FRANCIS / ASSEMBLY
INTERSECTION CONTROL EVALUATION REPORT

ASSEMBLY STREET AND FRANCIS AVENUE
IN SPOKANE, WASHINGTON

Prepared for:

City of Spokane
Washington State Department of Transportation

For Submittal to:

City of Spokane
Washington State Department of Transportation

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INTRODUCTION

CivTech has been retained to prepare an Intersection Control Evaluation (ICE) at the intersections of Assembly Street & Francis Avenue, Driscoll Boulevard & Assembly Avenue in Spokane, Washington. The intersection location and vicinity map are shown in **Figure 1**. The evaluation was conducted based on the guidelines set in Chapter 1300.05(3) Intersection Control Evaluation (ICE) Section of the Washington State Department of Transportation (WSDOT) Design Manual M 22-01.22 (October 2023).

Figure 1 – Vicinity Map



CivTech prepared this document using the 5-step ICE screening process that was coordinated with WSDOT to evaluate the alternatives and determine the best possible intersection type and design for this specified area.

BACKGROUND & PROJECT NEEDS

EXISTING ROADWAY NETWORK

The roadway classifications were obtained from the WSDOT Functional Classification Map.

Assembly Street is a north/south principal arterial roadway to the south and a minor arterial roadway to the north. The roadway begins south where it converts from Northwest Boulevard and continues north until it terminates at Woodside Avenue. The speed limit is 30 miles per hour (MPH) within the vicinity of the project.

Francis Avenue/Nine Mile Road is an east/west principal arterial roadway. Francis Avenue/Nine Mile Road is also classified as State Route 291, which is a WSDOT facility. The roadway begins to the east where it converts from Bigelow Gulch Road and continues west where it extends beyond the City limits as State Route 291. The speed limit is 35 MPH within the vicinity of the project.

Driscoll Boulevard is an east/west minor arterial roadway. The roadway begins to east where it converts from Cochran Street and continues west until it terminates at Assembly Street. The speed limit is 30 MPH within the vicinity of the project.

Nine Mile Road & Francis Avenue (1) is a three-legged unsignalized intersection with stop control in the northbound approach. The northbound approach consists of a through lane and a dedicated right-turn lane. The eastbound approach consists of a through lane and a dedicated right-turn lane. The westbound approach consists of a through lane.

Francis Avenue & N. Assembly St (2) is a four-legged unsignalized intersection with stop control in the northbound and southbound approaches. The northbound approach consists of a dedicated right-turn lane. The southbound approach consists of a shared left/through/right-turn lane. The eastbound approach consists of an exclusive left-turn lane, a through lane and a shared through/right-turn lane. The westbound approach consists of an exclusive left-turn lane, a through lane and a dedicated right-turn lane.

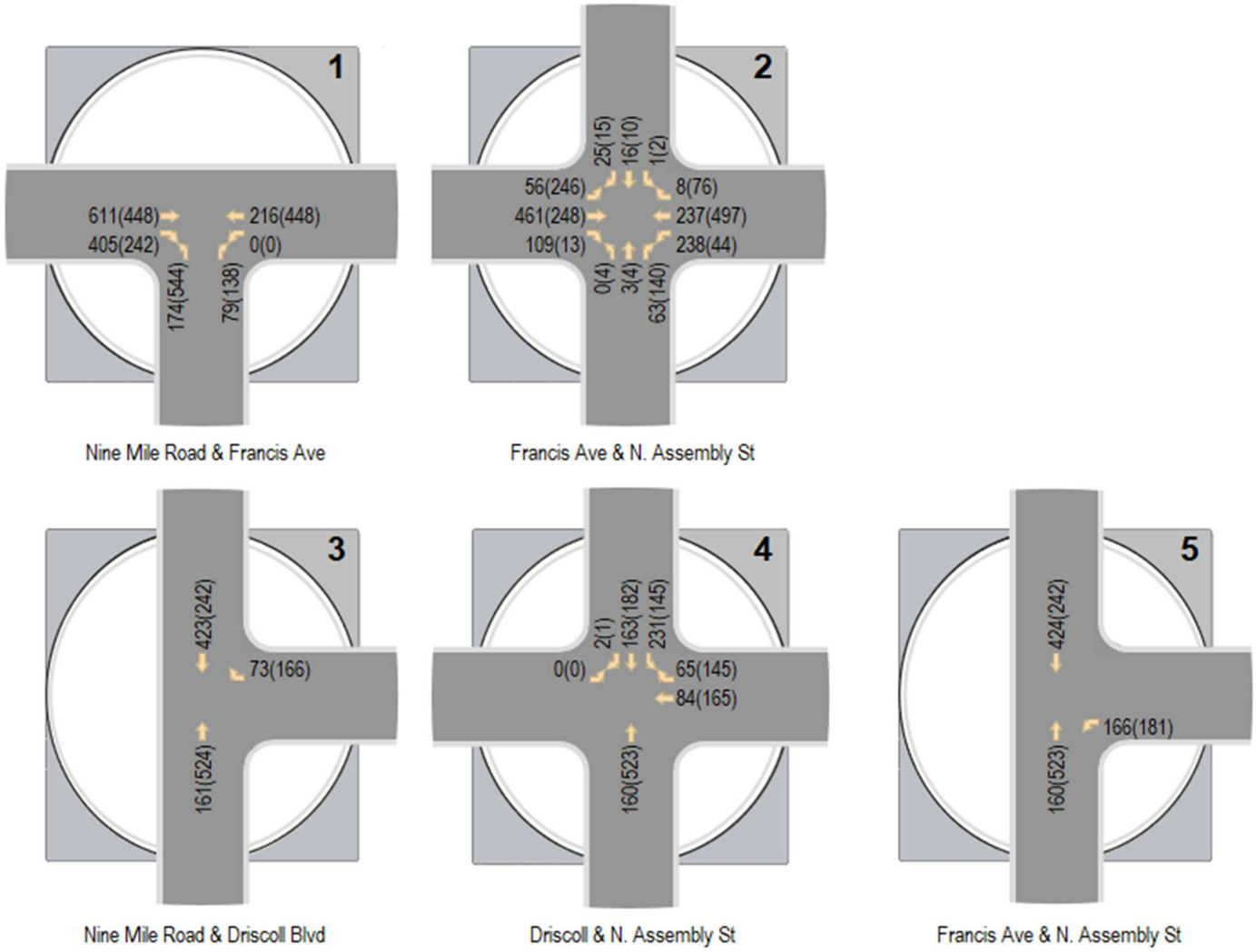
Nine Mile Road & Driscoll Boulevard (3) is a three-legged unsignalized intersection with stop control in the westbound approach. The northbound approach consists of two through lanes. The southbound approach consists of one through lane. The westbound approach consists of a dedicated right-turn lane.

Driscoll Boulevard & N. Assembly Street (4) is a three-legged unsignalized intersection with stop control in the southbound approach. The northbound approach consists of consists of a shared left/through/right-turn lane. The Southbound approach consists of a shared through/left-turn lane. The westbound approach consists of an exclusive left-turn lane and a through lane.

Nine Mile Road & N. Assembly Street (5) is a three-legged unsignalized intersection with stop control in the southbound approach. The southbound approach consists of one through lane. The northbound approach consists of one (1) through lane. The westbound approach consists of one exclusive left turn lane.

The existing peak hour volumes at these intersections are provided in **Figure 2.**

Figure 2 – Existing Peak Hour Volumes AM (PM)



PROJECT NEEDS

The evaluation spurred as the area is a funnel point for vehicles to get on and off from State Route 291 (Francis Avenue) and it currently experiences heavy delay during the peak hours due to the configuration among these three intersections, especially during the PM Peak Hour at the intersection of Nine Mile Road & Francis Avenue. This ICE document will review alternative options to help relieve the expected delay in the area.

INTERSECTION TRAFFIC CONTROL ALTERNATIVES

Alternative A – Assembly Street Connection.

Alternative A involves the connection of the Assembly Street roadway segment at Driscoll Boulevard. Assembly Street is re-aligned and connects with Assembly Street at Nine Mile/Francis Avenue. The Alternative A roadway network configuration is depicted in **Figure 3**.

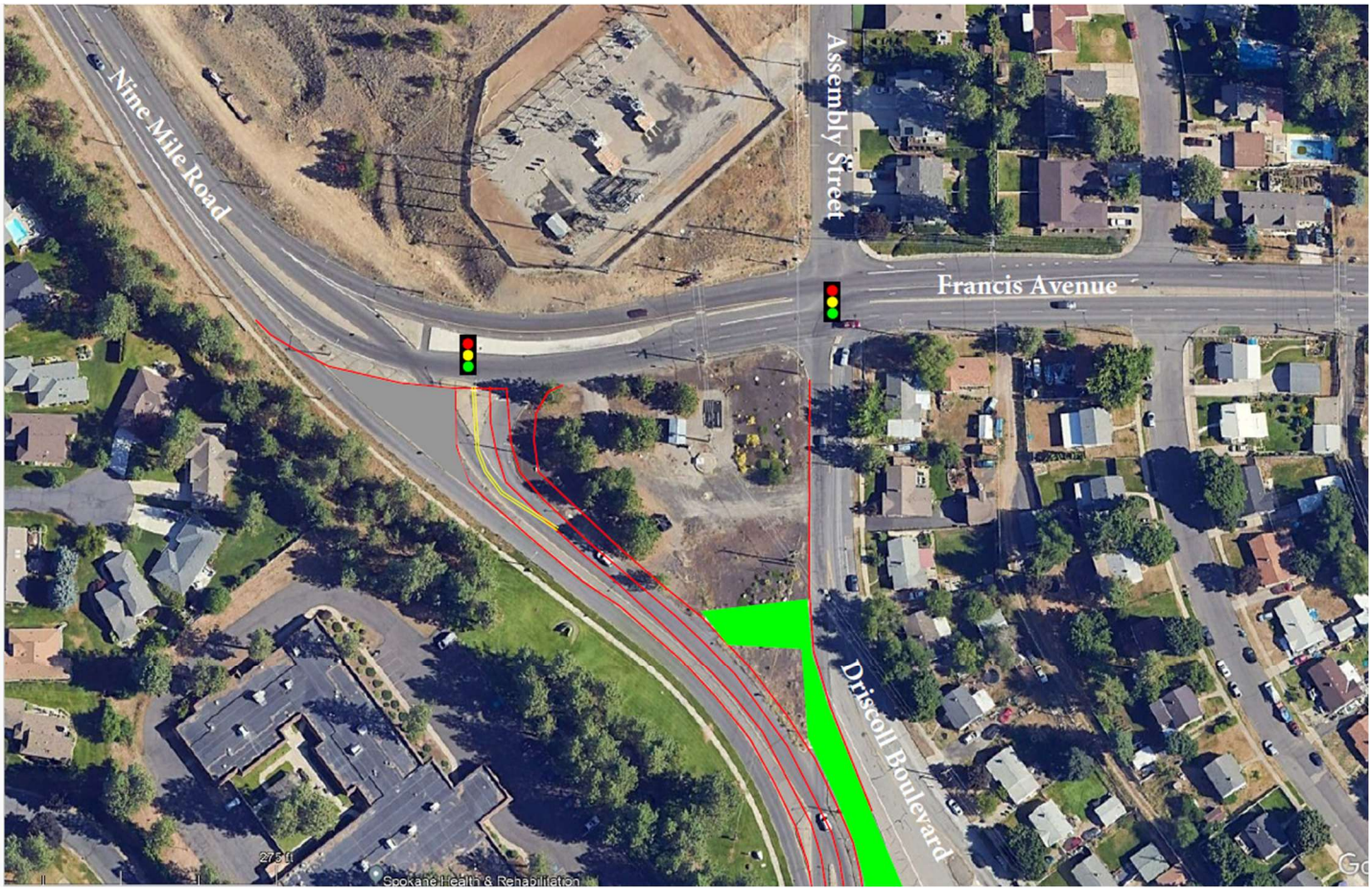
Figure 3 – Alternative A Roadway Network



Alternative B – Two (2) signals on Francis, Driscoll Alignment Modification.

Alternative B includes the intersections of Assembly Street & Francis Avenue and Francis Avenue & Nine Mile Road to be signalized. This alternative will also remove the connector road from Assembly Street to Francis Avenue. The recommended roadway network configuration is depicted in **Figure 4.**

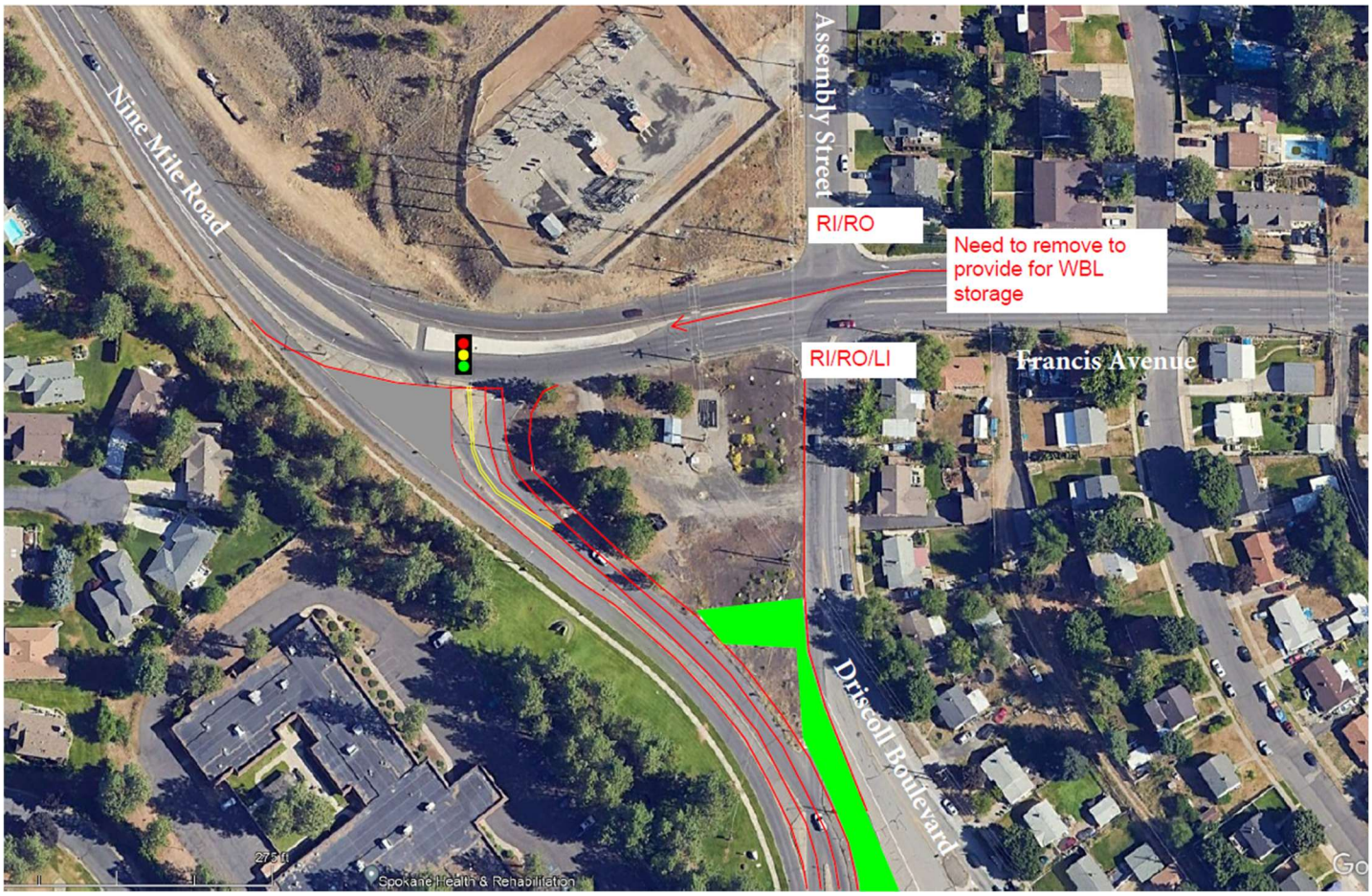
Figure 4 – Alternative B Roadway Network



Alternative C – 1 Signal on Francis, Driscoll modification with restrictions at Assembly.

Alternative C involves the intersection of Nine Mile Road & Francis Avenue to be signalized, the connector road from Assembly Street to Francis Avenue will be removed and the intersection of Assembly Street & Francis Avenue will have modifications to the northbound, southbound and eastbound approaches. The recommended roadway network configuration is depicted in **Figure 5.**

Figure 5 – Alternative C Roadway Network



Alternative D – Segment Termination (Assembly Steet).

Alternative D involves the termination of the Assembly Street roadway segment before Driscoll Boulevard. Assembly Street south of Francis is then connected directly to Nine Mile Road. At the existing intersection of Assembly St and Francis Avenue, the northbound and southbound approach are to be restricted to right-in/right-out. The proposed intersection of Assembly Street and Nine Mile Road requires the modification of the median to provide a left turn lane. To support future regional growth, it is recommended that both Nine Mile Road and Assembly Street and Assembly Street and Driscoll Boulevard should be signalized. The recommended roadway network configuration is depicted in **Figure 6**.

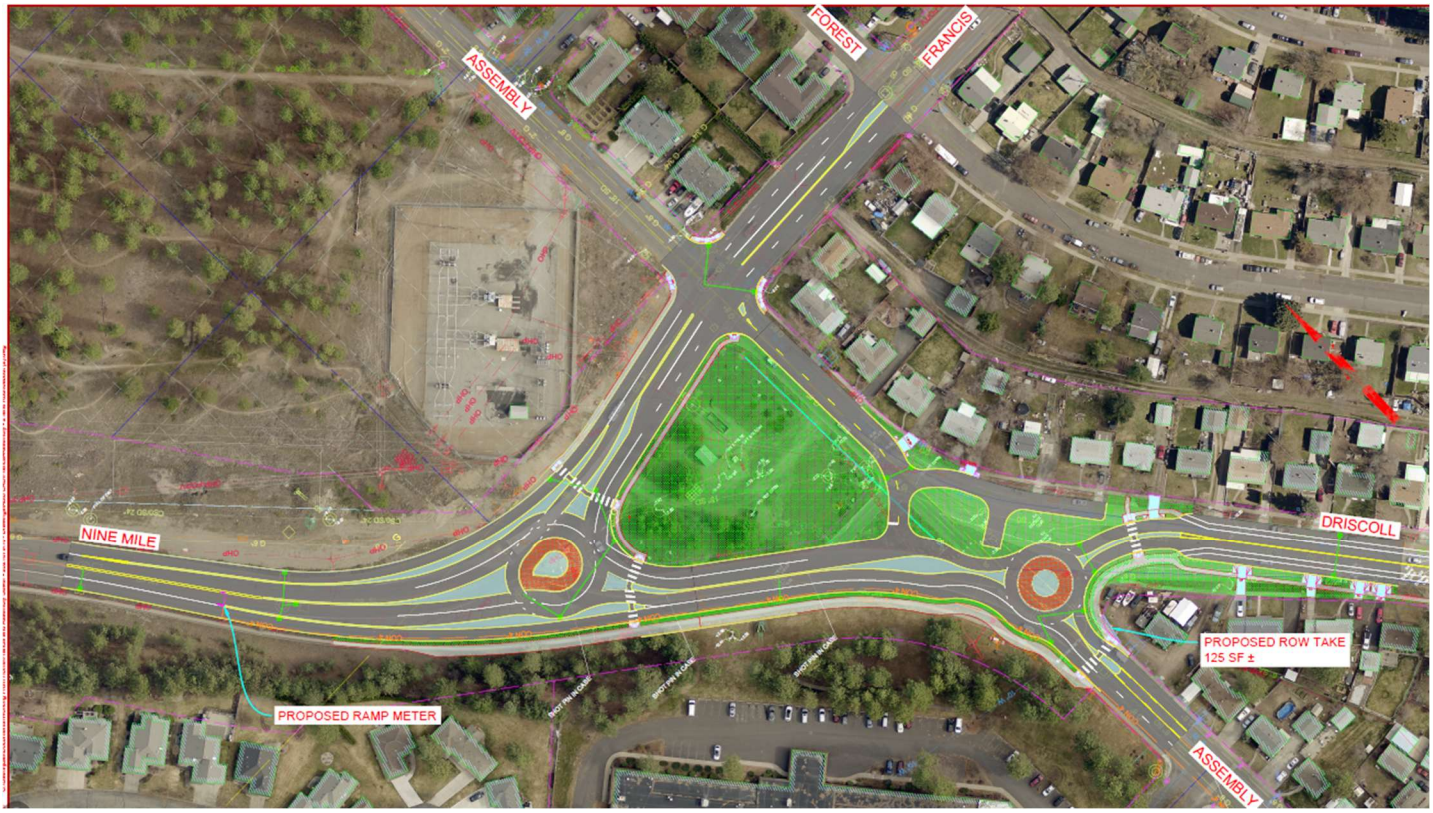
Figure 6 – Alternative D Roadway Network



Alternative D – Roundabouts.

This alternative involves intersection 1 (Francis Ave & Nine Mile Road) and intersection 4 (Assembly Street & Driscoll Boulevard) being analyzed as roundabouts. The intersection of Francis Avenue & Assembly Street will remain as it is. The roundabout at Francis Avenue and Nine Mile Road includes dual circulating lanes for southbound and northbound, as well as a southbound slip lane and a westbound slip lane. These slip lanes may be needed to accommodate the projected traffic volumes and limits the ability for future capacity upgrades should development continue or increase at a faster rate than projected. The recommended roadway network configuration is depicted in **Figure 7**.

Figure 7 – Alternative Roundabout



Alternative E – Roundabouts.

This alternative is very similar to Alternative D, with few exceptions. This alternative differs from Alternative D in that it adds a fourth leg to the Driscoll/Assembly/Nine Mile intersection. This alternative also restricts Assembly and Francis to be a northbound right-turn only intersection – thereby reducing conflict with Francis traffic. The recommended roadway network configuration is depicted in **Figure 8**. It should be noted that Alternative E changes the traffic volumes within the study area slightly as restrictions at Francis/Assembly cause slight rerouting to the Francis/Nine Mile roundabout. It was originally anticipated that bypass lanes would be required in order to meet Levels of Service standards (LOS D or better) and Volume-to-Capacity (V/C) for the roundabouts, however further analysis indicated it was not required to maintain adequate Levels of Service (LOS D or better) and V/C. This option can be expanded in the future to allow for bypass lanes, if needed, as development continues to occur.

Figure 8 – Alternative Roundabout



FUTURE DEVELOPMENTS

Three (3) adjacent future developments PM Peak hour volumes were considered in the background analysis, Volkman, Seven Mile Addition, and Sundance Medows. The location of each is shown in **Figure 8**. Volkman is proposed to include 825 single-family units and is anticipated to generate 660 total PM peak hour trips (416 in/244 out). Seven Mile Addition is a proposed 75-unit single family development anticipated to generate 79 total PM peak hour trips (49 in/30 out). Sundance Medows is projected to include 475 single family units and is anticipated to generate 470 total PM peak hour trips (296 in/174 out). The trip generation summary for the developments is shown in **Table 1**.

Figure 9 – Background Developments

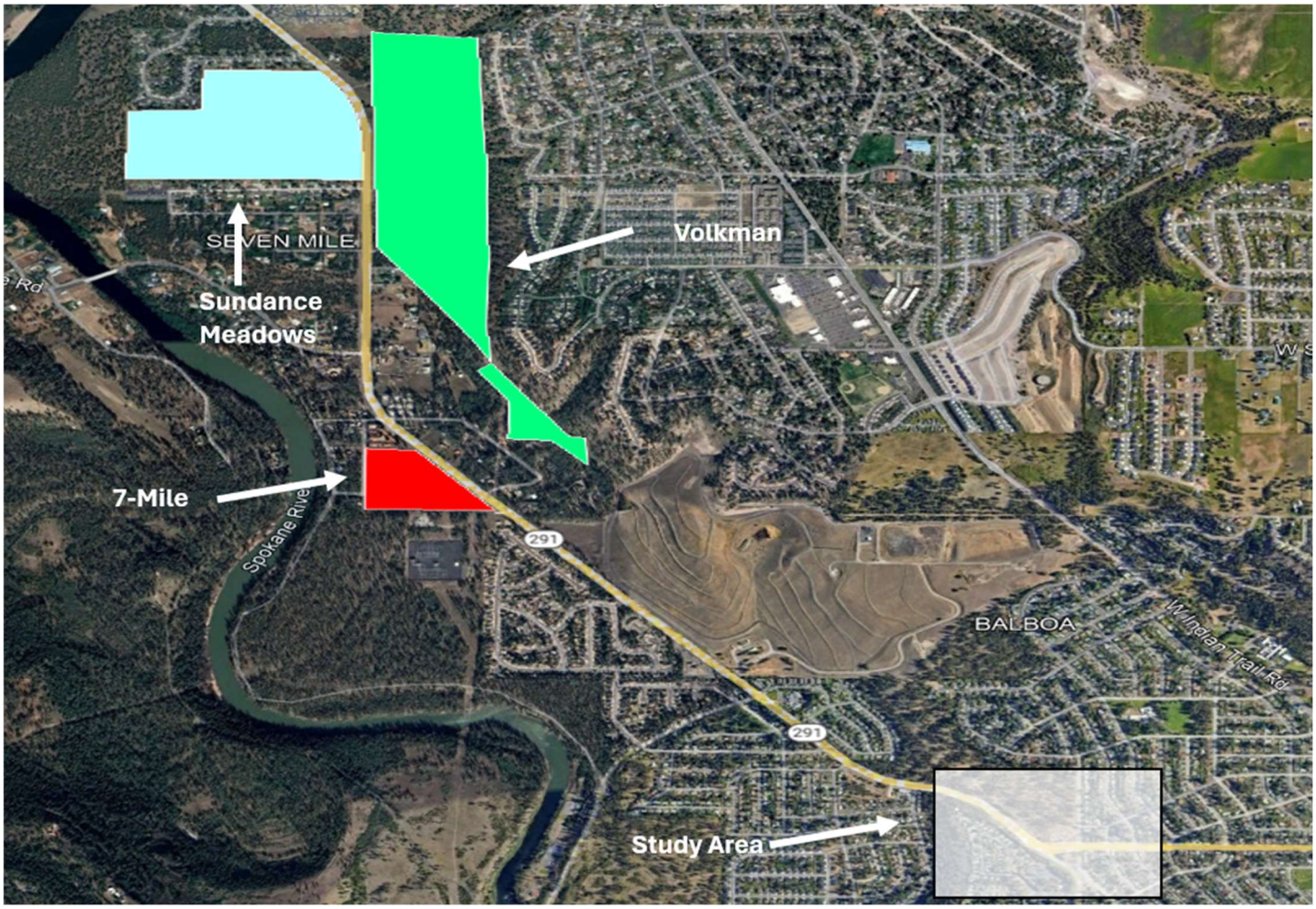


Table 1 – Trip Generation Summary

Land Use	ADT		AM Peak Hour				PM Peak Hour			
	Avg. Rate*	Total	Avg. Rate*	In	Out	Total	Avg. Rate*	In	Out	Total
Volkman [825 DU]	8.72	6,794	0.63	119	359	478	0.89	416	244	660
Seven Mile Addition [65 DU]	10.45	679	0.78	13	38	51	1.22	49	30	79
Sundance Medows [475 DU]	11.55	5,486	0.74	88	264	352	0.99	296	174	470
Totals Trips		**12,959**		**220**	**661**	**881**		**761**	**448**	**109**

For all three (3) developments, 35 percent of traffic is anticipated to originate and terminate to the south of the intersection Nine Mile Road & Assembly Street, 15 percent of traffic is anticipated to originate and terminate to the southeast of the intersection Driscoll Boulevard & Francis Avenue, and 50 percent of traffic is anticipated to originate and terminate to the east of the intersection Assembly Street & Francis Avenue. The Background Volumes are presented in **Figure 9**. The trip distribution can be seen in **Figure 10**.

