STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TECHNICAL REPORT COVERSHEET

650-050-38
ENVIRONMENTAL
MANAGEMENT
06/17

DRAFT INTERSECTION CONTROL EVALUATION

(DEL WEBB 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 18, 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) Del Webb Boulevard at SR 70		

Reference: Intersection Control Evaluation (ICE): Del Webb 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 Del Webb 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 Del Webb 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 Del Webb Boulevard 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	06/14/19
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	RCUT (Signalized)
Displaced Left-Turn	Continuous Green Tee	

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	A	5.9	Yes	A	7.8	Yes			
Roundabout	A	6.1	Yes	A	6.2	Yes			
RCUT (Signalized)	A	7.1	Yes	A	8.1	Yes			
Displaced Left-Turn	A	8.9	Yes	B	11.4	Yes			
Continuous Green Tee	A	4.2	Yes	A	6.4	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	A	8.2	Yes	B	10.5	Yes			
Roundabout	A	8.9	Yes	A	9.7	Yes			
RCUT (Signalized)	B	10.3	Yes	B	10.9	Yes			
Displaced Left-Turn	B	12.5	Yes	B	14.5	Yes			
Continuous Green Tee	A	6.4	Yes	A	9.6	Yes			

Provide any additional discussion necessary regarding the results of the operational analysis:	All of the alternative intersection configurations are operating at LOS B or better for both AM and PM Peak hours. The delay that is shown for the RCUT, Displaced Left-Turn, and Continuous Green T 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	1	0	0	1
	Fatal/Injury	0	0	1	0	0	1
	PDO	0	0	0	0	0	0
Multi-Vehicle	Total	0	0	0	2	3	5
	Fatal/Injury	0	0	0	2	2	4
	PDO	0	0	0	0	1	1
Vehicle-Pedestrian	Fatal/Injury	0	0	0	0	0	0
Vehicle-Bicycle	Fatal/Injury	0	0	0	0	0	0
Total	All	0	0	1	2	3	6

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	This option has a comparable Predicated Total Crashes for both opening and design year between the other options.	4.61	5.59	4.61	5.59
Roundabout	This option has the lowst Predicted Fatal+Injury crashes for both opening an design years	4.56	0.99	7.19	1.16
RCUT (Signalized)	This option has a comparable Predicated Total Crashes for both opening and design year between the other options.	3.92	4.36	3.92	4.36
Displaced Left-Turn	This option has a comparable Predicated Total Crashes for both opening and design year between the other options.	4.06	4.92	4.06	4.92
Continuous Green Tee	This option has a comparable Predicated Total Crashes for both opening and design year between the other options.	4.43	4.75	4.43	4.75

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	-	$2,340,000	Base	Base	Base	Base
Roundabout	-	$2,110,000	Preferred	Preferred	Preferred	$1,910,613
RCUT (Signalized)	-	$2,530,000	Less than 0	3.24	1.62	$267,414
Displaced Left-Turn	$410,000	$2,650,000	Less than 0	1.23	Less than 0	-$2,718,400
Continuous Green Tee	-	$2,400,000	8.41	5.81	14.21	$2,090,554

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 the designs 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 the designs trucks at the turns.
RCUT (Signalized)	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 the designs 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 the designs trucks at the turns.
Continuous Green Tee	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 the designs 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	No right of way acquisition required 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	No right of way acquisition required and no new environmental impacts are anticipated. The overhead transmission lines on the north side of the corridor are not expected to be impacted.
RCUT (Signalized)	No right of way acquisition required 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 to accommodate displaced left turns. Potential for environmental impacts on the south side of SR 70. No impacts to the overhead transmission lines on the north side.
Continuous Green Tee	No right of way acquisition required and no new environmental impacts are anticipated. The overhead transmission lines on the north side of the corridor are not expected to be impacted.

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

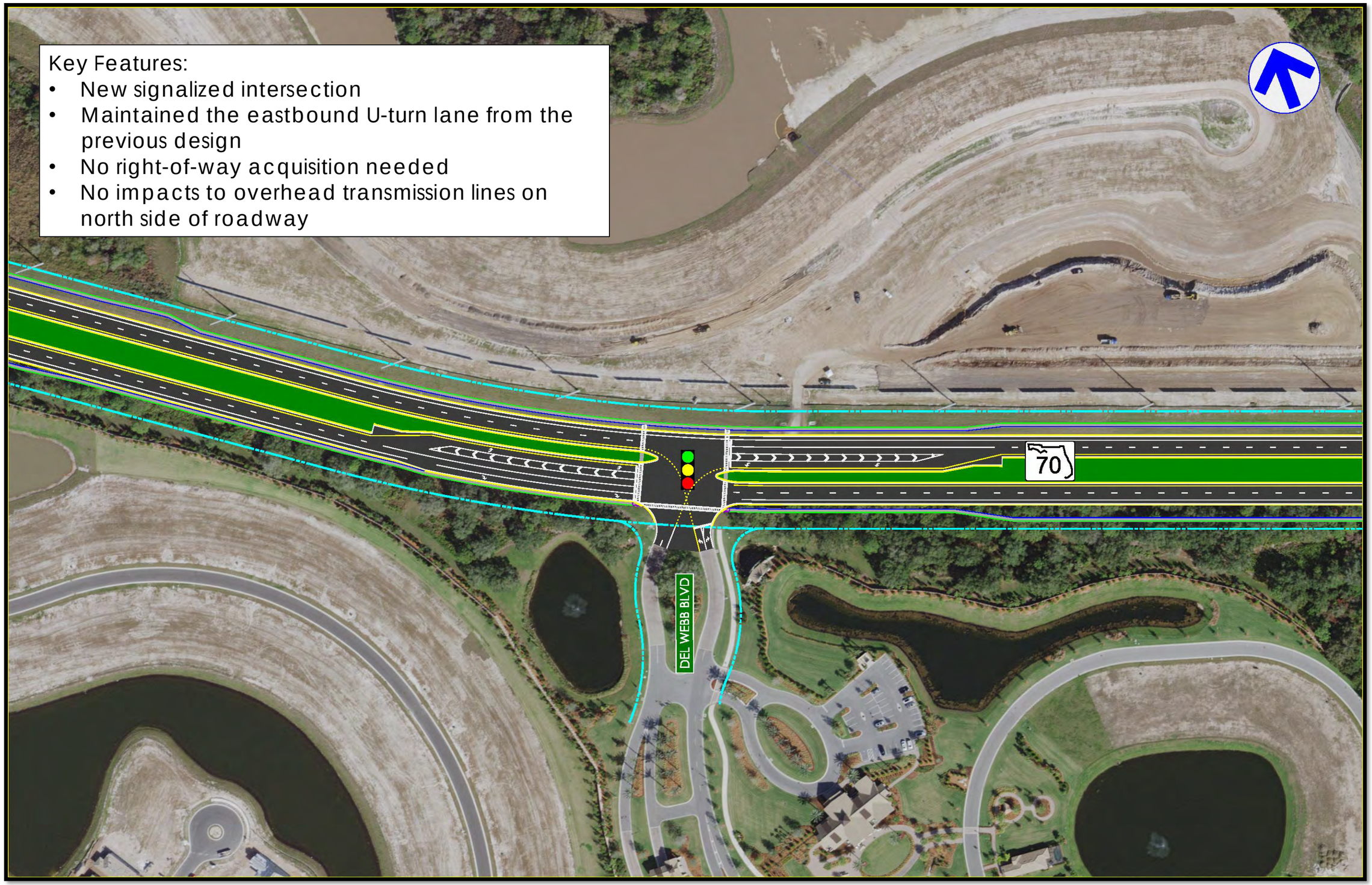
Control Strategy Evaluation		
Provide a brief justification as to why each of the following is either viable or not viable. If a single control strategy is recommended, select it as the only strategy to be advanced.		
Control Strategy	Strategy to be Advanced?	Justification
Signalized Control	No	This option was analyzed as the base intersection control which is why the B/C ratio is zero. The Roundabout and Continuous Green-Tee higher benefits relative to their cost.
Roundabout	Yes	1) Preferred option based on B/C analysis and NPV compared to base; 2) less severe crashes ; 3) traffic operations at LOS B or better; 4) no right of way impacts; and, 5) enhances the livable communities characteristic by lowering vehicle speeds and providing shorter crosswalk distances.
RCUT (Signalized)	No	Although this option has a high overall B/C ratio, it does not share the benefits to delay when compared to the Roundabout and Continuos Green Tee options.
Displaced Left-Turn	No	This option had a negative Net Present Value (NPV) ; therefore, it is not cost feasible compared to the base option of a signalized intersection.
Continuous Green Tee	No	This option had the second highest overall B/C. However, the roundabout is the preferred option based on the B/C analysis.
	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	

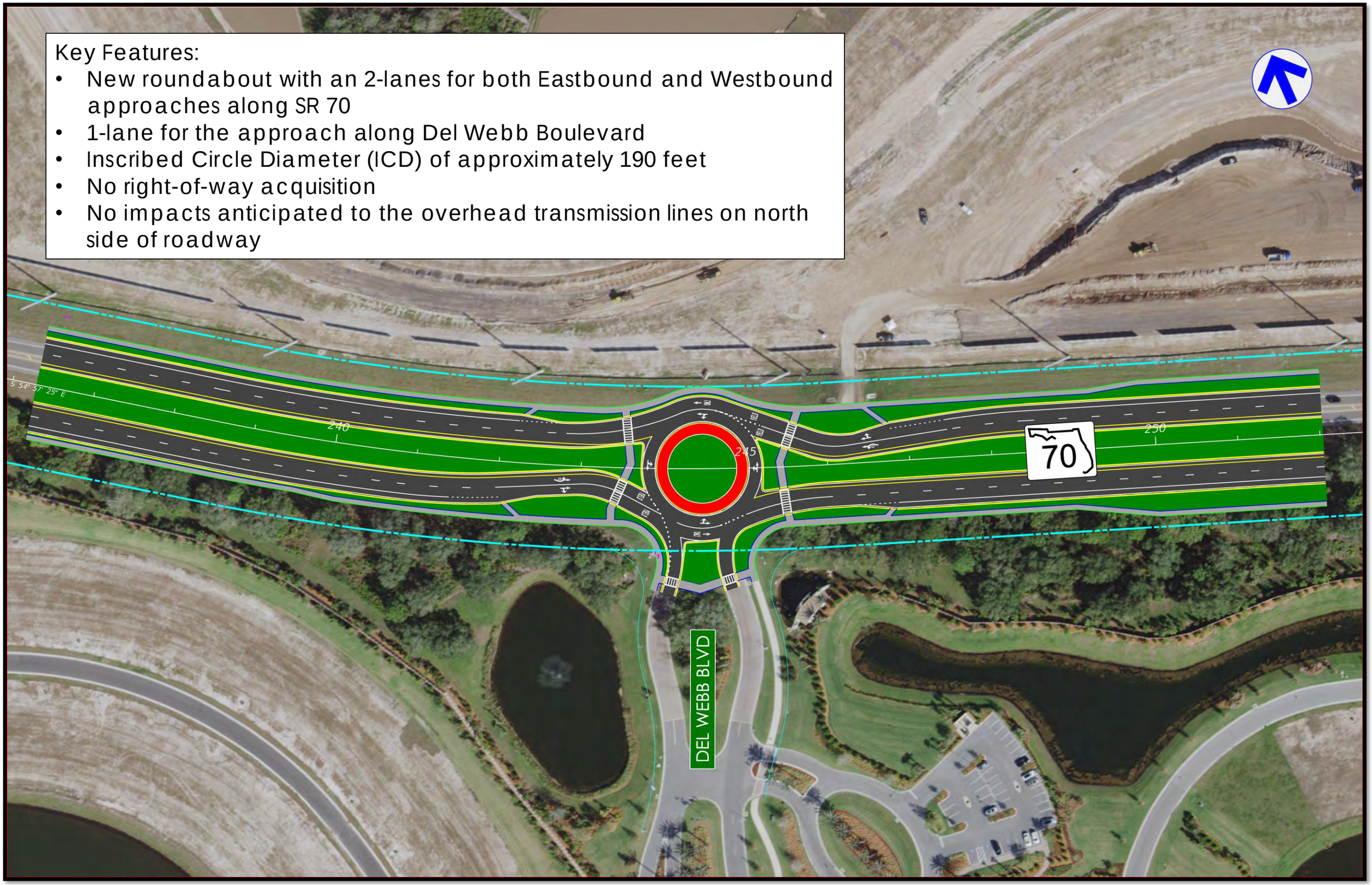
ATTACHMENT B

Conceptual Plans

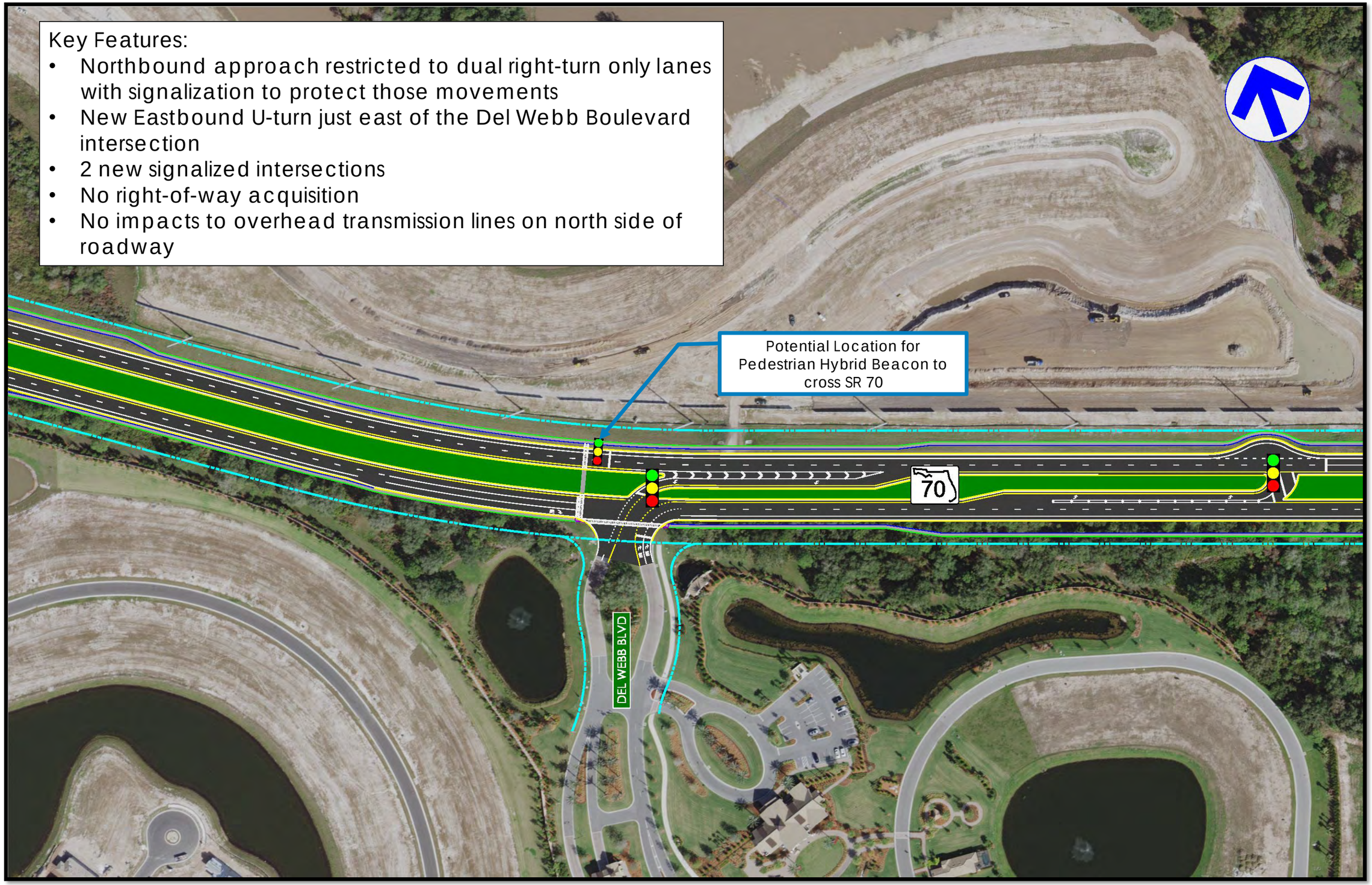
SR 70 and Del Webb Boulevard
Signalized Intersection



