
Control Strategy	Weekday AM Peak	Weekday PM Peak	Multimodal Score	SPICE Ranking	Strategy to Be Advanced?	Justification
Two-Way Stop-Controlled	2.54	103.39	N/A	3	No	Future volumes exceed Peak Hour Volume Thresholds based on FDOT ICE Manual, Figure A1
All-Way Stop-Controlled	1.53	1.53	N/A	N/A	No	Future volumes exceed Peak Hour Volume Thresholds based on FDOT ICE Manual, Figure A1
Signalized Control	0.53	0.48	4.8	8	Yes	Move to Stage 2 based on v/c for am and pm hours
Roundabout	1x2 0.70 2x2 0.70	1x2 0.69 2x2 0.69	5.6	1 & 6	Yes	Move froward to Phase 2 based on v/c ratio and SPICE top ranking. This is a reasonable control for the urban/suburban setting.
Median U-Turn	0.62	0.59	6.3	4	No	V/C higher than other intersection control types that are being advanced to stage 2.
RCUT (Signalized)	0.50	0.54	6.3	5	No	V/C higher than other intersection control types that are being advanced to stage 2.
RCUT (Unsignalized)	1.46	1.14	N/A	2	No	V/C above 1
Jughandle					No	Not included in the analysis.
Displaced Left-Turn	Partial EW 0.43 DLT 0.43	DLT 0.37 Partial EW 0.39	4.8	7	Yes	Partial Moved to Phase 2 based on comparable operations to Displaced Left-turn and potential cost impacts.
Continuous Green Tee	N/A	N/A	N/A	N/A	No	Not a T-intersection.
Quadrant Roadway	SW 0.42 SE 0.43	SW 0.45 SE 0.46	4.4		Yes	SW Quad move to Phase 2 based on top v/c ratio
Partial MUT	0.43	0.52	6.30	N/A	No	V/C higher than other intersection control types that are being advanced to stage 2.
Other 2 (Type)	N/A	N/A	N/A	N/A	No	No additional alternative intersection configurations were included in this analysis.

Resolution					
To be filled out by FDOT District Traffic Operations Engineer and District Design Engineer					
Project Determination	Multiple Viable Alternatives Identified: Continue to Stage 2				
Comments					
DTOE Name		Signature		Date	
DDE Name		Signature		Date	

Capacity Analysis for Planning of Junctions

Summary Report - Page 1 of 2

Project Name:	SR 70 @ Bourneside
Project Number:	0
Location:	Unincorporated Manatee County
Date:	2045 AM
Number of Intersection Legs:	4
Major Street Direction	East-West

Traffic Volume Demand

	Volume (Veh/hr)				Percent (%)	
	U-Turn	**Left**	**Thru**	**Right**	Heavy Vehicles	Volume Growth
Eastbound	0	211	532	95	7.00%	0.00%
Westbound	0	93	840	209	7.00%	0.00%
Southbound	0	108	20	180	2.00%	0.00%
Northbound	0	173	45	104	2.00%	0.00%
Adjustment Factor	0.80	0.95		0.85		
Suggested	**0.80**	**0.95**		**0.85**		

Truck to PCE Factor	**Suggested = 2.00**	2.00
FDOT Context Zone	**C3R-Suburban Residential**	
Critical Lane Volume Threshold — 2-phase signal	**Suggested = 1800**	**1800**
Critical Lane Volume Threshold — 3-phase signal	**Suggested = 1750**	**1750**
Critical Lane Volume Threshold — 4-phase signal	**Suggested = 1700**	**1700**