Figure 10 – Background Volumes

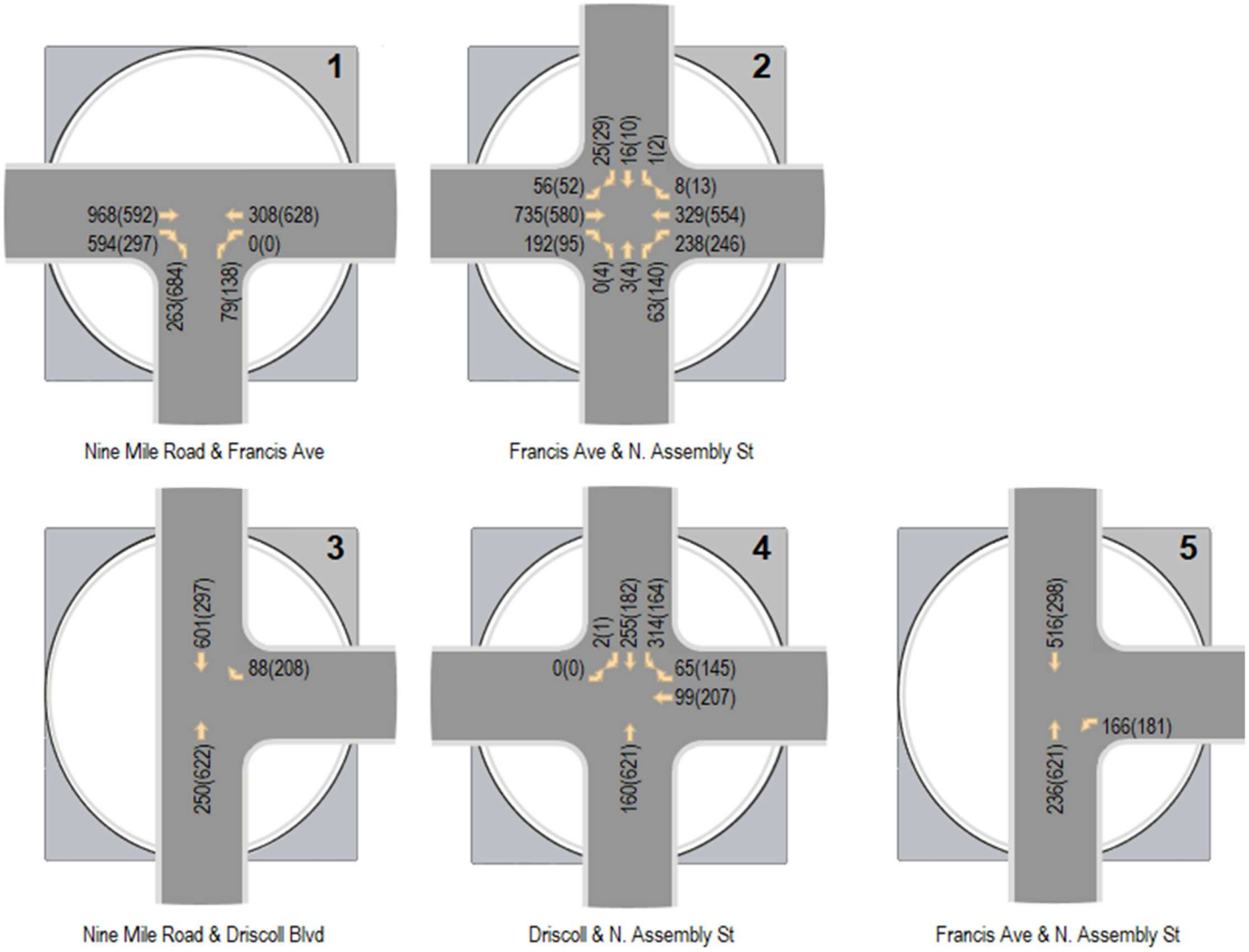


Figure 11 – Trip Distribution



OPERATIONAL & SAFETY PERFORMANCE ANALYSIS

As described previously, the operations of the intersections traffic controls were evaluated using the existing and background conditions. **Table 2** below shows the Levels of Service for the Existing Conditions scenario.

Table 2 – Existing Conditions LOS

ID	Intersection	Control [Cycle]	Approach/ Movement	Baseline AM(PM) Peak Hour Delays (sec/veh)
				Existing
1	Nine Mile Road & Francis Avenue	1-Way Stop (NB)	NB Left NB Right	42.2 E (280.0 F) 17.7 C (13.9 B)
2	Francis Avenue & N. Assembly St	2-Way Stop (NB/SB)	NB Right SB Shared EB Left WB Left	11.0 B (11.8 B) 51.4 F (38.7 E) 7.9 A (8.4 A) 10.1 B (10.0 A)
3	Nine Mil Road & Driscoll Boulevard	1-Way Stop (WB)	WB Right	10.2 B (15.4 C)
4	Driscoll Boulevard & N. Assembly Street	Yield (WB)	SB Left	8.3 A (8.4 A)
5	Nine Mile Road & N. Assembly Street	1-Way Stop (SB)	SB Thru	24.3 C (52.3 F)

The unsignalized intersection of **Nine Mile Road & Francis Avenue** in the existing scenario experiences a delay of 42.2 sec/veh (LOS E) and 280.0 sec/veh (LOS F) at the northbound left-turn movement during the AM and PM Peak Hour, respectively.

The unsignalized intersection of **Francis Avenue & N/ Assembly Street** in the existing scenario experiences a delay of 51.4 sec/veh (LOS F) and 38.7 sec/veh (LOS E) at the southbound shared movement during the AM and PM Peak Hour, respectively.

The unsignalized intersection of **Nine Mile Road & N. Assembly Street** in the existing scenario experiences a delay of 52.3 sec/veh (LOS F) at the southbound through movement during the PM Peak Hour. **Table 3** below shows the Background Scenario levels-of-service.

Table 3 – Background (No-Build) Scenario LOS

ID	Intersection	Control [Cycle]	Approach/ Movement	Baseline AM(PM) Peak Hour Delays (sec/veh)
				Background
1	Nine Mile Road & Francis Avenue	1-Way Stop (NB)	NB Left NB Right	490.2 F (717.7 F) 38.8 E (16.1 C)
2	Francis Avenue & N. Assembly St	2-Way Stop (NB/SB)	NB Right SB Shared EB Left WB Left	14.1 B (12.6 B) 13.6 B (94.8 F) 7.9 A (8.9 A) 10.8 B (10.7 B)
3	Nine Mil Road & Driscoll Boulevard	1-Way Stop (WB)	WB Right	13.4 B (20.4 C)
4	Driscoll Boulevard & N. Assembly Street	Yield (WB)	SB Left	8.7 A (8.6 A)
5	Nine Mile Road & N. Assembly Street	1-Way Stop (SB)	SB Thru	42.5 E (117.1 E)

With the inclusion of the surrounding development plus extrapolating the traffic volume to 2040, the unsignalized intersection of **Nine Mile Road & Francis Avenue** in the background scenario is expected to experience a delay of 490.2 F sec/veh (LOS E) and 717.7 sec/veh (LOS F) at the northbound left-turning movement, during the AM and PM Peak hour, respectively. The northbound right-turning movement is expected to experience a delay of 38.8 sec/veh (LOS E) during the AM Peak Hour.

The unsignalized intersection of **Francis Avenue & N. Assembly Street** in the background scenario is expected to experience a delay of 94.8 sec/veh (LOS F) at the southbound approach during the PM Peak Hour.

The unsignalized intersection of **Assembly Street & Driscoll Boulevard** is expected to experience a delay of 42.5 sec/veh (LOS E) and 117.1 sec/veh (LOS F) at the southbound through movement during the AM and PM Peak Hour, respectively.

TRAFFIC SIGNAL WARRANT ANALYSIS

CivTech utilized the 2024 peak hour traffic counts and Average Daily Traffic (ADT) volumes that were recorded by the City of Spokane in the signal warrant analysis below. The peak hour traffic counts were used to calculate a percentage to grow the City of Spokane 24-hour traffic counts.

As with the existing analysis, the traffic signal warrant analysis was accomplished in accordance with standard traffic signal warranting criteria found in the Manual on Uniform Traffic Control Devices, 2023 Edition (MUTCD). The MUTCD describes nine conditions under which a traffic signal might be warranted, designated Warrants 1 through 9. It indicates that, "The investigation of the need for a traffic control signal shall include an analysis of the applicable factors contained in the nine traffic signal warrants and other factors related to existing operation and safety at the study location." It then cautions that, "The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Warrant 1: Eight-Hour Vehicular Volume

The Eight-Hour Vehicular Volume Warrant is intended for locations where either of the following two conditions, or a combination of both, exist for each of any 8 hours of an average day and is, thus, the principle reason to consider the installation of a traffic signal: a large volume of intersecting traffic or traffic volumes so heavy on the major street that entering vehicles suffer extensive delay or conflict.

CONDITION A: MINIMUM VEHICULAR VOLUME

Condition A, the Minimum Vehicular Volume, is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal. The need for a traffic control signal shall be considered if the vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 of the MUTCD (reproduced below) occur on the major-street and the higher-volume minor-street approaches, respectively, to the intersection for each of any 8 hours of an average day.

CONDITION B: INTERRUPTION OF CONTINUOUS TRAFFIC

Condition B, the Interruption of Continuous Traffic, is intended for application at locations where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street. The need for a traffic control signal shall be considered if the vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 of the MUTCD occur on the major-street and the higher-volume minor-street approaches, respectively, to the intersection for each of any 8 hours of an average day.

COMBINATION OF CONDITIONS A AND B

The combination of Conditions A and B is intended for application at locations where Condition A is not satisfied and Condition B is not satisfied *and should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems*. (Emphasis added. CivTech was not made aware by either agency of any specific operational concerns with this intersection; therefore, it will be assumed for purposes of this analysis that this "combination warrant" is not applicable.) The need for a traffic control signal shall be considered if the vehicles per hour given in both of the 80 percent columns of Conditions A and Condition B in Table 4C-1 of the MUTCD occur on the major-street and the higher-volume minor-street approaches, respectively, to the intersection for each of any 8 hours of an average day.

Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume

Condition A—Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1.....	1.....	500	400	350	280	150	120	105	84
2 or more...	1.....	600	480	420	336	150	120	105	84
2 or more...	2 or more ...	600	480	420	336	200	160	140	112
1.....	2 or more ...	500	400	350	280	200	160	140	112

Condition B—Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1.....	1.....	750	600	525	420	75	60	53	42
2 or more...	1.....	900	720	630	504	75	60	53	42
2 or more...	2 or more ...	900	720	630	504	100	80	70	56
1.....	2 or more ...	750	600	525	420	100	80	70	56

[a] Basic minimum hourly volume.
[b] Used for combination of Conditions A and B after adequate trial of other remedial measures.
[c] May be used when the major-street speed exceeds 70 km/h or exceeds 40 mph or in an isolated community with a population of less than 10,000.
[d] May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major- street speed exceeds 70 km/h or exceeds 40 mph or in an isolated community with a population of less than 10,000.

Excerpt from MUTCD page 438

For each of the above, if the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent columns.

Warrant 2: Four-Hour Vehicular Volume

The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal. The need for a traffic control signal shall be considered if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in Figure 4C-1 (this and all other referenced figures are attached) for the existing combination of approach lanes.

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 70 km/h or exceeds 40 mph or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-2 may be used in place of Figure 4C-1. The posted speed limit on the roadways analyzed are below 40 mph; therefore, Figure 4C-1 was used for this analysis.

Warrant 3: Peak-Hour

The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street. It shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:

A. If all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:

    1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach; or 5 vehicle-hours for a two-lane approach, and

    2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes, and

    3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.

B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

(For this warrant, CivTech prefers the less data-intensive Category B.)

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 70 km/h or exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-4 may be used in place of Figure 4C-3 to satisfy the criteria in the second category of the Standard. The posted speed limit on the roadways analyzed are below 40 mph; therefore, Figure 4C-3 was used for this analysis

Table 4 – Traffic Signal Analysis Summary Warrants 1 – 3

Intersection	Warrant 1				Warrant 2	Warrant 3
	Condition A	Condition B	Combination of A & B	Overall		
Existing Year						
Assembly Street & Driscoll Boulevard	No	No	No	**No**	No	No
Francis Avenue & Assembly Street	No	No	No	**No**	No	No
Francis Avenue & Nine Mile Road	Yes	Yes	Yes	**Yes**	Yes	Yes

Table 4 summarizes the volume-based warrant analysis results for the existing year volumes. The warranting criteria for Warrants 2 and 3 were automatically calculated using formulae, not determined by the plotting method described in the MUTCD. The formulae, which approximate the curves of the MUTCD, were published in the *2023 Indiana MUTCD Revisions 1 & 2 & 3.*

ANALYSIS

The results of the volumes-based traffic signal warrants indicate that the traffic volumes for the existing scenario for the intersections of **Assembly Street & Driscoll Boulevard** and **Francis Avenue & Assembly Street** do not meet the criteria to warrant for a traffic signal.

The results of the volumes-based traffic signal warrants indicate that the traffic volumes for the existing scenario for the intersections of **Francis Avenue & Nine Mile Road** does meet the criteria to warrant for a traffic signal.

Table 5 below shows the AM Peak Hour Background Scenario levels-of-service considering Alternatives A through E.

Table 5 – AM Peak Hour Background Alternatives A-E Level-of-Service

ID	Intersection	Control [Cycle]	Approach/ Movement	Alternative A delay LOS [v/c]	Alternative B delay LOS [v/c]	Alternative C delay LOS [v/c]	Alternative D delay LOS [v/c]	Alternative E delay LOS [v/c]
1	Nine Mile Road & Francis Avenue	1-Way Stop (NB)	NB Left NB Right	-	-	-	-	-
		Signal	NB Left NB Right NB Overall EB Thru WB Left WB Thru **Overall**	-	16.7 B 18.1 B 17.4 B 18.2 B 16.1 B 8.6 A **16.0 B**	16.7 B 18.1 B 17.4 B 18.2 B 16.1 B 8.6 A **16.0 B**	18.2 B 20.2 C 19.4 B 23.1 C 30.8 C 9.1 A **20.6 C**	-
		Roundabout	NB SB WB **Overall**	6.9 A [0.246] 3.5 A [0.309] 1.4 A [0.206] **3.5 A [0.309]**				7.5 A [0.299] 9.9 A [0.206] 8.0 A [0.413] **8.2 A [0.413]**
2	Francis Avenue & N. Assembly Street	2-Way Stop (NB/SB)	NB Right SB Right WB Left	-	-	-	12.2 B 16.1 C 10.2 B	**13.7 B** **11.8 B** **----**
		2-Way Stop (NB/SB)	NB Left NB Shared SB Right EB Left WB Left	-	-	247.3 F 9.3 A 9.5 A 7.9 A 8.6 A	-	-

Table 5 – AM Peak Hour Background Alternatives A-E Level-of-Service

ID	Intersection	Control [Cycle]	Approach/ Movement	Alternative A delay LOS [v/c]	Alternative B delay LOS [v/c]	Alternative C delay LOS [v/c]	Alternative D delay LOS [v/c]	Alternative E delay LOS [v/c]
		Signal [90 sec]	NB Left NB Right NB Overall SB Left SB Right SB Overall EB Left EB Thru EB Right EB Overall WB Left WB Thru WB Right WB Overall **Overall**	46.6 D 15.6 B 35.2 D 147.5 F 20.9 C 24.3 C 58.9 E 37.7 D 0.0 A 40.4 D 67.4 E 23.4 C 23.4 C 45.0 D **39.6 D**	51.7 D 16.0 B 36.9 D 147.5 F 19.9 B 23.3 C 56.3 E 37.5 D 0.0 A 39.9 D 61.3 E 23.3 C 23.3 C 42.0 D **39.0 D**	-	-	-
3	Nine Mile Road & Driscoll Boulevard	1-Way Stop (WB)	WB Right	-	-	-	8.9 A	-
4	Driscoll Boulevard & N. Assembly Street	1-Way Stop (WB)	SB Left WB Left WB Right	-	-	-	-	-
		Signal [90 sec]	NB Thru SB Left SB Thru SB Overall WB Left WB Right **Overall**	15.2 B 40.6 D 0.2 A 9.0 B 31.9 C 44.5 D **14.9 B**	-	-	-	-
		Signal [60 sec]	NB Thru NB Right NB Overall SB Left SB Thru SB Overall WB Left WB Right WB Overall **Overall**	-	-	-	9.2 A 0.0 A 9.2 A 15.6 B 3.4 A 6.6 A 50.4 D 0.0 A 50.4 D **8.9 A**	-
		Roundabout	NB Shared SB Shared WB Shared **Overall**	6.3 A [0.25] 5.4 A [0.40] 6.1 A [0.3] **5.6 A [0.4]**				-
		Roundabout (2)	NE NW SE S **Overall**	-				5.4 A [0.006] (2) 4.5 A [0.359] 5.9 A [0.206] 8.5 A [0.229] **5.3 A [0.359]**
5	Nine Mile Road & N. Assembly Street	1-Way Stop (SB)	SB Thru	-	-	-	-	-

(1) Delay experienced by 10 assumed vehicles that do not currently exist
(2) Intersection 3 included as a fourth leg for Alternative E.

The signalized intersection of **Francis Avenue & N. Assembly Street** in the Alternative A scenario is expected to operate with a delay in the southbound, eastbound and westbound approach. The southbound left-turning movement experiences a delay of 147.5 sec/veh (LOS F) during the AM Peak Hour. The eastbound left-turning movement experiences a delay of 58.9 sec/veh (LOS E) during the AM Peak hour. The westbound left-turning movement experiences a delay of 67.4 sec/veh (LOS F) during the AM Peak Hour.

The signalized intersection of **Francis Avenue & N. Assembly Street** in the Alternative B scenario is expected to operate with a delay in the eastbound and westbound approach. The southbound left-turning movement experiences a delay of 147.5 sec/veh (LOS F) during the AM Peak Hour. The eastbound right-turning movement experiences a delay of 56.3 sec/veh (LOS E) during the AM Peak hour. The westbound left-turning movement experiences a delay of 61.3 sec/veh (LOS E) during the AM Peak Hour.

The unsignalized intersection of **Francis Avenue & N. Assembly Street** in the Alternative C scenario is expected to operate with a delay in the northbound approach. The northbound left-turning movement is expected to operate with a delay of 247.3 sec/veh (LOS F) during the AM Peak Hour.

Table 6 below shows the PM Peak Hour Background Scenario levels-of-service considering Alternatives A through E.

Table 6 – PM Peak Hour Background Alternatives A-E Level-of-Service

ID	Intersection	Control [Cycle]	Approach/ Movement	Alternative A delay LOS [v/c]	Alternative B delay LOS [v/c]	Alternative C delay LOS [v/c]	Alternative D delay LOS [v/c]	Alternative E delay LOS [v/c]
1	Nine Mile Road & Francis Avenue	1-Way Stop (NB)	NB Left NB Right	-	-	-	-	-
		Signal	NB Left NB Right NB Overall EB Thru WB Left WB Thru **Overall**	-	(29.8 C) (48.8 D) (39.4 D) (18.1 B) (12.8 B) (10.9 A) **(23.7 C)**	(29.8 C) (48.8 D) (39.4 D) (18.1 B) (12.8 B) (10.9 A) **(23.7 C)**	(25.0 C) (44.6 D) (34.9 D) (20.9 C) (35.4 D) (18.6 B) **(27.3 C)**	-
		Roundabout	NB SB WB **Overall**	(19.2 C [0.73]) (3.2 A [0.271]) (2.6 A [0.361]) **(8.7 A [0.730])**				(38.5 D [1.062]) (12.6 B [0.631]) (8.0 A [0.332]) **(19.4 B [1.062])**
2	Francis Avenue & N. Assembly Street	2-Way Stop (NB/SB)	NB Right SB Right WB Left	-	-	-	12.1 B 28.7 C 10.1 A	18.5 C 18.9 C ----
		2-Way Stop (NB/SB)	NB Left NB Shared SB Right EB Left WB Left	-	-	(2,351.5 F) (10.6 B) (11.3 B) (9.2 A) (8.9 A)	-	-
		Signal [90 sec]	NB Left NB Right NB Overall SB Left SB Right SB Overall EB Left EB Thru EB Right EB Overall WB Left WB Thru WB Right WB Overall **Overall**	(43.5 D) (19.2 B) (37.0 D) (122.5 F) (35.9 D) (39.8 D) (38.1 D) (49.4 D) (0.0 A) (48.2 D) (61.0 E) (43.8 D) (43.4 D) (48.5 D) **(43.3 D)**	(52.5 D) (19.9 C) (42.3 C) (122.5 F) (30.5 C) (34.4 C) (38.4 D) (46.5 D) (0.0 A) (45.7 D) (58.8 E) (42.4 D) (42.1 D) (46.9 D) **(44.5 D)**	-	-	-
3	Nine Mile Road & Driscoll Boulevard	1-Way Stop (WB)	WB Right	-	-	-	(10.7 B)	-

Table 6 – PM Peak Hour Background Alternatives A-E Level-of-Service

ID	Intersection	Control [Cycle]	Approach/ Movement	Alternative A delay LOS [v/c]	Alternative B delay LOS [v/c]	Alternative C delay LOS [v/c]	Alternative D delay LOS [v/c]	Alternative E delay LOS [v/c]
4	Driscoll Boulevard & N. Assembly Street	1-Way Stop (WB)	SB Left WB Left WB Right	-	-	-	-	-
		Signal [90 sec]	NB Thru SB Left SB Thru SB Overall WB Left WB Right **Overall**	(24.0 C) (35.7 C) (0.2 A) (9.2 A) (22.7 C) (51.0 D) **(23.6 C)**	-	-	-	-
		Signal [60 sec]	NB Thru NB Right NB Overall SB Left SB Thru SB Overall WB Left WB Right WB Overall **Overall**	-	-	-	(7.5 A) (0.0 A) (7.5 A) (6.3 A) (2.0 A) (3.1 A) (52.5 D) (0.0 A) (52.5 D) **(5.7 A)**	-
		Roundabout	NB Shared SB Shared WB Shared **Overall**	(9.1 A [0.75]) (5.5 A [0.30]) (20.8 C [0.82]) **(10.1 B [0.82])**				-
		Roundabout (2)	NE NW SE S **Overall**	-				(11.3 B [0.012])(2) (4.5 A [0.270]) (17.9 B [0.768]) (10.8 B [0.719]) **(9.9 A [0.768])**
5	Nine Mile Road & N. Assembly Street	1-Way Stop (SB)	SB Thru	-	-	-	-	-

(1) Delay experienced by 10 assumed vehicles that do not currently exist
(2) Intersection 3 included as a fourth leg for Alternative E.

The signalized intersection of **Francis Avenue & N. Assembly Street** in the Alternative A scenario is expected to operate with delays in the southbound and westbound approach. The southbound left-turning movement is expected to operate with a delay of 122.5 sec/veh (LOS F) during the PM Peak Hour. The westbound left-turning movement is expected to operate with a delay of 61.0 sec/veh (LOS E) during the PM Peak Hour.

The signalized intersection of **Francis Avenue & N. Assembly Street** in the Alternative B scenario is expected to operate with delays in the southbound and westbound approach. The southbound left-turning movement is expected to operate with a delay of 122.5 sec/veh (LOS F) during the PM Peak Hour. The westbound left-turning movement is expected to operate with a delay of 61.0 sec/veh (LOS E) during the PM Peak Hour.

The unsignalized intersection **Francis Avenue & N. Assembly Street** in the Alternative C scenario is expected to operate with a delay in the northbound left-turning movement of 2,351.5 sec/veh (LOS F) during the PM Peak Hour.

The signalized intersection **Nine Mile Road & Francis Avenue** in the Alternative D scenario is expected to operate with a delay in the northbound right-turning movement of 56.2 sec/veh (LOS F) during the PM Peak Hour.

The overall operations analysis show that **Alternative E** will provide the least amount of delay at the study intersections while providing the most access to existing (and future) residents. Based on LOS and operational characteristics, **Alternative E** will be used moving forward for the remainder of the analysis and ICE document.

OPENING YEAR 2028

Moving forward with Alternative E, it is expected that the Opening Year for the proposed alternative will be 2028. CivTech reviewed the anticipated traffic volume for intersection #1 in the opening year of 2028 and identified the lane configurations needed for acceptable operations. In the opening year of 2028, it is anticipated that a single lane roundabout will suffice to accommodate opening year traffic demand at Nine Mile Road and Francis Avenue. However, by the horizon year of 2040, it is anticipated that additional circulating lanes will be required to accommodate the traffic demand. Analysis has been completed projecting expected levels of service when utilizing a single lane of circulation within **Alternative E** at intersection 1 for opening year. **Table 7** below also shows how the single lane roundabout performs in 2040, resulting in a v/c ratio of 1.33 without additional circulating lanes.

Table 7 – Alternative E Single Circulation Lane Levels of Service

ID	Intersection	Control [Cycle]	Approach/ Movement	Alternative E (Opening Year) AM LOS [v/c] (PM LOS [v/c])	Alternative E (2040 Horizon Year) AM LOS [v/c] (PM LOS [v/c])
1	Nine Mile Road & Francis Avenue	Roundabout	NE SE W **Overall**	6.9 A [0.166] (7.6 A [0.462]) 10.7 A [0.253] (14.1 B [0. 691]) 7.4 A [0.412] (7.9 A [0.364]) **7.7 A [0.412] (9.6 A [0.691])**	7.6 A [0.240] (19.2 B [0.890]) 11.1 B [0.414] (169.5 F [1.333]) 7.2 A [0.611] (7.7 A [0.488]) **7.9 A [0.611] (63.6 E [1.333])**
4	Driscoll Boulevard & N. Assembly Street	Roundabout (2)	NE NW SE S **Overall**	4.7 A [0.005] (6.8 A [0.006])(1) 4.3 A [0.468] (4.3 A [0.359]) 5.2 A [0.177] (7.7 A [0.283]) 7.5 A [0.141] (8.0 A [0.449]) **5.0 A [0.468] (6.5 A [0.499])**	5.1 A [0.005] (10.2 B [0.009])(1) 4.4 A [0.736] (4.4 A [0.554]) 5.8 A [0.163] (12.5 B [0.583]) 8.2 A [0.201] (9.2 A [0.628]) **5.2 A [0.736] (8.0 A [0.628])**

(1) Intersection 3 included as a fourth leg for Alternative E.

Based upon the analysis, it is expected that the single circulation lane configuration for intersection #1 will be adequate to support traffic demands in the 2028 opening year scenario. However, this configuration for intersection #1 is projected to be inadequate for the expected demands in the 2040 horizon year.

Given these expectations, it is recommended that the **Alternative E** intersection #1 be designed to accommodate a second circulating lane for future use as traffic demands increase.

Graphics depicting the expected volumes in the 2028 Opening Year, and the 2040 Horizon Year can be found in **Attachment B**.

FEASIBILITY

Alternative E was reviewed based on factors and other specific site issues in accordance with Chapter 1300 of the WSDOT Design Manual. **Table 8** will summarize the comparison of **Alternative E** when looking at a signal or roundabout configuration.

Table 8 – Alternative Feasibility Comparison

Factor	Traffic Signal System	Roundabout System
Least Right-of-way Impacts	Best	Good
Least Design Constraints	Best	Good
Best Multimodal Accommodation	Good	Best
Best Safety Benefit	Best	Good
Lowest Maintenance/Operations	Good	Best
Easiest Implementation/Constructability	Best	Good
Lowest Initial Cost	Best	Good

The term "Best" is given to the intersection type that performs better between the roundabout and the traffic signal system. For example, the traffic signal system will require less right-of-way, therefore it is labeled as "Best" while the roundabout system is labeled as "Good". Similarly, the traffic signal system has the least design constraints, with regards to vertical and horizontal geometrics, when compared to the roundabout system. Another example is the maintenance and operations of the intersection type, in which the roundabout provides the "Best" overall performance when compared to the traffic signal, which was labeled as "Good".

Both the traffic signal system and roundabout system are feasible alternatives at this location. Because the existing intersections are all stop controlled intersections, the roundabout system didn't have as favorable crash reduction as expected when compared to the traffic signal system. Overall, the traffic signal system shows slightly better results than the roundabout system.

IMPROVEMENT COSTS

The costs for installing the traffic signal system or the roundabout system of **Alternative E** are summarized in **Table 8**.

With the alternative scenarios that involve a traffic signal to be implemented, it is recommended that advanced warning signs/beacons be added to alert drivers of upcoming traffic signals and the traffic signal timing change, which would enhance roadway safety and help reduce the likelihood of accidents. The advanced warning signs/beacons are also recommended due to the vertical profile of Francis Avenue and the horizontal curve that is present at the intersection of Francis Avenue and Nine-Mile Road. These advanced warning signs/beacons would be tied to the traffic signal timing, via fiber, and will alert drivers of the upcoming need to stop at a red indicator.

TABLE 9– Project Costs

Severity	Traffic Signal System	Roundabout System**
Preliminary Engineering	$699,892	$885,084
Construction	$8,048,763	$8,093,089
Total Intersection Cost	$8,748,655	$8,978,173

2026 engineers' estimate of probable costs
** Alternative D was estimated for the this table. Alternative E will be very similar.

The improvement costs noted in **Table 8** are for the total project costs, including improvements to the City of Spokane System and the WSDOT system. Further breakdown of costs by City versus WSDOT system are summarized in **Table 9**.

Table 10– Project Costs by Agency

Activity	Traffic Signal System		Roundabout System**	
	City	WSDOT	City	WSDOT
Preliminary Engineering	$307,467	$392,425	$304,510	$580,574
Construction	$3,535,867	$4,512,896	$2,751,807	$5,341,282
Total Intersection Cost	$3,843,334	$4,905,321	$3,056,317	$5,921,856

2025 engineers' estimate of probable costs
** Alternative D was estimated for the this table. Alternative E will be very similar.