SR 70 and Del Webb Boulevard
Roundabout



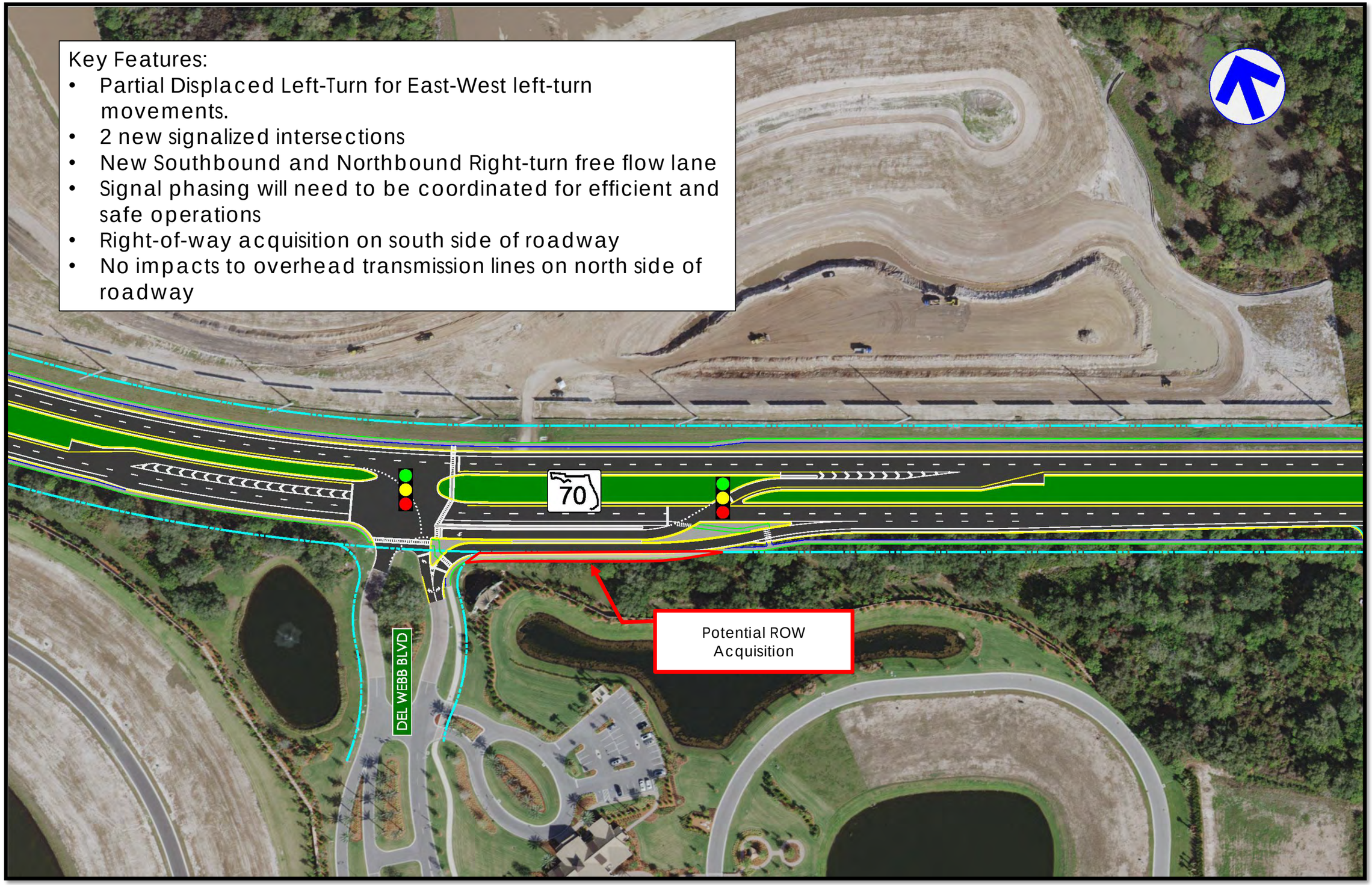
SR 70 and Del Webb Boulevard
Signalized Restricted Crossing U-Turn (RCUT)



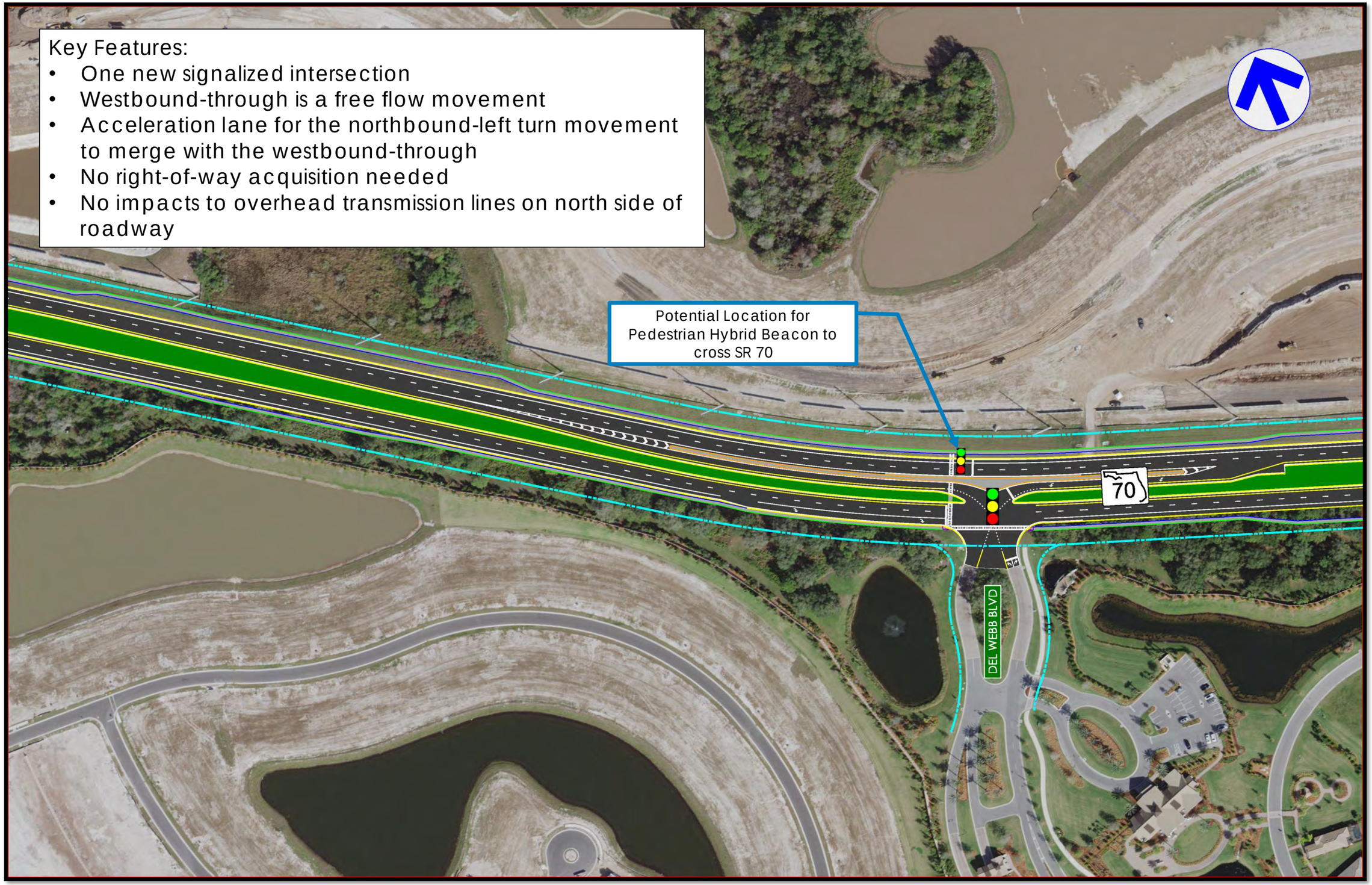
SR 70 and Del Webb Boulevard
Partial Displaced Left-Turn (East-West)

Key Features:

- Partial Displaced Left-Turn for East-West left-turn movements.
- 2 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 on south side of roadway
- No impacts to overhead transmission lines on north side of roadway



SR 70 and Del Webb Boulevard
Continuous Green-Tee



ATTACHMENT C

Traffic Operational Analysis

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	524	99	11	839	68	15
Future Volume (veh/h)	524	99	11	839	68	15
Number	2	12	1	6	7	14
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	1776	1776	1776	1863	1863
Adj Flow Rate, veh/h	552	104	12	883	72	16
Adj No. of Lanes	2	1	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	2145	1046	625	2640	102	91
Arrive On Green	0.64	0.64	0.07	0.78	0.06	0.06
Sat Flow, veh/h	3463	1509	1691	3463	1774	1583
Grp Volume(v), veh/h	552	104	12	883	72	16
Grp Sat Flow(s),veh/h/ln	1687	1509	1691	1687	1774	1583
Q Serve(g_s), s	5.3	1.7	0.1	5.8	3.0	0.7
Cycle Q Clear(g_c), s	5.3	1.7	0.1	5.8	3.0	0.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2145	1046	625	2640	102	91
V/C Ratio(X)	0.26	0.10	0.02	0.33	0.71	0.18
Avail Cap(c_a), veh/h	2145	1046	918	2640	426	380
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	5.9	3.8	3.1	2.4	34.7	33.6
Incr Delay (d2), s/veh	0.3	0.2	0.0	0.1	8.6	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.9	0.1	2.6	1.7	0.7
LnGrp Delay(d),s/veh	6.2	4.0	3.1	2.5	43.3	34.6
LnGrp LOS	A	A	A	A	D	C
Approach Vol, veh/h	656			895	88	
Approach Delay, s/veh	5.9			2.5	41.7	
Approach LOS	A			A	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	11.0	53.7		10.3		64.7		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	18.0	21.0		18.0		45.0		
Max Q Clear Time (g_c+I1), s	2.1	7.3		5.0		7.8		
Green Ext Time (p_c), s	0.0	3.1		0.1		6.6		

Intersection Summary	
HCM 2010 Ctrl Delay	5.9
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	808	86	13	547	89	8
Future Volume (veh/h)	808	86	13	547	89	8
Number	2	12	1	6	7	14
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	1776	1776	1776	1863	1863
Adj Flow Rate, veh/h	851	91	14	576	94	8
Adj No. of Lanes	2	1	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	2099	1046	488	2594	126	113
Arrive On Green	0.62	0.62	0.07	0.77	0.07	0.07
Sat Flow, veh/h	3463	1509	1691	3463	1774	1583
Grp Volume(v), veh/h	851	91	14	576	94	8
Grp Sat Flow(s),veh/h/ln	1687	1509	1691	1687	1774	1583
Q Serve(g_s), s	9.6	1.5	0.2	3.6	3.9	0.4
Cycle Q Clear(g_c), s	9.6	1.5	0.2	3.6	3.9	0.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2099	1046	488	2594	126	113
V/C Ratio(X)	0.41	0.09	0.03	0.22	0.74	0.07
Avail Cap(c_a), veh/h	2099	1046	781	2594	426	380
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	7.2	3.8	4.0	2.4	34.2	32.5
Incr Delay (d2), s/veh	0.6	0.2	0.0	0.0	8.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	0.8	0.1	1.6	2.2	0.3
LnGrp Delay(d),s/veh	7.7	3.9	4.0	2.5	42.5	32.8
LnGrp LOS	A	A	A	A	D	C
Approach Vol, veh/h	942			590	102	
Approach Delay, s/veh	7.4			2.5	41.7	
Approach LOS	A			A	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	11.0	52.7		11.3		63.7		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	18.0	21.0		18.0		45.0		
Max Q Clear Time (g_c+I1), s	2.2	11.6		5.9		5.6		
Green Ext Time (p_c), s	0.0	3.9		0.2		3.9		

Intersection Summary	
HCM 2010 Ctrl Delay	7.8
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	793	150	38	1155	125	45
Future Volume (veh/h)	793	150	38	1155	125	45
Number	2	12	1	6	7	14
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	1776	1776	1776	1863	1863
Adj Flow Rate, veh/h	835	158	40	1216	132	47
Adj No. of Lanes	2	1	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	1998	1046	455	2493	179	160
Arrive On Green	0.59	0.59	0.07	0.74	0.10	0.10
Sat Flow, veh/h	3463	1509	1691	3463	1774	1583
Grp Volume(v), veh/h	835	158	40	1216	132	47
Grp Sat Flow(s),veh/h/ln	1687	1509	1691	1687	1774	1583
Q Serve(g_s), s	10.1	2.7	0.6	11.0	5.4	2.1
Cycle Q Clear(g_c), s	10.1	2.7	0.6	11.0	5.4	2.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1998	1046	455	2493	179	160
V/C Ratio(X)	0.42	0.15	0.09	0.49	0.74	0.29
Avail Cap(c_a), veh/h	1998	1046	749	2493	426	380
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	8.3	3.9	4.8	4.0	32.7	31.2
Incr Delay (d2), s/veh	0.6	0.3	0.1	0.1	5.8	1.0
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	1.6	0.3	5.1	2.9	1.9
LnGrp Delay(d),s/veh	8.9	4.2	4.9	4.1	38.5	32.2
LnGrp LOS	A	A	A	A	D	C
Approach Vol, veh/h	993			1256	179	
Approach Delay, s/veh	8.2			4.2	36.9	
Approach LOS	A			A	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	11.0	50.4		13.6		61.4		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	18.0	21.0		18.0		45.0		
Max Q Clear Time (g_c+I1), s	2.6	12.1		7.4		13.0		
Green Ext Time (p_c), s	0.0	3.8		0.3		10.0		

Intersection Summary	
HCM 2010 Ctrl Delay	8.2
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1182	140	46	771	147	25
Future Volume (veh/h)	1182	140	46	771	147	25
Number	2	12	1	6	7	14
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	1776	1776	1776	1863	1863
Adj Flow Rate, veh/h	1244	147	48	812	155	26
Adj No. of Lanes	2	1	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	2026	1075	331	2490	199	177
Arrive On Green	0.60	0.60	0.06	0.74	0.11	0.11
Sat Flow, veh/h	3463	1509	1691	3463	1774	1583
Grp Volume(v), veh/h	1244	147	48	812	155	26
Grp Sat Flow(s),veh/h/ln	1687	1509	1691	1687	1774	1583
Q Serve(g_s), s	18.7	2.5	0.7	6.6	6.8	1.2
Cycle Q Clear(g_c), s	18.7	2.5	0.7	6.6	6.8	1.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2026	1075	331	2490	199	177
V/C Ratio(X)	0.61	0.14	0.14	0.33	0.78	0.15
Avail Cap(c_a), veh/h	2026	1075	606	2490	399	356
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	10.1	3.7	7.1	3.6	34.6	32.1
Incr Delay (d2), s/veh	1.4	0.3	0.2	0.1	6.5	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	9.0	1.5	0.3	3.1	3.7	1.1
LnGrp Delay(d),s/veh	11.5	3.9	7.3	3.7	41.1	32.4
LnGrp LOS	B	A	A	A	D	C
Approach Vol, veh/h	1391			860	181	
Approach Delay, s/veh	10.7			3.9	39.9	
Approach LOS	B			A	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	11.0	54.0		15.0		65.0		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	18.0	26.0		18.0		50.0		
Max Q Clear Time (g_c+I1), s	2.7	20.7		8.8		8.6		
Green Ext Time (p_c), s	0.1	3.6		0.3		6.0		