Capacity Analysis for Planning of Junctions

TYPE OF INTERSECTION	Overall v/c Ratio	V/C Ranking	Multimodal Score	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
Quadrant Roadway S-W	0.42	1	4.4	Fair	Fair	Fair
Quadrant Roadway S-E	0.43	2	4.4	Fair	Fair	Fair
Partial Displaced Left Turn E-W	0.43	2	4.8	Fair	Fair	Good
Displaced Left Turn	0.43	2	4.8	Fair	Fair	Good
Signalized Restricted Crossing U-Turn E-W	0.50	5	6.3	Good	Good	Fair
Partial Median U-Turn E-W	0.51	6	6.3	Good	Good	Fair
Traffic Signal	0.53	7	4.8	Fair	Fair	Good
Median U-Turn E-W	0.62	8	6.3	Good	Good	Fair
1 X 2	0.70	9	5.6	Fair	Good	Good
2 X 2	0.70	9	5.6	Fair	Good	Good

Capacity Analysis for Planning of Junctions

Project Name:	SR 70 @ Bourneside
Project Number:	0
Location:	Unincorporated Manatee County
Date:	2045 AM
Number of Intersection Legs:	4
Major Street Direction:	East-West

Traffic Volume Demand

	Volume (Veh/hr)				Percent (%)	
	U-Turn	Left	Thru	Right	Heavy Vehicles	Volume Growth
Eastbound	0	211	532	95	7.00%	0.00%
Westbound	0	93	840	209	7.00%	0.00%
Southbound	0	108	20	180	2.00%	0.00%
Northbound	0	173	45	104	2.00%	0.00%
Adjustment Factor	0.80	0.95		0.85		
Suggested	**0.80**	**0.95**		**0.85**		

Truck to PCE Factor		**Suggested = 2.00**	2.00
FDOT Context Zone		**C3R-Suburban Residential**	
Critical Lane Volume Threshold	2-phase signal	**Suggested = 1800**	**1800**
	3-phase signal	**Suggested = 1750**	**1750**
	4-phase signal	**Suggested = 1700**	**1700**

Capacity Analysis for Planning of Junctions

Number of Lanes for Non-roundabout Intersections

TYPE OF INTERSECTION	Sheet	Northbound				Southbound				Eastbound				Westbound			
		U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Traffic Signal	FULL		1	1	1		1	1	1		1	2	1		1	2	1
Two-Way Stop Control	E-W		1	1	1		1	1	1		1	2	1		1	2	1
All-Way Stop Control	FULL		1	1	1		1	1	1		1	2	1		1	2	1
Quadrant Roadway	S-W		0	0	0			0	0		0	0	0		0	0	0
	S-E		0	0	0		0	0	0			0	0		0	0	0
Partial Displaced Left Turn	E-W		1	1	1		1	1	1		1	2	1		1	2	1
Displaced Left Turn	FULL		1	1	1		1	1	1		1	2	1		1	2	1
Signalized Restricted Crossing U-Turn	E-W				1				1	1	1	2	1	1	1	2	1
Unsignalized Restricted Crossing U-Turn	E-W				1				1	1	1	2	1	1	1	2	1
Median U-Turn	E-W			1	1			1	1	1		2	1	1		2	1
Partial Median U-Turn	E-W		1	1	1		1	1	1	1		2	1	1		2	1

Number of Lanes for Interchanges

TYPE OF INTERCHANGE	Sheet	Northbound				Southbound				Eastbound				Westbound			
		U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R

Capacity Analysis for Planning of Junctions

Results for Non-roundabout Intersections

TYPE OF INTERSECTION	Sheet	Zone 1 (North)		Zone 2 (South)		Zone 3 (East)		Zone 4 (West)		Zone 5 (Center)		Overall v/c Ratio	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C				
Traffic Signal	FULL									902	0.53	0.53	Fair	Fair	Good
Two-Way Stop Control	E-W									--	2.54	2.54	Poor	Fair	Good
All-Way Stop Control	FULL									2762	1.53	1.53	Good	Good	Good
Quadrant Roadway	S-W			433	0.25			727	0.42	716	0.40	0.42	Fair	Fair	Fair
	S-E			493	0.28	747	0.43			754	0.42	0.43	Fair	Fair	Fair
Partial Displaced Left Turn	E-W					445	0.25	775	0.43	655	0.37	0.43	Fair	Fair	Good
Displaced Left Turn	FULL	388	0.22	305	0.17	445	0.25	775	0.43	635	0.35	0.43	Fair	Fair	Good
Signalized Restricted Crossing U-Turn	E-W	907	0.50	725	0.40	889	0.49	611	0.34			0.50	Good	Good	Fair
Unsignalized Restricted Crossing U-Turn	E-W	1075	1.46	679	0.83	1223	0.51	897	0.22			1.46	Fair	Fair	Fair
Median U-Turn	E-W					1114	0.62	711	0.40	875	0.49	0.62	Good	Good	Fair
Partial Median U-Turn	E-W					894	0.50	574	0.32	901	0.51	0.51	Good	Good	Fair