SAFETY PERFORMANCE ANALYSIS

Crash Analysis

Crash data for the Study Area was obtained from the City of Spokane for the past six (6) years. In total, there have been 38 incidents within the Study Area since the beginning of 2018. The summary of intersection crash data is presented in **Table 10**.

Table 11– 2018-2023 INTERSECTION CRASH DATA SUMMARY

ID	Intersection	Total Incidents	Incidents in each Category																
			2018	2019	2020	2021	2022	2023	Injury	Fatality	Single Vehicle	Left Turn	Rear End	Head On	Sideswipe	Angle	DUI	Pedestrian	Bicycle
1	Nine Mile Road & Francis Avenue	8	2	1	2	2	1	0	3	0	0	2	0	0	0	6	0	0	0
3	Francis Avenue & N. Assembly Street	26	3	6	6	5	5	1	14	0	4	1	0	0	0	21	0	0	0
4	Driscoll Boulevard & N. Assembly Street	4	0	0	1	1	1	1	4	0	0	3	0	0	0	1	0	0	0

Table 10 shows that the intersection that had the most accidents occurred at the **Francis Avenue & N. Assembly Street** intersection. This intersection is currently restricted on the northbound approach to allow right-outs only. This intersection had 26 crashes throughout six (6) years while 21 of the 26 crashes (80%) were angle related. There have been no fatalities in the study area.

Of the eight (8) crashes at the intersection of **Nine Mile Road & Francis Avenue**, five (5) crashes had been listed as 'No Apparent Injury', two (2) crashes had been listed as a 'Possible Injury' and one (1) crash had been listed as 'Suspected Serious Injury'.

Of the twenty-six (26) crashes at the intersection of **Francis Avenue & N. Assembly Street**, eleven (11) crashes had been listed as 'No Apparent Injury', eight (8) crashes had a 'Possible Injury' and seven (7) crashes had been listed as 'Suspected Minor Injury'.

Of the four (4) crashes at the intersection of **Driscoll Boulevard & N. Assembly Street**, all crashes had been listed as 'Possible Injury'.

When calculating the crash rate for each intersection listed above, the intersection crash rates for all three have a rate less than 1 crash per million entering vehicles. This signifies that there are no abnormal circumstances

occurring within these intersections. **Table 11** indicates the existing intersection crash rate per million entering vehicles.

Table 12 – Existing Intersection Crash Rates

Factor	Crash Rate per Million Entering Vehicles
Francis Avenue & Nine Mile Road	0.177
Francis Avenue & N. Assembly Street	0.384
Assembly Street & Driscoll Boulevard	0.258

The modifications that are presented also provide us with further Crash Modification Factors (CMF) and Crash Reduction Factors (CRF). **Table 12** represents the CRF's and CMF's for the modifications that were considered in this analysis.

Table 13 – Crash Reduction/Modification Factors

Configuration Type	CMF (CRF) [ID #]
Install a Traffic Signal w/Lefts	0.541 (45.9%)[7966]
Intersection to Roundabout	0.623 (37.7%)[10082]
Install Right-in-Right-out operations at Stop-Controlled Intersections	0.55 (45%)[9821]

Applying the crash modification factors from **Table 12** to the intersections listed in **Table 11** generates the potential crash rate reductions, shown in **Table 13**, at each intersection based on the installation of a traffic signal or a roundabout system of traffic control devices.

Table 14 – Updated Intersection Crash Rates

Factor	Crash Rate per Million (Traffic Signal w/Lefts)	Crash Rate per Million (Roundabout)
Francis Avenue & Nine Mile Road	0.110	0.096
Francis Avenue & N. Assembly Street	0.211	-
Assembly Street & Driscoll Boulevard	0.161	0.139

Based on the crash data provided, we can estimate the number of crashes each intersection will approximately decrease with the updated configuration based on Alternative D. These are summarized in **Table 14**.

Table 15 – Estimated Decrease in Crashes by System

Severity	Traffic Signal System	Roundabout System
K – Fatal Injury	0	0
A – Suspected Serious Injury	0.46	0.38
B – Suspected Minor Injury	3.67	3.02
C – Possible Injury	6.43	5.28
O – No Apparent Injury	7.34	6.03
Decrease in crashes Rounded to nearest whole #	17.9	14.7

The Study Area will experience a total decrease in crashes of approximately 17 crashes with the configuration signalized system of Alternative E and 14 crashes with the roundabout configuration.

Focusing only on the WSDOT system (Francis Avenue), the estimated decrease in crashes by system is summarized in **Table 15**.

Table 16 – Estimated Decrease in Crashes by System – WSDOT Only

Severity	Traffic Signal System	Roundabout System
K – Fatal Injury	0	0
A – Suspected Serious Injury	0.46	0.38
B – Suspected Minor Injury	3.67	3.02
C – Possible Injury	4.59	3.77
O – No Apparent Injury	7.34	6.03
Decrease in crashes Rounded to nearest whole #	16.1	13.2

The WSDOT system (Francis Avenue) will experience a total decrease in crashes of approximately 16 crashes with the configuration signalized system of Alternative E and 13 crashes with the roundabout configuration.

Benefit Cost Evaluation

Estimating the cost of crashes will be done to justify if the configuration will positively impact in an economic way. The Federal Highway Administration Safety Program: *Crash Costs for Highway Safety Analysis* (January 2018) document provides a national unit cost for each severity of crash, which is presented in **Table 16**.

Table 17 – Comprehensive Unit Cost (2016 dollars)

Severity	Crash Unit Cost
K – Fatal Injury	$11,295,400
A – Suspected Serious Injury	$655,000
B – Suspected Minor Injury	$198,500
C – Possible Injury	$125,600
O – No Apparent Injury	$11,900

Using the crash cost unit from the table above and the crash data from **Table 10**, the estimated cost that must be spent on intersection improvements can be calculated. Using the total estimated cost and our updated crash modification rates, the amount of money that will be saved from using the intersection configurations from Alternative D can be calculated. It should be noted that Alternative E will be very similar in cost. This information can be seen in **Table 17**.

Table 18 – Intersection Crash Cost per Severity & Cost Benefit

Severity	Traffic Signal System		Roundabout System	
	Crash Cost	Crash Benefit	Crash Cost	Crash Benefit
K – Fatal Injury	$0	$0	$0	$0
A – Suspected Serious Injury	$655,000	$300,645	$655,000	$245,935
B – Suspected Minor Injury	$1,588,000	$728,892	$1,588,000	$598,676
C – Possible Injury	$1,758,400	$807,106	$1,758,400	$662,917
O – No Apparent Injury	$190,400	$87,394	$190,400	$71,781
Totals	**$4,191,800**	**$1,924,036**	**$4,191,800**	**$1,580,309**

Alternative D (signalized system) will provide the study area with a benefit of reducing crashes equal to approximately $1,924,036, based on historic crash trends, exceeding the crash benefit of the roundabout system. Calculation Worksheets for the cost benefit analysis can be found in **Attachment D.**

Alternative D (roundabout system) will provide the study area with a benefit of reducing crashes equal to approximately $1,580,309, based on historic crash trends. Calculation Worksheets for the cost benefit analysis can be found in **Attachment D.** It should be noted that **Alternative E** will be similar costs to **Alternative D**.

Focusing on the WSDOT system (Francis Avenue only), the intersection crash costs and benefits are summarized in **Table 18**.

Table 19 – Intersection Crash Cost per Severity & Cost Benefit
WSDOT System Only

Severity	Traffic Signal System		Roundabout System	
	Crash Cost	Crash Benefit	Crash Cost	Crash Benefit
K – Fatal Injury	$0	$0	$0	$0
A – Suspected Serious Injury	$655,000	$300,645	$655,000	$245,935
B – Suspected Minor Injury	$1,588,000	$728,892	$1,588,000	$598,676
C – Possible Injury	$1,256,000	$576,504	$1,256,000	$473,512
O – No Apparent Injury	$190,400	$87,394	$190,400	$71,781
Totals	**$3,689,400**	**$1,693,435**	**$3,689,400**	**$1,390,904**

Alternative D (signalized system) just along Francis Avenue will provide the study area with a benefit of reducing crashes equal to approximately $1,693,435, based on historic crash trends, exceeding the crash benefit of the roundabout system. Calculation Worksheets for the cost benefit analysis can be found in **Attachment D.**

Alternative D (roundabout system) just along Francis Avenue will provide the study area with a benefit of reducing crashes equal to approximately $1,390,904, based on historic crash trends. Calculation Worksheets for the cost benefit analysis can be found in **Attachment D.** It should be noted that **Alternative E** will be similar costs to **Alternative D**.

The project benefit to cost can then be calculated for each system, using FHWA guidance. The Benefit to Cost Ratio (BCR) for the traffic signal system and the roundabout system are summarized in **Table 19**.

Table 20 – Project Benefit to Cost Ratio

Severity	Traffic Signal System	Roundabout System
System Costs (C)	$8,748,655	$8,978,173
System Crash Benefits	$1,924,036	$1,580,309
Worth of Benefits (WB)	$23,049,954	$18,932,097
Net Benefits (WB – C)	$14,301,298	$9,953,924
Benefit to Cost Ratio (NB/C)	2.63	2.11

Worth of Benefits calculated using FHWA criteria

As noted in **Table 19**, the traffic signal system BCR is 2.63 while the roundabout system BCR is 2.11. The traffic signal system has a higher BCR, meaning that there is more benefit from the traffic signal system when compared to the roundabout system.

Focusing on the WSDOT system (Francis Avenue only), the BCR for the traffic signal system and the roundabout system are summarized in **Table 20**.

Table 21 – Project Benefit to Cost Ratio – WSDOT System Only

Severity	Traffic Signal System	Roundabout System
System Costs (C)	$4,905,322	$5,921,856
System Crash Benefits	$1,693,435	$1,390,904
Worth of Benefits (WB)	$20,287,347	$16,663,028
Net Benefits (WB – C)	$15,382,025	$10,741,171
Benefit to Cost Ratio (NB/C)	4.14	2.81

Worth of Benefits calculated using FHWA criteria

As noted in **Table 20**, the traffic signal system along Francis Avenue only has a BCR of 4.14 while the roundabout system BCR is 2.81. The traffic signal system has a higher BCR, meaning that there is more benefit from the traffic signal system when compared to the roundabout system.

PUBLIC INVOLVEMENT

The City of Spokane, through coordination with WSDOT, held several public meetings and open houses to discuss and obtain public input on the alternatives presented. After receiving input from a large number of participants, the public opinion recommended roundabouts be implemented to enhance safety and mobility while providing for multimodal features desired by the community. Key concerns raised were driving, and rather stopping, at a traffic signal on a sloped intersection during winter operations as well as available sight-distance. People were also concerned with speeding.

ALTERNATIVES EVALUATION

The roundabout layout will require additional right-of-way along Assembly Street, specifically at the southernmost roundabout, to install the functional system when compared to the traffic signal system. In addition, the roundabout system will require impacts to the Avista property to the north to install the needed sidewalk, including the need for a wall to contain the steep property slope. Shifting Francis Avenue to the south is not possible without significant utility costs, therefore the layout as noted herein requires walls to be installed with the roundabout layout whereas the traffic signal layout does not require additional walls.

The roundabout option limits the availability to expand in the future. The current layout requires dual circulating lanes. There are currently no three-lane circulating laned roundabouts in Washington – therefore it can be assumed no additional circulating lanes will be added in the future. The only capacity increasing items that can be added to the roundabout intersection is to add a bypass lane, on the north leg, and an approach meter, in the southbound-to-eastbound direction. On the other hand, the traffic signal layout offers additional capacity by adding a separate northbound right-turn lane, and the traffic signal timing can be modified to allow overlap phasing on the northbound right-turn movement in the future.

The installation of a traffic signal on Francis Avenue will allow additional coordination of traffic volume on Francis Avenue, offering the ability to create gaps for side street and driveway access while keeping the Francis Avenue corridor in coordination – ensuring platoons of cars can traverse the corridor with limited stops. Similarly, the traffic signal system will allow for the same driveway and side street gaps on Assembly Street through implementation of a coordination traffic signal timing plan.

In general, the construction costs are lower for the traffic signal option as the construction phasing will be less intensive due to the existing configuration. The roundabout option does require additional right-of-way and will require walls on the north side to accommodate pedestrian facilities.

Roundabouts will offer traffic calming and will aid in reducing speeds within the area. Roundabouts will also reduce emissions and noise due to the reduced delay and improved operations over traffic signals. Roundabouts also require less maintenance overall that traffic signals as part of their lifespan costs.

Table 22 – Alternative E Feasibility Comparison

Factor	Pros	Cons
Roundabout	• Best multimodal accommodation – slower traffic through intersection and larger pathways provided • Best operational analysis • Lower overall maintenance costs • Public opinion preference • Provides traffic calming entering residential area • Less noise and reduced emissions due to reduced delays	• More right-of-way impacts • Construction phasing and implementation challenges • Expandability in the future is limited (dual lanes recommended) • More expensive to construct than traffic signals
Traffic Signal	• Least right-of-way impacts • Least design constraints • Better safety benefits than roundabout (due to dual lane roundabout comparison) • Easiest to implement and construct • Can be expanded to accommodate additional development traffic in the future • Less expensive to construct than roundabouts	• Higher maintenance and operations costs (with ITS advanced warning) • Pedestrians have more conflict points than with a roundabout • Least preferred by public opinion • More intersection delays than roundabouts

SELECTION

After carefully evaluating all available alternatives as well as considering input received by the public, CivTech recommends implementing **Alternative E** for this Study Area. This configuration minimizes delays during the AM and PM peak hours, will reduce delays during the off-peak hours in comparison to traffic signals, offers safe vehicle routes and is expected to reduce crash incidents in the area in comparison to existing conditions, and is in alignment with the general public expectations and can accommodate the planned and known development activities.

Attachments (4)

A. Synchro and Sidra Reports
B. 2028 & 2040 Expected Volumes
C. Alternative E design
D. Crash Data & Crash Rates Calculation Sheet
E. Cost Benefit Calculation Sheets.

Intersection	
Int Delay, s/veh	7.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	611	405	0	216	174	79
Future Vol, veh/h	611	405	0	216	174	79
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	-	0	-	-	0	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	-14	-	-	7	3	-
Peak Hour Factor	84	84	84	84	67	67
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	727	482	0	257	260	118

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	984	727
Stage 1	-	-	-	-	727	-
Stage 2	-	-	-	-	257	-
Critical Hdwy	-	-	-	-	7.01	6.51
Critical Hdwy Stg 1	-	-	-	-	6.01	-
Critical Hdwy Stg 2	-	-	-	-	6.01	-
Follow-up Hdwy	-	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	-	-	0	-	~ 235	401
Stage 1	-	-	0	-	425	-
Stage 2	-	-	0	-	755	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	~ 235	401
Mov Cap-2 Maneuver	-	-	-	-	342	-
Stage 1	-	-	-	-	425	-
Stage 2	-	-	-	-	755	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0	34.5
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBT
Capacity (veh/h)	342	401	-	-	-
HCM Lane V/C Ratio	0.759	0.294	-	-	-
HCM Ctrl Dly (s/v)	42.2	17.7	-	-	-
HCM Lane LOS	E	C	-	-	-
HCM 95th %tile Q (veh)	6	1.2	-	-	-

Notes
~: Volume exceeds capacity $: Delay exceeds 300s
+: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	81.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	482	242	0	448	544	138
Future Vol, veh/h	482	242	0	448	544	138
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	-	0	-	-	0	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	-14	-	-	7	3	-
Peak Hour Factor	95	95	93	93	97	97
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	507	255	0	482	561	142

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	989	507
Stage 1	-	-	-	-	507	-
Stage 2	-	-	-	-	482	-
Critical Hdwy	-	-	-	-	7	6.5
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	0	-	~ 234	546
Stage 1	-	-	0	-	~ 560	-
Stage 2	-	-	0	-	577	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	~ 234	546
Mov Cap-2 Maneuver	-	-	-	-	~ 366	-
Stage 1	-	-	-	-	~ 560	-
Stage 2	-	-	-	-	577	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0	226.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBT
Capacity (veh/h)	366	546	-	-	-
HCM Lane V/C Ratio	1.532	0.261	-	-	-
HCM Ctrl Dly (s/v)	280	13.9	-	-	-
HCM Lane LOS	F	B	-	-	-
HCM 95th %tile Q (veh)	31.1	1	-	-	-

Notes
~: Volume exceeds capacity $: Delay exceeds 300s
+: Computation Not Defined *: All major volume in platoon

Attachment A

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	56	461	109	238	237	8	0	3	63	1	16	25
Future Vol, veh/h	56	461	109	238	237	8	0	3	63	1	16	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	0	-	100	-	-	0	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	1	-	-	1	-
Grade, %	-	1	-	-	7	-	-	2	-	-	5	-
Peak Hour Factor	94	94	94	90	90	90	76	76	76	56	56	56
Heavy Vehicles, %	0	0	0	1	1	1	0	0	0	0	0	0
Mvmt Flow	60	490	116	264	263	9	0	4	83	2	29	45

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	272	0	0	606	0	0	-	1468	303	1158	1517	263
Stage 1	-	-	-	-	-	-	-	668	-	791	791	-
Stage 2	-	-	-	-	-	-	-	800	-	367	726	-
Critical Hdwy	4.1	-	-	4.115	-	-	-	6.9	7.1	8.3	7.5	6.7
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.9	-	7.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	5.9	-	7.5	6.5	-
Follow-up Hdwy	2.2	-	-	2.2095	-	-	-	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1303	-	-	976	-	-	0	109	687	119	79	753
Stage 1	-	-	-	-	-	-	0	427	-	310	324	-
Stage 2	-	-	-	-	-	-	0	366	-	569	354	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1303	-	-	976	-	-	-	76	687	79	55	753
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	155	-	146	66	-
Stage 1	-	-	-	-	-	-	-	407	-	296	237	-
Stage 2	-	-	-	-	-	-	-	267	-	473	338	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.7	5	11	51.4
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	687	1303	-	-	976	-	-	149
HCM Lane V/C Ratio	0.121	0.046	-	-	0.271	-	-	0.503
HCM Ctrl Dly (s/v)	11	7.9	-	-	10.1	-	-	51.4
HCM Lane LOS	B	A	-	-	B	-	-	F
HCM 95th %tile Q (veh)	0.4	0.1	-	-	1.1	-	-	2.4

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	497	76	246	428	13	4	4	140	2	10	15
Future Vol, veh/h	44	497	76	246	428	13	4	4	140	2	10	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	0	-	100	-	-	0	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	1	-	-	1	-
Grade, %	-	1	-	-	7	-	-	2	-	-	5	-
Peak Hour Factor	95	95	95	93	93	93	86	86	86	73	73	73
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	46	523	80	265	460	14	5	5	163	3	14	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	474	0	0	603	0	0	1670	1659	302	1346	1685	460
Stage 1	-	-	-	-	-	-	655	655	-	990	990	-
Stage 2	-	-	-	-	-	-	1015	1004	-	356	695	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.7	6.9	7.1	8.3	7.5	6.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.9	5.9	-	7.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.9	-	7.5	6.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1099	-	-	984	-	-	58	82	688	83	60	568
Stage 1	-	-	-	-	-	-	396	433	-	227	248	-
Stage 2	-	-	-	-	-	-	259	288	-	580	368	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1099	-	-	984	-	-	37	57	688	47	42	568
Mov Cap-2 Maneuver	-	-	-	-	-	-	96	128	-	103	70	-
Stage 1	-	-	-	-	-	-	379	415	-	217	181	-
Stage 2	-	-	-	-	-	-	169	211	-	419	353	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.6	3.6	11.8	38.7
HCM LOS			B	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	688	1099	-	-	984	-	-	143
HCM Lane V/C Ratio	0.237	0.042	-	-	0.269	-	-	0.259
HCM Ctrl Dly (s/v)	11.8	8.4	-	-	10	-	-	38.7
HCM Lane LOS	B	A	-	-	A	-	-	E
HCM 95th %tile Q (veh)	0.9	0.1	-	-	1.1	-	-	1

Attachment A

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	73	161	0	0	423
Future Vol, veh/h	0	73	161	0	0	423
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	2	-	-	1
Peak Hour Factor	72	72	65	65	85	85
Heavy Vehicles, %	0	0	2	2	0	0
Mvmt Flow	0	101	248	0	0	498

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	248	0	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	796	-	0	0	-
Stage 1	0	-	-	0	0	-
Stage 2	0	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	-	796	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	10.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	796	-
HCM Lane V/C Ratio	-	0.127	-
HCM Ctrl Dly (s/v)	-	10.2	-
HCM Lane LOS	-	B	-
HCM 95th %tile Q (veh)	-	0.4	-

Intersection	
Int Delay, s/veh	2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	166	524	0	0	242
Future Vol, veh/h	0	166	524	0	0	242
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	2	-	-	1
Peak Hour Factor	90	90	93	93	81	81
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	184	563	0	0	299

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	563	0	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	530	-	0	0	-
Stage 1	0	-	-	0	0	-
Stage 2	0	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	-	530	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	15.4	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	530	-
HCM Lane V/C Ratio	-	0.348	-
HCM Ctrl Dly (s/v)	-	15.4	-
HCM Lane LOS	-	C	-
HCM 95th %tile Q (veh)	-	1.5	-

Attachment A

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	1	84	65	0	0	0	231	163	2
Future Vol, veh/h	0	0	0	1	84	65	0	0	0	231	163	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	1	-	-	1	-	-	4	-
Peak Hour Factor	92	92	92	77	77	77	25	25	25	80	80	80
Heavy Vehicles, %	0	0	2	0	0	0	2	2	2	0	0	0
Mvmt Flow	0	0	0	1	109	84	0	0	0	289	204	3

Major/Minor	Minor1			Major2						Major1		
Conflicting Flow All	937	-	-	207	0	0				193	0	0
Stage 1	784	-	-	-	-	-				-	-	-
Stage 2	153	-	-	-	-	-				-	-	-
Critical Hdwy	6.4	-	-	4.1	-	-				4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-				-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-				-	-	-
Follow-up Hdwy	3.5	-	-	2.2	-	-				2.2	-	-
Pot Cap-1 Maneuver	296	0	0	1376	-	-				1392	-	-
Stage 1	453	0	0	-	-	-				-	-	-
Stage 2	880	0	0	-	-	-				-	-	-
Platoon blocked, %					-	-					-	-
Mov Cap-1 Maneuver	226	0	-	1376	-	-				1392	-	-
Mov Cap-2 Maneuver	289	0	-	-	-	-				-	-	-
Stage 1	347	0	-	-	-	-				-	-	-
Stage 2	879	0	-	-	-	-				-	-	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	0	0.1	4.8
HCM LOS	A		

Minor Lane/Major Mvmt	EBLn1	WBL	WBT	WBR	SBL	SBT	SBR
Capacity (veh/h)	-	1376	-	-	1392	-	-
HCM Lane V/C Ratio	-	0.001	-	-	0.207	-	-
HCM Ctrl Dly (s/v)	0	7.6	-	-	8.3	0	-
HCM Lane LOS	A	A	-	-	A	A	-
HCM 95th %tile Q (veh)	-	0	-	-	0.8	-	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	165	145	0	0	0	145	182	1
Future Vol, veh/h	0	0	0	0	165	145	0	0	0	145	182	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	1	-	-	1	-	-	4	-
Peak Hour Factor	92	92	92	91	91	91	92	92	92	86	86	86
Heavy Vehicles, %	2	2	2	0	0	0	2	2	2	0	0	0
Mvmt Flow	0	0	0	0	181	159	0	0	0	169	212	1

Major/Minor	Minor1			Major2						Major1		
Conflicting Flow All	812	-	-	-	-	0				340	0	0
Stage 1	551	-	-	-	-	-				-	-	-
Stage 2	261	-	-	-	-	-				-	-	-
Critical Hdwy	6.42	-	-	-	-	-				4.1	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-				-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-				-	-	-
Follow-up Hdwy	3.518	-	-	-	-	-				2.2	-	-
Pot Cap-1 Maneuver	348	0	0	0	-	-				1230	-	-
Stage 1	577	0	0	0	-	-				-	-	-
Stage 2	783	0	0	0	-	-				-	-	-
Platoon blocked, %					-	-					-	-
Mov Cap-1 Maneuver	294	0	-	-	-	-				1230	-	-
Mov Cap-2 Maneuver	378	0	-	-	-	-				-	-	-
Stage 1	487	0	-	-	-	-				-	-	-
Stage 2	783	0	-	-	-	-				-	-	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	0	0	3.7
HCM LOS	A		

Minor Lane/Major Mvmt	EBLn1	WBT	WBR	SBL	SBT	SBR
Capacity (veh/h)	-	-	-	1230	-	-
HCM Lane V/C Ratio	-	-	-	0.137	-	-
HCM Ctrl Dly (s/v)	0	-	-	8.4	0	-
HCM Lane LOS	A	-	-	A	A	-
HCM 95th %tile Q (veh)	-	-	-	0.5	-	-

Intersection	
Int Delay, s/veh	5.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	166	0	160	0	0	424
Future Vol, veh/h	166	0	160	0	0	424
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	4	-	1	-	-	3
Peak Hour Factor	81	81	92	92	92	92
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	205	0	174	0	0	461

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	635	-	0	-	-	-
Stage 1	174	-	-	-	-	-
Stage 2	461	-	-	-	-	-
Critical Hdwy	7.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	-	-	-	-	-
Critical Hdwy Stg 2	6.2	-	-	-	-	-
Follow-up Hdwy	3.5	-	-	-	-	-
Pot Cap-1 Maneuver	387	0	-	0	0	-
Stage 1	829	0	-	0	0	-
Stage 2	577	0	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	387	-	-	-	-	-
Mov Cap-2 Maneuver	387	-	-	-	-	-
Stage 1	829	-	-	-	-	-
Stage 2	577	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	24.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	387	-
HCM Lane V/C Ratio	-	0.53	-
HCM Ctrl Dly (s/v)	-	24.3	-
HCM Lane LOS	-	C	-
HCM 95th %tile Q (veh)	-	3	-

Intersection	
Int Delay, s/veh	10.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	181	0	523	0	0	242
Future Vol, veh/h	181	0	523	0	0	242
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	4	-	1	-	-	3
Peak Hour Factor	85	85	94	94	81	81
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	213	0	556	0	0	299

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	855	-	0	-	-	-
Stage 1	556	-	-	-	-	-
Stage 2	299	-	-	-	-	-
Critical Hdwy	7.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	-	-	-	-	-
Critical Hdwy Stg 2	6.2	-	-	-	-	-
Follow-up Hdwy	3.5	-	-	-	-	-
Pot Cap-1 Maneuver	274	0	-	0	0	-
Stage 1	511	0	-	0	0	-
Stage 2	708	0	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	274	-	-	-	-	-
Mov Cap-2 Maneuver	274	-	-	-	-	-
Stage 1	511	-	-	-	-	-
Stage 2	708	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	52.3	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	274	-
HCM Lane V/C Ratio	-	0.777	-
HCM Ctrl Dly (s/v)	-	52.3	-
HCM Lane LOS	-	F	-
HCM 95th %tile Q (veh)	-	5.9	-

Attachment A

Intersection	
Int Delay, s/veh	72

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	968	594	0	308	263	79
Future Vol, veh/h	968	594	0	308	263	79
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	-	0	-	-	0	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	-14	-	-	7	3	-
Peak Hour Factor	84	84	84	84	67	67
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	1152	707	0	367	393	118

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	1519	1152
Stage 1	-	-	-	-	1152	-
Stage 2	-	-	-	-	367	-
Critical Hdwy	-	-	-	-	7.01	6.51
Critical Hdwy Stg 1	-	-	-	-	6.01	-
Critical Hdwy Stg 2	-	-	-	-	6.01	-
Follow-up Hdwy	-	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	-	-	0	-	~ 102	220
Stage 1	-	-	0	-	~ 250	-
Stage 2	-	-	0	-	661	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	~ 102	220
Mov Cap-2 Maneuver	-	-	-	-	~ 200	-
Stage 1	-	-	-	-	~ 250	-
Stage 2	-	-	-	-	661	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0	$ 385.9
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBT
Capacity (veh/h)	200	220	-	-	-
HCM Lane V/C Ratio	1.963	0.536	-	-	-
HCM Ctrl Dly (s/v)	$ 490.2	38.8	-	-	-
HCM Lane LOS	F	E	-	-	-
HCM 95th %tile Q (veh)	29.1	2.8	-	-	-

Notes	
~: Volume exceeds capacity	$: Delay exceeds 300s
+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	206.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	482	242	0	488	544	138
Future Vol, veh/h	589	299	0	628	684	138
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	-	0	-	-	0	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	-14	-	-	7	3	-
Peak Hour Factor	95	95	93	93	97	97
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	620	315	0	675	705	142