Intersection Summary	
HCM 2010 Ctrl Delay	10.5
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	524	99	11	839	0	83
Future Volume (vph)	524	99	11	839	0	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.0		6.0
Lane Util. Factor	0.95	1.00	1.00	0.95		0.88
Frt	1.00	0.85	1.00	1.00		0.85
Flt Protected	1.00	1.00	0.95	1.00		1.00
Satd. Flow (prot)	3374	1509	1687	3374		2787
Flt Permitted	1.00	1.00	0.45	1.00		1.00
Satd. Flow (perm)	3374	1509	791	3374		2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	552	104	12	883	0	87
RTOR Reduction (vph)	0	32	0	0	0	81
Lane Group Flow (vph)	552	72	12	883	0	6
Heavy Vehicles (%)	7%	7%	7%	7%	2%	2%
Turn Type	NA	Perm	D.P+P	NA		Over
Protected Phases	2		1	Free		1
Permitted Phases		2	2			
Actuated Green, G (s)	34.7	34.7	38.0	50.0		3.3
Effective Green, g (s)	34.7	34.7	38.0	50.0		3.3
Actuated g/C Ratio	0.69	0.69	0.76	1.00		0.07
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)	2341	1047	660	3374		183
v/s Ratio Prot	0.16		0.00	0.26		0.00
v/s Ratio Perm		0.05	0.01			
v/c Ratio	0.24	0.07	0.02	0.26		0.03
Uniform Delay, d1	2.8	2.5	1.5	0.0		21.9
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	0.2	0.1	0.0	0.2		0.1
Delay (s)	3.0	2.6	1.5	0.2		21.9
Level of Service	A	A	A	A		C
Approach Delay (s)	3.0			0.2	21.9	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	2.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	28.7%	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)	0	0	0	850	68	0
Future Volume (vph)	0	0	0	850	68	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.95	1.00	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3374	1687	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3374	1687	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	895	72	0
RTOR Reduction (vph)	0	0	0	0	49	0
Lane Group Flow (vph)	0	0	0	895	23	0
Turn Type				NA	Prot	
Protected Phases				2	4	
Permitted Phases						
Actuated Green, G (s)				33.6	4.4	
Effective Green, g (s)				33.6	4.4	
Actuated g/C Ratio				0.67	0.09	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				2267	148	
v/s Ratio Prot				c0.27	c0.01	
v/s Ratio Perm						
v/c Ratio				0.39	0.15	
Uniform Delay, d1				3.7	21.1	
Progression Factor				1.00	1.00	
Incremental Delay, d2				0.5	0.5	
Delay (s)				4.2	21.6	
Level of Service				A	C	
Approach Delay (s)	0.0			4.2	21.6	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	5.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.7%	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)	808	86	13	547	0	97
Future Volume (vph)	808	86	13	547	0	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.0		6.0
Lane Util. Factor	0.95	1.00	1.00	0.95		0.88
Frt	1.00	0.85	1.00	1.00		0.85
Flt Protected	1.00	1.00	0.95	1.00		1.00
Satd. Flow (prot)	3374	1509	1687	3374		2787
Flt Permitted	1.00	1.00	0.33	1.00		1.00
Satd. Flow (perm)	3374	1509	590	3374		2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	851	91	14	576	0	102
RTOR Reduction (vph)	0	31	0	0	0	92
Lane Group Flow (vph)	851	60	14	576	0	10
Heavy Vehicles (%)	7%	7%	7%	7%	2%	2%
Turn Type	NA	Perm	D.P+P	NA		Over
Protected Phases	2		1	Free		1
Permitted Phases		2	2			
Actuated Green, G (s)	33.1	33.1	38.0	50.0		4.9
Effective Green, g (s)	33.1	33.1	38.0	50.0		4.9
Actuated g/C Ratio	0.66	0.66	0.76	1.00		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)	2233	998	555	3374		273
v/s Ratio Prot	c0.25		0.00	0.17		0.00
v/s Ratio Perm		0.04	0.02			
v/c Ratio	0.38	0.06	0.03	0.17		0.04
Uniform Delay, d1	3.8	3.0	1.5	0.0		20.4
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	0.5	0.1	0.0	0.1		0.1
Delay (s)	4.3	3.1	1.5	0.1		20.5
Level of Service	A	A	A	A		C
Approach Delay (s)	4.2			0.1	20.5	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	3.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	36.5%	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)	0	0	0	560	89	0
Future Volume (vph)	0	0	0	560	89	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.95	1.00	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3374	1687	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3374	1687	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	589	94	0
RTOR Reduction (vph)	0	0	0	0	87	0
Lane Group Flow (vph)	0	0	0	589	7	0
Turn Type				NA	Prot	
Protected Phases				2	4	
Permitted Phases						
Actuated Green, G (s)				34.4	3.6	
Effective Green, g (s)				34.4	3.6	
Actuated g/C Ratio				0.69	0.07	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				2321	121	
v/s Ratio Prot				c0.17	c0.00	
v/s Ratio Perm						
v/c Ratio				0.25	0.06	
Uniform Delay, d1				2.9	21.6	
Progression Factor				1.00	1.00	
Incremental Delay, d2				0.3	0.2	
Delay (s)				3.2	21.8	
Level of Service				A	C	
Approach Delay (s)	0.0			3.2	21.8	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	5.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	30.4%	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)	793	150	38	1155	0	170
Future Volume (vph)	793	150	38	1155	0	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.0		6.0
Lane Util. Factor	0.95	1.00	1.00	0.95		0.88
Frt	1.00	0.85	1.00	1.00		0.85
Flt Protected	1.00	1.00	0.95	1.00		1.00
Satd. Flow (prot)	3374	1509	1687	3374		2787
Flt Permitted	1.00	1.00	0.34	1.00		1.00
Satd. Flow (perm)	3374	1509	599	3374		2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	835	158	40	1216	0	179
RTOR Reduction (vph)	0	56	0	0	0	104
Lane Group Flow (vph)	835	102	40	1216	0	75
Heavy Vehicles (%)	7%	7%	7%	7%	2%	2%
Turn Type	NA	Perm	D.P+P	NA		Over
Protected Phases	2		1	Free		1
Permitted Phases		2	2			
Actuated Green, G (s)	32.2	32.2	38.0	50.0		5.8
Effective Green, g (s)	32.2	32.2	38.0	50.0		5.8
Actuated g/C Ratio	0.64	0.64	0.76	1.00		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)	2172	971	581	3374		323
v/s Ratio Prot	0.25		0.01	0.36		0.03
v/s Ratio Perm		0.07	0.04			
v/c Ratio	0.38	0.10	0.07	0.36		0.23
Uniform Delay, d1	4.2	3.4	1.5	0.0		20.1
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	0.5	0.2	0.1	0.3		0.4
Delay (s)	4.7	3.6	1.5	0.3		20.4
Level of Service	A	A	A	A		C
Approach Delay (s)	4.6			0.3	20.4	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	3.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.9%	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)	0	0	0	1193	125	0
Future Volume (vph)	0	0	0	1193	125	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.95	1.00	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3374	1687	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3374	1687	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	1256	132	0
RTOR Reduction (vph)	0	0	0	0	13	0
Lane Group Flow (vph)	0	0	0	1256	119	0
Turn Type				NA	Prot	
Protected Phases				2	4	
Permitted Phases						
Actuated Green, G (s)				30.2	7.8	
Effective Green, g (s)				30.2	7.8	
Actuated g/C Ratio				0.60	0.16	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				2037	263	
v/s Ratio Prot				c0.37	c0.07	
v/s Ratio Perm						
v/c Ratio				0.62	0.45	
Uniform Delay, d1				6.2	19.2	
Progression Factor				1.00	1.00	
Incremental Delay, d2				1.4	1.2	
Delay (s)				7.7	20.4	
Level of Service				A	C	
Approach Delay (s)	0.0			7.7	20.4	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.9%	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)	1182	140	46	771	0	172
Future Volume (vph)	1182	140	46	771	0	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.0		6.0
Lane Util. Factor	0.95	1.00	1.00	0.95		0.88
Frt	1.00	0.85	1.00	1.00		0.85
Flt Protected	1.00	1.00	0.95	1.00		1.00
Satd. Flow (prot)	3374	1509	1687	3374		2787
Flt Permitted	1.00	1.00	0.19	1.00		1.00
Satd. Flow (perm)	3374	1509	336	3374		2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1244	147	48	812	0	181
RTOR Reduction (vph)	0	56	0	0	0	23
Lane Group Flow (vph)	1244	91	48	812	0	158
Heavy Vehicles (%)	7%	7%	7%	7%	2%	2%
Turn Type	NA	Perm	D.P+P	NA		Over
Protected Phases	2		1	Free		1
Permitted Phases		2	2			
Actuated Green, G (s)	31.0	31.0	38.0	50.0		7.0
Effective Green, g (s)	31.0	31.0	38.0	50.0		7.0
Actuated g/C Ratio	0.62	0.62	0.76	1.00		0.14
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)	2091	935	444	3374		390
v/s Ratio Prot	c0.37		0.02	0.24		0.06
v/s Ratio Perm		0.06	0.07			
v/c Ratio	0.59	0.10	0.11	0.24		0.40
Uniform Delay, d1	5.7	3.8	1.8	0.0		19.6
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	1.3	0.2	0.1	0.2		0.7
Delay (s)	7.0	4.1	1.9	0.2		20.3
Level of Service	A	A	A	A		C
Approach Delay (s)	6.7			0.3	20.3	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	50.0	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	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	817	147	0
Future Volume (vph)	0	0	0	817	147	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.95	1.00	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3374	1687	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3374	1687	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	860	155	0
RTOR Reduction (vph)	0	0	0	0	53	0
Lane Group Flow (vph)	0	0	0	860	102	0
Turn Type				NA	Prot	
Protected Phases				2	4	
Permitted Phases						
Actuated Green, G (s)				30.6	7.4	
Effective Green, g (s)				30.6	7.4	
Actuated g/C Ratio				0.61	0.15	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				2064	249	
v/s Ratio Prot				c0.25	c0.06	
v/s Ratio Perm						
v/c Ratio				0.42	0.41	
Uniform Delay, d1				5.1	19.3	
Progression Factor				1.00	1.00	
Incremental Delay, d2				0.6	1.1	
Delay (s)				5.7	20.4	
Level of Service				A	C	
Approach Delay (s)	0.0			5.7	20.4	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	7.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	524	99	0	0	839	68	0
Future Volume (vph)	524	99	0	0	839	68	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0	6.0			6.0	6.0	
Lane Util. Factor	0.95	1.00			0.95	1.00	
Frt	1.00	0.85			1.00	1.00	
Flt Protected	1.00	1.00			1.00	0.95	
Satd. Flow (prot)	3463	1549			3463	1816	
Flt Permitted	1.00	1.00			1.00	0.95	
Satd. Flow (perm)	3463	1549			3463	1816	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	552	104	0	0	883	72	0
RTOR Reduction (vph)	0	34	0	0	0	0	0
Lane Group Flow (vph)	552	70	0	0	883	72	0
Heavy Vehicles (%)	7%	7%	2%	7%	7%	2%	2%
Turn Type	NA	Perm	Perm		NA	Prot	
Protected Phases	1 2				1 2	3 4	
Permitted Phases		1 2	1 2				
Actuated Green, G (s)	63.8	63.8			63.8	19.2	
Effective Green, g (s)	63.8	63.8			63.8	19.2	
Actuated g/C Ratio	0.67	0.67			0.67	0.20	
Clearance Time (s)							
Vehicle Extension (s)							
Lane Grp Cap (vph)	2325	1040			2325	367	
v/s Ratio Prot	0.16				c0.26	c0.04	
v/s Ratio Perm		0.05					
v/c Ratio	0.24	0.07			0.38	0.20	
Uniform Delay, d1	6.1	5.4			6.9	31.5	
Progression Factor	1.00	1.00			1.00	0.25	
Incremental Delay, d2	0.1	0.0			0.1	0.3	
Delay (s)	6.1	5.4			7.0	8.0	
Level of Service	A	A			A	A	
Approach Delay (s)	6.0				7.0	8.0	
Approach LOS	A				A	A	

Intersection Summary			
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	36.8%	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)	524	0	11	839	0	15
Future Volume (vph)	524	0	11	839	0	15
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)	552	0	12	883	0	16
RTOR Reduction (vph)	0	0	0	0	0	16
Lane Group Flow (vph)	552	0	12	883	0	0
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)	75.2		2.8	90.0		2.8
Effective Green, g (s)	75.2		2.8	90.0		2.8
Actuated g/C Ratio	0.84		0.03	1.00		0.03
Clearance Time (s)	6.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	2893		53	3463		51
v/s Ratio Prot	0.16		0.01	0.26		0.00
v/s Ratio Perm						
v/c Ratio	0.19		0.23	0.25		0.01
Uniform Delay, d1	1.4		42.5	0.0		42.3
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.1		2.2	0.2		0.1
Delay (s)	1.6		44.7	0.2		42.3
Level of Service	A		D	A		D
Approach Delay (s)	1.6			0.8	42.3	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	1.5	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	27.4%	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)	11	0	68	15	0	99
Future Volume (vph)	11	0	68	15	0	99
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		1.00	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		1912	1625		3632
Flt Permitted	0.95		1.00	1.00		1.00
Satd. Flow (perm)	1816		1912	1625		3632
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	12	0	72	16	0	104
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	12	0	72	16	0	104
Turn Type	Prot		NA	Free		NA
Protected Phases	2		3 4			1 7 8
Permitted Phases				Free		
Actuated Green, G (s)	36.6		19.2	95.0		46.4
Effective Green, g (s)	36.6		19.2	95.0		46.4
Actuated g/C Ratio	0.39		0.20	1.00		0.49
Clearance Time (s)	6.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	699		386	1625		1773
v/s Ratio Prot	c0.01		c0.04			c0.03
v/s Ratio Perm				0.01		
v/c Ratio	0.02		0.19	0.01		0.06
Uniform Delay, d1	18.1		31.4	0.0		12.8
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.0		0.2	0.0		0.0
Delay (s)	18.1		31.7	0.0		12.8
Level of Service	B		C	A		B
Approach Delay (s)	18.1		25.9			12.8
Approach LOS	B		C			B

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.08		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	17.5%	ICU Level of Service	A
Analysis Period (min)	15		

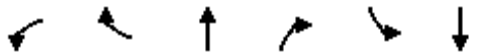
c Critical Lane Group

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	808	86	0	0	547	89	0
Future Volume (vph)	808	86	0	0	547	89	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0	6.0			6.0	6.0	
Lane Util. Factor	0.95	1.00			0.95	1.00	
Frt	1.00	0.85			1.00	1.00	
Flt Protected	1.00	1.00			1.00	0.95	
Satd. Flow (prot)	3463	1549			3463	1816	
Flt Permitted	1.00	1.00			1.00	0.95	
Satd. Flow (perm)	3463	1549			3463	1816	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	851	91	0	0	576	94	0
RTOR Reduction (vph)	0	33	0	0	0	0	0
Lane Group Flow (vph)	851	58	0	0	576	94	0
Heavy Vehicles (%)	7%	7%	2%	7%	7%	2%	2%
Turn Type	NA	Perm	Perm		NA	Prot	
Protected Phases	1 2				1 2	3 4	
Permitted Phases		1 2	1 2				
Actuated Green, G (s)	60.2	60.2			60.2	22.8	
Effective Green, g (s)	60.2	60.2			60.2	22.8	
Actuated g/C Ratio	0.63	0.63			0.63	0.24	
Clearance Time (s)							
Vehicle Extension (s)							
Lane Grp Cap (vph)	2194	981			2194	435	
v/s Ratio Prot	c0.25				0.17	c0.05	
v/s Ratio Perm		0.04					
v/c Ratio	0.39	0.06			0.26	0.22	
Uniform Delay, d1	8.5	6.6			7.6	28.9	
Progression Factor	1.00	1.00			1.00	0.20	
Incremental Delay, d2	0.1	0.0			0.1	0.3	
Delay (s)	8.6	6.6			7.7	6.0	
Level of Service	A	A			A	A	
Approach Delay (s)	8.4				7.7	6.0	
Approach LOS	A				A	A	