Capacity Analysis for Planning of Junctions

Results for Roundabouts

TYPE OF ROUNDABOUT	Zone 1 (North)			Zone 3 (East)			Zone 2 (South)			Zone 4 (West)			Overall v/c Ratio	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3				
50 ICD	-2.40			1.09			2.23			2.07			2.23	Good	Good	Good
75 ICD	-8.91			1.07			1.47			1.90			1.90	Good	Good	Good
1 X 1	0.76			0.83			0.60			1.41			1.41	Good	Good	Good
1 X 2	0.63			0.41	0.43		0.52			0.68	0.70		0.70	Fair	Good	Good
2 X 2	0.30	0.37		0.68	0.70		0.32	0.24		0.41	0.43		0.70	Fair	Good	Good

Results for Interchanges

TYPE OF INTERCHANGE	Sheet	Zone 1 (Rt Mrg)		Zone 2 (Lt Mrg)		Zone 3 (Ctr. 1)		Zone 4 (Ctr. 2)		Zone 5 (Lt Mrg)		Zone 6 (Rt Mrg)		Overall v/c Ratio	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C				

Capacity Analysis for Planning of Junctions

Summary Report - Page 1 of 2

Project Name:	SR 70 @ Bourneside
Project Number:	0
Location:	Unincorporated Manatee County
Date:	2045 PM
Number of Intersection Legs:	4
Major Street Direction	East-West

Traffic Volume Demand

	Volume (Veh/hr)				Percent (%)	
	U-Turn	**Left**	**Thru**	**Right**	Heavy Vehicles	Volume Growth
Eastbound	0	191	833	183	7.00%	0.00%
Westbound	0	104	501	108	7.00%	0.00%
Southbound	0	207	45	219	2.00%	0.00%
Northbound	0	97	21	92	2.00%	0.00%
Adjustment Factor	0.80	0.95		0.85		
Suggested	**0.80**	**0.95**		**0.85**		

Truck to PCE Factor	**Suggested = 2.00**	2.00
FDOT Context Zone	**C3R-Suburban Residential**	
Critical Lane Volume Threshold — 2-phase signal	**Suggested = 1800**	**1800**
Critical Lane Volume Threshold — 3-phase signal	**Suggested = 1750**	**1750**
Critical Lane Volume Threshold — 4-phase signal	**Suggested = 1700**	**1700**

Capacity Analysis for Planning of Junctions

TYPE OF INTERSECTION	Overall v/c Ratio	V/C Ranking	Multimodal Score	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
Displaced Left Turn	0.37	1	4.8	Fair	Fair	Good
Partial Displaced Left Turn E-W	0.39	2	4.8	Fair	Fair	Good
Quadrant Roadway S-W	0.45	3	4.4	Fair	Fair	Fair
Quadrant Roadway S-E	0.46	4	4.4	Fair	Fair	Fair
Traffic Signal	0.48	5	4.8	Fair	Fair	Good
Partial Median U-Turn E-W	0.52	6	6.3	Good	Good	Fair
Signalized Restricted Crossing U-Turn E-W	0.54	7	6.3	Good	Good	Fair
Median U-Turn E-W	0.59	8	6.3	Good	Good	Fair
1 X 2	0.69	9	5.6	Fair	Good	Good
2 X 2	0.69	9	5.6	Fair	Good	Good