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	1295	620
Stage 1	-	-	-	-	620	-
Stage 2	-	-	-	-	675	-
Critical Hdwy	-	-	-	-	7	6.5
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	0	-	~ 146	467
Stage 1	-	-	0	-	~ 487	-
Stage 2	-	-	0	-	~ 455	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	~ 146	467
Mov Cap-2 Maneuver	-	-	-	-	~ 281	-
Stage 1	-	-	-	-	~ 487	-
Stage 2	-	-	-	-	~ 455	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0	$ 599.9
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBT
Capacity (veh/h)	281	467	-	-	-
HCM Lane V/C Ratio	2.509	0.305	-	-	-
HCM Ctrl Dly (s/v)	$ 717.7	16.1	-	-	-
HCM Lane LOS	F	C	-	-	-
HCM 95th %tile Q (veh)	57.6	1.3	-	-	-

Notes	
~: Volume exceeds capacity	$: Delay exceeds 300s
+: Computation Not Defined	*: All major volume in platoon

Attachment A

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	56	735	192	238	329	8	0	3	63	1	16	25
Future Vol, veh/h	56	735	275	238	329	8	0	3	63	1	16	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	0	-	100	-	-	0	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	1	-	-	1	-
Grade, %	-	1	-	-	7	-	-	2	-	-	5	-
Peak Hour Factor	94	94	94	90	90	90	76	76	76	56	56	56
Heavy Vehicles, %	0	0	0	1	1	1	0	0	0	0	0	0
Mvmt Flow	60	782	293	264	366	9	0	4	83	2	29	45

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	375	0	0	1075	0	0	-	1952	538	1407	2089	366
Stage 1	-	-	-	-	-	-	-	1049	-	894	894	-
Stage 2	-	-	-	-	-	-	-	903	-	513	1195	-
Critical Hdwy	4.1	-	-	4.115	-	-	-	6.9	7.1	8.3	7.5	6.7
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.9	-	7.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	5.9	-	7.5	6.5	-
Follow-up Hdwy	2.2	-	-	2.2095	-	-	-	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1195	-	-	651	-	-	0	52	478	74	30	650
Stage 1	-	-	-	-	-	-	0	273	-	264	283	-
Stage 2	-	-	-	-	-	-	0	325	-	449	188	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1195	-	-	651	-	-	-	29	478	39	~ 17	650
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	92	-	69	-	-
Stage 1	-	-	-	-	-	-	-	259	-	251	168	-
Stage 2	-	-	-	-	-	-	-	193	-	347	179	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.4	5.9	14.1	13.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	478	1195	-	-	651	-	-	491
HCM Lane V/C Ratio	0.173	0.05	-	-	0.406	-	-	0.153
HCM Ctrl Dly (s/v)	14.1	8.2	-	-	14.3	-	-	13.6
HCM Lane LOS	B	A	-	-	B	-	-	B
HCM 95th %tile Q (veh)	0.6	0.2	-	-	2	-	-	0.5

Notes	
~: Volume exceeds capacity	$: Delay exceeds 300s
+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	497	76	246	428	13	4	4	140	2	10	15
Future Vol, veh/h	44	579	101	246	568	13	4	4	140	2	10	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	0	-	100	-	-	0	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	1	-	-	1	-
Grade, %	-	1	-	-	7	-	-	2	-	-	5	-
Peak Hour Factor	95	95	95	93	93	93	86	86	86	73	73	73
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	46	609	106	265	611	14	5	5	163	3	14	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	625	0	0	715	0	0	1920	1909	358	1540	1948	611
Stage 1	-	-	-	-	-	-	754	754	-	1141	1141	-
Stage 2	-	-	-	-	-	-	1166	1155	-	399	807	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.7	6.9	7.1	8.3	7.5	6.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.9	5.9	-	7.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.9	-	7.5	6.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	966	-	-	895	-	-	37	56	632	57	38	457
Stage 1	-	-	-	-	-	-	342	386	-	179	202	-
Stage 2	-	-	-	-	-	-	209	241	-	540	317	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	966	-	-	895	-	-	18	38	632	30	25	457
Mov Cap-2 Maneuver	-	-	-	-	-	-	64	97	-	75	33	-
Stage 1	-	-	-	-	-	-	326	367	-	170	142	-
Stage 2	-	-	-	-	-	-	127	170	-	377	302	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.5	3.2	12.7	94.8
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	632	966	-	-	895	-	-	74
HCM Lane V/C Ratio	0.258	0.048	-	-	0.296	-	-	0.5
HCM Ctrl Dly (s/v)	12.7	8.9	-	-	10.7	-	-	94.8
HCM Lane LOS	B	A	-	-	B	-	-	F
HCM 95th %tile Q (veh)	1	0.2	-	-	1.2	-	-	2.1

Attachment A

Intersection	
Int Delay, s/veh	1.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	88	250	0	0	601
Future Vol, veh/h	0	115	314	0	0	792
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	2	-	-	1
Peak Hour Factor	72	72	65	65	85	85
Heavy Vehicles, %	0	0	2	2	0	0
Mvmt Flow	0	160	483	0	0	932

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	483	0	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	588	-	0	0	-
Stage 1	0	-	-	0	0	-
Stage 2	0	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	-	588	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	13.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	588	-
HCM Lane V/C Ratio	-	0.272	-
HCM Ctrl Dly (s/v)	-	13.4	-
HCM Lane LOS	-	B	-
HCM 95th %tile Q (veh)	-	1.1	-

Intersection	
Int Delay, s/veh	3.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	166	524	0	0	242
Future Vol, veh/h	0	208	622	0	0	299
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	2	-	-	1
Peak Hour Factor	90	90	93	93	81	81
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	231	669	0	0	369

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	669	0	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	461	-	0	0	-
Stage 1	0	-	-	0	0	-
Stage 2	0	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	-	461	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	20.4	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	461	-
HCM Lane V/C Ratio	-	0.501	-
HCM Ctrl Dly (s/v)	-	20.4	-
HCM Lane LOS	-	C	-
HCM 95th %tile Q (veh)	-	2.8	-

Attachment A

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	99	65	0	0	0	314	255	2
Future Vol, veh/h	0	0	0	0	99	65	0	0	0	314	255	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	1	-	-	1	-	-	4	-
Peak Hour Factor	92	92	92	77	77	77	25	25	25	80	80	80
Heavy Vehicles, %	0	0	2	0	0	0	2	2	2	0	0	0
Mvmt Flow	0	0	0	0	129	84	0	0	0	393	319	3

Major/Minor	Minor1			Major2						Major1		
Conflicting Flow All	1278	-	-	-	-	0				213	0	0
Stage 1	1107	-	-	-	-	-				-	-	-
Stage 2	171	-	-	-	-	-				-	-	-
Critical Hdwy	6.4	-	-	-	-	-				4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-				-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-				-	-	-
Follow-up Hdwy	3.5	-	-	-	-	-				2.2	-	-
Pot Cap-1 Maneuver	185	0	0	0	-	-				1369	-	-
Stage 1	319	0	0	0	-	-				-	-	-
Stage 2	864	0	0	0	-	-				-	-	-
Platoon blocked, %					-	-					-	-
Mov Cap-1 Maneuver	120	0	-	-	-	-				1369	-	-
Mov Cap-2 Maneuver	173	0	-	-	-	-				-	-	-
Stage 1	207	0	-	-	-	-				-	-	-
Stage 2	864	0	-	-	-	-				-	-	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	0	0	4.8
HCM LOS	A		

Minor Lane/Major Mvmt	EBLn1	WBT	WBR	SBL	SBT	SBR
Capacity (veh/h)	-	-	-	1369	-	-
HCM Lane V/C Ratio	-	-	-	0.287	-	-
HCM Ctrl Dly (s/v)	0	-	-	8.7	0	-
HCM Lane LOS	A	-	-	A	A	-
HCM 95th %tile Q (veh)	-	-	-	1.2	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	165	145	0	0	0	145	182	1
Future Vol, veh/h	0	0	0	0	207	145	0	0	0	170	182	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	1	-	-	1	-	-	4	-
Peak Hour Factor	92	92	92	91	91	91	92	92	92	86	86	86
Heavy Vehicles, %	2	2	2	0	0	0	2	2	2	0	0	0
Mvmt Flow	0	0	0	0	227	159	0	0	0	198	212	1

Major/Minor	Minor1			Major2						Major1		
Conflicting Flow All	916	-	-	-	-	0				386	0	0
Stage 1	609	-	-	-	-	-				-	-	-
Stage 2	307	-	-	-	-	-				-	-	-
Critical Hdwy	6.42	-	-	-	-	-				4.1	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-				-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-				-	-	-
Follow-up Hdwy	3.518	-	-	-	-	-				2.2	-	-
Pot Cap-1 Maneuver	302	0	0	0	-	-				1184	-	-
Stage 1	543	0	0	0	-	-				-	-	-
Stage 2	746	0	0	0	-	-				-	-	-
Platoon blocked, %					-	-					-	-
Mov Cap-1 Maneuver	245	0	-	-	-	-				1184	-	-
Mov Cap-2 Maneuver	332	0	-	-	-	-				-	-	-
Stage 1	440	0	-	-	-	-				-	-	-
Stage 2	746	0	-	-	-	-				-	-	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	0	0	4.2
HCM LOS	A		

Minor Lane/Major Mvmt	EBLn1	WBT	WBR	SBL	SBT	SBR
Capacity (veh/h)	-	-	-	1184	-	-
HCM Lane V/C Ratio	-	-	-	0.167	-	-
HCM Ctrl Dly (s/v)	0	-	-	8.6	0	-
HCM Lane LOS	A	-	-	A	A	-
HCM 95th %tile Q (veh)	-	-	-	0.6	-	-

Attachment A

Intersection	
Int Delay, s/veh	8.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	166	0	236	0	0	516
Future Vol, veh/h	166	0	236	0	0	516
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	4	-	1	-	-	3
Peak Hour Factor	81	81	92	92	92	92
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	205	0	257	0	0	561

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	818	-	0	-	-	-
Stage 1	257	-	-	-	-	-
Stage 2	561	-	-	-	-	-
Critical Hdwy	7.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	-	-	-	-	-
Critical Hdwy Stg 2	6.2	-	-	-	-	-
Follow-up Hdwy	3.5	-	-	-	-	-
Pot Cap-1 Maneuver	290	0	-	0	0	-
Stage 1	747	0	-	0	0	-
Stage 2	508	0	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	290	-	-	-	-	-
Mov Cap-2 Maneuver	290	-	-	-	-	-
Stage 1	747	-	-	-	-	-
Stage 2	508	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	42.5	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	290	-
HCM Lane V/C Ratio	-	0.707	-
HCM Ctrl Dly (s/v)	-	42.5	-
HCM Lane LOS	-	E	-
HCM 95th %tile Q (veh)	-	4.9	-

Intersection	
Int Delay, s/veh	20.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	181	0	523	0	0	243
Future Vol, veh/h	181	0	621	0	0	300
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	4	-	1	-	-	3
Peak Hour Factor	85	85	94	94	81	81
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	213	0	661	0	0	370

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1031	-	0	-	-	-
Stage 1	661	-	-	-	-	-
Stage 2	370	-	-	-	-	-
Critical Hdwy	7.2	-	-	-	-	-
Critical Hdwy Stg 1	6.2	-	-	-	-	-
Critical Hdwy Stg 2	6.2	-	-	-	-	-
Follow-up Hdwy	3.5	-	-	-	-	-
Pot Cap-1 Maneuver	~ 207	0	-	0	0	-
Stage 1	447	0	-	0	0	-
Stage 2	648	0	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 207	-	-	-	-	-
Mov Cap-2 Maneuver	~ 207	-	-	-	-	-
Stage 1	447	-	-	-	-	-
Stage 2	648	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	118.8	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	207	-
HCM Lane V/C Ratio	-	1.029	-
HCM Ctrl Dly (s/v)	-	118.8	-
HCM Lane LOS	-	F	-
HCM 95th %tile Q (veh)	-	9.3	-

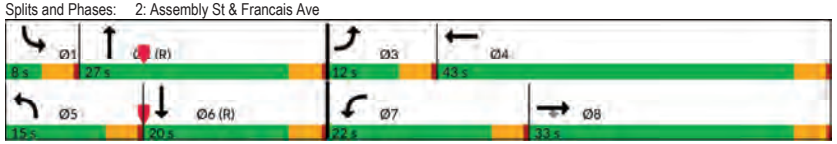
Notes	
~: Volume exceeds capacity	$: Delay exceeds 300s
+: Computation Not Defined	*: All major volume in platoon

Attachment A

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	56	384	530	238	237	174	3	1	16
Future Volume (vph)	56	384	768	238	237	234	3	1	16
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	3	8		7	4	5	2	1	6
Permitted Phases			8						
Detector Phase	3	8	8	7	4	5	2	1	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	12.0	33.0	33.0	22.0	43.0	15.0	27.0	8.0	20.0
Total Split (%)	13.3%	36.7%	36.7%	24.4%	47.8%	16.7%	30.0%	8.9%	22.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	7.3	24.1	24.1	17.1	35.8	11.1	35.2	4.6	21.7
Actuated g/C Ratio	0.08	0.27	0.27	0.19	0.40	0.12	0.39	0.05	0.24
v/c Ratio	0.43	0.45	0.91	0.85	0.21	0.76	0.25	0.02	0.18
Control Delay (s/veh)	49.1	28.1	22.3	60.8	17.4	60.9	16.6	42.0	17.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	49.1	28.1	22.3	60.8	17.4	60.9	16.6	42.0	17.0
LOS	D	C	C	E	B	E	B	D	B
Approach Delay (s/veh)		25.4			38.8		44.7		17.7
Approach LOS		C			D		D		B

Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 90		
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green		
Natural Cycle: 75		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.91		
Intersection Signal Delay (s/veh): 32.1	Intersection LOS: C	
Intersection Capacity Utilization 61.9%	ICU Level of Service B	
Analysis Period (min) 15		

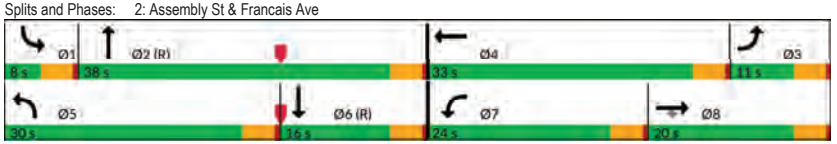
Splits and Phases: 2: Assembly St & Francais Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	44	363	317	246	428	555	4	2	10
Future Volume (vph)	56	486	427	246	615	763	4	2	10
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	3	8		7	4	5	2	1	6
Permitted Phases			8						
Detector Phase	3	8	8	7	4	5	2	1	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	11.0	20.0	20.0	24.0	33.0	30.0	38.0	8.0	16.0
Total Split (%)	12.2%	22.2%	22.2%	26.7%	36.7%	33.3%	42.2%	8.9%	17.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	7.8	16.5	16.5	18.0	30.7	25.8	41.9	4.3	13.8
Actuated g/C Ratio	0.09	0.18	0.18	0.20	0.34	0.29	0.47	0.05	0.15
v/c Ratio	0.40	0.82	0.70	0.81	0.60	0.94	0.37	0.04	0.23
Control Delay (s/veh)	47.1	48.0	9.9	53.3	27.9	60.1	14.5	42.5	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	10.1	0.4	0.0	0.0
Total Delay (s/veh)	47.1	48.0	9.9	53.3	27.9	70.2	14.9	42.5	16.6
LOS	D	D	A	D	C	E	B	D	B
Approach Delay (s/veh)		31.2			35.1		55.4		17.7
Approach LOS		C			D		E		B

Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 90		
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green		
Natural Cycle: 90		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.94		
Intersection Signal Delay (s/veh): 41.1	Intersection LOS: D	
Intersection Capacity Utilization 58.4%	ICU Level of Service B	
Analysis Period (min) 15		

Splits and Phases: 2: Assembly St & Francais Ave



Attachment A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	384	530	238	237	8	174	3	132	1	16	25
Future Volume (veh/h)	56	384	768	238	237	8	234	3	132	1	16	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1794	1794	1794	1513	1513	1513	1778	1778	1778	1661	1661	1661
Adj Flow Rate, veh/h	60	409	0	264	263	9	308	4	174	2	29	45
Peak Hour Factor	0.94	0.94	0.94	0.90	0.90	0.90	0.76	0.76	0.76	0.56	0.56	0.56
Percent Heavy Veh, %	0	0	0	1	1	1	0	0	0	0	0	0
Cap, veh/h	76	556		288	904	31	377	16	675	3	202	313
Arrive On Green	0.04	0.16	0.00	0.20	0.32	0.32	0.11	0.46	0.46	0.00	0.34	0.34
Sat Flow, veh/h	1709	3409	1521	1441	2835	97	3284	34	1478	1581	587	910
Grp Volume(v), veh/h	60	409	0	264	133	139	308	0	178	2	0	74
Grp Sat Flow(s),veh/h/ln	1709	1705	1521	1441	1437	1495	1642	0	1512	1581	0	1497
Q Serve(g_s), s	3.1	10.3	0.0	16.2	6.2	6.3	8.2	0.0	6.5	0.1	0.0	3.1
Cycle Q Clear(g_c), s	3.1	10.3	0.0	16.2	6.2	6.3	8.2	0.0	6.5	0.1	0.0	3.1
Prop In Lane	1.00		1.00	1.00		0.06	1.00		0.98	1.00		0.61
Lane Grp Cap(c), veh/h	76	556		288	458	477	377	0	691	3	0	515
V/C Ratio(X)	0.79	0.74		0.92	0.29	0.29	0.82	0.00	0.26	0.58	0.00	0.14
Avail Cap(c_a), veh/h	152	1099		288	623	648	401	0	691	70	0	515
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	0.62	0.00	0.62	1.00	0.00	1.00
Uniform Delay (d), s/veh	42.6	35.8	0.0	35.3	23.0	23.0	38.9	0.0	15.0	44.9	0.0	20.4
Incr Delay (d2), s/veh	16.4	1.9	0.0	32.1	0.3	0.3	7.7	0.0	0.6	102.7	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	4.3	0.0	8.1	2.1	2.2	3.7	0.0	2.3	0.1	0.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.9	37.7	0.0	67.4	23.4	23.4	46.6	0.0	15.6	147.5	0.0	20.9
LnGrp LOS	E	D		E	C	C	D		B	F		C
Approach Vol, veh/h		469			536			486			76	
Approach Delay, s/veh		40.4			45.0			35.2			24.3	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.2	45.1	8.0	32.7	14.3	35.0	22.0	18.7
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	4.0	23.0	8.0	39.0	11.0	16.0	18.0	29.0
Max Q Clear Time (g_c+I1), s	2.1	8.5	5.1	8.3	10.2	5.1	18.2	12.3
Green Ext Time (p_c), s	0.0	0.9	0.0	1.6	0.1	0.2	0.0	2.4

Intersection Summary	
HCM 7th Control Delay, s/veh	39.6
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	363	317	246	428	13	555	4	274	2	10	15
Future Volume (veh/h)	56	486	427	246	615	13	763	4	274	2	10	36
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1794	1794	1794	1527	1527	1527	1778	1778	1778	1661	1661	1661
Adj Flow Rate, veh/h	59	512	0	265	661	14	887	5	319	3	14	49
Peak Hour Factor	0.95	0.95	0.95	0.93	0.93	0.93	0.86	0.86	0.86	0.73	0.73	0.73
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	184	586		293	773	16	944	10	662	5	52	183
Arrive On Green	0.11	0.17	0.00	0.20	0.27	0.27	0.29	0.45	0.45	0.00	0.16	0.16
Sat Flow, veh/h	1709	3409	1521	1454	2904	61	3284	23	1487	1581	324	1133
Grp Volume(v), veh/h	59	512	0	265	330	345	887	0	324	3	0	63
Grp Sat Flow(s),veh/h/ln	1709	1705	1521	1454	1450	1516	1642	0	1510	1581	0	1457
Q Serve(g_s), s	2.9	13.2	0.0	16.0	19.5	19.5	23.7	0.0	13.6	0.2	0.0	3.4
Cycle Q Clear(g_c), s	2.9	13.2	0.0	16.0	19.5	19.5	23.7	0.0	13.6	0.2	0.0	3.4
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.98	1.00		0.78
Lane Grp Cap(c), veh/h	184	586		293	386	403	944	0	673	5	0	235
V/C Ratio(X)	0.32	0.87		0.90	0.86	0.86	0.94	0.00	0.48	0.59	0.00	0.27
Avail Cap(c_a), veh/h	184	606		323	467	488	949	0	673	70	0	235
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	0.66	0.00	0.66	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.1	36.3	0.0	35.1	31.4	31.4	31.3	0.0	17.6	44.8	0.0	33.1
Incr Delay (d2), s/veh	1.0	13.1	0.0	25.9	12.5	12.1	12.2	0.0	1.6	77.7	0.0	2.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	6.4	0.0	7.6	7.9	8.3	10.7	0.0	4.8	0.2	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	38.1	49.4	0.0	61.0	43.8	43.4	43.5	0.0	19.2	122.5	0.0	35.9
LnGrp LOS	D	D		E	D	D	D		B	F		D
Approach Vol, veh/h		571			940			1211			66	
Approach Delay, s/veh		48.2			48.5			37.0			39.8	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.3	44.1	13.7	27.9	29.9	18.5	22.2	19.5
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	4.0	34.0	7.0	29.0	26.0	12.0	20.0	16.0
Max Q Clear Time (g_c+I1), s	2.2	15.6	4.9	21.5	25.7	5.4	18.0	15.2
Green Ext Time (p_c), s	0.0	2.0	0.0	2.5	0.1	0.1	0.2	0.3

Intersection Summary	
HCM 7th Control Delay, s/veh	43.3
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Attachment A

Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	10	143	160	198	586
Future Volume (vph)	10	161	202	198	712
Turn Type	Prot	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0
Total Split (s)	35.0	35.0	35.0	20.0	55.0
Total Split (%)	38.9%	38.9%	38.9%	22.2%	61.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None	None	C-Max	Max	Max
Act Effct Green (s)	7.8	7.8	31.0	39.2	74.2
Actuated g/C Ratio	0.09	0.09	0.34	0.44	0.82
v/c Ratio	0.09	0.65	0.74	0.34	0.32
Control Delay (s/veh)	36.8	15.4	30.5	16.0	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.6
Total Delay (s/veh)	36.8	15.4	30.5	16.0	5.3
LOS	D	B	C	B	A
Approach Delay (s/veh)	16.7		30.5		7.7
Approach LOS	B		C		A

Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 90		
Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green		
Natural Cycle: 60		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.74		
Intersection Signal Delay (s/veh): 17.3	Intersection LOS: B	
Intersection Capacity Utilization 29.9%	ICU Level of Service A	
Analysis Period (min) 15		

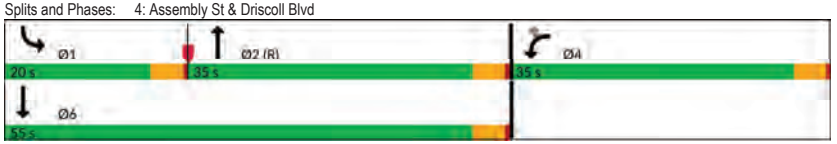
Splits and Phases: 4: Assembly St & Driscoll Blvd



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	10	310	523	145	428
Future Volume (vph)	10	372	669	173	510
Turn Type	Prot	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0
Total Split (s)	35.0	35.0	35.0	20.0	55.0
Total Split (%)	38.9%	38.9%	38.9%	22.2%	61.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None	None	C-Max	Max	Max
Act Effct Green (s)	9.3	9.3	31.0	37.7	72.7
Actuated g/C Ratio	0.10	0.10	0.34	0.42	0.81
v/c Ratio	0.06	0.78	0.64	0.29	0.22
Control Delay (s/veh)	33.2	14.9	27.9	20.7	5.3
Queue Delay	0.0	1.0	0.0	0.0	0.0
Total Delay (s/veh)	33.2	15.9	27.9	20.7	5.3
LOS	C	B	C	C	A
Approach Delay (s/veh)	16.3		27.9		9.2
Approach LOS	B		C		A

Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 90		
Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green		
Natural Cycle: 60		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.78		
Intersection Signal Delay (s/veh): 17.8	Intersection LOS: B	
Intersection Capacity Utilization 42.5%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 4: Assembly St & Driscoll Blvd



Attachment A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	143	160	10	198	586
Future Volume (veh/h)	10	161	202	10	198	712
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
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
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1794	1794	1766	1766	1711	1711
Adj Flow Rate, veh/h	13	209	808	40	248	890
Peak Hour Factor	0.77	0.77	0.25	0.25	0.80	0.80
Percent Heavy Veh, %	0	0	2	2	0	0
Cap, veh/h	277	247	1714	85	290	2434
Arrive On Green	0.16	0.16	0.53	0.53	0.36	1.00
Sat Flow, veh/h	1709	1521	3343	161	1629	3336
Grp Volume(v), veh/h	13	209	417	431	248	890
Grp Sat Flow(s),veh/h/ln	1709	1521	1678	1737	1629	1625
Q Serve(g_s), s	0.6	12.0	14.1	14.1	12.7	0.0
Cycle Q Clear(g_c), s	0.6	12.0	14.1	14.1	12.7	0.0
Prop In Lane	1.00	1.00		0.09	1.00	
Lane Grp Cap(c), veh/h	277	247	884	915	290	2434
V/C Ratio(X)	0.05	0.85	0.47	0.47	0.86	0.37
Avail Cap(c_a), veh/h	589	524	884	915	290	2434
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.41	0.41
Uniform Delay (d), s/veh	31.8	36.6	13.4	13.4	27.9	0.0
Incr Delay (d2), s/veh	0.1	7.9	1.8	1.7	12.7	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	4.9	5.4	5.6	4.9	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	31.9	44.5	15.2	15.2	40.6	0.2
LnGrp LOS	C	D	B	B	D	A
Approach Vol, veh/h	222		848			1138
Approach Delay, s/veh	43.7		15.2			9.0
Approach LOS	D		B			A
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	20.0	51.4		18.6		71.4
Change Period (Y+Rc), s	4.0	4.0		4.0		4.0
Max Green Setting (Gmax), s	16.0	31.0		31.0		51.0
Max Q Clear Time (g_c+I1), s	14.7	16.1		14.0		2.0
Green Ext Time (p_c), s	0.1	4.8		0.6		7.9
Intersection Summary						
HCM 7th Control Delay, s/veh			14.9			
HCM 7th LOS			B			

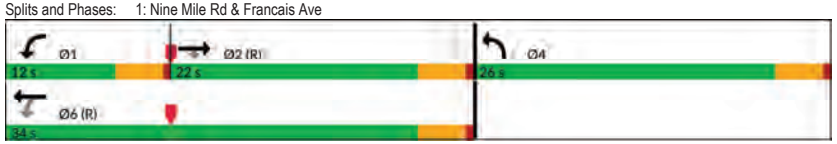
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	310	523	10	145	428
Future Volume (veh/h)	10	372	669	10	173	510
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1794	1794	1766	1766	1711	1711
Adj Flow Rate, veh/h	11	409	727	11	201	593
Peak Hour Factor	0.91	0.91	0.92	0.92	0.86	0.86
Percent Heavy Veh, %	0	0	2	2	0	0
Cap, veh/h	498	443	1344	20	290	2014
Arrive On Green	0.29	0.29	0.40	0.40	0.36	1.00
Sat Flow, veh/h	1709	1521	3472	51	1629	3336
Grp Volume(v), veh/h	11	409	360	378	201	593
Grp Sat Flow(s),veh/h/ln	1709	1521	1678	1757	1629	1625
Q Serve(g_s), s	0.4	23.5	14.8	14.8	9.5	0.0
Cycle Q Clear(g_c), s	0.4	23.5	14.8	14.8	9.5	0.0
Prop In Lane	1.00	1.00		0.03	1.00	
Lane Grp Cap(c), veh/h	498	443	667	698	290	2014
V/C Ratio(X)	0.02	0.92	0.54	0.54	0.69	0.29
Avail Cap(c_a), veh/h	589	524	667	698	290	2014
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.66	0.66
Uniform Delay (d), s/veh	22.7	30.9	20.8	20.8	26.9	0.0
Incr Delay (d2), s/veh	0.0	20.1	3.1	3.0	8.7	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	10.8	6.2	6.4	3.8	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	22.7	51.0	24.0	23.8	35.7	0.2
LnGrp LOS	C	D	C	C	D	A
Approach Vol, veh/h	420		738			794
Approach Delay, s/veh	50.2		23.9			9.2
Approach LOS	D		C			A
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	20.0	39.8		30.2		59.8
Change Period (Y+Rc), s	4.0	4.0		4.0		4.0
Max Green Setting (Gmax), s	16.0	31.0		31.0		51.0
Max Q Clear Time (g_c+I1), s	11.5	16.8		25.5		2.0
Green Ext Time (p_c), s	0.2	4.0		0.8		4.7
Intersection Summary						
HCM 7th Control Delay, s/veh			23.6			
HCM 7th LOS			C			