Intersection Summary			
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	36.6%	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)	808	0	13	547	0	8
Future Volume (vph)	808	0	13	547	0	8
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)	851	0	14	576	0	8
RTOR Reduction (vph)	0	0	0	0	0	8
Lane Group Flow (vph)	851	0	14	576	0	0
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)	27.0		1.0	40.0		1.0
Effective Green, g (s)	27.0		1.0	40.0		1.0
Actuated g/C Ratio	0.68		0.02	1.00		0.02
Clearance Time (s)	6.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	2337		43	3463		41
v/s Ratio Prot	c0.25		0.01	0.17		0.00
v/s Ratio Perm						
v/c Ratio	0.36		0.33	0.17		0.00
Uniform Delay, d1	2.8		19.2	0.0		19.0
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.4		4.4	0.1		0.0
Delay (s)	3.2		23.6	0.1		19.1
Level of Service	A		C	A		B
Approach Delay (s)	3.2			0.7	19.1	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	2.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	35.1%	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)	13	0	89	8	0	86
Future Volume (vph)	13	0	89	8	0	86
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		1.00	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		1912	1625		3632
Flt Permitted	0.95		1.00	1.00		1.00
Satd. Flow (perm)	1816		1912	1625		3632
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	14	0	94	8	0	91
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	14	0	94	8	0	91
Turn Type	Prot		NA	Free		NA
Protected Phases	2		3 4			1 7 8
Permitted Phases				Free		
Actuated Green, G (s)	32.9		22.8	95.0		50.1
Effective Green, g (s)	32.9		22.8	95.0		50.1
Actuated g/C Ratio	0.35		0.24	1.00		0.53
Clearance Time (s)	6.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	628		458	1625		1915
v/s Ratio Prot	c0.01		c0.05			c0.03
v/s Ratio Perm				0.00		
v/c Ratio	0.02		0.21	0.00		0.05
Uniform Delay, d1	20.5		28.9	0.0		10.9
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.1		0.2	0.0		0.0
Delay (s)	20.5		29.1	0.0		10.9
Level of Service	C		C	A		B
Approach Delay (s)	20.5		26.8			10.9
Approach LOS	C		C			B

Intersection Summary			
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.09		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	17.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	793	150	0	0	1155	125	0
Future Volume (vph)	793	150	0	0	1155	125	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0	6.0			6.0	6.0	
Lane Util. Factor	0.95	1.00			0.95	1.00	
Frt	1.00	0.85			1.00	1.00	
Flt Protected	1.00	1.00			1.00	0.95	
Satd. Flow (prot)	3463	1549			3463	1816	
Flt Permitted	1.00	1.00			1.00	0.95	
Satd. Flow (perm)	3463	1549			3463	1816	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	835	158	0	0	1216	132	0
RTOR Reduction (vph)	0	57	0	0	0	0	0
Lane Group Flow (vph)	835	101	0	0	1216	132	0
Heavy Vehicles (%)	7%	7%	2%	7%	7%	2%	2%
Turn Type	NA	Perm	Perm		NA	Prot	
Protected Phases	1 2				1 2	3 4	
Permitted Phases		1 2	1 2				
Actuated Green, G (s)	60.6	60.6			60.6	22.4	
Effective Green, g (s)	60.6	60.6			60.6	22.4	
Actuated g/C Ratio	0.64	0.64			0.64	0.24	
Clearance Time (s)							
Vehicle Extension (s)							
Lane Grp Cap (vph)	2209	988			2209	428	
v/s Ratio Prot	0.24				c0.35	c0.07	
v/s Ratio Perm		0.07					
v/c Ratio	0.38	0.10			0.55	0.31	
Uniform Delay, d1	8.2	6.7			9.6	29.9	
Progression Factor	1.00	1.00			1.00	0.20	
Incremental Delay, d2	0.1	0.0			0.3	0.4	
Delay (s)	8.3	6.7			9.9	6.3	
Level of Service	A	A			A	A	
Approach Delay (s)	8.1				9.9	6.3	
Approach LOS	A				A	A	

Intersection Summary			
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	47.9%	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)	793	0	38	1155	0	45
Future Volume (vph)	793	0	38	1155	0	45
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)	835	0	40	1216	0	47
RTOR Reduction (vph)	0	0	0	0	0	43
Lane Group Flow (vph)	835	0	40	1216	0	4
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)	25.0		3.0	40.0		3.0
Effective Green, g (s)	25.0		3.0	40.0		3.0
Actuated g/C Ratio	0.62		0.08	1.00		0.08
Clearance Time (s)	6.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	2164		129	3463		124
v/s Ratio Prot	0.24		0.02	0.35		0.00
v/s Ratio Perm						
v/c Ratio	0.39		0.31	0.35		0.03
Uniform Delay, d1	3.7		17.5	0.0		17.1
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.5		1.4	0.3		0.1
Delay (s)	4.2		18.9	0.3		17.2
Level of Service	A		B	A		B
Approach Delay (s)	4.2			0.9	17.2	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	2.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	34.7%	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)	38	0	125	45	0	150
Future Volume (vph)	38	0	125	45	0	150
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		1.00	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		1912	1625		3632
Flt Permitted	0.95		1.00	1.00		1.00
Satd. Flow (perm)	1816		1912	1625		3632
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	40	0	132	47	0	158
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	40	0	132	47	0	158
Turn Type	Prot		NA	Free		NA
Protected Phases	2		3 4			1 7 8
Permitted Phases				Free		
Actuated Green, G (s)	21.7		22.4	95.0		61.3
Effective Green, g (s)	21.7		22.4	95.0		61.3
Actuated g/C Ratio	0.23		0.24	1.00		0.65
Clearance Time (s)	6.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	414		450	1625		2343
v/s Ratio Prot	c0.02		c0.07			c0.04
v/s Ratio Perm				0.03		
v/c Ratio	0.10		0.29	0.03		0.07
Uniform Delay, d1	28.9		29.8	0.0		6.2
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.5		0.4	0.0		0.0
Delay (s)	29.4		30.2	0.0		6.3
Level of Service	C		C	A		A
Approach Delay (s)	29.4		22.3			6.3
Approach LOS	C		C			A

Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.16		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	19.7%	ICU Level of Service	A
Analysis Period (min)	15		

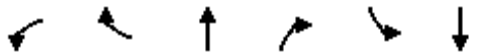
c Critical Lane Group

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	1182	140	0	0	771	147	0
Future Volume (vph)	1182	140	0	0	771	147	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)	6.0	6.0			6.0	6.0	
Lane Util. Factor	0.95	1.00			0.95	1.00	
Frt	1.00	0.85			1.00	1.00	
Flt Protected	1.00	1.00			1.00	0.95	
Satd. Flow (prot)	3463	1549			3463	1816	
Flt Permitted	1.00	1.00			1.00	0.95	
Satd. Flow (perm)	3463	1549			3463	1816	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1244	147	0	0	812	155	0
RTOR Reduction (vph)	0	52	0	0	0	0	0
Lane Group Flow (vph)	1244	95	0	0	812	155	0
Heavy Vehicles (%)	7%	7%	2%	7%	7%	2%	2%
Turn Type	NA	Perm	Perm		NA	Prot	
Protected Phases	1 2				1 2	3 4	
Permitted Phases		1 2	1 2				
Actuated Green, G (s)	60.0	60.0			60.0	23.0	
Effective Green, g (s)	60.0	60.0			60.0	23.0	
Actuated g/C Ratio	0.63	0.63			0.63	0.24	
Clearance Time (s)							
Vehicle Extension (s)							
Lane Grp Cap (vph)	2187	978			2187	439	
v/s Ratio Prot	c0.36				0.23	c0.09	
v/s Ratio Perm		0.06					
v/c Ratio	0.57	0.10			0.37	0.35	
Uniform Delay, d1	10.1	6.9			8.4	29.8	
Progression Factor	1.00	1.00			1.00	0.20	
Incremental Delay, d2	0.3	0.0			0.1	0.5	
Delay (s)	10.4	6.9			8.5	6.4	
Level of Service	B	A			A	A	
Approach Delay (s)	10.0				8.5	6.4	
Approach LOS	B				A	A	

Intersection Summary			
HCM 2000 Control Delay	9.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	49.8%	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)	1182	0	46	771	0	25
Future Volume (vph)	1182	0	46	771	0	25
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)	1244	0	48	812	0	26
RTOR Reduction (vph)	0	0	0	0	0	24
Lane Group Flow (vph)	1244	0	48	812	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)	25.0		3.0	40.0		3.0
Effective Green, g (s)	25.0		3.0	40.0		3.0
Actuated g/C Ratio	0.62		0.08	1.00		0.08
Clearance Time (s)	6.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	2164		129	3463		124
v/s Ratio Prot	c0.36		0.03	0.23		0.00
v/s Ratio Perm						
v/c Ratio	0.57		0.37	0.23		0.02
Uniform Delay, d1	4.4		17.6	0.0		17.1
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	1.1		1.8	0.2		0.1
Delay (s)	5.5		19.4	0.2		17.2
Level of Service	A		B	A		B
Approach Delay (s)	5.5			1.2	17.2	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	3.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	45.2%	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)	46	0	147	25	0	140
Future Volume (vph)	46	0	147	25	0	140
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		1.00	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		1912	1625		3632
Flt Permitted	0.95		1.00	1.00		1.00
Satd. Flow (perm)	1816		1912	1625		3632
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	48	0	155	26	0	147
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	48	0	155	26	0	147
Turn Type	Prot		NA	Free		NA
Protected Phases	2		3 4			1 7 8
Permitted Phases				Free		
Actuated Green, G (s)	21.4		23.0	95.0		61.6
Effective Green, g (s)	21.4		23.0	95.0		61.6
Actuated g/C Ratio	0.23		0.24	1.00		0.65
Clearance Time (s)	6.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	409		462	1625		2355
v/s Ratio Prot	c0.03		c0.08			c0.04
v/s Ratio Perm				0.02		
v/c Ratio	0.12		0.34	0.02		0.06
Uniform Delay, d1	29.3		29.7	0.0		6.1
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.6		0.4	0.0		0.0
Delay (s)	29.9		30.1	0.0		6.1
Level of Service	C		C	A		A
Approach Delay (s)	29.9		25.8			6.1
Approach LOS	C		C			A

Intersection Summary			
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.17		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	20.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	NBT	NBR2	SWL
Lane Configurations					
Traffic Volume (vph)	524	99	68	15	11
Future Volume (vph)	524	99	68	15	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00
Flt Protected	1.00	1.00	1.00	1.00	0.95
Satd. Flow (prot)	3374	1509	1863	1583	1687
Flt Permitted	1.00	1.00	1.00	1.00	0.95
Satd. Flow (perm)	3374	1509	1863	1583	1687
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	552	104	72	16	12
RTOR Reduction (vph)	0	28	0	15	0
Lane Group Flow (vph)	552	76	72	1	12
Heavy Vehicles (%)	7%	7%	2%	2%	7%
Turn Type	NA	custom	NA	custom	D.P+P
Protected Phases	2	4	4		1
Permitted Phases		2		1	2
Actuated Green, G (s)	47.4	54.6	7.2	2.4	49.8
Effective Green, g (s)	47.4	54.6	7.2	2.4	49.8
Actuated g/C Ratio	0.63	0.73	0.10	0.03	0.66
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2132	1219	178	50	1255
v/s Ratio Prot	c0.16	0.01	c0.04		c0.00
v/s Ratio Perm		0.04		0.00	0.01
v/c Ratio	0.26	0.06	0.40	0.01	0.01
Uniform Delay, d1	6.1	2.9	31.9	35.1	4.3
Progression Factor	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.0	1.5	0.1	0.0
Delay (s)	6.4	2.9	33.4	35.2	4.3
Level of Service	A	A	C	D	A
Approach Delay (s)	5.8		33.7		4.3
Approach LOS	A		C		A

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	NBT	NBR2	SWL
Lane Configurations					
Traffic Volume (vph)	808	86	89	8	13
Future Volume (vph)	808	86	89	8	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00
Flt Protected	1.00	1.00	1.00	1.00	0.95
Satd. Flow (prot)	3374	1509	1863	1583	1687
Flt Permitted	1.00	1.00	1.00	1.00	0.95
Satd. Flow (perm)	3374	1509	1863	1583	1687
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	851	91	94	8	14
RTOR Reduction (vph)	0	25	0	8	0
Lane Group Flow (vph)	851	66	94	0	14
Heavy Vehicles (%)	7%	7%	2%	2%	7%
Turn Type	NA	custom	NA	custom	D.P+P
Protected Phases	2	4	4		1
Permitted Phases		2		1	2
Actuated Green, G (s)	46.6	54.6	8.0	2.4	49.0
Effective Green, g (s)	46.6	54.6	8.0	2.4	49.0
Actuated g/C Ratio	0.62	0.73	0.11	0.03	0.65
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2096	1219	198	50	1237
v/s Ratio Prot	c0.25	0.01	c0.05		c0.00
v/s Ratio Perm		0.04		0.00	0.01
v/c Ratio	0.41	0.05	0.47	0.01	0.01
Uniform Delay, d1	7.2	2.9	31.5	35.1	4.5
Progression Factor	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.0	1.8	0.0	0.0
Delay (s)	7.8	2.9	33.3	35.2	4.5
Level of Service	A	A	C	D	A
Approach Delay (s)	7.3		33.5		4.5
Approach LOS	A		C		A

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	NBT	NBR2	SWL
Lane Configurations					
Traffic Volume (vph)	793	150	125	45	38
Future Volume (vph)	793	150	125	45	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00
Flt Protected	1.00	1.00	1.00	1.00	0.95
Satd. Flow (prot)	3374	1509	1863	1583	1687
Flt Permitted	1.00	1.00	1.00	1.00	0.95
Satd. Flow (perm)	3374	1509	1863	1583	1687
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	835	158	132	47	40
RTOR Reduction (vph)	0	48	0	44	0
Lane Group Flow (vph)	835	110	132	3	40
Heavy Vehicles (%)	7%	7%	2%	2%	7%
Turn Type	NA	custom	NA	custom	D.P+P
Protected Phases	2	4	4		1
Permitted Phases		2		1	2
Actuated Green, G (s)	41.2	52.0	10.8	5.0	46.2
Effective Green, g (s)	41.2	52.0	10.8	5.0	46.2
Actuated g/C Ratio	0.55	0.69	0.14	0.07	0.62
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1853	1166	268	105	1174
v/s Ratio Prot	c0.25	0.01	c0.07		c0.00
v/s Ratio Perm		0.06		0.00	0.02
v/c Ratio	0.45	0.09	0.49	0.03	0.03
Uniform Delay, d1	10.1	3.8	29.6	32.7	5.7
Progression Factor	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.0	1.4	0.1	0.0
Delay (s)	10.9	3.8	31.0	32.8	5.7
Level of Service	B	A	C	C	A
Approach Delay (s)	9.8		31.5		5.7
Approach LOS	A		C		A

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	NBT	NBR2	SWL
Lane Configurations					
Traffic Volume (vph)	1182	140	147	25	46
Future Volume (vph)	1182	140	147	25	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00
Flt Protected	1.00	1.00	1.00	1.00	0.95
Satd. Flow (prot)	3374	1509	1863	1583	1687
Flt Permitted	1.00	1.00	1.00	1.00	0.95
Satd. Flow (perm)	3374	1509	1863	1583	1687
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1244	147	155	26	48
RTOR Reduction (vph)	0	40	0	25	0
Lane Group Flow (vph)	1244	107	155	1	48
Heavy Vehicles (%)	7%	7%	2%	2%	7%
Turn Type	NA	custom	NA	custom	D.P+P
Protected Phases	2	4	4		1
Permitted Phases		2		1	2
Actuated Green, G (s)	45.9	58.0	12.1	4.0	49.9
Effective Green, g (s)	45.9	58.0	12.1	4.0	49.9
Actuated g/C Ratio	0.57	0.72	0.15	0.05	0.62
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1935	1207	281	79	1178
v/s Ratio Prot	c0.37	0.01	c0.08		c0.00
v/s Ratio Perm		0.06		0.00	0.03
v/c Ratio	0.64	0.09	0.55	0.02	0.04
Uniform Delay, d1	11.5	3.2	31.4	36.1	5.8
Progression Factor	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.0	2.3	0.1	0.0
Delay (s)	13.2	3.3	33.8	36.2	5.8
Level of Service	B	A	C	D	A
Approach Delay (s)	12.1		34.1		5.8
Approach LOS	B		C		A