Capacity Analysis for Planning of Junctions

Project Name:	SR 70 @ Bourneside
Project Number:	0
Location:	Unincorporated Manatee County
Date:	2045 PM
Number of Intersection Legs:	4
Major Street Direction:	East-West

Traffic Volume Demand

	Volume (Veh/hr)				Percent (%)	
	U-Turn	Left	Thru	Right	Heavy Vehicles	Volume Growth
Eastbound	0	191	833	183	7.00%	0.00%
Westbound	0	104	501	108	7.00%	0.00%
Southbound	0	207	45	219	2.00%	0.00%
Northbound	0	97	21	92	2.00%	0.00%
Adjustment Factor	0.80	0.95		0.85		
Suggested	**0.80**	**0.95**		**0.85**		

Truck to PCE Factor		**Suggested = 2.00**	2.00
FDOT Context Zone		**C3R-Suburban Residential**	
Critical Lane Volume Threshold	2-phase signal	**Suggested = 1800**	**1800**
	3-phase signal	**Suggested = 1750**	**1750**
	4-phase signal	**Suggested = 1700**	**1700**

Capacity Analysis for Planning of Junctions

Number of Lanes for Non-roundabout Intersections

TYPE OF INTERSECTION	Sheet	Northbound				Southbound				Eastbound				Westbound			
		U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Traffic Signal	FULL		1	1	1		1	1	1		1	2	1		1	2	1
Two-Way Stop Control	E-W		1	1	1		1	1	1		1	2	1		1	2	1
All-Way Stop Control	FULL		1	1	1		1	1	1		1	2	1		1	2	1
Quadrant Roadway	S-W		0	0	0			0	0		0	0	0		0	0	0
	S-E		0	0	0		0	0	0			0	0		0	0	0
Partial Displaced Left Turn	E-W		1	1	1		1	1	1		1	2	1		1	2	1
Displaced Left Turn	FULL		1	1	1		1	1	1		1	2	1		1	2	1
Signalized Restricted Crossing U-Turn	E-W				1				1	1	1	2	1	1	1	2	1
Unsignalized Restricted Crossing U-Turn	E-W				1				1	1	1	2	1	1	1	2	1
Median U-Turn	E-W			1	1			1	1	1		2	1	1		2	1
Partial Median U-Turn	E-W		1	1	1		1	1	1	1		2	1	1		2	1

Number of Lanes for Interchanges

TYPE OF INTERCHANGE	Sheet	Northbound				Southbound				Eastbound				Westbound			
		U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R

Capacity Analysis for Planning of Junctions

Results for Non-roundabout Intersections

TYPE OF INTERSECTION	Sheet	Zone 1 (North)		Zone 2 (South)		Zone 3 (East)		Zone 4 (West)		Zone 5 (Center)		Overall v/c Ratio	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C				
Traffic Signal	FULL									817	0.48	0.48	Fair	Fair	Good
Two-Way Stop Control	E-W									--	103.39	103.39	Poor	Fair	Good
All-Way Stop Control	FULL									2748	1.53	1.53	Good	Good	Good
Quadrant Roadway	S-W			394	0.23			693	0.40	813	0.45	0.45	Fair	Fair	Fair
	S-E			449	0.26	804	0.46			810	0.45	0.46	Fair	Fair	Fair
Partial Displaced Left Turn	E-W					668	0.37	532	0.30	689	0.39	0.39	Fair	Fair	Good
Displaced Left Turn	FULL	447	0.25	261	0.15	668	0.37	532	0.30	668	0.37	0.37	Fair	Fair	Good
Signalized Restricted Crossing U-Turn	E-W	882	0.49	803	0.45	532	0.30	967	0.54			0.54	Good	Good	Fair
Unsignalized Restricted Crossing U-Turn	E-W	635	1.14	1102	1.04	763	0.18	1291	0.62			1.14	Fair	Fair	Fair
Median U-Turn	E-W					760	0.42	1048	0.58	1058	0.59	0.59	Good	Good	Fair
Partial Median U-Turn	E-W					637	0.35	784	0.44	914	0.52	0.52	Good	Good	Fair