Attachment A

Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Configurations					
Traffic Volume (vph)	502	514	254	216	174
Future Volume (vph)	502	514	254	234	216
Turn Type	NA	Perm	pm+pt	NA	Prot
Protected Phases	2		1	6	4
Permitted Phases		2	6		
Detector Phase	2	2	1	6	4
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0
Total Split (s)	22.0	22.0	12.0	34.0	26.0
Total Split (%)	36.7%	36.7%	20.0%	56.7%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes		
Recall Mode	C-Max	C-Max	None	C-Max	Max
Act Effct Green (s)	18.0	18.0	30.0	30.0	22.0
Actuated g/C Ratio	0.30	0.30	0.50	0.50	0.37
v/c Ratio	0.55	0.67	0.80	0.17	0.42
Control Delay (s/veh)	19.9	6.0	28.9	8.6	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	19.9	6.0	28.9	8.6	9.4
LOS	B	A	C	A	A
Approach Delay (s/veh)	12.9			19.1	9.4
Approach LOS	B			B	A

Intersection Summary		
Cycle Length: 60		
Actuated Cycle Length: 60		
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green		
Natural Cycle: 60		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.80		
Intersection Signal Delay (s/veh): 13.6	Intersection LOS: B	
Intersection Capacity Utilization 55.1%	ICU Level of Service B	
Analysis Period (min) 15		

Splits and Phases: 1: Nine Mile Rd & Francais Ave



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Configurations					
Traffic Volume (vph)	406	318	256	441	544
Future Volume (vph)	565	403	256	711	690
Turn Type	NA	Perm	pm+pt	NA	Prot
Protected Phases	2		1	6	4
Permitted Phases		2	6		
Detector Phase	2	2	1	6	4
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0
Total Split (s)	22.0	22.0	12.0	34.0	26.0
Total Split (%)	36.7%	36.7%	20.0%	56.7%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes		
Recall Mode	C-Max	C-Max	None	C-Max	Max
Act Effct Green (s)	18.0	18.0	30.0	30.0	22.0
Actuated g/C Ratio	0.30	0.30	0.50	0.50	0.37
v/c Ratio	0.54	0.54	0.72	0.46	0.81
Control Delay (s/veh)	19.8	5.0	22.6	10.9	21.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	19.8	5.0	22.6	10.9	21.7
LOS	B	A	C	B	C
Approach Delay (s/veh)	13.6			14.0	21.7
Approach LOS	B			B	C

Intersection Summary		
Cycle Length: 60		
Actuated Cycle Length: 60		
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green		
Natural Cycle: 50		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.81		
Intersection Signal Delay (s/veh): 16.4	Intersection LOS: B	
Intersection Capacity Utilization 63.0%	ICU Level of Service B	
Analysis Period (min) 15		

Splits and Phases: 1: Nine Mile Rd & Francais Ave



Attachment A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	502	514	254	216	174	145
Future Volume (veh/h)	502	514	254	234	216	145
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
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
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	2307	2307	1513	1513	1736	1736
Adj Flow Rate, veh/h	598	0	302	279	269	273
Peak Hour Factor	0.84	0.84	0.84	0.84	0.67	0.67
Percent Heavy Veh, %	1	1	1	1	1	1
Cap, veh/h	1315		445	1437	606	539
Arrive On Green	0.30	0.00	0.13	0.50	0.37	0.37
Sat Flow, veh/h	4499	1955	1441	2949	1653	1471
Grp Volume(v), veh/h	598	0	302	279	269	273
Grp Sat Flow(s),veh/h/ln	2192	1955	1441	1437	1653	1471
Q Serve(g_s), s	6.6	0.0	8.0	3.2	7.4	8.7
Cycle Q Clear(g_c), s	6.6	0.0	8.0	3.2	7.4	8.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1315		445	1437	606	539
V/C Ratio(X)	0.45		0.68	0.19	0.44	0.51
Avail Cap(c_a), veh/h	1315		445	1437	606	539
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.90	0.90	1.00	1.00
Uniform Delay (d), s/veh	17.0	0.0	12.4	8.3	14.4	14.8
Incr Delay (d2), s/veh	1.1	0.0	3.7	0.3	2.3	3.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	2.7	0.9	2.9	3.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	18.2	0.0	16.1	8.6	16.7	18.1
LnGrp LOS	B		B	A	B	B
Approach Vol, veh/h	598			581	542	
Approach Delay, s/veh	18.2			12.5	17.4	
Approach LOS	B			B	B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	12.0	22.0		26.0		34.0
Change Period (Y+Rc), s	4.0	4.0		4.0		4.0
Max Green Setting (Gmax), s	8.0	18.0		22.0		30.0
Max Q Clear Time (g_c+I1), s	10.0	8.6		10.7		5.2
Green Ext Time (p_c), s	0.0	2.7		1.5		1.8

Intersection Summary			
HCM 7th Control Delay, s/veh		16.0	
HCM 7th LOS		B	

Notes

User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [EBR, WBT] is excluded from calculations of the approach delay and intersection delay.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	406	318	256	441	544	296
Future Volume (veh/h)	565	403	256	711	690	296
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
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
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	2322	2322	1527	1527	1750	1750
Adj Flow Rate, veh/h	595	0	275	765	508	523
Peak Hour Factor	0.95	0.95	0.93	0.93	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	1323		449	1450	611	544
Arrive On Green	0.30	0.00	0.13	0.50	0.37	0.37
Sat Flow, veh/h	4527	1967	1454	2977	1666	1483
Grp Volume(v), veh/h	595	0	275	765	508	523
Grp Sat Flow(s),veh/h/ln	2206	1967	1454	1450	1666	1483
Q Serve(g_s), s	6.5	0.0	7.5	10.7	16.7	20.7
Cycle Q Clear(g_c), s	6.5	0.0	7.5	10.7	16.7	20.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1323		449	1450	611	544
V/C Ratio(X)	0.45		0.61	0.53	0.83	0.96
Avail Cap(c_a), veh/h	1323		449	1450	611	544
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.50	0.50	1.00	1.00
Uniform Delay (d), s/veh	17.0	0.0	11.5	10.2	17.3	18.6
Incr Delay (d2), s/veh	1.1	0.0	1.2	0.7	12.5	30.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	2.2	3.0	7.7	10.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	18.1	0.0	12.8	10.9	29.8	48.8
LnGrp LOS	B		B	B	C	D
Approach Vol, veh/h	595			1040	1031	
Approach Delay, s/veh	18.1			11.4	39.4	
Approach LOS	B			B	D	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	12.0	22.0		26.0		34.0
Change Period (Y+Rc), s	4.0	4.0		4.0		4.0
Max Green Setting (Gmax), s	8.0	18.0		22.0		30.0
Max Q Clear Time (g_c+I1), s	9.5	8.5		22.7		12.7
Green Ext Time (p_c), s	0.0	2.7		0.0		5.0

Intersection Summary			
HCM 7th Control Delay, s/veh		23.7	
HCM 7th LOS		C	

Notes

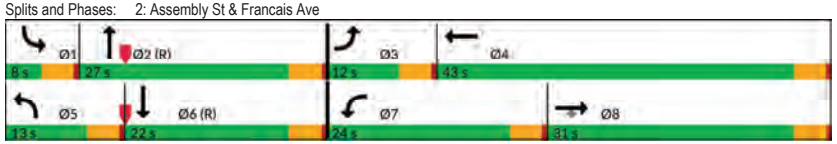
User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [EBR, WBT] is excluded from calculations of the approach delay and intersection delay.

Attachment A

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	56	384	530	238	237	174	3	1	16
Future Volume (vph)	56	384	642	238	237	192	3	1	16
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	3	8		7	4	5	2	1	6
Permitted Phases			8						
Detector Phase	3	8	8	7	4	5	2	1	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	12.0	31.0	31.0	24.0	43.0	13.0	27.0	8.0	22.0
Total Split (%)	13.3%	34.4%	34.4%	26.7%	47.8%	14.4%	30.0%	8.9%	24.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	7.3	20.9	20.9	18.0	33.5	10.6	37.5	5.3	24.5
Actuated g/C Ratio	0.08	0.23	0.23	0.20	0.37	0.12	0.42	0.06	0.27
v/c Ratio	0.43	0.52	0.80	0.81	0.22	0.65	0.24	0.02	0.16
Control Delay (s/veh)	49.1	31.8	11.0	53.6	18.8	47.3	5.3	41.0	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	49.1	31.8	11.0	53.6	18.8	47.3	5.3	41.0	15.8
LOS	D	C	B	D	B	D	A	D	B
Approach Delay (s/veh)		20.4			36.0		29.9		16.5
Approach LOS		C			D		C		B

Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 90		
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green		
Natural Cycle: 65		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.81		
Intersection Signal Delay (s/veh): 25.9	Intersection LOS: C	
Intersection Capacity Utilization 61.9%	ICU Level of Service B	
Analysis Period (min) 15		

Splits and Phases: 2: Assembly St & Francais Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	44	363	317	246	428	555	4	2	10
Future Volume (vph)	56	473	354	246	615	617	4	2	10
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	3	8		7	4	5	2	1	6
Permitted Phases			8						
Detector Phase	3	8	8	7	4	5	2	1	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	11.0	20.0	20.0	25.0	34.0	25.0	37.0	8.0	20.0
Total Split (%)	12.2%	22.2%	22.2%	27.8%	37.8%	27.8%	41.1%	8.9%	22.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	9.4	16.6	16.6	18.2	27.3	21.3	41.6	4.6	17.9
Actuated g/C Ratio	0.10	0.18	0.18	0.20	0.30	0.24	0.46	0.05	0.20
v/c Ratio	0.33	0.80	0.64	0.79	0.68	0.92	0.37	0.04	0.18
Control Delay (s/veh)	43.1	46.1	9.3	51.4	31.5	52.9	3.7	42.0	14.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	43.1	46.1	9.3	51.4	31.5	52.9	3.7	42.0	14.4
LOS	D	D	A	D	C	D	A	D	B
Approach Delay (s/veh)		31.2			37.1		37.6		15.6
Approach LOS		C			D		D		B

Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 90		
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green		
Natural Cycle: 80		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.92		
Intersection Signal Delay (s/veh): 34.9	Intersection LOS: C	
Intersection Capacity Utilization 58.4%	ICU Level of Service B	
Analysis Period (min) 15		

Splits and Phases: 2: Assembly St & Francais Ave



Attachment A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	384	530	238	237	8	174	3	132	1	16	25
Future Volume (veh/h)	56	384	642	238	237	8	192	3	132	1	16	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1794	1794	1794	1513	1513	1513	1778	1778	1778	1661	1661	1661
Adj Flow Rate, veh/h	60	409	0	264	263	9	253	4	174	2	29	45
Peak Hour Factor	0.94	0.94	0.94	0.90	0.90	0.90	0.76	0.76	0.76	0.56	0.56	0.56
Percent Heavy Veh, %	0	0	0	1	1	1	0	0	0	0	0	0
Cap, veh/h	76	552		292	907	31	321	15	673	3	211	328
Arrive On Green	0.04	0.16	0.00	0.20	0.32	0.32	0.10	0.46	0.46	0.00	0.36	0.36
Sat Flow, veh/h	1709	3409	1521	1441	2835	97	3284	34	1478	1581	587	910
Grp Volume(v), veh/h	60	409	0	264	133	139	253	0	178	2	0	74
Grp Sat Flow(s),veh/h/ln	1709	1705	1521	1441	1437	1495	1642	0	1512	1581	0	1497
Q Serve(g_s), s	3.1	10.3	0.0	16.1	6.2	6.3	6.8	0.0	6.5	0.1	0.0	3.0
Cycle Q Clear(g_c), s	3.1	10.3	0.0	16.1	6.2	6.3	6.8	0.0	6.5	0.1	0.0	3.0
Prop In Lane	1.00		1.00	1.00		0.06	1.00		0.98	1.00		0.61
Lane Grp Cap(c), veh/h	76	552		292	460	479	321	0	689	3	0	539
V/C Ratio(X)	0.79	0.74		0.90	0.29	0.29	0.79	0.00	0.26	0.58	0.00	0.14
Avail Cap(c_a), veh/h	152	1023		320	623	648	328	0	689	70	0	539
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.82	0.82	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	42.6	35.9	0.0	35.0	22.9	22.9	39.7	0.0	15.1	44.9	0.0	19.4
Incr Delay (d2), s/veh	13.7	1.6	0.0	26.3	0.3	0.3	12.0	0.0	0.9	102.7	0.0	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	4.3	0.0	7.6	2.1	2.2	3.2	0.0	2.3	0.1	0.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	56.3	37.5	0.0	61.3	23.3	23.3	51.7	0.0	16.0	147.5	0.0	19.9
LnGrp LOS	E	D		E	C	C	D		B	F		B
Approach Vol, veh/h		469			536			431			76	
Approach Delay, s/veh		39.9			42.0			36.9			23.3	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.2	45.0	8.0	32.8	12.8	36.4	22.2	18.6
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	4.0	23.0	8.0	39.0	9.0	18.0	20.0	27.0
Max Q Clear Time (g_c+I1), s	2.1	8.5	5.1	8.3	8.8	5.0	18.1	12.3
Green Ext Time (p_c), s	0.0	0.9	0.0	1.6	0.0	0.2	0.2	2.3

Intersection Summary	
HCM 7th Control Delay, s/veh	39.0
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	363	317	246	428	13	555	4	274	2	10	15
Future Volume (veh/h)	56	473	354	246	615	13	617	4	274	2	10	36
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1794	1794	1794	1527	1527	1527	1778	1778	1778	1661	1661	1661
Adj Flow Rate, veh/h	59	498	0	265	661	14	717	5	319	3	14	49
Peak Hour Factor	0.95	0.95	0.95	0.93	0.93	0.93	0.86	0.86	0.86	0.73	0.73	0.73
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	176	576		294	778	16	766	10	666	5	70	247
Arrive On Green	0.10	0.17	0.00	0.20	0.27	0.27	0.23	0.45	0.45	0.00	0.22	0.22
Sat Flow, veh/h	1709	3409	1521	1454	2904	61	3284	23	1487	1581	324	1133
Grp Volume(v), veh/h	59	498	0	265	330	345	717	0	324	3	0	63
Grp Sat Flow(s),veh/h/ln	1709	1705	1521	1454	1450	1516	1642	0	1510	1581	0	1457
Q Serve(g_s), s	2.9	12.8	0.0	16.0	19.4	19.4	19.3	0.0	13.6	0.2	0.0	3.2
Cycle Q Clear(g_c), s	2.9	12.8	0.0	16.0	19.4	19.4	19.3	0.0	13.6	0.2	0.0	3.2
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.98	1.00		0.78
Lane Grp Cap(c), veh/h	176	576		294	389	406	766	0	676	5	0	317
V/C Ratio(X)	0.33	0.86		0.90	0.85	0.85	0.94	0.00	0.48	0.59	0.00	0.20
Avail Cap(c_a), veh/h	176	606		339	483	505	766	0	676	70	0	317
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.82	0.82	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.5	36.4	0.0	35.0	31.2	31.2	33.8	0.0	17.5	44.8	0.0	28.8
Incr Delay (d2), s/veh	0.9	10.1	0.0	23.8	11.2	10.8	18.7	0.0	2.4	77.7	0.0	1.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	6.0	0.0	7.5	7.8	8.1	9.4	0.0	5.0	0.2	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	38.4	46.5	0.0	58.8	42.4	42.1	52.5	0.0	19.9	122.5	0.0	30.2
LnGrp LOS	D	D		E	D	D	D		B	F		C
Approach Vol, veh/h		557			940			1041			66	
Approach Delay, s/veh		45.7			46.9			42.3			34.4	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.3	44.3	13.3	28.1	25.0	23.6	22.2	19.2
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	4.0	33.0	7.0	30.0	21.0	16.0	21.0	16.0
Max Q Clear Time (g_c+I1), s	2.2	15.6	4.9	21.4	21.3	5.2	18.0	14.8
Green Ext Time (p_c), s	0.0	2.0	0.0	2.7	0.0	0.2	0.2	0.4

Intersection Summary	
HCM 7th Control Delay, s/veh	44.5
HCM 7th LOS	D

Notes

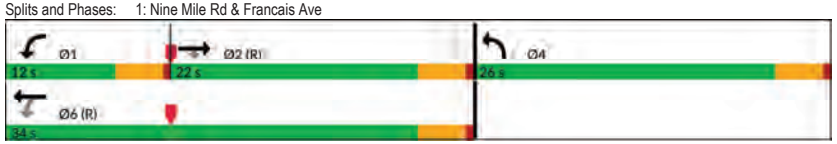
User approved pedestrian interval to be less than phase max green.
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Attachment A

Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Configurations					
Traffic Volume (vph)	502	514	254	216	174
Future Volume (vph)	502	514	254	234	216
Turn Type	NA	Perm	pm+pt	NA	Prot
Protected Phases	2		1	6	4
Permitted Phases		2	6		
Detector Phase	2	2	1	6	4
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0
Total Split (s)	22.0	22.0	12.0	34.0	26.0
Total Split (%)	36.7%	36.7%	20.0%	56.7%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes		
Recall Mode	C-Max	C-Max	None	C-Max	Max
Act Effct Green (s)	18.0	18.0	30.0	30.0	22.0
Actuated g/C Ratio	0.30	0.30	0.50	0.50	0.37
v/c Ratio	0.55	0.67	0.80	0.17	0.42
Control Delay (s/veh)	19.9	6.0	28.9	8.6	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	19.9	6.0	28.9	8.6	9.4
LOS	B	A	C	A	A
Approach Delay (s/veh)	12.9			19.1	9.4
Approach LOS	B			B	A

Intersection Summary		
Cycle Length: 60		
Actuated Cycle Length: 60		
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green		
Natural Cycle: 60		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.80		
Intersection Signal Delay (s/veh): 13.6	Intersection LOS: B	
Intersection Capacity Utilization 55.1%	ICU Level of Service B	
Analysis Period (min) 15		

Splits and Phases: 1: Nine Mile Rd & Francais Ave



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Configurations					
Traffic Volume (vph)	406	318	256	441	544
Future Volume (vph)	565	403	256	711	690
Turn Type	NA	Perm	pm+pt	NA	Prot
Protected Phases	2		1	6	4
Permitted Phases		2	6		
Detector Phase	2	2	1	6	4
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0
Total Split (s)	22.0	22.0	12.0	34.0	26.0
Total Split (%)	36.7%	36.7%	20.0%	56.7%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes		
Recall Mode	C-Max	C-Max	None	C-Max	Max
Act Effct Green (s)	18.0	18.0	30.0	30.0	22.0
Actuated g/C Ratio	0.30	0.30	0.50	0.50	0.37
v/c Ratio	0.54	0.54	0.72	0.46	0.81
Control Delay (s/veh)	19.8	5.0	22.6	10.9	21.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	19.8	5.0	22.6	10.9	21.7
LOS	B	A	C	B	C
Approach Delay (s/veh)	13.6			14.0	21.7
Approach LOS	B			B	C

Intersection Summary		
Cycle Length: 60		
Actuated Cycle Length: 60		
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green		
Natural Cycle: 50		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.81		
Intersection Signal Delay (s/veh): 16.4	Intersection LOS: B	
Intersection Capacity Utilization 63.0%	ICU Level of Service B	
Analysis Period (min) 15		

Splits and Phases: 1: Nine Mile Rd & Francais Ave



Attachment A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	502	514	254	216	174	145
Future Volume (veh/h)	502	514	254	234	216	145
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
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
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	2307	2307	1513	1513	1736	1736
Adj Flow Rate, veh/h	598	0	302	279	269	273
Peak Hour Factor	0.84	0.84	0.84	0.84	0.67	0.67
Percent Heavy Veh, %	1	1	1	1	1	1
Cap, veh/h	1315		445	1437	606	539
Arrive On Green	0.30	0.00	0.13	0.50	0.37	0.37
Sat Flow, veh/h	4499	1955	1441	2949	1653	1471
Grp Volume(v), veh/h	598	0	302	279	269	273
Grp Sat Flow(s),veh/h/ln	2192	1955	1441	1437	1653	1471
Q Serve(g_s), s	6.6	0.0	8.0	3.2	7.4	8.7
Cycle Q Clear(g_c), s	6.6	0.0	8.0	3.2	7.4	8.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1315		445	1437	606	539
V/C Ratio(X)	0.45		0.68	0.19	0.44	0.51
Avail Cap(c_a), veh/h	1315		445	1437	606	539
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.0	0.0	12.4	8.3	14.4	14.8
Incr Delay (d2), s/veh	1.1	0.0	4.1	0.3	2.3	3.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	2.8	0.9	2.9	3.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	18.2	0.0	16.5	8.6	16.7	18.1
LnGrp LOS	B		B	A	B	B
Approach Vol, veh/h	598			581	542	
Approach Delay, s/veh	18.2			12.7	17.4	
Approach LOS	B			B	B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	12.0	22.0		26.0		34.0
Change Period (Y+Rc), s	4.0	4.0		4.0		4.0
Max Green Setting (Gmax), s	8.0	18.0		22.0		30.0
Max Q Clear Time (g_c+I1), s	10.0	8.6		10.7		5.2
Green Ext Time (p_c), s	0.0	2.7		1.5		1.8

Intersection Summary			
HCM 7th Control Delay, s/veh		16.1	
HCM 7th LOS		B	

Notes

User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [EBR, WBT] is excluded from calculations of the approach delay and intersection delay.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	406	318	256	441	544	296
Future Volume (veh/h)	565	403	256	711	690	296
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
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
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	2322	2322	1527	1527	1750	1750
Adj Flow Rate, veh/h	595	0	275	765	508	523
Peak Hour Factor	0.95	0.95	0.93	0.93	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	1323		449	1450	611	544
Arrive On Green	0.30	0.00	0.13	0.50	0.37	0.37
Sat Flow, veh/h	4527	1967	1454	2977	1666	1483
Grp Volume(v), veh/h	595	0	275	765	508	523
Grp Sat Flow(s),veh/h/ln	2206	1967	1454	1450	1666	1483
Q Serve(g_s), s	6.5	0.0	7.5	10.7	16.7	20.7
Cycle Q Clear(g_c), s	6.5	0.0	7.5	10.7	16.7	20.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1323		449	1450	611	544
V/C Ratio(X)	0.45		0.61	0.53	0.83	0.96
Avail Cap(c_a), veh/h	1323		449	1450	611	544
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.0	0.0	11.5	10.2	17.3	18.6
Incr Delay (d2), s/veh	1.1	0.0	2.4	1.4	12.5	30.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	2.3	3.1	7.7	10.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	18.1	0.0	14.0	11.6	29.8	48.8
LnGrp LOS	B		B	B	C	D
Approach Vol, veh/h	595			1040	1031	
Approach Delay, s/veh	18.1			12.2	39.4	
Approach LOS	B			B	D	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	12.0	22.0		26.0		34.0
Change Period (Y+Rc), s	4.0	4.0		4.0		4.0
Max Green Setting (Gmax), s	8.0	18.0		22.0		30.0
Max Q Clear Time (g_c+I1), s	9.5	8.5		22.7		12.7
Green Ext Time (p_c), s	0.0	2.7		0.0		5.0

Intersection Summary			
HCM 7th Control Delay, s/veh		24.1	
HCM 7th LOS		C	

Notes

User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [EBR, WBT] is excluded from calculations of the approach delay and intersection delay.

Attachment A

Intersection	
Int Delay, s/veh	44.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	56	384	530	238	237	8	174	0	135	0	0	41
Future Vol, veh/h	56	384	642	238	237	8	192	0	135	0	0	41
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	100	-	150	0	-	-	150	-	0	-	-	0
Veh in Median Storage, #	-	1	-	-	1	-	-	1	-	-	1	-
Grade, %	-	1	-	-	7	-	-	2	-	-	5	-
Peak Hour Factor	94	94	94	90	90	90	76	76	76	56	56	56
Heavy Vehicles, %	0	0	0	1	1	1	0	0	0	0	0	0
Mvmt Flow	60	409	683	264	263	9	253	0	178	0	0	73

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	272	0	-	409	0	0	1188	-	204	-	-	136
Stage 1	-	-	-	-	-	-	528	-	-	-	-	-
Stage 2	-	-	-	-	-	-	661	-	-	-	-	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.9	-	7.1	-	-	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	6.9	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.9	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.21	-	-	3.5	-	3.3	-	-	3.3
Pot Cap-1 Maneuver	1303	-	0	1275	-	-	~ 154	0	*1009	0	0	877
Stage 1	-	-	0	-	-	-	593	0	-	0	0	-
Stage 2	-	-	0	-	-	-	393	0	-	0	0	-
Platoon blocked, %		-		0	-	-	0		0			
Mov Cap-1 Maneuver	1303	-	-	1275	-	-	~ 107	-	*1009	-	-	877
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 184	-	-	-	-	-
Stage 1	-	-	-	-	-	-	566	-	-	-	-	-
Stage 2	-	-	-	-	-	-	286	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	1	4.22	149.07	9.48
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	184	1009	1303	-	1275	-	-	877
HCM Lane V/C Ratio	1.374	0.176	0.046	-	0.207	-	-	0.083
HCM Ctrl Dly (s/v)	247.3	9.3	7.9	-	8.6	-	-	9.5
HCM Lane LOS	F	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	14.9	0.6	0.1	-	0.8	-	-	0.3

Notes

~: Volume exceeds capacity $: Delay exceeds 300s
+: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	650.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	363	317	246	428	13	555	0	278	0	0	27
Future Vol, veh/h	56	473	354	246	615	13	617	0	278	0	0	48
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	100	-	150	0	-	-	150	-	0	-	-	0
Veh in Median Storage, #	-	1	-	-	1	-	-	1	-	-	1	-
Grade, %	-	1	-	-	7	-	-	2	-	-	5	-
Peak Hour Factor	95	95	95	93	93	93	86	86	86	73	73	73
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	59	498	373	265	661	14	717	0	323	0	0	66

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	675	0	-	498	0	0	1475	-	249	-	-	338
Stage 1	-	-	-	-	-	-	616	-	-	-	-	-
Stage 2	-	-	-	-	-	-	860	-	-	-	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.9	-	7.1	-	-	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	6.9	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.9	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	-	3.3	-	-	3.3
Pot Cap-1 Maneuver	926	-	0	1182	-	-	~ 88	0	971	0	0	634
Stage 1	-	-	0	-	-	-	~ 516	0	-	0	0	-
Stage 2	-	-	0	-	-	-	~ 292	0	-	0	0	-
Platoon blocked, %		-		0	-	-	0		0			
Mov Cap-1 Maneuver	926	-	-	1182	-	-	~ 57	-	971	-	-	634
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 118	-	-	-	-	-
Stage 1	-	-	-	-	-	-	~ 483	-	-	-	-	-
Stage 2	-	-	-	-	-	-	~ 203	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.97	2.51	$ 1624.33	11.34
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	118	971	926	-	1182	-	-	634
HCM Lane V/C Ratio	6.067	0.333	0.064	-	0.224	-	-	0.104
HCM Ctrl Dly (s/v)	$ 2351.5	10.6	9.2	-	8.9	-	-	11.3
HCM Lane LOS	F	B	A	-	A	-	-	B
HCM 95th %tile Q(veh)	78.3	1.5	0.2	-	0.9	-	-	0.3

Notes

~: Volume exceeds capacity $: Delay exceeds 300s
+: Computation Not Defined *: All major volume in platoon

Attachment A

Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Configurations					
Traffic Volume (vph)	502	514	254	216	174
Future Volume (vph)	833	845	254	327	285
Turn Type	NA	Perm	pm+pt	NA	Prot
Protected Phases	2		1	6	4
Permitted Phases		2	6		
Detector Phase	2	2	1	6	4
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0
Total Split (s)	22.0	22.0	12.0	34.0	26.0
Total Split (%)	36.7%	36.7%	20.0%	56.7%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes		
Recall Mode	Max	Max	None	Max	C-Max
Act Effct Green (s)	18.0	18.0	30.0	30.0	22.0
Actuated g/C Ratio	0.30	0.30	0.50	0.50	0.37
v/c Ratio	0.91	0.95	0.91	0.24	0.50
Control Delay (s/veh)	35.2	24.0	46.7	9.0	11.3
Queue Delay	0.0	2.4	1.3	0.0	0.0
Total Delay (s/veh)	35.2	26.3	48.0	9.0	11.3
LOS	D	C	D	A	B
Approach Delay (s/veh)	30.7			26.1	11.3
Approach LOS	C			C	B

Intersection Summary		
Cycle Length: 60		
Actuated Cycle Length: 60		
Offset: 28 (47%), Referenced to phase 4:NBL, Start of Green		
Natural Cycle: 70		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.95		
Intersection Signal Delay (s/veh): 26.1	Intersection LOS: C	
Intersection Capacity Utilization 55.1%	ICU Level of Service B	
Analysis Period (min) 15		