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

SR 70 @ DEL WEBB 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**	**6.2**	**A**	**A**				
SR 70 EB	5.2	6.5	A	A	0.26	0.38	35	55
SR 70 WB	6.8	5.5	A	A	0.38	0.26	55	30
Del Webb Blvd NB	5.7	8.3	A	A	0.11	0.17	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	**4.1**	**4.3**	**A**	**A**				
SR 70 EB	3.6	3.6	A	A	0.22	0.31	35	55
SR 70 WB	3.7	3.8	A	A	0.31	0.21	60	35
Del Webb Blvd NB	11.6	13.4	B	B	0.12	0.16	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	**8.9**	**9.7**	**A**	**A**				
SR 70 EB	7.1	9.9	A	A	0.41	0.58	60	115
SR 70 WB	10.2	7.4	B	A	0.57	0.40	100	55
Del Webb Blvd NB	10.1	18.2	B	C	0.30	0.45	30	50

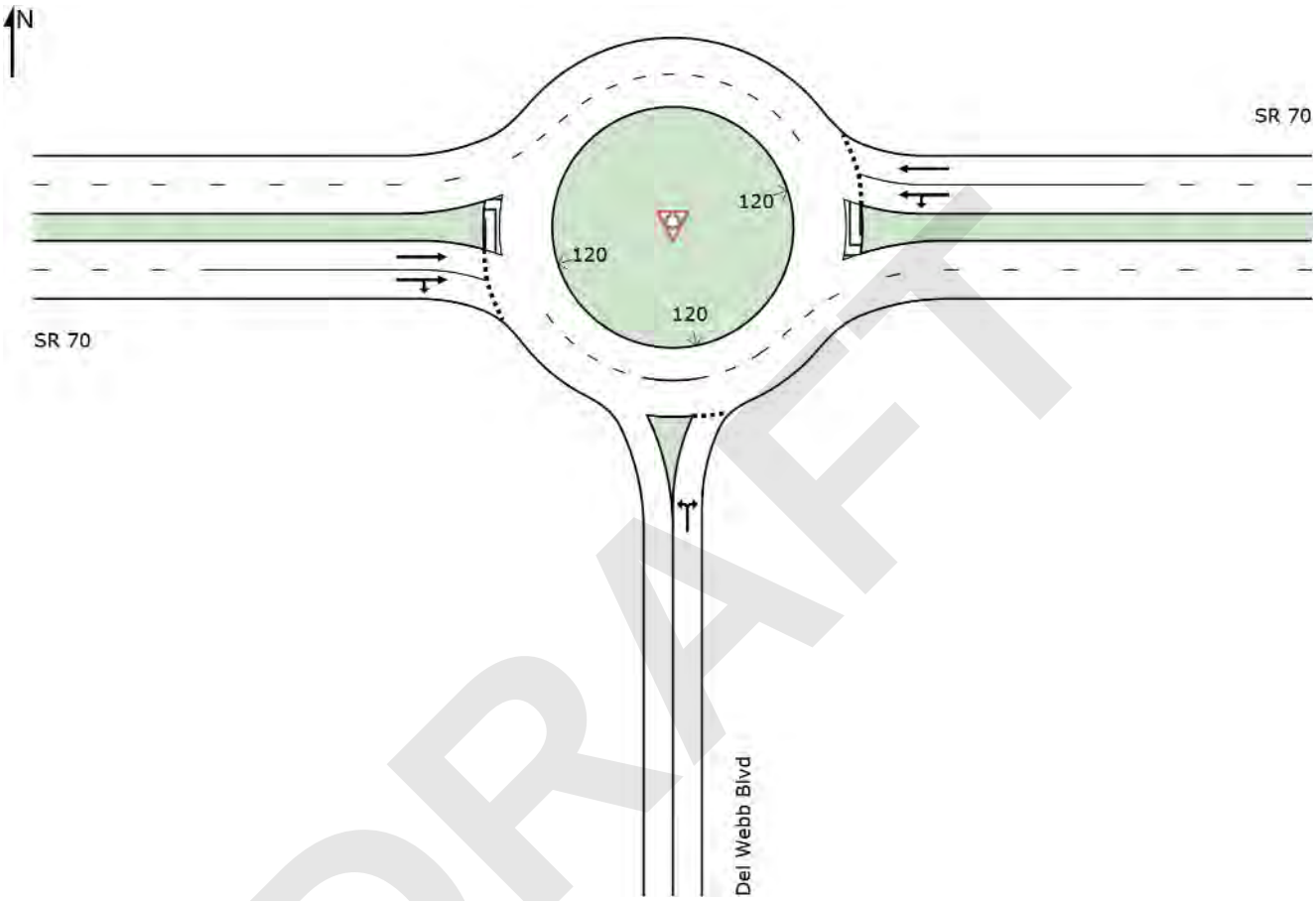
2045 DESIGN YEAR (Sidra Standard)

Approach	Delay (s)		Level of Service		v/c Ratio		95th % Queue (ft)	
	AM	PM	AM	PM	AM	PM	AM	PM
Overall	**4.7**	**5.0**	**A**	**A**				
SR 70 EB	3.8	3.9	A	A	0.34	0.48	65	110
SR 70 WB	4.3	4.4	A	A	0.47	0.33	105	65
Del Webb Blvd NB	12.7	16.0	B	C	0.29	0.37	30	40

SITE LAYOUT

Site: [SR 70 & Del Webb Blvd]

Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: [SR 70 & Del Webb 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: Del Webb Blvd												
3	L2	72	2.0	0.112	5.7	LOS A	0.4	10.1	0.51	0.47	0.51	33.0
18	R2	16	2.0	0.112	5.7	LOS A	0.4	10.1	0.51	0.47	0.51	31.9
Approach		87	2.0	0.112	5.7	LOS A	0.4	10.1	0.51	0.47	0.51	32.8
East: SR 70												
1	L2	12	7.0	0.380	6.8	LOS A	2.0	53.5	0.26	0.12	0.26	34.9
8	T1	883	7.0	0.380	6.8	LOS A	2.0	53.5	0.26	0.12	0.26	34.8
Approach		895	7.0	0.380	6.8	LOS A	2.0	53.5	0.26	0.12	0.26	34.8
West: SR 70												
4	T1	552	7.0	0.263	5.2	LOS A	1.2	32.9	0.08	0.02	0.08	35.6
12	R2	104	7.0	0.263	5.2	LOS A	1.2	32.9	0.08	0.02	0.08	34.2
Approach		656	7.0	0.263	5.2	LOS A	1.2	32.9	0.08	0.02	0.08	35.4
All Vehicles		1638	6.7	0.380	6.1	LOS A	2.0	53.5	0.20	0.10	0.20	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 & Del Webb 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: Del Webb Blvd												
3	L2	72	2.0	0.121	12.7	LOS B	0.4	11.2	0.50	0.77	0.50	34.5
18	R2	16	2.0	0.121	6.3	LOS A	0.4	11.2	0.50	0.77	0.50	33.3
Approach		87	2.0	0.121	11.6	LOS B	0.4	11.2	0.50	0.77	0.50	34.3
East: SR 70												
1	L2	12	7.0	0.313	10.5	LOS B	2.2	57.7	0.29	0.37	0.29	37.7
8	T1	883	7.0	0.313	3.6	LOS A	2.2	58.5	0.28	0.36	0.28	37.8
Approach		895	7.0	0.313	3.7	LOS A	2.2	58.5	0.28	0.36	0.28	37.8
West: SR 70												
4	T1	552	7.0	0.217	3.6	LOS A	1.3	34.3	0.09	0.34	0.09	38.4
12	R2	104	7.0	0.217	3.9	LOS A	1.3	34.3	0.08	0.36	0.08	36.8
Approach		656	7.0	0.217	3.6	LOS A	1.3	34.3	0.09	0.35	0.09	38.1
All Vehicles		1638	6.7	0.313	4.1	LOS A	2.2	58.5	0.21	0.38	0.21	37.7

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 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 & Del Webb 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: Del Webb Blvd												
3	L2	94	2.0	0.173	8.3	LOS A	0.6	15.4	0.62	0.62	0.62	31.7
18	R2	8	2.0	0.173	8.3	LOS A	0.6	15.4	0.62	0.62	0.62	30.6
Approach		102	2.0	0.173	8.3	LOS A	0.6	15.4	0.62	0.62	0.62	31.6
East: SR 70												
1	L2	14	7.0	0.255	5.5	LOS A	1.2	30.7	0.25	0.13	0.25	35.5
8	T1	576	7.0	0.255	5.5	LOS A	1.2	30.7	0.25	0.13	0.25	35.5
Approach		589	7.0	0.255	5.5	LOS A	1.2	30.7	0.25	0.13	0.25	35.5
West: SR 70												
4	T1	851	7.0	0.378	6.5	LOS A	2.1	55.0	0.10	0.03	0.10	34.9
12	R2	91	7.0	0.378	6.5	LOS A	2.1	55.0	0.10	0.03	0.10	33.6
Approach		941	7.0	0.378	6.5	LOS A	2.1	55.0	0.10	0.03	0.10	34.8
All Vehicles		1633	6.7	0.378	6.2	LOS A	2.1	55.0	0.19	0.10	0.19	34.8

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 & Del Webb 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: Del Webb Blvd												
3	L2	94	2.0	0.164	14.0	LOS B	0.6	15.2	0.58	0.85	0.58	33.6
18	R2	8	2.0	0.164	7.6	LOS A	0.6	15.2	0.58	0.85	0.58	32.5
Approach		102	2.0	0.164	13.4	LOS B	0.6	15.2	0.58	0.85	0.58	33.5
East: SR 70												
1	L2	14	7.0	0.212	10.5	LOS B	1.3	35.3	0.30	0.39	0.30	37.6
8	T1	576	7.0	0.212	3.6	LOS A	1.4	36.1	0.29	0.38	0.29	37.7
Approach		589	7.0	0.212	3.8	LOS A	1.4	36.1	0.29	0.38	0.29	37.7
West: SR 70												
4	T1	851	7.0	0.313	3.6	LOS A	2.1	56.2	0.11	0.34	0.11	38.3
12	R2	91	7.0	0.313	3.9	LOS A	2.1	56.2	0.10	0.35	0.10	36.8
Approach		941	7.0	0.313	3.6	LOS A	2.1	56.2	0.11	0.34	0.11	38.2
All Vehicles		1633	6.7	0.313	4.3	LOS A	2.1	56.2	0.20	0.39	0.20	37.7

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 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 & Del Webb 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: Del Webb Blvd												
3	L2	132	2.0	0.300	10.1	LOS B	1.2	29.5	0.65	0.67	0.71	31.3
18	R2	47	2.0	0.300	10.1	LOS B	1.2	29.5	0.65	0.67	0.71	30.3
Approach		179	2.0	0.300	10.1	LOS B	1.2	29.5	0.65	0.67	0.71	31.1
East: SR 70												
1	L2	40	7.0	0.565	10.2	LOS B	3.7	98.7	0.45	0.28	0.45	33.0
8	T1	1216	7.0	0.565	10.2	LOS B	3.7	98.7	0.45	0.28	0.45	33.1
Approach		1256	7.0	0.565	10.2	LOS B	3.7	98.7	0.45	0.28	0.45	33.1
West: SR 70												
4	T1	835	7.0	0.409	7.1	LOS A	2.3	61.2	0.20	0.08	0.20	34.6
12	R2	158	7.0	0.409	7.1	LOS A	2.3	61.2	0.20	0.08	0.20	33.3
Approach		993	7.0	0.409	7.1	LOS A	2.3	61.2	0.20	0.08	0.20	34.4
All Vehicles		2427	6.6	0.565	8.9	LOS A	3.7	98.7	0.36	0.23	0.37	33.4

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 & Del Webb 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: Del Webb Blvd												
3	L2	132	2.0	0.294	14.3	LOS B	1.2	30.2	0.63	0.86	0.63	34.0
18	R2	47	2.0	0.294	8.0	LOS A	1.2	30.2	0.63	0.86	0.63	32.8
Approach		179	2.0	0.294	12.7	LOS B	1.2	30.2	0.63	0.86	0.63	33.6
East: SR 70												
1	L2	40	7.0	0.468	11.0	LOS B	3.9	102.5	0.47	0.46	0.47	36.9
8	T1	1216	7.0	0.468	4.0	LOS A	4.0	105.4	0.46	0.43	0.46	37.0
Approach		1256	7.0	0.468	4.3	LOS A	4.0	105.4	0.46	0.43	0.46	37.0
West: SR 70												
4	T1	835	7.0	0.340	3.8	LOS A	2.5	65.7	0.22	0.36	0.22	37.9
12	R2	158	7.0	0.340	4.0	LOS A	2.5	65.7	0.21	0.37	0.21	36.4
Approach		993	7.0	0.340	3.8	LOS A	2.5	65.7	0.21	0.36	0.21	37.6
All Vehicles		2427	6.6	0.468	4.7	LOS A	4.0	105.4	0.37	0.43	0.37	37.0

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 & Del Webb 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: Del Webb Blvd												
3	L2	155	2.0	0.448	18.2	LOS C	1.9	48.4	0.80	0.90	1.18	28.1
18	R2	26	2.0	0.448	18.2	LOS C	1.9	48.4	0.80	0.90	1.18	27.2
Approach		181	2.0	0.448	18.2	LOS C	1.9	48.4	0.80	0.90	1.18	27.9
East: SR 70												
1	L2	48	7.0	0.396	7.4	LOS A	2.1	54.2	0.39	0.25	0.39	34.2
8	T1	812	7.0	0.396	7.4	LOS A	2.1	54.2	0.39	0.25	0.39	34.4
Approach		860	7.0	0.396	7.4	LOS A	2.1	54.2	0.39	0.25	0.39	34.4
West: SR 70												
4	T1	1244	7.0	0.578	9.9	LOS A	4.3	112.6	0.29	0.13	0.29	33.2
12	R2	147	7.0	0.578	9.9	LOS A	4.3	112.6	0.29	0.13	0.29	32.0
Approach		1392	7.0	0.578	9.9	LOS A	4.3	112.6	0.29	0.13	0.29	33.1
All Vehicles		2433	6.6	0.578	9.7	LOS A	4.3	112.6	0.36	0.23	0.39	33.0

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 & Del Webb 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: Del Webb Blvd												
3	L2	155	2.0	0.371	16.9	LOS B	1.6	41.8	0.73	0.94	0.84	32.4
18	R2	26	2.0	0.371	10.5	LOS B	1.6	41.8	0.73	0.94	0.84	31.4
Approach		181	2.0	0.371	16.0	LOS B	1.6	41.8	0.73	0.94	0.84	32.3
East: SR 70												
1	L2	48	7.0	0.329	11.0	LOS B	2.3	61.9	0.45	0.47	0.45	36.9
8	T1	812	7.0	0.329	4.0	LOS A	2.4	64.2	0.43	0.43	0.43	37.0
Approach		860	7.0	0.329	4.4	LOS A	2.4	64.2	0.44	0.44	0.44	37.0
West: SR 70												
4	T1	1244	7.0	0.481	3.9	LOS A	4.2	110.3	0.28	0.37	0.28	37.6
12	R2	147	7.0	0.481	4.2	LOS A	4.2	110.3	0.27	0.37	0.27	36.1
Approach		1392	7.0	0.481	3.9	LOS A	4.2	110.3	0.28	0.37	0.28	37.4
All Vehicles		2433	6.6	0.481	5.0	LOS A	4.2	110.3	0.37	0.43	0.38	36.8

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.