Capacity Analysis for Planning of Junctions

Results for Roundabouts

TYPE OF ROUNDABOUT	Zone 1 (North)			Zone 3 (East)			Zone 2 (South)			Zone 4 (West)			Overall v/c Ratio	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3				
50 ICD	1.67			1.89			-0.87			1.06			1.89	Good	Good	Good
75 ICD	1.37			1.83			-1.55			1.00			1.83	Good	Good	Good
1 X 1	0.75			1.38			0.59			0.78			1.38	Good	Good	Good
1 X 2	0.67			0.66	0.69		0.48			0.38	0.39		0.69	Fair	Good	Good
2 X 2	0.35	0.36		0.38	0.39		0.26	0.26		0.66	0.69		0.69	Fair	Good	Good

Results for Interchanges

TYPE OF INTERCHANGE	Sheet	Zone 1 (Rt Mrg)		Zone 2 (Lt Mrg)		Zone 3 (Ctr. 1)		Zone 4 (Ctr. 2)		Zone 5 (Lt Mrg)		Zone 6 (Rt Mrg)		Overall v/c Ratio	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C				

Federal Highway Administration (FHWA)
Safety Performance for Intersection Control Evaluation Tool

Results

Summary of crash prediction results for each alternative

Project Information

Project Name:	SR 70 from Lorraine Rd to CR 675	**Intersection Type**	At-Grade Intersections
Intersection:	SR 70 @ Bourneside	**Opening Year**	2025
Agency:	D1	**Design Year**	2045
Project Reference:	414506-2-22-01	**Facility Type**	On Urban and Suburban Arterial
City:	Unincorporated Manatee County	**Number of Legs**	4-leg
State:	FL	**1-Way/2-Way**	2-way Intersecting 2-way
Date:	6/14/2019	**# of Major Street Lanes (both directions)**	5 or fewer
Analyst:	Nicole Harris, PE	**Major Street Approach Speed**	Less than 55 mph

Crash Prediction Summary

Control Strategy	Crash Type	Opening Year	Design Year	Total Project Life Cycle	Rank	AADT Within Prediction Range?	Source of Prediction
Traffic Signal	Total	3.82	7.14	115.40	8	Yes	Calibrated SPF
	Fatal & Injury	1.29	2.43	39.13			
Traffic Signal (Alt)	Total	3.82	7.14	115.40	8	Yes	Calibrated SPF
	Fatal & Injury	1.29	2.43	39.13			
Minor Road Stop	Total	1.99	3.43	57.41	3	No	Calibrated SPF
	Fatal & Injury	0.80	1.46	23.86			
All Way Stop	Total	No SPF	No SPF	No SPF	--	N/A	N/A
	Fatal & Injury	No SPF	No SPF	No SPF			
1-lane Roundabout	Total	2.11	3.08	54.70	1	N/A	Uncalibrated SPF
	Fatal & Injury	0.40	0.64	10.94			
2-lane Roundabout	Total	6.60	11.94	193.99	6	N/A	Uncalibrated SPF
	Fatal & Injury	1.12	2.16	34.25			
Displaced Left Turn (DLT)	Total	3.36	6.28	101.55	7	N/A	CMF
	Fatal & Injury	1.13	2.14	34.43			
Median U-Turn (MUT)	Total	3.24	6.07	98.09	4	N/A	CMF
	Fatal & Injury	0.90	1.70	27.39			
Signalized RCUT	Total	3.24	6.07	98.09	5	N/A	CMF
	Fatal & Injury	1.00	1.90	30.52			
Unsignalized RCUT	Total	1.29	2.23	37.32	2	N/A	CMF
	Fatal & Injury	0.37	0.67	10.98			