Splits and Phases: 1: Assembly St & Nine Mile Rd/Francis Ave



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Configurations					
Traffic Volume (vph)	406	318	256	441	544
Future Volume (vph)	630	543	256	822	924
Turn Type	NA	Perm	pm+pt	NA	Prot
Protected Phases	2		1	6	4
Permitted Phases		2	6		
Detector Phase	2	2	1	6	4
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0
Total Split (s)	20.0	20.0	9.0	29.0	31.0
Total Split (%)	33.3%	33.3%	15.0%	48.3%	51.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes		
Recall Mode	C-Max	C-Max	None	C-Max	Max
Act Effct Green (s)	16.0	16.0	25.0	25.0	27.0
Actuated g/C Ratio	0.27	0.27	0.42	0.42	0.45
v/c Ratio	0.68	0.67	1.09	0.64	0.84
Control Delay (s/veh)	23.9	6.4	102.8	16.6	18.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	23.9	6.4	102.8	16.6	18.9
LOS	C	A	F	B	B
Approach Delay (s/veh)	15.8			37.1	18.9
Approach LOS	B			D	B

Intersection Summary		
Cycle Length: 60		
Actuated Cycle Length: 60		
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green		
Natural Cycle: 60		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 1.09		
Intersection Signal Delay (s/veh): 23.6	Intersection LOS: C	
Intersection Capacity Utilization 62.7%	ICU Level of Service B	
Analysis Period (min) 15		

Splits and Phases: 1: Assembly St & Nine Mile Rd/Francis Ave



Attachment A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	502	514	254	216	174	135
Future Volume (veh/h)	833	845	254	327	285	135
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
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
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	2307	2307	1513	1513	1736	1736
Adj Flow Rate, veh/h	992	0	302	389	313	321
Peak Hour Factor	0.84	0.84	0.84	0.84	0.67	0.67
Percent Heavy Veh, %	1	1	1	1	1	1
Cap, veh/h	1315		358	1437	606	539
Arrive On Green	0.30	0.00	0.13	0.50	0.37	0.37
Sat Flow, veh/h	4499	1955	1441	2949	1653	1471
Grp Volume(v), veh/h	992	0	302	389	313	321
Grp Sat Flow(s),veh/h/ln	2192	1955	1441	1437	1653	1471
Q Serve(g_s), s	12.3	0.0	8.0	4.7	8.9	10.6
Cycle Q Clear(g_c), s	12.3	0.0	8.0	4.7	8.9	10.6
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1315		358	1437	606	539
V/C Ratio(X)	0.75		0.84	0.27	0.52	0.60
Avail Cap(c_a), veh/h	1315		358	1437	606	539
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.0	0.0	14.3	8.7	14.8	15.4
Incr Delay (d2), s/veh	4.1	0.0	16.5	0.5	3.1	4.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	10.5	0.0	7.1	2.4	6.3	7.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	23.1	0.0	30.8	9.1	18.0	20.2
LnGrp LOS	C		C	A	B	C
Approach Vol, veh/h	992			691	634	
Approach Delay, s/veh	23.1			18.6	19.1	
Approach LOS	C			B	B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	12.0	22.0		26.0		34.0
Change Period (Y+Rc), s	4.0	4.0		4.0		4.0
Max Green Setting (Gmax), s	8.0	18.0		22.0		30.0
Max Q Clear Time (g_c+I1), s	10.0	0.0		12.6		6.7
Green Ext Time (p_c), s	0.0	0.0		1.6		2.6

Intersection Summary			
HCM 7th Control Delay, s/veh		20.6	
HCM 7th LOS		C	

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	406	318	256	441	544	286
Future Volume (veh/h)	630	543	256	822	924	286
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
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
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	2322	2322	1527	1527	1750	1750
Adj Flow Rate, veh/h	663	0	275	884	624	648
Peak Hour Factor	0.95	0.95	0.93	0.93	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	1176		332	1209	750	667
Arrive On Green	0.27	0.00	0.08	0.42	0.45	0.45
Sat Flow, veh/h	4527	1967	1454	2977	1666	1483
Grp Volume(v), veh/h	663	0	275	884	624	648
Grp Sat Flow(s),veh/h/ln	2206	1967	1454	1450	1666	1483
Q Serve(g_s), s	7.8	0.0	5.0	15.3	19.8	25.6
Cycle Q Clear(g_c), s	7.8	0.0	5.0	15.3	19.8	25.6
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1176		332	1209	750	667
V/C Ratio(X)	0.56		0.83	0.73	0.83	0.97
Avail Cap(c_a), veh/h	1176		332	1209	750	667
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.0	0.0	19.6	14.7	14.5	16.1
Incr Delay (d2), s/veh	2.0	0.0	15.8	3.9	10.5	28.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.0	3.2	5.0	8.4	12.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	20.9	0.0	35.4	18.6	25.0	44.6
LnGrp LOS	C		D	B	C	D
Approach Vol, veh/h	663			1159	1272	
Approach Delay, s/veh	20.9			22.6	34.9	
Approach LOS	C			C	C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	9.0	20.0		31.0		29.0
Change Period (Y+Rc), s	4.0	4.0		4.0		4.0
Max Green Setting (Gmax), s	5.0	16.0		27.0		25.0
Max Q Clear Time (g_c+I1), s	7.0	0.0		27.6		17.3
Green Ext Time (p_c), s	0.0	0.0		0.0		3.6

Intersection Summary			
HCM 7th Control Delay, s/veh		27.3	
HCM 7th LOS		C	

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

Attachment A

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	583	10	10	475	8	0	0	10	0	0	61
Future Vol, veh/h	0	914	10	10	586	8	0	0	10	0	0	61
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	100	-	-	0	-	-	0
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	1	-	-	7	-	-	2	-	-	5	-
Peak Hour Factor	94	94	94	90	90	90	76	76	76	56	56	56
Heavy Vehicles, %	0	0	0	1	1	1	0	0	0	0	0	0
Mvmt Flow	0	972	11	11	651	9	0	0	13	0	0	109

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	983	0	0	-	-	491	-	-	651
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	4.115	-	-	-	-	7.1	-	-	6.7
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	2.2095	-	-	-	-	3.3	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	705	-	-	0	0	514	0	0	431
Stage 1	0	-	-	-	-	-	0	0	-	0	0	-
Stage 2	0	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	705	-	-	-	-	514	-	-	431
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0	0.17	12.19	16.15
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	514	-	-	705	-	-	431
HCM Lane V/C Ratio	0.026	-	-	0.016	-	-	0.253
HCM Ctrl Dly (s/v)	12.2	-	-	10.2	-	-	16.1
HCM Lane LOS	B	-	-	B	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	0	-	-	1

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	694	10	10	674	13	0	0	10	0	0	45
Future Vol, veh/h	0	918	10	10	1055	13	0	0	10	0	0	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	100	-	-	0	-	-	0
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	1	-	-	7	-	-	2	-	-	5	-
Peak Hour Factor	95	95	95	93	93	93	86	86	86	73	73	73
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	966	11	11	1134	14	0	0	12	0	0	62

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	977	0	0	-	-	488	-	-	1134
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	4.1	-	-	-	-	7.1	-	-	6.7
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	2.2	-	-	-	-	3.3	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	714	-	-	0	0	516	0	0	212
Stage 1	0	-	-	-	-	-	0	0	-	0	0	-
Stage 2	0	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	714	-	-	-	-	516	-	-	212
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0	0.09	12.13	28.73
HCM LOS			B	D

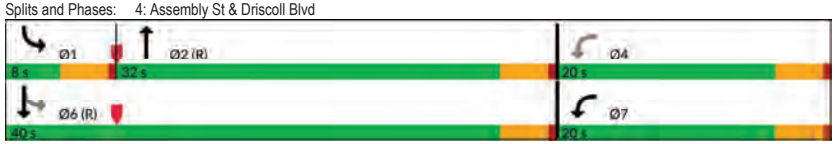
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	516	-	-	714	-	-	212
HCM Lane V/C Ratio	0.023	-	-	0.015	-	-	0.29
HCM Ctrl Dly (s/v)	12.1	-	-	10.1	-	-	28.7
HCM Lane LOS	B	-	-	B	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	0	-	-	1.2

Attachment A

Lane Group	WBL	NBT	SBL	SBT	Ø4
Lane Configurations					
Traffic Volume (vph)	10	160	198	586	
Future Volume (vph)	10	238	298	817	
Turn Type	pm+pt	NA	pm+pt	NA	
Protected Phases	7	2	1	6	4
Permitted Phases	4		6		
Detector Phase	7	2	1	6	
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0
Total Split (s)	20.0	32.0	8.0	40.0	20.0
Total Split (%)	33.3%	53.3%	13.3%	66.7%	33%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	
Lead/Lag		Lag	Lead		
Lead-Lag Optimize?		Yes	Yes		
Recall Mode	None	C-Max	None	C-Max	None
Act Effct Green (s)	8.6	28.0	43.4	43.4	
Actuated g/C Ratio	0.14	0.47	0.72	0.72	
v/c Ratio	0.63	1.21	0.75	0.71	
Control Delay (s/veh)	13.9	127.8	27.5	10.1	
Queue Delay	0.0	0.0	0.0	0.4	
Total Delay (s/veh)	13.9	127.8	27.5	10.5	
LOS	B	F	C	B	
Approach Delay (s/veh)	13.9	127.8		15.0	
Approach LOS	B	F		B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay (s/veh): 60.5	Intersection LOS: E
Intersection Capacity Utilization 49.5%	ICU Level of Service A
Analysis Period (min) 15	

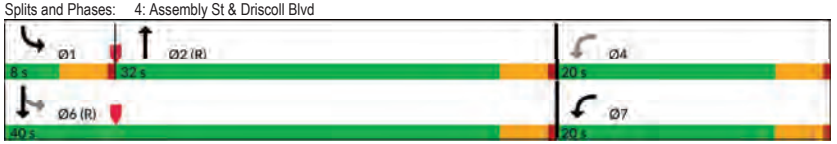
Splits and Phases: 4: Assembly St & Driscoll Blvd



Lane Group	WBL	NBT	SBL	SBT	Ø4
Lane Configurations					
Traffic Volume (vph)	10	533	145	428	
Future Volume (vph)	10	800	213	585	
Turn Type	pm+pt	NA	pm+pt	NA	
Protected Phases	7	2	1	6	4
Permitted Phases	4		6		
Detector Phase	7	2	1	6	
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0
Total Split (s)	20.0	32.0	8.0	40.0	20.0
Total Split (%)	33.3%	53.3%	13.3%	66.7%	33%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	
Lead/Lag		Lag	Lead		
Lead-Lag Optimize?		Yes	Yes		
Recall Mode	None	C-Max	None	C-Max	None
Act Effct Green (s)	14.3	28.0	37.7	37.7	
Actuated g/C Ratio	0.24	0.47	0.63	0.63	
v/c Ratio	0.89	1.08	0.86	0.59	
Control Delay (s/veh)	33.1	74.2	45.3	8.6	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay (s/veh)	33.1	74.2	45.3	8.6	
LOS	C	E	D	A	
Approach Delay (s/veh)	33.1	74.2		18.4	
Approach LOS	C	E		B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay (s/veh): 43.6	Intersection LOS: D
Intersection Capacity Utilization 69.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: Assembly St & Driscoll Blvd



Attachment A



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	149	160	10	198	586
Future Volume (veh/h)	10	182	238	10	298	817
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
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
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1794	1794	1766	1766	1711	1683
Adj Flow Rate, veh/h	13	0	952	0	324	888
Peak Hour Factor	0.77	0.77	0.25	0.25	0.92	0.92
Percent Heavy Veh, %	0	0	2	2	0	2
Cap, veh/h	22		1271		451	1435
Arrive On Green	0.01	0.00	0.72	0.00	0.07	0.85
Sat Flow, veh/h	1592	0	1766	0	1629	1683
Grp Volume(v), veh/h	14	0	952	0	324	888
Grp Sat Flow(s),veh/h/ln	1715	0	1766	0	1629	1683
Q Serve(g_s), s	0.5	0.0	19.7	0.0	2.7	9.9
Cycle Q Clear(g_c), s	0.5	0.0	19.7	0.0	2.7	9.9
Prop In Lane	0.93	0.00		0.00	1.00	
Lane Grp Cap(c), veh/h	24		1271		451	1435
V/C Ratio(X)	0.59		0.75		0.72	0.62
Avail Cap(c_a), veh/h	457		1271		451	1435
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	29.4	0.0	5.1	0.0	10.1	1.4
Incr Delay (d2), s/veh	21.0	0.0	4.1	0.0	5.4	2.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.6	0.0	8.9	0.0	5.5	1.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	50.4	0.0	9.2	0.0	15.6	3.4
LnGrp LOS	D		A		B	A
Approach Vol, veh/h	14		952			1212
Approach Delay, s/veh	50.4		9.2			6.6
Approach LOS	D		A			A

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.0	47.2		4.8		55.2
Change Period (Y+Rc), s	4.0	4.0		4.0		4.0
Max Green Setting (Gmax), s	4.0	28.0		16.0		36.0
Max Q Clear Time (g_c+I1), s	4.7	21.7		2.5		11.9
Green Ext Time (p_c), s	0.0	3.6		0.0		7.6

Intersection Summary			
HCM 7th Control Delay, s/veh			8.0
HCM 7th LOS			A

Notes

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	310	533	10	145	428
Future Volume (veh/h)	10	423	800	10	213	585
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
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
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1794	1794	1766	1766	1683	1683
Adj Flow Rate, veh/h	11	0	870	0	232	636
Peak Hour Factor	0.91	0.91	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	19		1276		499	1438
Arrive On Green	0.01	0.00	0.72	0.00	0.07	0.85
Sat Flow, veh/h	1573	0	1766	0	1603	1683
Grp Volume(v), veh/h	12	0	870	0	232	636
Grp Sat Flow(s),veh/h/ln	1716	0	1766	0	1603	1683
Q Serve(g_s), s	0.4	0.0	16.2	0.0	1.8	5.3
Cycle Q Clear(g_c), s	0.4	0.0	16.2	0.0	1.8	5.3
Prop In Lane	0.92	0.00		0.00	1.00	
Lane Grp Cap(c), veh/h	21		1276		499	1438
V/C Ratio(X)	0.58		0.68		0.47	0.44
Avail Cap(c_a), veh/h	458		1276		501	1438
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	29.5	0.0	4.5	0.0	5.6	1.0
Incr Delay (d2), s/veh	23.0	0.0	3.0	0.0	0.7	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	0.3	0.0	4.0	0.0	0.9	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	52.5	0.0	7.5	0.0	6.3	2.0
LnGrp LOS	D		A		A	A
Approach Vol, veh/h	12		870			868
Approach Delay, s/veh	52.5		7.5			3.1
Approach LOS	D		A			A

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	7.9	47.4		4.7		55.3
Change Period (Y+Rc), s	4.0	4.0		4.0		4.0
Max Green Setting (Gmax), s	4.0	28.0		16.0		36.0
Max Q Clear Time (g_c+I1), s	3.8	18.2		2.4		7.3
Green Ext Time (p_c), s	0.0	4.5		0.0		4.8

Intersection Summary			
HCM 7th Control Delay, s/veh			5.7
HCM 7th LOS			A

Notes

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Attachment A

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	5	0	10	0	0
Future Vol, veh/h	0	5	111	10	0	331
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	2	-	-	1
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	121	11	0	360

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	126	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	924	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	924	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	8.92	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	- 924	-
HCM Lane V/C Ratio	-	- 0.006	-
HCM Ctrl Dly (s/v)	-	- 8.9	-
HCM Lane LOS	-	- A	-
HCM 95th %tile Q(veh)	-	- 0	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	5	0	10	0	0
Future Vol, veh/h	0	5	380	10	0	225
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	2	-	-	1
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	413	11	0	245

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	418	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	635	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	635	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	10.72	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	- 635	-
HCM Lane V/C Ratio	-	- 0.009	-
HCM Ctrl Dly (s/v)	-	- 10.7	-
HCM Lane LOS	-	- B	-
HCM 95th %tile Q(veh)	-	- 0	-

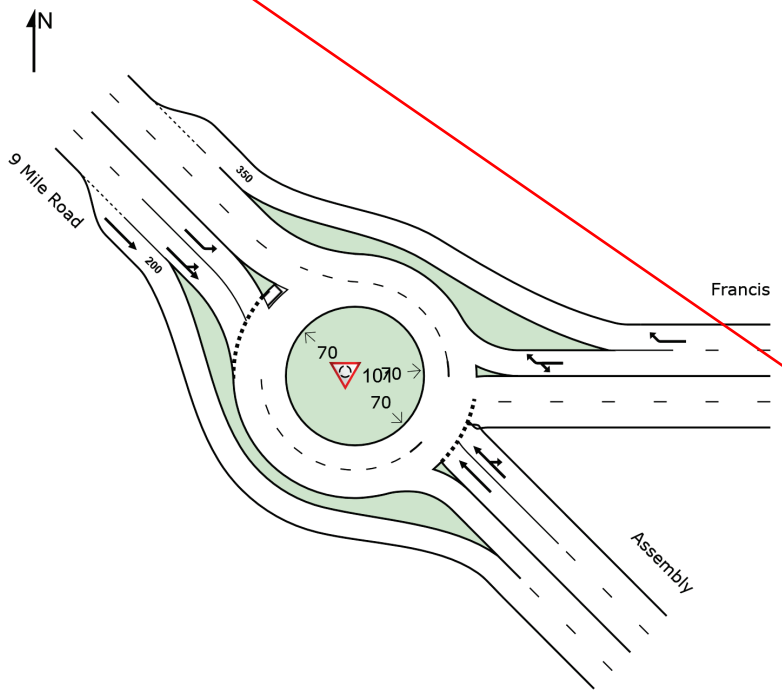
Attachment A

SITE LAYOUT

Site: 101 [Francis & Assembly _v5 - AM (Site Folder: General)]

New Site
Site Category: Proposed Design 1
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



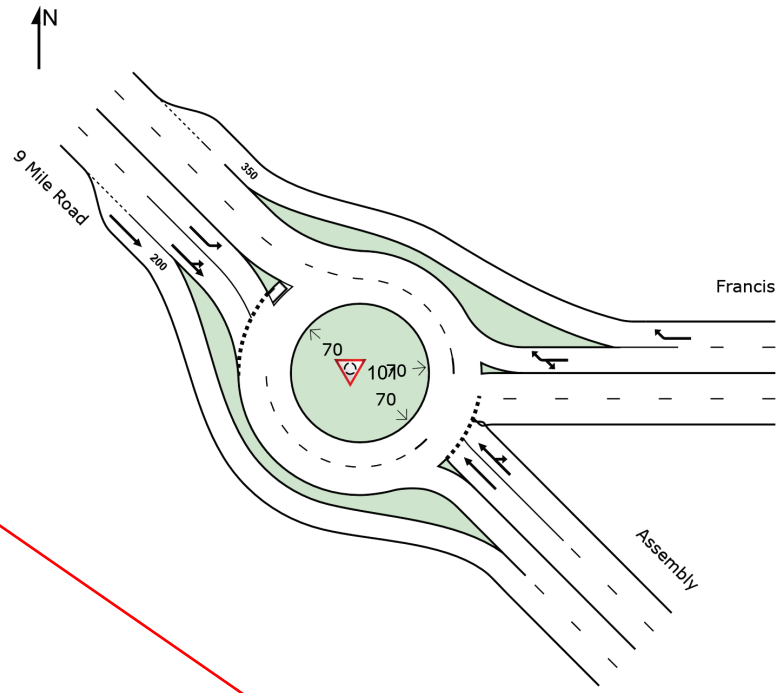
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Project: Z:\Civtech\Projects\22-1640 CO Spokane On Call_Francis Roundabout Eval\Sidra\Old\Francis & Assembly_v3.sip9

SITE LAYOUT

Site: 101 [Francis & Assembly _v5 - PM (Site Folder: General)]

New Site
Site Category: Proposed Design 1
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Attachment A

MOVEMENT SUMMARY

Site: 101 [Francis & Assembly _v5 - AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Proposed Design 1
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
SouthEast: Assembly															
8x	T1	All MCs	265	2.0	265	2.0	0.246	7.0	LOS A	1.0	24.8	0.55	0.45	0.55	26.4
18bx	R3	All MCs	145	2.0	145	2.0	0.246	6.8	LOS A	1.0	24.7	0.54	0.44	0.54	26.2
Approach			410	2.0	410	2.0	0.246	6.9	LOS A	1.0	24.8	0.55	0.45	0.55	26.4
East: Francis															
1b	L3	All MCs	254	3.0	254	3.0	0.199	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	32.5
16a	R1	All MCs	308	2.0	308	2.0	0.199	2.5	LOS A	0.0	0.0	0.00	0.00	0.00	32.9
Approach			562	2.5	562	2.5	0.199	1.4	LOS A	0.0	0.0	0.00	0.00	0.00	32.7
NorthWest: 9 Mile Road															
7ax	L1	All MCs	528	2.0	528	2.0	0.320	6.4	LOS A	1.6	39.6	0.45	0.28	0.45	28.4
4x	T1	All MCs	788	2.0	788	2.0	0.320	1.5	LOS A	1.6	39.6	0.10	0.06	0.10	31.8
Approach			1316	2.0	1316	2.0	0.320	3.4	LOS A	1.6	39.6	0.24	0.15	0.24	30.3
All Vehicles			2288	2.1	2288	2.1	0.320	3.6	LOS A	1.6	39.6	0.23	0.17	0.23	30.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options 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 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Francis & Assembly _v5 - PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Proposed Design 1
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
SouthEast: Assembly															
8x	T1	All MCs	856	2.0	856	2.0	0.730	19.4	LOS C	8.2	205.5	0.85	1.08	1.66	23.1
18bx	R3	All MCs	291	2.0	291	2.0	0.730	18.6	LOS C	8.2	205.5	0.85	1.07	1.65	23.1
Approach			1147	2.0	1147	2.0	0.730	19.2	LOS C	8.2	205.5	0.85	1.08	1.66	23.1
East: Francis															
1b	L3	All MCs	256	3.0	256	3.0	0.348	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	32.3
16a	R1	All MCs	754	2.0	754	2.0	0.348	3.5	LOS A	0.0	0.0	0.00	0.00	0.00	32.9
Approach			1010	2.3	1010	2.3	0.348	2.6	LOS A	0.0	0.0	0.00	0.00	0.00	32.7
NorthWest: 9 Mile Road															
7ax	L1	All MCs	590	2.0	590	2.0	0.271	5.8	LOS A	1.3	31.9	0.43	0.27	0.43	28.4
4x	T1	All MCs	503	2.0	503	2.0	0.260	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	32.6
Approach			1093	2.0	1093	2.0	0.271	3.2	LOS A	1.3	31.9	0.23	0.15	0.23	30.2
All Vehicles			3250	2.1	3250	2.1	0.730	8.7	LOS A	8.2	205.5	0.38	0.43	0.66	27.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options 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 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

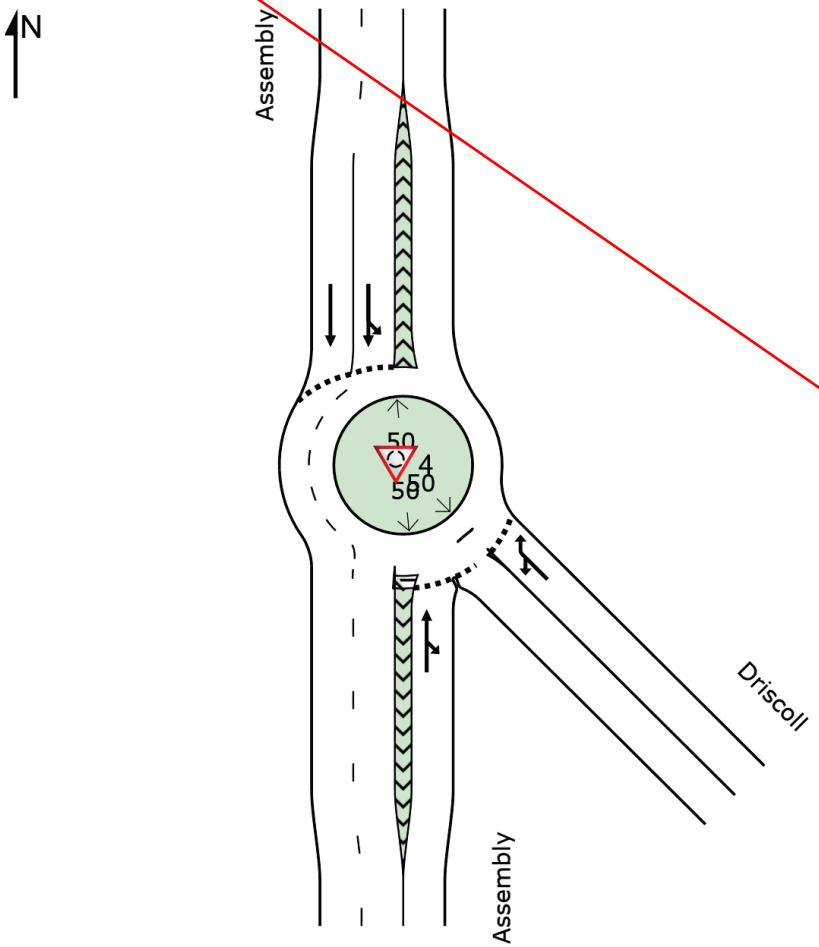
Attachment A

SITE LAYOUT

Site: 4 [Driscoll & Assembly AM (Site Folder: AM)]

New Site
Site Category: Proposed Design 1
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



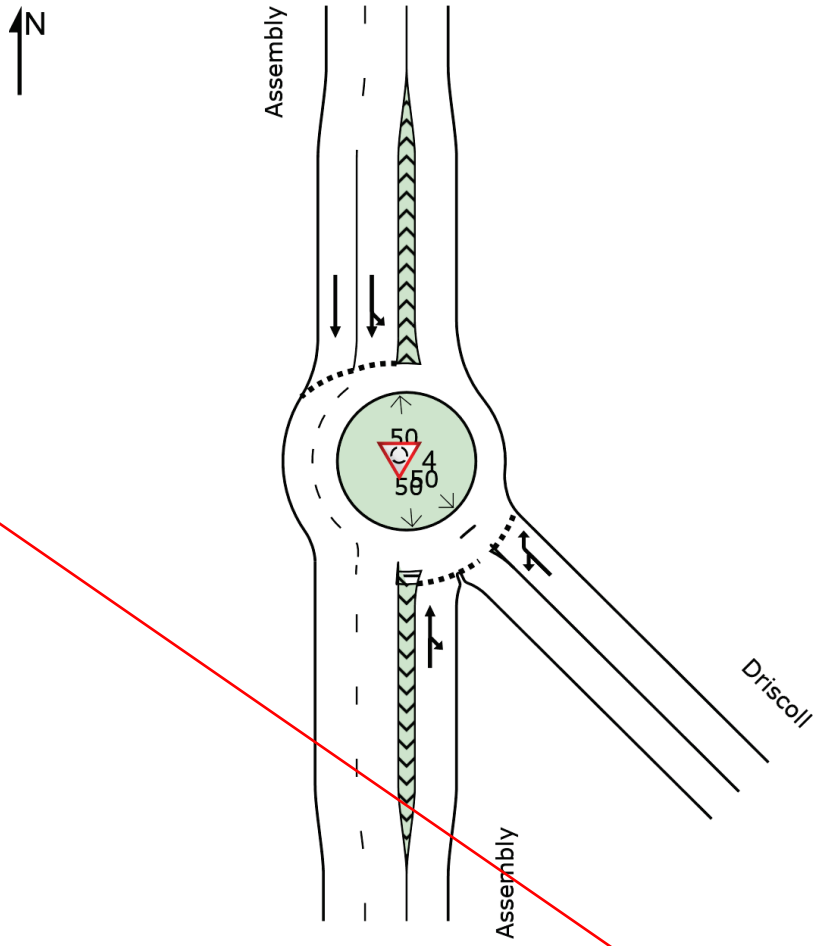
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Organisation: CIVTECH | Licence: PLUS / 1PC | Created: Friday, April 4, 2025 8:45:06 AM
Project: Z:\Civtech\Projects\22-1640 CO Spokane On Call_Francis Roundabout Eval\Sidra\Francis & Assembly Proposed_HT06182024.sip9

SITE LAYOUT

Site: 4 [Driscoll & Assembly PM (Site Folder: PM)]

New Site
Site Category: Proposed Design 1
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Project: Z:\Civtech\Projects\22-1640 CO Spokane On Call_Francis Roundabout Eval\Sidra\Francis & Assembly Proposed_HT06182024.sip9