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 @ Del Webb	**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**	3-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	3.26	5.31	89.50	5	Yes	Calibrated SPF
	Fatal & Injury	1.23	1.91	32.85			
2-lane Roundabout	Total	5.26	8.01	139.11	1	N/A	Uncalibrated SPF
	Fatal & Injury	0.89	1.47	24.69			
Displaced Left Turn (DLT)	Total	2.86	4.67	78.76	4	N/A	CMF
	Fatal & Injury	1.08	1.68	28.90			
Signalized RCUT	Total	2.77	4.51	76.08	2	N/A	CMF
	Fatal & Injury	0.96	1.49	25.62			
Continuous Green-T Intersection	Total	3.13	5.09	85.92	3	N/A	CMF
	Fatal & Injury	1.04	1.62	27.92			

ATTACHMENT E

Cost Estimates

SR 70 and Del Webb Boulevard
Signalized Intersection (base condition)
Cost Estimate

Pay Item	Description	Total Quantity	Unit	Weighted Avg. Unit Price	Total Amount	Notes
ROADWAY: Area of influence of intersection is 2200-ft or 0.42 miles along SR 70						This area area will be fully reconstructed
101-1	MOBILIZATION	10.00	%		$ 177,164.38	
102-1	MAINTENANCE OF TRAFFIC	10.00	%		$ 177,164.38	
110-1-1	CLEARING & GRUBBING	10.10	AC	$ 11,000.00	$ 111,111.11	Clear area within the right of way in the 2200-ft limits: (2200 * 200 ft)/43560=8.27 AC
120-1	REGULAR EXCAVATION	4,065.60	CY	$ 5.10	$ 20,734.56	Cost per mile from model @ 0.42 miles
160-4	TYPE B STABILIZATION	22,244.44	SY	$ 3.80	$ 84,528.89	Area to be constructed and stabilized including shoulders -2x [2200*(2.5+6.5+24+4+2.5)] + 48 (450) + 12(400)
285-709	OPTIONAL BASE,BASE GROUP 09	19,800.00	SY	$ 17.00	$ 336,600.00	Paved area to be constructed:Use typical section 2x [2200*(6.5+24+4)] + 48 (450) + 12(400)] / 9
327-70-4	MILLING EXIST ASPH PAVT, 3" AVG DEPTH	259.89	SY	$ 2.40	$ 623.73	Area to be milled and resurfaced: Use typical section (2339 SF/9) for side street - shape
334-1-24	SUPERPAVE ASPH CONC, TRAF D, PG76-22,PMA	3,986.00	TN	$ 100.00	$ 398,600.00	Assume Traffic C: Area to be contructed +Area to be millied: (17000 *400)/2000
337-7-41	ASPH CONC FC,TRAFFIC B,FC-12.5,PG 76-22	802.40	TN	$ 105.00	$ 84,252.00	Assume Traffic C: (17000*80)/2000
430-175-112	PIPE CULV, OPT MATL, ROUND, 12"S/CD	813.12	LF	$ 91.00	$ 73,993.92	Cost per mile from model @ 0.42 miles
520-1-10	CONCRETE CURB & GUTTER, TYPE E	4,435.20	LF	$ 20.00	$ 88,704.00	Cost per mile from model @ 0.42 miles
522-2	CONCRETE SIDEWALK AND DRIVEWAYS, 6"	2,463.72	SY	$ 38.00	$ 93,621.36	Cost per mile from model @ 0.42 miles
570-1-2	PERFORMANCE TURF, SOD	5,482.40	SY	$ 2.60	$ 14,254.24	Cost per mile from model @ 0.42 miles
715-511-140	LIGHT POLE COMP,F&I,SGL ARM SM, AL,40'	14.70	EA	$ 14,600.00	$ 214,620.00	Cost per mile from model @ 0.42 miles
	Signalization	1.00	PI	$ 250,000.00	$ 250,000.00	$250,000 for SR 70 @ Del Webb
	Partial Total				$ 1,771,643.81	
	Roadway Total				$ 2,125,972.57	
999-25	INITIAL CONTINGENCY AMOUNT (DO NOT BID)	10%			$ 212,597.26	
Intersection Grand Total					$ 2,338,570	

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 Del Webb Boulevard
Roundabout Intersection
Cost Estimate

Pay Item	Description	Total Quantity	Unit	Weighted Avg. Unit Price	Total Amount	Notes
ROADWAY: Area of influence of intersection is 2200-ft or 0.42 miles along SR 70						This area area will be fully reconstructed
101-1	MOBILIZATION	10.00	%		$ 159,903.29	
102-1	MAINTENANCE OF TRAFFIC	10.00	%		$ 159,903.29	
110-1-1	CLEARING & GRUBBING	10.10	AC	$ 11,000.00	$ 111,111.11	Clear area within the right of way in the 2200-ft limits: (2200 * 200 ft)/43560=10.10 AC
120-1	REGULAR EXCAVATION	4,065.60	CY	$ 5.10	$ 20,734.56	Cost per mile from model @ 0.42 miles
160-4	TYPE B STABILIZATION	19,311.11	SY	$ 3.80	$ 73,382.22	Area to be constructed and stabilized : Use Typical Section: (2200*2*(2.5+6.5+24+4+2.5))
285-709	OPTIONAL BASE,BASE GROUP 09	15,840.22	SY	$ 17.00	$ 269,283.78	Paved area to be constructed: 108062 SF from shapes from DGN (1700 -ft long) and use typical section for 500-ft: 500*2*(6.5+24+4)
327-70-4	MILLING EXIST ASPH PAVT, 3" AVG DEPTH	361.11	SY	$ 2.40	$ 866.67	Area to be milled and resurfaced: 3250 SF use shape from DGN for returns
334-1-24	SUPERPAVE ASPH CONC, TRAF D, PG76-22,PMA	3,204.16	TN	$ 100.00	$ 320,415.50	Assume Traffic C: Area to be constructed +Area to be milled: (15840.22*400 + 361.11*200)/2000 - Use Optional Base Group Area for new construction
337-7-41	ASPH CONC FC,TRAFFIC B,FC-12.5,PG 76-22	648.05	TN	$ 105.00	$ 68,045.59	Assume Traffic C: (15840.22*80 + 361.11 SY*80)/2000
430-175-112	PIPE CULV, OPT MATL, ROUND, 12"S/CD	813.12	LF	$ 91.00	$ 73,993.92	Cost per mile from model @ 0.42 miles
520-1-10	CONCRETE CURB & GUTTER, TYPE E	4,435.20	LF	$ 20.00	$ 88,704.00	Cost per mile from model @ 0.42 miles
522-2	CONCRETE SIDEWALK AND DRIVEWAYS, 6"	2,463.72	SY	$ 38.00	$ 93,621.36	Cost per mile from model @ 0.42 miles
570-1-2	PERFORMANCE TURF, SOD	5,482.40	SY	$ 2.60	$ 14,254.24	Cost per mile from model @ 0.42 miles
715-511-140	LIGHT POLE COMP,F&I,SGL ARM SM, AL,40'	14.70	EA	$ 14,600.00	$ 214,620.00	Cost per mile from model @ 0.42 miles
	Signalization	-	PI	-	$ 250,000.00	No signalization
	Partial Total				$ 1,599,032.94	
	Roadway Total				$ 1,918,839.53	
999-25	INITIAL CONTINGENCY AMOUNT (DO NOT BID)	10%			$ 191,883.95	
Intersection Grand Total					$ 2,110,723	

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 Del Webb Boulevard
Continuous Green Tee Intersection
Cost Estimate

Pay Item	Description	Total Quantity	Unit	Weighted Avg. Unit Price	Total Amount	Notes
ROADWAY: Area of influence of intersection is 2200-ft or 0.42 miles along SR 70						This area area will be fully reconstructed
101-1	MOBILIZATION	10.00	%		$ 181,763.99	
102-1	MAINTENANCE OF TRAFFIC	10.00	%		$ 181,763.99	
110-1-1	CLEARING & GRUBBING	10.10	AC	$ 11,000.00	$ 111,111.11	Clear area within the right of way in the 1800-ft limits: (2200 * 200 ft)/43560=10.10 AC
120-1	REGULAR EXCAVATION	4,065.60	CY	$ 5.10	$ 20,734.56	Cost per mile from model @ 0.42 miles
160-4	TYPE B STABILIZATION	23,148.78	SY	$ 3.80	$ 87,965.36	Area to be constructed and stabilized including unpaved shoulders - Use shapes from DGN
285-709	OPTIONAL BASE,BASE GROUP 09	20,833.00	SY	$ 17.00	$ 354,161.00	Paved area to be constructed
327-70-4	MILLING EXIST ASPH PAVT, 3" AVG DEPTH	259.89	SY	$ 2.40	$ 623.73	Area to be milled and resurfaced: Use typical section (2339 SF/9) for side street - shape
334-1-24	SUPERPAVE ASPH CONC, TRAF D, PG76-22,PMA	4,192.60	TN	$ 100.00	$ 419,260.00	Assume Traffic C: Area to be contructed +Area to be milled: (20833*400 + 260*200)/2000 - Use Optional Base Group Area for new construction
337-7-41	ASPH CONC FC,TRAFFIC B,FC-12.5,PG 76-22	843.72	TN	$ 105.00	$ 88,590.60	Assume Traffic C: (20833*80 + 260 SY*80)/2000
430-175-112	PIPE CULV, OPT MATL, ROUND, 12"S/CD	813.12	LF	$ 91.00	$ 73,993.92	Cost per mile from model @ 0.42 miles
520-1-10	CONCRETE CURB & GUTTER, TYPE E	4,435.20	LF	$ 20.00	$ 88,704.00	Cost per mile from model @ 0.42 miles
522-2	CONCRETE SIDEWALK AND DRIVEWAYS, 6"	2,463.72	SY	$ 38.00	$ 93,621.36	Cost per mile from model @ 0.42 miles
570-1-2	PERFORMANCE TURF, SOD	5,482.40	SY	$ 2.60	$ 14,254.24	Cost per mile from model @ 0.42 miles
715-511-140	LIGHT POLE COMP,F&I,SGL ARM SM, AL,40'	14.70	EA	$ 14,600.00	$ 214,620.00	Cost per mile from model @ 0.42 miles
	Signalization	1.00	PI	$ 250,000.00	$ 250,000.00	$250,000 for SR 70 @ Del Webb
	Partial Total				$ 1,817,639.88	
	Roadway Total				$ 2,181,167.85	
999-25	INITIAL CONTINGENCY AMOUNT (DO NOT BID)	10%			$ 218,116.79	
Intersection Grand Total					$ 2,399,285	

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 Del Webb Boulevard
Restricted Crossing U-Turn Intersection
Cost Estimate

Pay Item	Description	Total Quantity	Unit	Weighted Avg. Unit Price	Total Amount	Notes
ROADWAY: Area of influence of intersection is 2200-ft or 0.42 miles along SR 70						This area area will be fully reconstructed
101-1	MOBILIZATION	10.00	%		$ 191,514.17	
102-1	MAINTENANCE OF TRAFFIC	10.00	%		$ 191,514.17	
110-1-1	CLEARING & GRUBBING	10.10	AC	$ 11,000.00	$ 111,111.11	Clear area within the right of way in the 1800-ft limits: (2200 * 200 ft)/43560=10.10 AC
120-1	REGULAR EXCAVATION	4,065.60	CY	$ 5.10	$ 20,734.56	Cost per mile from model @ 0.42 miles
160-4	TYPE B STABILIZATION	21,845.67	SY	$ 3.80	$ 83,013.53	Area to be constructed and stabilized including unpaved shoulders - Use shapes from DGN
285-709	OPTIONAL BASE,BASE GROUP 09	19,660.00	SY	$ 17.00	$ 334,220.00	Paved area to be constructed
327-70-4	MILLING EXIST ASPH PAVT, 3" AVG DEPTH	307.33	SY	$ 2.40	$ 737.60	Area to be milled and resurfaced: Use typical section (2766 SF/9) for side street - shape
334-1-24	SUPERPAVE ASPH CONC, TRAF D, PG76-22,PMA	3,962.70	TN	$ 100.00	$ 396,270.00	Assume Traffic C: Area to be contructed +Area to be milled: (19660*400 + 307*200)/2000 - Use Optional Base Group Area for new construction
337-7-41	ASPH CONC FC,TRAFFIC B,FC-12.5,PG 76-22	798.68	TN	$ 105.00	$ 83,861.40	Assume Traffic C: (19660 + 307 SY*80)/2000
430-175-112	PIPE CULV, OPT MATL, ROUND, 12"S/CD	813.12	LF	$ 91.00	$ 73,993.92	Cost per mile from model @ 0.42 miles
520-1-10	CONCRETE CURB & GUTTER, TYPE E	4,435.20	LF	$ 20.00	$ 88,704.00	Cost per mile from model @ 0.42 miles
522-2	CONCRETE SIDEWALK AND DRIVEWAYS, 6"	2,463.72	SY	$ 38.00	$ 93,621.36	Cost per mile from model @ 0.42 miles
570-1-2	PERFORMANCE TURF, SOD	5,482.40	SY	$ 2.60	$ 14,254.24	Cost per mile from model @ 0.42 miles
715-511-140	LIGHT POLE COMP,F&I,SGL ARM SM, AL,40'	14.70	EA	$ 14,600.00	$ 214,620.00	Cost per mile from model @ 0.42 miles
	Signalization	2.00	PI	$ 400,000.00	$ 400,000.00	$250,000 for SR 70 @ Del Webb and $150,000 along SR 70 for U-Turn =$400,000
	Partial Total				$ 1,915,141.72	
	Roadway Total				$ 2,298,170.06	
999-25	INITIAL CONTINGENCY AMOUNT (DO NOT BID)	10%			$ 229,817.01	
Intersection Grand Total					$ 2,527,987	

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 Del Webb Boulevard
Partial Displaced Left Intersection
Cost Estimate

Pay Item	Description	Total Quantity	Unit	Weighted Avg. Unit Price	Total Amount	Notes
ROADWAY: Area of influence of intersection is 2200-ft or 0.42 miles along SR 70						This area area will be fully reconstructed
101-1	MOBILIZATION	10.00	%		$ 200,589.91	
102-1	MAINTENANCE OF TRAFFIC	10.00	%		$ 200,589.91	
110-1-1	CLEARING & GRUBBING	10.10	AC	$ 11,000.00	$ 111,111.11	Clear area within the right of way in the 1800-ft limits: (2200 * 200 ft)/43560=10.10 AC
120-1	REGULAR EXCAVATION	4,065.60	CY	$ 5.10	$ 20,734.56	Cost per mile from model @ 0.42 miles
160-4	TYPE B STABILIZATION	24,059.78	SY	$ 3.80	$ 91,427.16	Area to be constructed and stabilized including unpaved shoulders - Use shapes from DGN
285-709	OPTIONAL BASE,BASE GROUP 09	21,653.00	SY	$ 17.00	$ 368,101.00	Paved area to be constructed
327-70-4	MILLING EXIST ASPH PAVT, 3" AVG DEPTH	321.22	SY	$ 2.40	$ 770.93	Area to be milled and resurfaced: Use typical section (2891 SF/9) for side street - shape
334-1-24	SUPERPAVE ASPH CONC, TRAF D, PG76-22,PMA	4,362.70	TN	$ 100.00	$ 436,270.00	Assume Traffic C: Area to be contructed +Area to be milled: (13538*400 + 9351*200)/2000 - Use Optional Base Group Area for new construction
337-7-41	ASPH CONC FC,TRAFFIC B,FC-12.5,PG 76-22	878.96	TN	$ 105.00	$ 92,290.80	Assume Traffic C: (13538*80 + 9351 SY*80)/2000
430-175-112	PIPE CULV, OPT MATL, ROUND, 12"S/CD	813.12	LF	$ 91.00	$ 73,993.92	Cost per mile from model @ 0.42 miles
520-1-10	CONCRETE CURB & GUTTER, TYPE E	4,435.20	LF	$ 20.00	$ 88,704.00	Cost per mile from model @ 0.42 miles
522-2	CONCRETE SIDEWALK AND DRIVEWAYS, 6"	2,463.72	SY	$ 38.00	$ 93,621.36	Cost per mile from model @ 0.42 miles
570-1-2	PERFORMANCE TURF, SOD	5,482.40	SY	$ 2.60	$ 14,254.24	Cost per mile from model @ 0.42 miles
715-511-140	LIGHT POLE COMP,F&I,SGL ARM SM, AL,40'	14.70	EA	$ 14,600.00	$ 214,620.00	Cost per mile from model @ 0.42 miles
	Signalization	2.00	PI	$ 400,000.00	$ 400,000.00	$250,000 for SR 70 @ Del Webb and $150,000 for signal along SR 70 for displaced left =$400,000
	Partial Total				$ 2,005,899.08	
	Roadway Total				$ 2,407,078.89	
999-25	INITIAL CONTINGENCY AMOUNT (DO NOT BID)	10%			$ 240,707.89	
-	Right of Way Cost Estimate	-	-	-	$ 410,000.00	Details of the right of way estimate are included in Attachment E.
Intersection Grand Total					$ 3,057,787	
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						
Potential right of way impacts are included for this alternative intersection.						

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

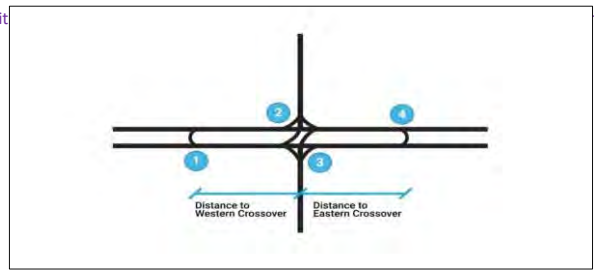
Use this sheet to enter the delay information for each of the included control strategies.

Note: Delay calculations for Displaced Left-Turn, Signalized Restricted Crossing U-turn, and Continuous Green-T Intersection 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). The HCM describes direct application of this concept to Displaced Left-Turns and RCUTs, however, it may also be extended to continuous green-t intersections to account for the major-street through movement which separated from the rest of the intersection and not accounted for in the Synchro analysis.

				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	5.9	7.8		8.2	10.5	
Roundabout	Single Input	Single Input	sec/veh	6.1	6.2		8.9	9.7	
Displaced Left Turn (DLT)	Single Input	Worksheet (Partial E-W)	sec/veh	8.9	11.4		12.5	14.5	
Signalized Restricted Crossing U-Turn (RCUT)	Select Input Type	Worksheet (E-W)	sec/veh	7.1	8.1		10.3	10.9	
Continuous Green-T Intersection	Single Input	See worksheet	sec/veh	4.2	6.4		6.4	9.6	

Use this sheet to enter the delay information for a Signalized RCUT wit

RCUT E-W



User must enter value on this sheet

	Eastern Crossover	Western Crossover
Distance from main intersection to:	1000	0
Free-flow speed on major street	40	

*Volumes are computed based on values entered in DemandCounts and Exhibit 6-2 of FHWA RCUT Guide

Opening Year AM Peak

Intersection 1	EB Thru	WB U-Turn
Volume	623	0
Delay	0	0

Intersection 2	WB Left	WB Thru	WB Right	SB Right
Volume	11	907	0	0
Delay	1.5	0		

Intersection 3	EB Left	EB Thru	EB Right	NB Right
Volume	0	524	99	83
Delay	0	3	2.6	21.9

Intersection 4	WB Thru	EB U-Turn
Volume	850	68
Delay	4.2	21.6

Opening Year PM Peak

Intersection 1	EB Thru	WB U-Turn
Volume	894	0
Delay	0	0

Intersection 2	WB Left	WB Thru	WB Right	SB Right
Volume	13	636	0	0
Delay	1.5	0	0	0

Intersection 3	EB Left	EB Thru	EB Right	NB Right
Volume	0	808	86	97
Delay	0	4.3	3.1	20.5

Intersection 4	WB Thru	EB U-Turn
Volume	560	89
Delay	3.2	21.8
		21.8

Opening Year Weekend Peak

Intersection 1	EB Thru	WB U-Turn
Volume	0	0
Delay	3.4	21.9

Intersection 2	WB Left	WB Thru	WB Right	SB Right
Volume	0	0	0	0
Delay	18.2	4.8	2.7	21.5

Intersection 3	EB Left	EB Thru	EB Right	NB Right
Volume	0	0	0	0
Delay	19.1	4.4	4.3	21.3

Intersection 4	WB Thru	EB U-Turn
Volume	0	0
Delay	4.2	22.9

Design Year AM Peak

Intersection 1	EB Thru	WB U-Turn
Volume	943	0
Delay	0	0

Intersection 2	WB Left	WB Thru	WB Right	SB Right
Volume	38	1280	0	0
Delay	1.5	0	0	0

Intersection 3	EB Left	EB Thru	EB Right	NB Right
Volume	0	793	150	170
Delay	0	4.7	3.6	20.4

Intersection 4	WB Thru	EB U-Turn
Volume	1193	125
Delay	7.7	20.4

Design Year PM Peak

Intersection 1	EB Thru	WB U-Turn
Volume	1322	0
Delay	0	0

Intersection 2	WB Left	WB Thru	WB Right	SB Right
Volume	46	918	0	0
Delay	1.9	0	0	0

Intersection 3	EB Left	EB Thru	EB Right	NB Right
Volume	0	1182	140	172
Delay	0	7	4.1	20.3

Intersection 4	WB Thru	EB U-Turn
Volume	817	147
Delay	5.7	20.4

Design Year WeekendPeak

Intersection 1	EB Thru	WB U-Turn
Volume	0	0
Delay	7.7	41.7

Intersection 2	WB Left	WB Thru	WB Right	SB Right
Volume	0	0	0	0
Delay	27.9	37.2	8.2	42.2

Intersection 3	EB Left	EB Thru	EB Right	NB Right
Volume	0	0	0	0
Delay	23.7	10	8.1	34.9

Intersection 4	WB Thru	EB U-Turn
Volume	0	0
Delay	27.8	42.5

Above this line, "EB Left", WB U", etc refer to movements at each small intersection within the RCUT

Below this line "EB Left", "WB U" etc refer to movements at the main intersection

Opening Year AM Peak

Computation of Control Delay for entire RCUT

Computed based on formulas I have here

	Delay for each movement	Extra distance travel time (EDTT) for each movement	Experienced Travel Time (ETT)	Average ETT
EB Left	0	0	0	
EB Through	3	0	3	
EB Right	2.6	0	2.6	
NB Left	43.5	34.0136054	77.5136054	
NB Through	43.5	34.0136054	77.5136054	
NB Right	21.9	0	21.9	
WB Left	5.7	0	5.7	
WB Through	4.2	0	4.2	
WB Right	4.2	0	4.2	
SB Left	3	0	3	
SB Through	2.6	0	2.6	
SB Right	0	0	0	
				7.07925782

Opening Year PM Peak

Computation of Control Delay for entire RCUT

Computed based on formulas I have here

	Delay for each movement	Extra distance travel time (EDTT) for each movement	Experienced Travel Time (ETT)	Average ETT
EB Left	0	0	0	
EB Through	4.3	0	4.3	
EB Right	3.1	0	3.1	
NB Left	42.3	34.0136054	76.3136054	
NB Through	42.3	34.0136054	76.3136054	
NB Right	20.5	0	20.5	
WB Left	4.7	0	4.7	
WB Through	3.2	0	3.2	
WB Right	3.2	0	3.2	
SB Left	4.3	0	4.3	
SB Through	3.1	0	3.1	
SB Right	0	0	0	
				8.06473945

Opening Year Weekend Peak

Computation of Control Delay for entire RCUT

Computed based on formulas I have here

	Delay for each movement	Extra distance travel time (EDTT) for each movement	Experienced Travel Time (ETT)	Average ETT
EB Left	22.5	0	22.5	
EB Through	7.8	0	7.8	
EB Right	7.7	0	7.7	
NB Left	49	34.0136054	83.0136054	
NB Through	46.9	34.0136054	80.9136054	
NB Right	21.3	0	21.3	
WB Left	22.4	0	22.4	
WB Through	9	0	9	
WB Right	6.9	0	6.9	
SB Left	47.8	0	47.8	
SB Through	47.7	0	47.7	
SB Right	21.5	0	21.5	
				#DIV/0!

Design Year AM Peak

Computation of Control Delay for entire RCUT

Computed based on formulas I have here

	Delay for each movement	Extra distance travel time (EDTT) for each movement	Experienced Travel Time (ETT)	Average ETT
EB Left	0	0	0	
EB Through	4.7	0	4.7	
EB Right	3.6	0	3.6	
NB Left	40.8	34.0136054	74.8136054	
NB Through	40.8	34.0136054	74.8136054	
NB Right	20.4	0	20.4	
WB Left	9.2	0	9.2	
WB Through	7.7	0	7.7	
WB Right	7.7	0	7.7	
SB Left	4.7	0	4.7	
SB Through	3.6	0	3.6	
SB Right	0	0	0	
				10.3121859

Design Year PM Peak

Computation of Control Delay for entire RCUT

Computed based on formulas I have here

	Delay for each movement	Extra distance travel time (EDTT) for each movement	Experienced Travel Time (ETT)	Average ETT
EB Left	0	0	0	
EB Through	7	0	7	
EB Right	4.1	0	4.1	
NB Left	40.7	34.0136054	74.7136054	
NB Through	40.7	34.0136054	74.7136054	
NB Right	20.3	0	20.3	
WB Left	7.6	0	7.6	
WB Through	5.7	0	5.7	
WB Right	5.7	0	5.7	
SB Left	7	0	7	
SB Through	4.1	0	4.1	
SB Right	0	0	0	
				10.8536132

Design Year Weekend Peak

Computation of Control Delay for entire RCUT

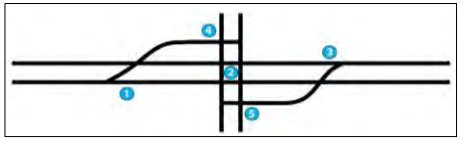
Computed based on formulas I have here

	Delay for each movement	Extra distance travel time (EDTT) for each movement	Experienced Travel Time (ETT)	Average ETT
EB Left	31.4	0	31.4	
EB Through	17.7	0	17.7	
EB Right	15.8	0	15.8	
NB Left	114.6	34.0136054	148.613605	
NB Through	85.6	34.0136054	119.613605	
NB Right	34.9	0	34.9	
WB Left	55.7	0	55.7	
WB Through	65	0	65	
WB Right	36	0	36	
SB Left	93.9	0	93.9	
SB Through	92	0	92	
SB Right	42.2	0	42.2	
				#DIV/0!

DLT E-W

Use this sheet to

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: 1556

Intersection 1	EB Left	WB Thru*	SB Right
Volume	0	839	0
Delay	0	0	0

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	0	524	99	11	839	0	68	0	0	0
Delay (Intx 2)		6.1	5.4		7	0	8			
Delay (Intx 4)									0	
Delay (Intx 5)				18.1			31.7	31.7		

Intersection 3	EB Thru**	WB Left	NB Right
Volume	524	11	15
Delay	1.6	44.7	42.31

* Delay entered for this movement also applied to NB Left Turn movement — **Average delay for DLT: 8.9**
** Delay entered for this movement also applied to SB Left Turn movment

Opening Year PM Peak TEV: 1551

Intersection 1	EB Left	WB Thru*	SB Right
Volume	0	547	0
Delay			

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	0	808	86	13	547	0	89	0	0	0
Delay (Intx 2)		8.6	6.6		7.7		6			
Delay (Intx 4)									0	
Delay (Intx 5)				20.5			29.1	29.1		

Intersection 3	EB Thru**	WB Left	NB Right
Volume	808	13	8
Delay	3.2	23.6	19.1

* Delay entered for this movement also applied to NB Left Turn movement — **Average delay for DLT: 11.4**
** Delay entered for this movement also applied to SB Left Turn movment

Opening Year Weekend Peak TEV: 0

Intersection 1	EB Left	WB Thru*	SB Right
Volume	0	0	0
Delay	31.4	9.6	22.6

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	0	0	0	0	0	0	0	0	0	0
Delay (Intx 2)		25.5	4.7		26.6	4.8	33.3	14.2	43.3	18.1
Delay (Intx 4)	24								16.8	16.8
Delay (Intx 5)				17.7			18.2	18.2		

Intersection 3	EB Thru**	WB Left	NB Right
Volume			
Delay	8.9	29.4	19.4

* Delay entered for this movement also applied to NB Left Turn movement — **Average delay for DLT: #DIV/0!**
** Delay entered for this movement also applied to SB Left Turn movment

Design Year AM Peak TEV: 2306

Intersection 1	EB Left	WB Thru*	SB Right
Volume	0	1155	0
Delay			

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	0	793	150	38	1155	0	125	0	0	0
Delay (Intx 2)		8.3	6.7		9.9		6.3			
Delay (Intx 4)									0	
Delay (Intx 5)				29.4			30.2	30.2		

Intersection 3	EB Thru**	WB Left	NB Right
Volume	793	38	45
Delay	4.2	18.9	17.2

* Delay entered for this movement also applied to NB Left Turn movement — **Average delay for DLT: 12.5**
** Delay entered for this movement also applied to SB Left Turn movment

Design Year PM Peak TEV: 2311

Intersection 1	EB Left	WB Thru*	SB Right
Volume	0	771	0
Delay			

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	0	1182	140	46	771	0	147	0	0	0
Delay (Intx 2)		10.4	6.9		8.5		6.4			
Delay (Intx 4)									0	
Delay (Intx 5)				29.9			30.1	30.1		

Intersection 3	EB Thru**	WB Left	NB Right
Volume	1182	46	25
Delay	5.5	19.4	17.2

* Delay entered for this movement also applied to NB Left Turn movement — **Average delay for DLT: 14.5**
** Delay entered for this movement also applied to SB Left Turn movment

Design Year Weekend Peak TEV: 0

Intersection 1	EB Left	WB Thru*	SB Right
Volume	0	0	0
Delay	31.4	9.6	22.6

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	0	0	0	0	0	0	0	0	0	0
Delay (Intx 2)		25.5	4.7		26.6	4.8	33.3	14.2	43.3	18.1
Delay (Intx 4)	24								16.8	16.8
Delay (Intx 5)				17.7			18.2	18.2		

Intersection 3	EB Thru**	WB Left	NB Right
Volume			
Delay	8.9	29.4	19.4

* Delay entered for this movement also applied to NB Left Turn movement — **Average delay for DLT: #DIV/0!**
** Delay entered for this movement also applied to SB Left Turn movment

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.

Continuous Green T Intersection - Delay Calculation
Del Webb and SR 70

Opening Year (2025)
AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Traffic Volume		524	99	11	839		68		15				
Delay		6.4	2.9	4.3	0		33.4		35.2				
TEV	1556												
Delay * Volume	0	3353.6	287.1	47.3	0	0	2271.2	0	528	0	0	0	
Intersection Delay	4.169152												

Design Year (2045)
AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Traffic Volume		793	150	38	1155		125		45				
Delay		10.9	3.8	5.7	0		31		32.8				
TEV	2306												
Delay * Volume	0	8643.7	570	216.6	0	0	3875	0	1476	0	0	0	
Intersection Delay	6.409931												

Opening Year (2025)
PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Traffic Volume		808	86	13	547		89		8				
Delay		7.8	2.9	4.5	0		33.3		35.2				
TEV	1551												
Delay * Volume	0	6302.4	249.4	58.5	0	0	2963.7	0	281.6	0	0	0	
Intersection Delay	6.354352												

Design Year (2045)
PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Traffic Volume		1182	140	46	771		147		25				
Delay		13.2	3.3	5.8	0		33.8		36.2				
TEV	2311												
Delay * Volume	0	15602.4	462	266.8	0	0	4968.6	0	905	0	0	0	
Intersection Delay	9.608308												

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.