MOVEMENT SUMMARY

Site: 4 [Driscoll & Assembly AM (Site Folder: AM)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Proposed Design 1
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Assembly															
NBT	T1	All MCs	238	2.0	238	2.0	0.254	6.3	LOS A	1.3	32.3	0.42	0.54	0.42	34.5
NBR	R3	All MCs	12	2.0	12	2.0	0.254	6.5	LOS A	1.3	32.3	0.42	0.54	0.42	34.0
Approach			249	2.0	249	2.0	0.254	6.3	LOS A	1.3	32.3	0.42	0.54	0.42	34.4
SouthEast: Driscoll															
WBL	L3	All MCs	15	2.0	15	2.0	0.298	11.2	LOS B	1.4	34.7	0.41	0.57	0.41	34.1
WBR	R1	All MCs	248	2.0	248	2.0	0.298	5.8	LOS A	1.4	34.7	0.41	0.57	0.41	34.7
Approach			263	2.0	263	2.0	0.298	6.1	LOS A	1.4	34.7	0.41	0.57	0.41	34.6
North: Assembly															
SBL	L1	All MCs	239	0.0	239	0.0	0.397	7.9	LOS A	2.7	67.8	0.12	0.53	0.12	34.2
SBT	T1	All MCs	858	0.0	858	0.0	0.397	4.7	LOS A	2.7	67.9	0.12	0.47	0.12	35.3
Approach			1096	0.0	1096	0.0	0.397	5.4	LOS A	2.7	67.9	0.12	0.49	0.12	35.0
All Vehicles			1609	0.6	1609	0.6	0.397	5.6	LOS A	2.7	67.9	0.21	0.51	0.21	34.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options 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 6).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 4 [Driscoll & Assembly PM (Site Folder: PM)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Proposed Design 1
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Assembly															
NBT	T1	All MCs	743	2.0	743	2.0	0.754	9.1	LOS A	8.9	225.6	0.74	0.66	0.84	33.4
NBR	R3	All MCs	11	2.0	11	2.0	0.754	9.4	LOS A	8.9	225.6	0.74	0.66	0.84	32.9
Approach			754	2.0	754	2.0	0.754	9.1	LOS A	8.9	225.6	0.74	0.66	0.84	33.4
SouthEast: Driscoll															
WBL	L3	All MCs	11	2.0	11	2.0	0.818	26.1	LOS C	9.0	228.4	0.98	1.11	1.61	28.0
WBR	R1	All MCs	409	2.0	409	2.0	0.818	20.7	LOS C	9.0	228.4	0.98	1.11	1.61	28.4
Approach			420	2.0	420	2.0	0.818	20.8	LOS C	9.0	228.4	0.98	1.11	1.61	28.4
North: Assembly															
SBL	L1	All MCs	208	2.0	208	2.0	0.303	7.9	LOS A	2.2	57.1	0.11	0.55	0.11	34.0
SBT	T1	All MCs	614	2.0	614	2.0	0.303	4.7	LOS A	2.3	57.3	0.11	0.47	0.11	35.2
Approach			823	2.0	823	2.0	0.303	5.5	LOS A	2.3	57.3	0.11	0.49	0.11	34.9
All Vehicles			1997	2.0	1997	2.0	0.818	10.1	LOS B	9.0	228.4	0.53	0.69	0.70	32.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options 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 6).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Attachment A

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	620	0	0	376	0	0	0	75	0	0	42
Future Vol, veh/h	0	951	0	0	487	0	0	0	75	0	0	42
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	Stop
Storage Length	80	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	1	-	-	7	-	-	2	-	-	5	-
Peak Hour Factor	94	94	94	90	90	90	76	76	76	56	56	56
Heavy Vehicles, %	0	0	0	1	1	1	0	0	0	0	0	0
Mvmt Flow	0	1012	0	0	541	0	0	0	99	0	0	75

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	541	0	-	-	-	0	-	-	506	-	-	271
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.1	-	-	-	-	-	-	-	7.1	-	-	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	-	-	-	-	-	3.3	-	-	3.3
Pot Cap-1 Maneuver	1038	-	0	0	-	-	0	0	503	0	0	706
Stage 1	-	-	0	0	-	-	0	0	-	0	0	-
Stage 2	-	-	0	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1038	-	-	-	-	-	-	-	503	-	-	706
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0	0	13.9	10.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	503	1038	-	-	-	706
HCM Lane V/C Ratio	0.196	-	-	-	-	0.106
HCM Ctrl Dly (s/v)	13.9	0	-	-	-	10.7
HCM Lane LOS	B	A	-	-	-	B
HCM 95th %tile Q(veh)	0.7	0	-	-	-	0.4

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	662	0	0	662	0	0	0	146	0	0	74
Future Vol, veh/h	0	993	0	0	773	0	0	0	146	0	0	74
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	Stop
Storage Length	80	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	1	-	-	7	-	-	2	-	-	5	-
Peak Hour Factor	94	94	94	90	90	90	76	76	76	56	56	56
Heavy Vehicles, %	0	0	0	1	1	1	0	0	0	0	0	0
Mvmt Flow	0	1056	0	0	859	0	0	0	192	0	0	132

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	859	0	-	-	-	0	-	-	528	-	-	429
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.1	-	-	-	-	-	-	-	7.1	-	-	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	-	-	-	-	-	3.3	-	-	3.3
Pot Cap-1 Maneuver	791	-	0	0	-	-	0	0	486	0	0	546
Stage 1	-	-	0	0	-	-	0	0	-	0	0	-
Stage 2	-	-	0	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	791	-	-	-	-	-	-	-	486	-	-	546
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0	0	17.18	13.69
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	486	791	-	-	-	546
HCM Lane V/C Ratio	0.396	-	-	-	-	0.242
HCM Ctrl Dly (s/v)	17.2	0	-	-	-	13.7
HCM Lane LOS	C	A	-	-	-	B
HCM 95th %tile Q(veh)	1.9	0	-	-	-	0.9

Attachment A

MOVEMENT SUMMARY

Site: [2 (9)] Francis & Nine Mile AM - Single Circ

(AM_PMX_Revised - Single Circ)

Output produced by SIDRA INTERSECTION Version: 10.0.9.250

New Site
Site Category: 2028 Projected Volumes
Roundabout
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Queued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
SouthEast: Assembly															
3ax	L1	All MCs	162	2.0	162	2.0	0.253	12.0	LOS B	1.6	40.4	0.70	0.70	0.70	29.4
18x	R2	All MCs	60	2.0	60	2.0	0.253	7.3	LOS A	1.6	40.4	0.70	0.70	0.70	29.9
Approach			222	2.0	222	2.0	0.253	10.7	LOS B	1.6	40.4	0.70	0.70	0.70	29.5
NorthEast: Francis															
1x	L2	All MCs	195	2.0	195	2.0	0.152	10.5	LOS B	0.9	22.2	0.36	0.61	0.36	29.3
16ax	R1	All MCs	260	2.0	260	2.0	0.166	4.1	LOS A	1.0	25.9	0.35	0.42	0.35	35.7
Approach			454	2.0	454	2.0	0.166	6.9	LOS A	1.0	25.9	0.35	0.50	0.35	33.3
West: 9 Mile															
5a	L1	All MCs	614	2.0	614	2.0	0.412	9.4	LOS A	2.9	73.1	0.44	0.60	0.44	32.6
12a	R1	All MCs	440	2.0	440	2.0	0.357	4.5	LOS A	2.3	57.9	0.44	0.46	0.44	33.5
Approach			1054	2.0	1054	2.0	0.412	7.4	LOS A	2.9	73.1	0.44	0.54	0.44	32.8
All Vehicles			1730	2.0	1730	2.0	0.412	7.7	LOS A	2.9	73.1	0.45	0.55	0.45	32.6

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: Z:\Civtech\Projects\22-1640 CO Spokane On Call_Francis Roundabout Eval\Francis Roundabout Eval\July 2026\Francis & Assembly_20260522_PMX_wm 2028 vol.sipx

MOVEMENT SUMMARY

Site: [4A (8)] Driscoll & Assembly AM - Copy (AM_PMX_Revised - Single Circ)

Output produced by SIDRA INTERSECTION Version: 10.0.9.250

New Site
Site Category: 2028 Projected Volumes
Roundabout
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Queued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Assembly															
3a	L1	All MCs	120	2.0	120	2.0	0.141	8.7	LOS A	0.6	16.0	0.27	0.58	0.27	16.4
18a	R1	All MCs	43	2.0	43	2.0	0.141	4.7	LOS A	0.6	16.0	0.27	0.58	0.27	27.9
NBR	R3	All MCs	11	2.0	11	2.0	0.141	5.2	LOS A	0.6	16.0	0.27	0.58	0.27	33.7
Approach			174	2.0	174	2.0	0.141	7.5	LOS A	0.6	16.0	0.27	0.58	0.27	20.0
SouthEast: Driscoll															
WBL	L3	All MCs	1	2.0	1	2.0	0.117	10.9	LOS B	0.5	13.8	0.31	0.48	0.31	34.4
8x	T1	All MCs	100	2.0	100	2.0	0.117	5.2	LOS A	0.5	13.8	0.31	0.48	0.31	32.8
18x	R2	All MCs	38	2.0	38	2.0	0.117	5.0	LOS A	0.5	13.8	0.31	0.48	0.31	28.4
Approach			139	2.0	139	2.0	0.117	5.2	LOS A	0.5	13.8	0.31	0.48	0.31	31.0
NorthEast: Connector															
1x	L2	All MCs	2	2.0	2	2.0	0.005	6.3	LOS A	0.0	0.5	0.32	0.46	0.32	27.5
1ax	L1	All MCs	1	2.0	1	2.0	0.005	5.6	LOS A	0.0	0.5	0.32	0.46	0.32	27.5
16x	R2	All MCs	2	2.0	2	2.0	0.005	2.5	LOS A	0.0	0.5	0.32	0.46	0.32	23.7
Approach			5	2.0	5	2.0	0.005	4.7	LOS A	0.0	0.5	0.32	0.46	0.32	26.3
NorthWest: Assembly															
7x	L2	All MCs	5	2.0	5	2.0	0.468	9.2	LOS A	3.4	86.0	0.06	0.43	0.06	24.8
4x	T1	All MCs	128	2.0	128	2.0	0.468	4.5	LOS A	3.4	86.0	0.06	0.43	0.06	34.0
14ax	R1	All MCs	504	2.0	504	2.0	0.468	4.1	LOS A	3.4	86.0	0.06	0.43	0.06	34.0
Approach			638	2.0	638	2.0	0.468	4.3	LOS A	3.4	86.0	0.06	0.43	0.06	33.9
All Vehicles			957	2.0	957	2.0	0.468	5.0	LOS A	3.4	86.0	0.14	0.47	0.14	29.3

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [2 (8)] Francis & Nine Mile PM - Single Circ

(PM_PMX_Revised - Single Circ)

Output produced by SIDRA INTERSECTION Version: 10.0.9.250

New Site
Site Category: 2028 Projected Volumes
Roundabout
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Queued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
SouthEast: Assembly															
3ax	L1	All MCs	457	2.0	457	2.0	0.691	15.5	LOS B	7.9	201.5	0.89	0.86	1.15	27.5
18x	R2	All MCs	196	2.0	196	2.0	0.691	10.8	LOS B	7.9	201.5	0.89	0.86	1.15	28.0
Approach			652	2.0	652	2.0	0.691	14.1	LOS B	7.9	201.5	0.89	0.86	1.15	27.7
NorthEast: Francis															
1x	L2	All MCs	226	2.0	226	2.0	0.246	12.2	LOS B	1.6	40.7	0.66	0.69	0.66	28.5
16ax	R1	All MCs	574	2.0	574	2.0	0.462	5.7	LOS A	3.9	99.8	0.75	0.60	0.75	34.4
Approach			800	2.0	800	2.0	0.462	7.6	LOS A	3.9	99.8	0.73	0.63	0.73	33.0
West: 9 Mile															
5a	L1	All MCs	524	2.0	524	2.0	0.364	9.5	LOS A	2.6	66.4	0.48	0.60	0.48	32.5
12a	R1	All MCs	263	2.0	263	2.0	0.232	4.6	LOS A	1.4	35.4	0.46	0.47	0.46	33.4
Approach			787	2.0	787	2.0	0.364	7.9	LOS A	2.6	66.4	0.47	0.56	0.47	32.7
All Vehicles			2239	2.0	2239	2.0	0.691	9.6	LOS A	7.9	201.5	0.68	0.67	0.76	31.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: Z:\Civtech\Projects\22-1640 CO Spokane On Call_Francis Roundabout Eval\Francis Roundabout Eval\July 2026\Francis & Assembly_20260522_PMX_wm 2028 vol.sipx

MOVEMENT SUMMARY

Site: [4A (7)] Driscoll & Assembly PM - Copy (PM_PMX_Revised - Single Circ)

Output produced by SIDRA INTERSECTION Version: 10.0.9.250

New Site
Site Category: 2028 Projected Volumes
Roundabout
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Queued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Assembly															
3a	L1	All MCs	457	2.0	457	2.0	0.449	8.8	LOS A	2.8	71.7	0.31	0.58	0.31	16.3
18a	R1	All MCs	103	2.0	103	2.0	0.449	4.8	LOS A	2.8	71.7	0.31	0.58	0.31	27.7
NBR	R3	All MCs	11	2.0	11	2.0	0.449	5.2	LOS A	2.8	71.7	0.31	0.58	0.31	33.4
Approach			571	2.0	571	2.0	0.449	8.0	LOS A	2.8	71.7	0.31	0.58	0.31	18.5
SouthEast: Driscoll															
WBL	L3	All MCs	1	2.0	1	2.0	0.283	13.4	LOS B	1.6	41.3	0.65	0.65	0.65	33.4
8x	T1	All MCs	193	2.0	193	2.0	0.283	7.7	LOS A	1.6	41.3	0.65	0.65	0.65	31.4
18x	R2	All MCs	55	2.0	55	2.0	0.283	7.5	LOS A	1.6	41.3	0.65	0.65	0.65	27.7
Approach			250	2.0	250	2.0	0.283	7.7	LOS A	1.6	41.3	0.65	0.65	0.65	30.2
NorthEast: Connector															
1x	L2	All MCs	2	2.0	2	2.0	0.006	8.5	LOS A	0.0	0.8	0.59	0.55	0.59	27.0
1ax	L1	All MCs	1	2.0	1	2.0	0.006	7.7	LOS A	0.0	0.8	0.59	0.55	0.59	27.0
16x	R2	All MCs	2	2.0	2	2.0	0.006	4.7	LOS A	0.0	0.8	0.59	0.55	0.59	23.0
Approach			5	2.0	5	2.0	0.006	6.8	LOS A	0.0	0.8	0.59	0.55	0.59	25.7
NorthWest: Assembly															
7x	L2	All MCs	5	2.0	5	2.0	0.359	9.2	LOS A	2.4	60.1	0.05	0.44	0.05	24.8
4x	T1	All MCs	88	2.0	88	2.0	0.359	4.5	LOS A	2.4	60.1	0.05	0.44	0.05	34.1
14ax	R1	All MCs	396	2.0	396	2.0	0.359	4.1	LOS A	2.4	60.1	0.05	0.44	0.05	34.1
Approach			489	2.0	489	2.0	0.359	4.3	LOS A	2.4	60.1	0.05	0.44	0.05	33.9
All Vehicles			1315	2.0	1315	2.0	0.449	6.5	LOS A	2.8	71.7	0.28	0.54	0.28	24.2

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	598	0	0	506	0	0	0	75	0	0	56
Future Vol, veh/h	0	929	0	0	617	0	0	0	75	0	0	56
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	Stop
Storage Length	80	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	1	-	-	7	-	-	2	-	-	5	-
Peak Hour Factor	94	94	94	90	90	90	76	76	76	56	56	56
Heavy Vehicles, %	0	0	0	1	1	1	0	0	0	0	0	0
Mvmt Flow	0	988	0	0	686	0	0	0	99	0	0	100

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	686	0	-	-	-	0	-	-	494	-	-	343
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.1	-	-	-	-	-	-	-	7.1	-	-	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	-	-	-	-	-	3.3	-	-	3.3
Pot Cap-1 Maneuver	917	-	0	0	-	-	0	0	512	0	0	628
Stage 1	-	-	0	0	-	-	0	0	-	0	0	-
Stage 2	-	-	0	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	917	-	-	-	-	-	-	-	512	-	-	628
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0	0	13.7	11.81
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	512	917	-	-	-	628
HCM Lane V/C Ratio	0.193	-	-	-	-	0.159
HCM Ctrl Dly (s/v)	13.7	0	-	-	-	11.8
HCM Lane LOS	B	A	-	-	-	B
HCM 95th %tile Q(veh)	0.7	0	-	-	-	0.6

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	735	0	0	909	0	0	0	146	0	0	101
Future Vol, veh/h	0	1066	0	0	1020	0	0	0	146	0	0	101
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	Stop
Storage Length	80	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	1	-	-	7	-	-	2	-	-	5	-
Peak Hour Factor	94	94	94	90	90	90	76	76	76	56	56	56
Heavy Vehicles, %	0	0	0	1	1	1	0	0	0	0	0	0
Mvmt Flow	0	1134	0	0	1133	0	0	0	192	0	0	180

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1133	0	-	-	-	0	-	-	567	-	-	567
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.1	-	-	-	-	-	-	-	7.1	-	-	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	-	-	-	-	-	3.3	-	-	3.3
Pot Cap-1 Maneuver	624	-	0	0	-	-	0	0	457	0	0	436
Stage 1	-	-	0	0	-	-	0	0	-	0	0	-
Stage 2	-	-	0	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	624	-	-	-	-	-	-	-	457	-	-	436
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0	0	18.46	18.94
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	457	624	-	-	-	436
HCM Lane V/C Ratio	0.42	-	-	-	-	0.413
HCM Ctrl Dly (s/v)	18.5	0	-	-	-	18.9
HCM Lane LOS	C	A	-	-	-	C
HCM 95th %tile Q(veh)	2	0	-	-	-	2

Attachment A

MOVEMENT SUMMARY

Site: [2 (9)] Francis & Nine Mile AM - Single Circ

(AM_PMX_Revised - Single Circ)

Output produced by SIDRA INTERSECTION Version: 10.0.9.250

New Site
Site Category: 2040 Projected Volumes
Roundabout
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Queued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
SouthEast: Assembly															
3ax	L1	All MCs	288	2.0	288	2.0	0.414	12.1	LOS B	2.9	74.6	0.77	0.72	0.77	29.2
18x	R2	All MCs	76	2.0	76	2.0	0.414	7.4	LOS A	2.9	74.6	0.77	0.72	0.77	29.7
Approach			364	2.0	364	2.0	0.414	11.1	LOS B	2.9	74.6	0.77	0.72	0.77	29.3
NorthEast: Francis															
1x	L2	All MCs	276	2.0	276	2.0	0.240	11.1	LOS B	1.5	38.4	0.52	0.64	0.52	28.9
16ax	R1	All MCs	335	2.0	335	2.0	0.234	4.6	LOS A	1.6	39.9	0.50	0.48	0.50	35.2
Approach			611	2.0	611	2.0	0.240	7.6	LOS A	1.6	39.9	0.51	0.55	0.51	32.7
West: 9 Mile															
5a	L1	All MCs	574	2.0	574	2.0	0.506	10.4	LOS B	3.8	96.9	0.61	0.64	0.61	32.2
12a	R1	All MCs	857	2.0	857	2.0	0.611	5.1	LOS A	5.5	138.7	0.65	0.55	0.65	32.6
Approach			1430	2.0	1430	2.0	0.611	7.2	LOS A	5.5	138.7	0.64	0.59	0.64	32.4
All Vehicles			2405	2.0	2405	2.0	0.611	7.9	LOS A	5.5	138.7	0.62	0.60	0.62	32.0

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: Z:\Civtech\Projects\22-1640 CO Spokane On Call_Francis Roundabout Eval\Francis Roundabout Eval\July 2026\Francis & Assembly_20260522_PMX_wm.sipx

MOVEMENT SUMMARY

Site: [4A (8)] Driscoll & Assembly AM - Copy (AM_PMX_Revised - Single Circ)

Output produced by SIDRA INTERSECTION Version: 10.0.9.250

New Site
Site Category: 2040 Projected Volumes
Roundabout
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Queued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Assembly															
3a	L1	All MCs	176	2.0	176	2.0	0.201	9.2	LOS A	1.0	25.3	0.38	0.61	0.38	16.3
18a	R1	All MCs	43	2.0	43	2.0	0.201	5.2	LOS A	1.0	25.3	0.38	0.61	0.38	27.6
NBR	R3	All MCs	11	2.0	11	2.0	0.201	5.6	LOS A	1.0	25.3	0.38	0.61	0.38	33.3
Approach			230	2.0	230	2.0	0.201	8.2	LOS A	1.0	25.3	0.38	0.61	0.38	18.9
SouthEast: Driscoll															
WBL	L3	All MCs	11	2.0	11	2.0	0.163	11.2	LOS B	0.8	20.8	0.39	0.52	0.39	34.1
8x	T1	All MCs	137	2.0	137	2.0	0.163	5.5	LOS A	0.8	20.8	0.39	0.52	0.39	32.3
18x	R2	All MCs	38	2.0	38	2.0	0.163	5.3	LOS A	0.8	20.8	0.39	0.52	0.39	28.2
Approach			186	2.0	186	2.0	0.163	5.8	LOS A	0.8	20.8	0.39	0.52	0.39	31.2
NorthEast: Connector															
1x	L2	All MCs	2	2.0	2	2.0	0.005	6.7	LOS A	0.0	0.6	0.40	0.48	0.40	27.4
1ax	L1	All MCs	1	2.0	1	2.0	0.005	6.0	LOS A	0.0	0.6	0.40	0.48	0.40	27.4
16x	R2	All MCs	2	2.0	2	2.0	0.005	2.9	LOS A	0.0	0.6	0.40	0.48	0.40	23.5
Approach			5	2.0	5	2.0	0.005	5.1	LOS A	0.0	0.6	0.40	0.48	0.40	26.1
NorthWest: Assembly															
7x	L2	All MCs	5	2.0	5	2.0	0.736	9.3	LOS A	9.8	248.9	0.22	0.41	0.22	24.4
4x	T1	All MCs	215	2.0	215	2.0	0.736	4.7	LOS A	9.8	248.9	0.22	0.41	0.22	33.4
14ax	R1	All MCs	774	2.0	774	2.0	0.736	4.3	LOS A	9.8	248.9	0.22	0.41	0.22	33.4
Approach			995	2.0	995	2.0	0.736	4.4	LOS A	9.8	248.9	0.22	0.41	0.22	33.3
All Vehicles			1416	2.0	1416	2.0	0.736	5.2	LOS A	9.8	248.9	0.27	0.45	0.27	29.0

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [2 (8)] Francis & Nine Mile PM - Single Circ

(PM_PMX_Revised - Single Circ)

Output produced by SIDRA INTERSECTION Version: 10.0.9.250

New Site
Site Category: 2040 Projected Volumes
Roundabout
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Queued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
SouthEast: Assembly															
3ax	L1	All MCs	930	2.0	930	2.0	1.333	170.2	LOS F	99.8	2535.8	1.00	3.73	7.66	7.7
18x	R2	All MCs	158	2.0	158	2.0	1.333	165.5	LOS F	99.8	2535.8	1.00	3.73	7.66	7.8
Approach			1088	2.0	1088	2.0	1.333	169.5	LOS F	99.8	2535.8	1.00	3.73	7.66	7.7
NorthEast: Francis															
1x	L2	All MCs	278	2.0	278	2.0	0.415	14.4	LOS B	3.2	81.6	0.90	0.77	0.92	27.7
16ax	R1	All MCs	820	2.0	820	2.0	0.890	20.8	LOS D	18.9	480.0	1.00	1.28	1.83	28.4
Approach			1098	2.0	1098	2.0	0.890	19.2	LOS B	18.9	480.0	0.98	1.15	1.60	28.3
West: 9 Mile															
5a	L1	All MCs	641	2.0	641	2.0	0.473	9.9	LOS A	4.0	100.4	0.62	0.62	0.62	32.2
12a	R1	All MCs	547	2.0	547	2.0	0.488	5.2	LOS A	3.9	98.9	0.65	0.55	0.65	32.6
Approach			1188	2.0	1188	2.0	0.488	7.7	LOS A	4.0	100.4	0.63	0.59	0.63	32.3
All Vehicles			3374	2.0	3374	2.0	1.333	63.6	LOS E	99.8	2535.8	0.86	1.78	3.21	17.1

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 10.0 | Copyright © 2000-2026 Akcelik and Associates Pty Ltd | sidrasolutions.com
Organisation: CIVTECH | Licence: PLUS / 1PC | Processed: Friday, July 17, 2026 2:26:44 PM
Project: Z:\Civtech\Projects\22-1640 CO Spokane On Call_Francis Roundabout Eval\Francis Roundabout Eval\July 2026\Francis & Assembly_20260522_PMX_wm.sipx

MOVEMENT SUMMARY

Site: [4A (7)] Driscoll & Assembly PM - Copy (PM_PMX_Revised - Single Circ)

Output produced by SIDRA INTERSECTION Version: 10.0.9.250

New Site
Site Category: 2040 Projected Volumes
Roundabout
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Queued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed mph
South: Assembly															
3a	L1	All MCs	624	2.0	624	2.0	0.628	9.8	LOS A	5.0	127.3	0.57	0.62	0.57	16.1
18a	R1	All MCs	103	2.0	103	2.0	0.628	5.8	LOS A	5.0	127.3	0.57	0.62	0.57	27.3
NBR	R3	All MCs	11	2.0	11	2.0	0.628	6.3	LOS A	5.0	127.3	0.57	0.62	0.57	32.8
Approach			738	2.0	738	2.0	0.628	9.2	LOS A	5.0	127.3	0.57	0.62	0.57	17.8
SouthEast: Driscoll															
WBL	L3	All MCs	11	2.0	11	2.0	0.583	18.1	LOS B	5.3	134.6	0.90	0.87	1.13	31.4
8x	T1	All MCs	349	2.0	349	2.0	0.583	12.4	LOS B	5.3	134.6	0.90	0.87	1.13	28.6
18x	R2	All MCs	55	2.0	55	2.0	0.583	12.2	LOS B	5.3	134.6	0.90	0.87	1.13	26.3
Approach			415	2.0	415	2.0	0.583	12.5	LOS B	5.3	134.6	0.90	0.87	1.13	28.2
NorthEast: Connector															
1x	L2	All MCs	2	2.0	2	2.0	0.009	11.9	LOS B	0.1	1.4	0.79	0.64	0.79	25.9
1ax	L1	All MCs	1	2.0	1	2.0	0.009	11.1	LOS B	0.1	1.4	0.79	0.64	0.79	25.9
16x	R2	All MCs	2	2.0	2	2.0	0.009	8.1	LOS A	0.1	1.4	0.79	0.64	0.79	21.8
Approach			5	2.0	5	2.0	0.009	10.2	LOS B	0.1	1.4	0.79	0.64	0.79	24.6
NorthWest: Assembly															
7x	L2	All MCs	5	2.0	5	2.0	0.554	9.3	LOS A	5.4	136.5	0.16	0.42	0.16	24.5
4x	T1	All MCs	188	2.0	188	2.0	0.554	4.6	LOS A	5.4	136.5	0.16	0.42	0.16	33.6
14ax	R1	All MCs	554	2.0	554	2.0	0.554	4.2	LOS A	5.4	136.5	0.16	0.42	0.16	33.6
Approach			748	2.0	748	2.0	0.554	4.4	LOS A	5.4	136.5	0.16	0.42	0.16	33.5
All Vehicles			1907	2.0	1907	2.0	0.628	8.0	LOS A	5.4	136.5	0.48	0.59	0.53	23.9

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Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

ASSEMBLY

FOREST

FRANCIS

NINE MILE

DRISCOLL

ASSEMBLY

42 (74)

75 (146)

239(528)

179(208)

55(180)

49(420)

565(482)

405(242)

5 (5)

118(81)

464(364)

2 (2)

1 (1)

2 (2)

35 (51)

92(178)

10)

10 (10)

40(95)

116(420)

PROPOSED RAMP METER

FUTURE EXPANSION LANES (TYP).

PROPOSED ROW TAKE
125 SF ±

PC 4+00.07

PT 4+76.43

PT 10+62.82

PC 9+77.80

PT 11+30.20

Plotted On Dec 22, 2025 - 4:21pm B:\Francis and Assembly Sewer - 2021079\10 - Drawings\Auto CAD\Francis-Assembly - 2 lane Roundabout - Moved.dwg

CITY OF SPOKANE

PUBLIC WORKS DIVISION
INTEGRATED CAPITAL MANAGEMENT

SHOWN DATA IS APPX. EXTRACTED FROM GIS DATA, NOT TO BE USED FOR DESIGN OR CONSTRUCTION.