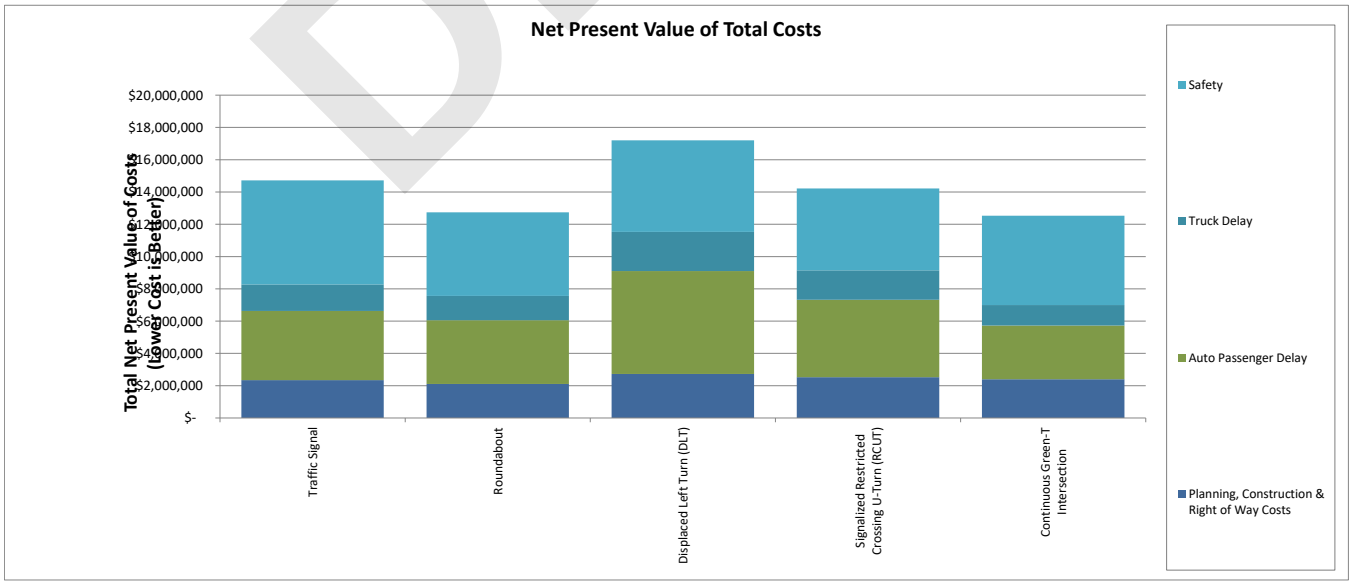
Agency:	FDOT District 1
Project Name:	SR 70 from Lorraine Rd to CR 675
Project Reference:	FDOT Project #414506-2-22-01
Intersection:	SR 70 and Del Webb Blvd
City:	Unincorporated Manatee County
State:	Florida
Performing Department or Organization:	Florida Department of Transportation District 1
Date:	6/14/0019
Analyst:	CB
Analysis Type	At-Grade Intersection

Analysis Summary

Cost Categories	Net Present Value of Costs				
	Traffic Signal	Roundabout	Displaced Left Turn (DLT)	Signalized Restricted Crossing U-Turn (RCUT)	Continuous Green-T Intersection
Planning, Construction & Right of Way Costs	$ 2,340,000	$ 2,110,000	$ 2,732,000	$ 2,530,000	$ 2,400,000
Auto Passenger Delay	$ 4,295,198	$ 3,950,585	$ 6,369,038	$ 4,797,225	$ 3,331,768
Truck Delay	$ 1,633,786	$ 1,502,525	$ 2,422,701	$ 1,824,694	$ 1,267,171
Safety	$ 6,455,259	$ 5,177,569	$ 5,680,628	$ 5,066,635	$ 5,536,522
Total cost	**$14,822,472**	**$12,813,631**	**$17,442,644**	**$14,456,830**	**$12,633,690**

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)	Signalized Restricted Crossing U-Turn (RCUT)	Continuous Green-T Intersection
Auto Passenger Delay		$ 344,613	$ (2,073,840)	$ (502,026)	$ 963,430
Truck Delay		$ 131,261	$ (788,915)	$ (190,907)	$ 366,615
Safety		$ 1,277,690	$ 774,631	$ 1,388,624	$ 918,736
Net Present Value of Benefits		**$ 1,753,565**	**$ (2,088,124)**	**$ 695,690**	**$ 2,248,782**
Net Present Value of Costs		**$ (157,048)**	**$ 630,276**	**$ 428,276**	**$ 158,229**
Net Present Value of Improvement		**$ 1,910,613**	**$ (2,718,400)**	**$ 267,414**	**$ 2,090,554**
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.**	**1.62**	**14.21**
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.**	**8.41**
Safety B/C		**Control strategy preferred. Benefits are greater than base case and cost is less than base case.**	**1.23**	**3.24**	**5.81**



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 Del Webb Blvd.				
Project Setting Description (*Describe the area surrounding the intersection*)	SR 70 at Del Webb 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*)	There is paved sidewalk on the east side of Del Webb Blvd. For SR 70, there are proposed sidewalks and paved shoulders on both sides of the road.				

Major Street Information

Route #:	SR 70	Route Name(s)				Milepost	11.684
Existing Control Type	Two-way Stop-Control	Existing AADT	13,000	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					
	Crosswalk on Approach?	No	Left-Through		Weekday AM Peak		Weekday PM Peak	
	On-Street Bike Facilities?	Yes	Through	2	Left		Left	
	Multi-Use Path?	No	Left-Through-Right		Through	793	Through	1,182
	Scheduled Bus Service?	No	Through-Right		Right	150	Right	140
	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	38	Left	46
	Multi-Use Path?	No	Left-Through-Right		Through	1,155	Through	771
	Scheduled Bus Service?	No	Through-Right		Right		Right	
	Bus Stop on Approach?	No	Right-Turn		Daily Truck %		14.0%	

Minor Street Information											
Route #:		Route Name(s)	Del Webb Blvd					Milepost (if app.)			
Existing Control Type	Two-way Stop-Control			Existing AADT	2,200			Design Year AADT	3,000		
Design Vehicle	Interstate Semitrailer (WB-62)			Control Vehicle	Interstate Semitrailer (WB-62)						
Primary Functional Classification	Urban Local							Design Speed (mph)	40		
Secondary Functional Classification (if app.)								Target Speed (mph) [if app.]			
Approach #1	Direction	Northbound		Number of Lanes		Study Period #1 Traffic Volumes		Study Period #2 Traffic Volumes			
	Sidewalks along:	One 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		Left	125	Left	147		
	Multi-Use Path?	No		Left-Through-Right		Through		Through			
	Scheduled Bus Service?	No		Through-Right		Right	45	Right	25		
	Bus Stop on Approach?	No		Right-Turn	1	Daily Truck %		4.0%			
Approach #2	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 %					
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	3.90	4.93	3.70	3	No	V/C capacity ratios are exceeded.
All-Way Stop-Controlled	1.64	1.64	6.7	N/A	No	V/C capacity ratios are exceeded.
Signalized Control	0.43	0.49	4.8	8	Yes	Move to Stage 2 based on v/c for am and pm hours
Roundabout	1x2 .55 2x2 .55 1x1 1.07	1x2 0.57 2x2 0.57 1x1 1.09	5.6 5.6 6.7	1 & 4	Yes	Move to Stage 2 based on SPICE recommendation and v/c less than 1
Median U-Turn	N/A	N/A	N/A	N/A	No	Not applicable since this is a T-intersection.
RCUT (Signalized)	0.44	0.47	6.3	5	Yes	Move to Stage 2 based on v/c for am and pm hours
RCUT (Unsignalized)	0.57	1.10	4.4	2	No	V/C ratio exceeded during the PM Peak.
Jughandle				N/A	No	Not included in the analysis.
Displaced Left-Turn	0.43	0.45	4.8	7	Yes	Partial Displaced Left-Turn: Move to Stage 2 based on v/c for am and pm hours
Continuous Green Tee	0.34	0.48	3.0	6	Yes	Move to Stage 2 based on v/c for am and pm hours
Quadrant Roadway	N/A	N/A	N/A		No	Not applicable since this is a T-intersection.
Partial MUT	N/A	N/A	N/A	N/A	No	Not applicable since this is a T-intersection.
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 @ Del Webb
Project Number:	0
Location:	Unincorporated Manatee County
Date:	2045 AM
Number of Intersection Legs:	3
Which leg is the minor street?	S

Traffic Volume Demand

	Volume (Veh/hr)				Percent (%)	
	U-Turn	**Left**	**Thru**	**Right**	Heavy Vehicles	Volume Growth
Eastbound	0	0	793	150	7.00%	0.00%
Westbound	0	38	1155	0	7.00%	0.00%
Southbound	0	0	0	0	0.00%	0.00%
Northbound	0	125	0	45	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

TYPE OF INTERSECTION	Overall v/c Ratio	V/C Ranking	Multimodal Score	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
Continuous Green T S	0.34	1	3.0	Poor	Poor	Good
Traffic Signal	0.43	2	4.8	Fair	Fair	Good
Partial Displaced Left Turn E-W	0.43	2	4.8	Fair	Fair	Good
Signalized Restricted Crossing U-Turn E-W	0.44	4	6.3	Good	Good	Fair
1 X 2	0.55	5	5.6	Fair	Good	Good
2 X 2	0.55	5	5.6	Fair	Good	Good
Unsignalized Restricted Crossing U-Turn E-W	0.57	7	4.4	Fair	Fair	Fair
1 X 1	1.07	8	6.7	Good	Good	Good
All-Way Stop Control	1.64	9	6.7	Good	Good	Good
Two-Way Stop Control E-W	3.90	10	3.7	Poor	Fair	Good

Capacity Analysis for Planning of Junctions

Project Name:	SR 70 @ Del Webb
Project Number:	0
Location:	Unincorporated Manatee County
Date:	2045 AM
Number of Intersection Legs:	3
Major Street Direction:	North-South

Traffic Volume Demand

	Volume (Veh/hr)				Percent (%)	
	U-Turn	Left	Thru	Right	Heavy Vehicles	Volume Growth
Eastbound	0	0	793	150	7.00%	0.00%
Westbound	0	38	1155	0	7.00%	0.00%
Southbound	0	0	0	0	0.00%	0.00%
Northbound	0	125	0	45	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	0	1		0	0	0		0	2	1		1	2	0
Two-Way Stop Control	E-W		1	0	1		0	0	0		0	2	1		1	2	0
All-Way Stop Control	FULL		1	0	1		0	0	0		0	2	1		1	2	0
Continuous Green T	S		1		1							2	1		1	2	
Partial Displaced Left Turn	E-W		1	1	1		0	1	0		0	2	1		1	2	0
Signalized Restricted Crossing U-Turn	E-W				1				0	1	0	2	1	1	1	2	0
Unsignalized Restricted Crossing U-Turn	E-W				1				0	1	0	2	1	1	1	2	0

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									760	0.43	0.43	Fair	Fair	Good
Two-Way Stop Control	E-W									--	3.90	3.90	Poor	Fair	Good
All-Way Stop Control	FULL									2461	1.64	1.64	Good	Good	Good
Continuous Green T	S									602	0.34	0.34	Poor	Poor	Good
Partial Displaced Left Turn	E-W					468	*0.26*	682	*0.38*	753	0.43	0.43	Fair	Fair	Good
Signalized Restricted Crossing U-Turn	E-W	682	*0.38*	629	*0.35*	799	*0.44*	505	*0.28*			0.44	Good	Good	Fair
Unsignalized Restricted Crossing U-Turn	E-W	1364	*0.00*	849	*0.57*	1277	*0.31*	1010	*0.00*			0.57	Fair	Fair	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				
1 X 1	0.00			0.77			0.30			1.07			1.07	Good	Good	Good
1 X 2	0.00			0.38	0.40		0.26			0.52	0.55		0.55	Fair	Good	Good
2 X 2	0.00	0.00		0.52	0.55		0.21	0.07		0.38	0.40		0.55	Fair	Good	Good

Capacity Analysis for Planning of Junctions

Summary Report - Page 1 of 2

Project Name:	SR 70 @ Del Webb
Project Number:	0
Location:	Bradenton, FL
Date:	2045 PM
Number of Intersection Legs:	3
Which leg is the minor street?	S

Traffic Volume Demand

	Volume (Veh/hr)				Percent (%)	
	U-Turn	**Left**	**Thru**	**Right**	Heavy Vehicles	Volume Growth
Eastbound	0	0	1182	140	7.00%	0.00%
Westbound	0	46	771	0	7.00%	0.00%
Southbound	0	0	0	0	0.00%	0.00%
Northbound	0	147	0	25	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

TYPE OF INTERSECTION	Overall v/c Ratio	V/C Ranking	Multimodal Score	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
Partial Displaced Left Turn E-W	0.45	1	4.8	Fair	Fair	Good
Signalized Restricted Crossing U-Turn E-W	0.47	2	6.3	Good	Good	Fair
Continuous Green T S	0.48	3	3.0	Poor	Poor	Good
Traffic Signal	0.49	4	4.8	Fair	Fair	Good
1 X 2	0.57	5	5.6	Fair	Good	Good
2 X 2	0.57	5	5.6	Fair	Good	Good
1 X 1	1.09	7	6.7	Good	Good	Good
Unsignalized Restricted Crossing U-Turn E-W	1.10	8	4.4	Fair	Fair	Fair
All-Way Stop Control	1.64	9	6.7	Good	Good	Good
Two-Way Stop Control E-W	4.93	10	3.7	Poor	Fair	Good

Capacity Analysis for Planning of Junctions

Project Name:	SR 70 @ Del Webb
Project Number:	0
Location:	Bradenton, FL
Date:	2045 PM
Number of Intersection Legs:	3
Major Street Direction:	North-South

Traffic Volume Demand

	Volume (Veh/hr)				Percent (%)	
	U-Turn	Left	Thru	Right	Heavy Vehicles	Volume Growth
Eastbound	0	0	1182	140	7.00%	0.00%
Westbound	0	46	771	0	7.00%	0.00%
Southbound	0	0	0	0	0.00%	0.00%
Northbound	0	147	0	25	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	0	1		0	0	0		0	2	1		1	2	0
Two-Way Stop Control	E-W		1	0	1		0	0	0		0	2	1		1	2	0
All-Way Stop Control	FULL		1	0	1		0	0	0		0	2	1		1	2	0
Continuous Green T	S		1		1							2	1		1	2	
Partial Displaced Left Turn	E-W		1	1	1		0	1	0		0	2	1		1	2	0
Signalized Restricted Crossing U-Turn	E-W				1				0	1	0	2	1	1	1	2	0
Unsignalized Restricted Crossing U-Turn	E-W				1				0	1	0	2	1	1	1	2	0

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									850	0.49	0.49	Fair	Fair	Good
Two-Way Stop Control	E-W									--	4.93	4.93	Poor	Fair	Good
All-Way Stop Control	FULL									2465	1.64	1.64	Good	Good	Good
Continuous Green T	S									842	0.48	0.48	Poor	Poor	Good
Partial Displaced Left Turn	E-W					684	0.38	488	0.27	790	0.45	0.45	Fair	Fair	Good
Signalized Restricted Crossing U-Turn	E-W	488	0.27	840	0.47	625	0.35	708	0.39			0.47	Good	Good	Fair
Unsignalized Restricted Crossing U-Turn	E-W	975	0.00	1265	1.10	874	0.25	1415	0.00			1.10	Fair	Fair	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				
1 X 1	0.00			1.09			0.47			0.75			1.09	Good	Good	Good
1 X 2	0.00			0.53	0.57		0.37			0.36	0.38		0.57	Fair	Good	Good
2 X 2	0.00	0.00		0.36	0.38		0.37	0.06		0.53	0.57		0.57	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 @ Del Webb	**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**	3-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	3.50	5.70	96.15	8	Yes	Calibrated SPF
	Fatal & Injury	1.32	2.05	35.27			
Minor Road Stop	Total	2.21	3.64	61.06	3	Yes	Calibrated SPF
	Fatal & Injury	0.80	1.27	21.68			
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	1.02	1.31	24.47	1	N/A	Uncalibrated SPF
	Fatal & Injury	0.28	0.42	7.35			
2-lane Roundabout	Total	5.44	8.29	143.87	4	N/A	Uncalibrated SPF
	Fatal & Injury	0.92	1.52	25.48			
Displaced Left Turn (DLT)	Total	3.08	5.02	84.61	7	N/A	CMF
	Fatal & Injury	1.16	1.80	31.03			
Signalized RCUT	Total	2.97	4.85	81.73	5	N/A	CMF
	Fatal & Injury	1.03	1.60	27.51			
Unsignalized RCUT	Total	1.44	2.37	39.69	2	N/A	CMF
	Fatal & Injury	0.37	0.59	9.97			
Continuous Green-T Intersection	Total	3.36	5.47	92.30	6	N/A	CMF
	Fatal & Injury	1.12	1.74	29.98			