FRANCIS - ASSEMBLY

PROJECT # *2021079*
INTERSECTION
DOUBLE ROUNDABOUT

xx (xx)

AM (PM) 2028 Projected Analysis Volumes

Attachment B

ASSEMBLY
FOREST
FRANCIS
NINE MILE
DRISCOLL
ASSEMBLY
PROPOSED RAMP METER
FUTURE EXPANSION LANES (TYP).
PROPOSED ROW TAKE 125 SF ±
56 (101)
75 (146)
308 (754)
254 (256)
70 (145)
265 (856)
528 (590)
788 (503)
5 (5)
198 (173)
712 (510)
2 (2)
1 (1)
2 (2)
35 (51)
126 (321)
10 (10)
10 (10)
40 (95)
162 (574)
PC 4+50.07
PT 4+76.43
PC 9+77.50
PT 11+30.20
3+00
4+00
5+00
6+00
7+00
8+00
9+00
10+00
11+00
12+00

CITY OF SPOKANE

PUBLIC WORKS DIVISION
INTEGRATED CAPITAL MANAGEMENT

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FRANCIS - ASSEMBLY

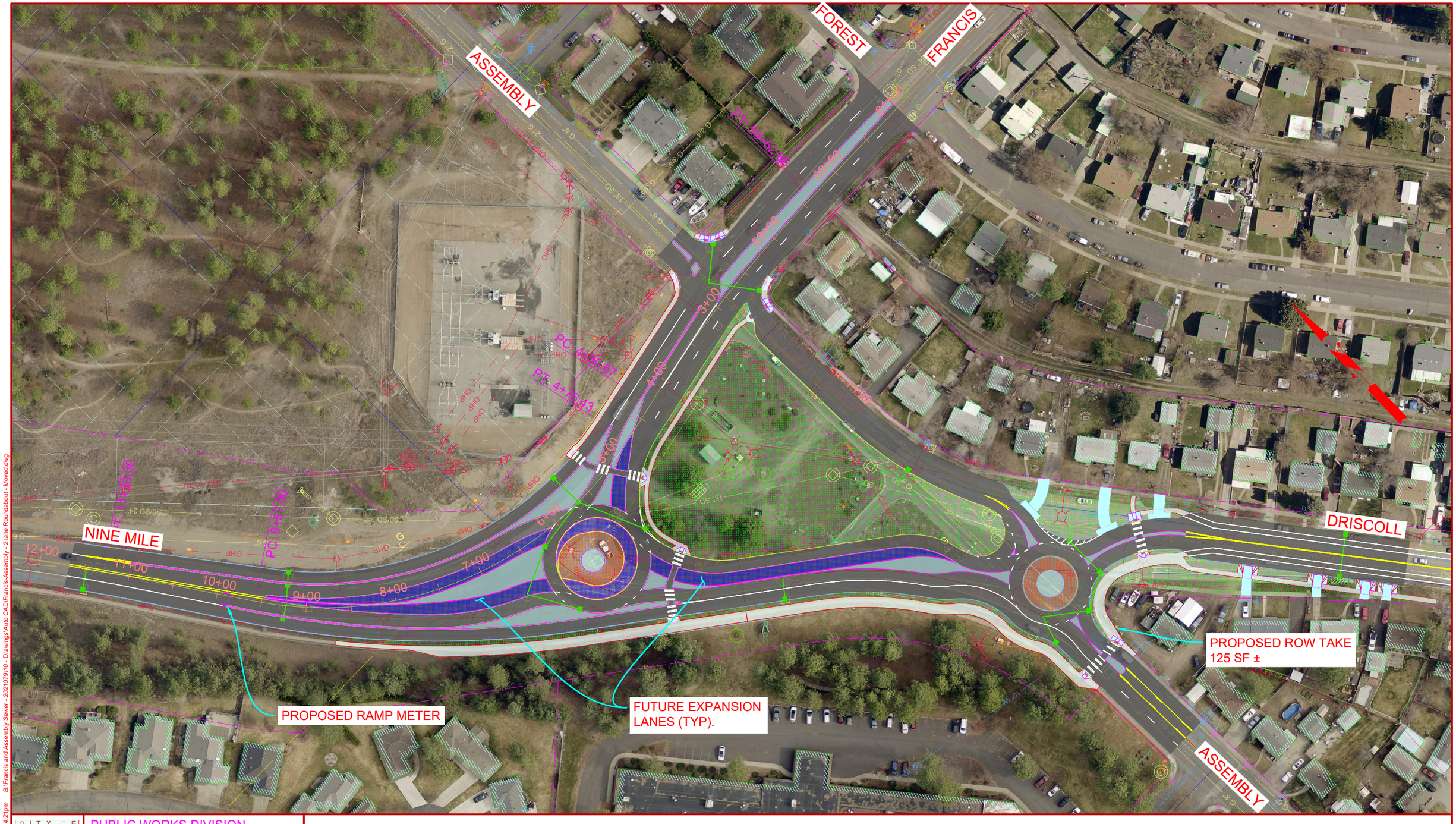
PROJECT # *2021079*
INTERSECTION
DOUBLE ROUNDABOUT

xx (xx)

AM (PM) Background Analysis Volumes

Attachment B

Plotted On Dec 22, 2025 - 4:21pm B:\Francis and Assembly Sewer - 2021079\10 - Drawings\Auto CAD\Francis-Assembly - 2 lane Roundabout - Moved.dwg



Plotted On Dec 22, 2025 - 4:21pm B:\Francis and Assembly Sewer - 2021079\10 - Drawings\Auto CAD\Francis-Assembly - 2 lane Roundabout - Moved.dwg

CITY OF SPOKANE

PUBLIC WORKS DIVISION

INTEGRATED CAPITAL MANAGEMENT

SHOWN DATA IS APPX. EXTRACTED FROM GIS DATA, NOT TO BE USED FOR DESIGN OR CONSTRUCTION.

FRANCIS - ASSEMBLY

PROJECT # *2021079*

INTERSECTION

DOUBLE ROUNDABOUT

Attachment C

JURISDICTION	COUNTY	CITY	INVESTIGATIVE AGENCY	REPORT NUMBER	INDEXED PRIMARY TRAFFICWAY	PRIMARY TRAFFICWAY	BLOCK NUMBER	SR ONLY HISTORY/ SUSPENSE	INTERSECTING TRAFFICWAY	DATE	DAY NAME	TIME 24	TIME	MOST SEVERE INJURY TYPE CODE
State Route	Spokane	Spokane	Municipal/City Police	E845764	291	291		No		10/05/2018	Friday	21:22	9:22 PM	1
State Route	Spokane	Spokane	Municipal/City Police	E762943	291	291		No		01/26/2018	Friday	15:52	3:52 PM	1
State Route	Spokane	Spokane	Municipal/City Police	E926602	291	291		No		06/03/2019	Monday	07:23	7:23 AM	1
State Route	Spokane	Spokane	Municipal/City Police	EB11543	291	291		No		03/04/2021	Thursday	18:59	6:59 PM	1
State Route	Spokane	Spokane	Municipal/City Police	EA98877	291	291		No		01/13/2021	Wednesday	16:50	4:50 PM	7
State Route	Spokane	Spokane	Municipal/City Police	EA57974	291	291		No		08/23/2020	Sunday	16:41	4:41 PM	5
State Route	Spokane	Spokane	Municipal/City Police	EA90733	291	291		No		12/18/2020	Friday	19:28	7:28 PM	1
State Route	Spokane	Spokane	Municipal/City Police	EC78074	291	291		No		08/25/2022	Thursday	15:04	3:04 PM	7

MOST SEVERE INJURY TYPE	FATAL COLS	SUSP SER INJ COLS	SUSP MINOR INJ COLS	POSS INJ COLS	TOTAL INJ COLS	# FAT	# SUSP SER INJ	# SUSP MINOR INJ	# POS INJ	TOTAL # INJ	# VEH	# PEDS	# PEDAL	FIRST COLLISION TYPE CODE	FIRST COLLISION TYPE	FIRST OBJECT STRUCK CODE	FIRST OBJECT STRUCK	SECOND COLLISION TYPE CODE	SECOND COLLISION TYPE
No Apparent Injury	0	0	0	0	0	0	0	0	0	0	2	0	0	10	Entering at angle				
No Apparent Injury	0	0	0	0	0	0	0	0	0	0	2	0	0	10	Entering at angle				
No Apparent Injury	0	0	0	0	0	0	0	0	0	0	2	0	0	28	From opposite direction - one left turn - one straight				
No Apparent Injury	0	0	0	0	0	0	0	0	0	0	2	0	0	10	Entering at angle				
Possible Injury	0	0	0	1	1	0	0	0	1	1	2	0	0	28	From opposite direction - one left turn - one straight				
Suspected Serious Injury	0	1	0	0	1	0	2	0	0	2	2	0	0	10	Entering at angle				
No Apparent Injury	0	0	0	0	0	0	0	0	0	0	2	0	0	10	Entering at angle				
Possible Injury	0	0	0	1	1	0	0	0	2	2	2	0	0	10	Entering at angle				

JUNCTION RELATIONSHIP CODE	JUNCTION RELATIONSHIP	WEATHER CODE	WEATHER	ROADWAY SURFACE CONDITION CODE	ROADWAY SURFACE CONDITION	ROADWAY CHARACTERICTIC CODE	ROADWAY CHARACTERISTIC	LIGHTING CONDITION CODE	LIGHTING CONDITION	MISCELLANEOUS TRAFFICWAY TYPE	FIRST IMPACT LOCATION CODE	FIRST IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)	SR ONLY VEH 1 MOVEMENT	SR ONLY VEH 2 MOVEMENT	VEHICLE 1 TYPE	VEHICLE 1 ACTION	VEHICLE 1 COMPASS DIRECTION FROM	VEHICLE 1 COMPASS DIRECTION TO	VEHICLE 1 TRAFFIC CONTROL	VEHICLE 1 POSTED SPEED
1	At Intersect	3	Raining	2	Wet	3	Straight at H	4	Dark-Street Lights On		A1	Lane 1 Incr	Turning Left	Moving Stra	Pickup,Pan	Making Left	South	West	Stop Sign	Way - Divided
1	At Intersect	1	Clear or Pa	1	Dry	6	Curve & Gra	3	Dusk		D1	Lane 1 Dec	Turning Left	Moving Stra	Passenger	Making Left	South	Northwest	Stop Sign	y - Divided,
1	At Intersect	1	Clear or Pa	1	Dry	2	Straight & G	1	Daylight		D2	Lane 2 Dec	Turning Left	Moving Stra	Passenger	Making Left	East	South	No Traffic C	35
1	At Intersect	1	Clear or Pa	1	Dry			4	Dark-Street Lights On		D1	Lane 1 Dec	Moving Stra	Moving Stra	Passenger	Going Straig	South	North	Stop Sign	30
1	At Intersect	1	Clear	1	Dry	3	Straight at H	4	Dark-Street Lights On		D1	Lane 1 Dec	Turning Left	Moving Stra	Pickup,Pan	Making Left	East	South	No Traffic Control	Two Way
1	At Intersect	1	Clear	1	Dry	6	Curve & Gra	1	Daylight		D2	Lane 2 Dec	Turning Left	Moving Stra	Motorcycle	Making Left	South	West	Stop Sign	30
1	At Intersect	1	Clear or Pa	1	Dry	1	Straight & L	4	Dark-Street Lights On		D1	Lane 1 Dec	Moving Stra	Moving Stra	Passenger	Going Straig	North	South	Stop Sign	Way - Divided
1	At Intersect	1	Clear or Pa	1	Dry	6	Curve & Gra	1	Daylight		D2	Lane 2 Dec	Moving Stra	Moving Stra	Pickup,Pan	Starting in T	North	South	Stop Sign	Two Way

VEHICLE 1 ROADWAY TYPE	VEHICLE 1 ROADWAY SURFACE TYPE	VEHICLE 2 TYPE	VEHICLE 2 ACTION	VEHICLE 2 COMPASS DIRECTION FROM	VEHICLE 2 COMPASS DIRECTION TO	VEHICLE 2 TRAFFIC CONTROL	VEHICLE 2 POSTED SPEED	VEHICLE 2 ROADWAY TYPE	VEHICLE 2 ROADWAY SURFACE TYPE	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 2)	WA STATE PLANE SOUTH - X	WA STATE PLANE SOUTH - Y
l, no Barrier	Blacktop	Passenger (	Going Strai	East	West	No Traffic Control		Two Way - Divided, no Barrier	Blacktop	Did Not Grant RW to Vehicle	None	2384881.18	883010.12
with Barrier	Blacktop	Pickup,Pan	Going Strai	West	East	No Traffic Control		Two Way - Divided, with Barrier	Blacktop	Inattention	None	2384864.59	883034.48
with Barrier	Blacktop	Passenger (	Going Strai	West	East	No Traffic Control	35	Two Way - Divided, with Barrier	Blacktop	Did Not Grant RW to Vehicle	None	2384873.87	883013.04
	Concrete	Passenger (	Going Strai	West	East	No Traffic Control	30	Two Way - Divided, no Barrier	Concrete	Unknown Distraction	None	2384864.84	883034.92
- Undivided	Blacktop	Pickup,Pan	Going Strai	West	East	No Traffic Control		Two Way - Undivided	Blacktop	Did Not Grant RW to Vehicle	None	2384879.93	883035.06
with Barrier	Blacktop	Motorcycle	Negotiating	West	East	No Traffic Control	35	Two Way - Divided, with Barrier	Blacktop	Disregard Traffic Sign and Signals	None	2384868.7	883009.29
l, no Barrier	Blacktop	Passenger (	Going Strai	West	East	No Traffic Control		Two Way - Divided, with Barrier	Blacktop	Did Not Grant RW to Vehicle	None	2384864.84	883034.92
- Undivided	Blacktop	Pickup,Pan	Going Strai	West	East	No Traffic Control		Two Way - Undivided	Blacktop	Did Not Grant RW to Vehicle	None	2384880.25	883006.72

JURISDICTION	COUNTY	CITY	INVESTIGATIVE AGENCY	REPORT NUMBER	INDEXED PRIMARY TRAFFICWAY	PRIMARY TRAFFICWAY	BLOCK NUMBER	SR ONLY HISTORY/ SUSPENSE	INTERSECTING TRAFFICWAY	DATE	DAY NAME	TIME 24	TIME	MOST SEVERE INJURY TYPE CODE	MOST SEVERE INJURY TYPE	FATAL COLS	SUSP SER INJ COLS
State Route	Spokane	Spokane	Municipal/C	E912595	291	291		No		04/19/2019	Friday	20:12	8:12 PM	1	No Apparent Injury	0	0
State Route	Spokane	Spokane	Municipal/C	E995320	291	291		No		12/18/2019	Wednesday	08:32	8:32 AM	1	No Apparent Injury	0	0
State Route	Spokane	Spokane	Municipal/C	EA05247	291	291		No		01/21/2020	Tuesday	03:33	3:33 AM	1	No Apparent Injury	0	0
State Route	Spokane	Spokane	Municipal/C	EA34361	291	291		No		05/16/2020	Saturday	20:07	8:07 PM	1	No Apparent Injury	0	0
State Route	Spokane	Spokane	Municipal/C	EA47511	291	291		No		07/15/2020	Wednesday	16:00	4:00 PM	1	No Apparent Injury	0	0
State Route	Spokane	Spokane	Municipal/C	EA51948	291	291		No		08/02/2020	Sunday	12:16	12:16 PM	1	No Apparent Injury	0	0
State Route	Spokane	Spokane	Municipal/C	EB12976	291	291		No		03/11/2021	Thursday	13:41	1:41 PM	1	No Apparent Injury	0	0
City Street	Spokane	Spokane	Municipal/C	EB39053	W FRANCIS	W FRANCIS AVE		No	W NINE MIL	06/13/2021	Sunday	13:28	1:28 PM	1	No Apparent Injury	0	0
State Route	Spokane	Spokane	Municipal/C	EC61653	291	291		No		07/05/2022	Tuesday	10:30	10:30 AM	1	No Apparent Injury	0	0
State Route	Spokane	Spokane	Municipal/C	EC71024	291	291		No		08/04/2022	Thursday	10:46	10:46 AM	1	No Apparent Injury	0	0
State Route	Spokane	Spokane	Municipal/C	ED15442	291	291		No		12/13/2022	Tuesday	09:46	9:46 AM	1	No Apparent Injury	0	0
State Route	Spokane	Spokane	Municipal/C	E781829	291	291		No		03/17/2018	Saturday	16:30	4:30 PM	7	Possible Injury	0	0
State Route	Spokane	Spokane	Municipal/C	E920949	291	291		No		05/12/2019	Sunday	19:45	7:45 PM	7	Possible Injury	0	0
State Route	Spokane	Spokane	Municipal/C	E940415	291	291		No		07/16/2019	Tuesday	11:55	11:55 AM	7	Possible Injury	0	0
State Route	Spokane	Spokane	Municipal/C	E997407	291	291		No		12/25/2019	Wednesday	22:07	10:07 PM	7	Possible Injury	0	0
State Route	Spokane	Spokane	Municipal/C	EA41004	291	291		No		06/17/2020	Wednesday	21:18	9:18 PM	7	Possible Injury	0	0
State Route	Spokane	Spokane	Municipal/C	EB41729	291	291		No		06/22/2021	Tuesday	17:36	5:36 PM	7	Possible Injury	0	0
State Route	Spokane	Spokane	Municipal/C	EB57176	291	291		No		08/06/2021	Friday	15:56	3:56 PM	7	Possible Injury	0	0
State Route	Spokane	Spokane	Municipal/C	EC17007	291	291		No		02/03/2022	Thursday	12:09	12:09 PM	7	Possible Injury	0	0
State Route	Spokane	Spokane	Municipal/C	E847237	291	291		No		10/09/2018	Tuesday	07:38	7:38 AM	6	Suspected Minor Injury	0	0
City Street	Spokane	Spokane	Municipal/C	E912765	W NINE MIL	W NINE MIL	6200	No	N DRISCOL	04/20/2019	Saturday	18:12	6:12 PM	6	Suspected Minor Injury	0	0
State Route	Spokane	Spokane	Municipal/C	E957738	291	291		No		09/07/2019	Saturday	14:03	2:03 PM	6	Suspected Minor Injury	0	0
State Route	Spokane	Spokane	Municipal/C	EA31349	291	291		No		04/30/2020	Thursday	14:24	2:24 PM	6	Suspected Minor Injury	0	0
State Route	Spokane	Spokane	State Patro	EB31358	291	291		No		05/16/2021	Sunday	16:54	4:54 PM	6	Suspected Minor Injury	0	0
City Street	Spokane	Spokane	Municipal/C	ED73467	W NINE MIL	W NINE MIL	6200	No	N ASSEMBL	06/24/2023	Saturday	20:44	8:44 PM	6	Suspected Minor Injury	0	0
State Route	Spokane	Spokane	Municipal/C	EC66597	291	291		No		07/18/2022	Monday	15:02	3:02 PM	0	Unknown	0	0

SUSP MINOR INJ COLS	POSS INJ COLS	TOTAL INJ COLS	# FAT	# SUSP SER INJ	# SUSP MINOR INJ	# POS INJ	TOTAL # INJ	# VEH	# PEDS	# PEDAL	FIRST COLLISION TYPE CODE	FIRST COLLISION TYPE	FIRST OBJECT STRUCK CODE	FIRST OBJECT STRUCK	SECOND COLLISION TYPE CODE	SECOND COLLISION TYPE
0	0	0	0	0	0	0	0	2	0	0	10	Entering at angle				
0	0	0	0	0	0	0	0	2	0	0	10	Entering at angle				
0	0	0	0	0	0	0	0	1	0	0	50	Fixed objec	16	Street Light Pole or Base		
0	0	0	0	0	0	0	0	2	0	0	10	Entering at angle				
0	0	0	0	0	0	0	0	2	0	0	10	Entering at angle				
0	0	0	0	0	0	0	0	2	0	0	10	Entering at angle				
0	0	0	0	0	0	0	0	2	0	0	10	Entering at angle				
0	0	0	0	0	0	0	0	2	0	0	28	From opposite direction - one left turn - one straight				
0	0	0	0	0	0	0	0	2	0	0	10	Entering at angle				
0	0	0	0	0	0	0	0	2	0	0	10	Entering at angle				
0	0	0	0	0	0	0	0	2	0	0	10	Entering at angle				
0	1	1	0	0	0	2	2	2	0	0	10	Entering at angle				
0	1	1	0	0	0	1	1	1	0	0	50	Fixed objec	14	Metal Sign I	50	Fixed objec
0	1	1	0	0	0	1	1	2	0	0	10	Entering at angle				
0	1	1	0	0	0	1	1	2	0	0	10	Entering at angle				
0	1	1	0	0	0	1	1	2	0	0	10	Entering at angle				
0	1	1	0	0	0	2	2	2	0	0	10	Entering at angle			50	Fixed objec
0	1	1	0	0	0	1	1	2	0	0	10	Entering at angle				
0	1	1	0	0	0	2	2	2	0	0	10	Entering at angle				
1	0	1	0	0	3	0	3	2	0	0	10	Entering at angle				
1	0	1	0	0	1	1	2	2	0	0	10	Entering at angle				
1	0	1	0	0	1	1	2	2	0	0	10	Entering at angle				
1	0	1	0	0	1	2	3	2	0	0	10	Entering at angle				
1	0	1	0	0	1	0	1	1	0	0	50	Fixed objec	83	Linear Curb	50	Fixed objec
1	0	1	0	0	1	0	1	2	0	0	10	Entering at angle				
0	0	0	0	0	0	0	0	1	0	0	50	Fixed objec	14	Metal Sign Post		

JUNCTION RELATIONSHIP CODE	JUNCTION RELATIONSHIP	WEATHER CODE	WEATHER	ROADWAY SURFACE CONDITION CODE	ROADWAY SURFACE CONDITION	ROADWAY CHARACTERICTIC CODE	ROADWAY CHARACTERISTIC	LIGHTING CONDITION CODE	LIGHTING CONDITION	MISCELLANEOUS TRAFFICWAY TYPE	FIRST IMPACT LOCATION CODE	FIRST IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)
1	At Intersect	1	Clear or Pa	1	Dry	6	Curve & Gra	3	Dusk		D1	Lane 1 Dec
1	At Intersect	1	Clear or Pa	1	Dry	6	Curve & Gra	1	Daylight		D1	Lane 1 Dec
4	Not at Inter	1	Clear	4	Ice	6	Curve & Gra	4	Dark-Street Lights On		DL	Decreasing
1	At Intersect	1	Clear or Pa	1	Dry	6	Curve & Gra	1	Daylight		D1	Lane 1 Dec
1	At Intersect	1	Clear or Pa	1	Dry	2	Straight & G	1	Daylight		D1	Lane 1 Dec
1	At Intersect	1	Clear or Pa	1	Dry	2	Straight & G	1	Daylight		D1	Lane 1 Dec
1	At Intersect	1	Clear or Pa	1	Dry	5	Curve & Lev	1	Daylight		D1	Lane 1 Dec
1	At Intersect	1	Clear	1	Dry	5	Curve & Lev	1	Daylight		C1	Lane of Prin
1	At Intersect	1	Clear or Pa	1	Dry	6	Curve & Gra	1	Daylight		D1	Lane 1 Dec
1	At Intersect	1	Clear or Pa	1	Dry	5	Curve & Lev	1	Daylight		D1	Lane 1 Dec
1	At Intersect	1	Clear	4	Ice	6	Curve & Gra	1	Daylight		D1	Lane 1 Dec
1	At Intersect	1	Clear or Pa	1	Dry	7	Curve at Hi	1	Daylight		D1	Lane 1 Dec
5	At Intersect	1	Clear or Pa	1	Dry	1	Straight & L	1	Daylight		D0	Past Right S
1	At Intersect	1	Clear or Pa	1	Dry	6	Curve & Gra	1	Daylight		D1	Lane 1 Dec
1	At Intersect	1	Clear or Pa	1	Dry	1	Straight & L	4	Dark-Street Lights On		D1	Lane 1 Dec
1	At Intersect	1	Clear	1	Dry			4	Dark-Street Lights On		D1	Lane 1 Dec
1	At Intersect	1	Clear	1	Dry	6	Curve & Gra	1	Daylight		D1	Lane 1 Dec
1	At Intersect	1	Clear or Pa	1	Dry	6	Curve & Gra	1	Daylight		D1	Lane 1 Dec
1	At Intersect	2	Overcast	3	Snow/Slush			1	Daylight		D1	Lane 1 Dec
1	At Intersect	3	Raining	2	Wet	6	Curve & Gra	1	Daylight		D1	Lane 1 Dec
1	At Intersect	1	Clear or Pa	1	Dry	6	Curve & Gra	1	Daylight		C1	Lane of Prin
1	At Intersect	1	Clear or Pa	1	Dry	6	Curve & Gra	1	Daylight		D1	Lane 1 Dec
1	At Intersect	1	Clear	1	Dry	2	Straight & G	1	Daylight		D2	Lane 2 Dec
4	Not at Inter	1	Clear	1	Dry	6	Curve & Gra	1	Daylight		A8	Median Sho
1	At Intersect	1	Clear	1	Dry	6	Curve & Gra	3	Dusk		C1	Lane of Prin
1	At Intersect	1	Clear	1	Dry	6	Curve & Gra	1	Daylight		DL	Decreasing

SR ONLY VEH 1 MOVEMENT	SR ONLY VEH 2 MOVEMENT	VEHICLE 1 TYPE	VEHICLE 1 ACTION	VEHICLE 1 COMPASS DIRECTION FROM	VEHICLE 1 COMPASS DIRECTION TO	VEHICLE 1 TRAFFIC CONTROL	VEHICLE 1 POSTED SPEED	VEHICLE 1 ROADWAY TYPE	VEHICLE 1 ROADWAY SURFACE TYPE	VEHICLE 2 TYPE
Turning Left	Moving Stra	Passenger	Making Left	South	North	Stop Sign	30	Other	Blacktop	Pickup,Panel Truck or Vanette under 10,000 lb
Turning Left	Moving Stra	Pickup,Pan	Making Left	South	West	Stop Sign	35	with Barrier	Blacktop	Pickup,Panel Truck or Vanette under 10,000 lb
Moving Stra	Unknown o	Pickup,Pan	Negotiating	West	East	No Traffic C	35	Other	Blacktop	
Turning Left	Moving Stra	Pickup,Pan	Making Left	South	Northwest	Stop Sign	y - Divided, with Barrier		Blacktop	Passenger Car
Turning Left	Moving Stra	Passenger	Making Left	South	West	Stop Sign	35	Other	Blacktop	Passenger Car
Turning Left	Moving Stra	Passenger	Making Left	South	Northwest	Stop Sign	30	with Barrier	Blacktop	Pickup,Panel Truck or Vanette under 10,000 lb
Turning Left	Moving Stra	Passenger	Making Left	South	Northwest	Stop Sign	30	with Barrier	Blacktop	Pickup,Panel Truck or Vanette under 10,000 lb
nary Trafficway		Passenger	Going Straig	South	North	Stop Sign		Two Way - D	Blacktop	Passenger Car
Turning Left	Moving Stra	Pickup,Pan	Making Left	South	North	Stop Sign	30	One Way	Blacktop	Pickup,Panel Truck or Vanette under 10,000 lb
Turning Left	Moving Stra	Passenger	Making Left	South	North	Stop Sign	30	with Barrier	Blacktop	Passenger Car
Moving Stra	Moving Stra	Pickup,Pan	Starting in T	South	Northwest	Stop Sign	30	with Barrier	Blacktop	Pickup,Panel Truck or Vanette under 10,000 lb
Turning Left	Moving Stra	Pickup,Pan	Making Left	East	West	Stop Sign	25	Other	Blacktop	Pickup,Panel Truck or Vanette under 10,000 lb
Moving Stra	Unknown o	Pickup,Pan	Going Straig	West	East	No Traffic Co	n - Divided, with Barrier		Blacktop	
Turning Left	Moving Stra	Passenger	Making Left	South	Northwest	Stop Sign	Way - Divided, no Barrier		Blacktop	Pickup,Panel Truck or Vanette under 10,000 lb
Turning Left	Moving Stra	Pickup,Pan	Making Left	South	North	Stop Sign	30	with Barrier	Blacktop	Pickup,Panel Truck or Vanette under 10,000 lb
Moving Stra	Moving Stra	Pickup,Pan	Starting in T	South	North	Stop Sign	30	with Barrier	Concrete	Pickup,Panel Truck or Vanette under 10,000 lb
Turning Left	Moving Stra	Pickup,Pan	Making Left	South	Northwest	Stop Sign	y - Divided, with Barrier		Blacktop	Passenger Car
Turning Left	Moving Stra	Passenger	Making Left	South	West	Stop Sign	30	l, no Barrier	Blacktop	Pickup,Panel Truck or Vanette under 10,000 lb
Turning Left	Moving Stra	Passenger	Making Left	Southeast	Northwest	Stop Sign			Blacktop	Passenger Car
Moving Stra	Moving Stra	Passenger	Starting in T	South	Northwest	Stop Sign	35	with Barrier	Blacktop	Passenger Car
nary Trafficway		Passenger	Going Straig	Southeast	Northwest	Stop Sign		Two Way - D	Blacktop	Pickup,Panel Truck or Vanette under 10,000 lb
Turning Left	Moving Stra	Pickup,Pan	Making Left	Southeast	Northwest	Stop Sign	30	with Barrier	Blacktop	Pickup,Panel Truck or Vanette under 10,000 lb
Turning Left	Moving Stra	Pickup,Pan	Making Left	South	North	Stop Sign	30	l, no Barrier	Blacktop	Pickup,Panel Truck or Vanette under 10,000 lb
Moving Stra	Unknown o	Motorcycle	Negotiating	South	North	No Traffic C	35	with Barrier	Blacktop	
nary Trafficway		Passenger	Making Left	East	South	Stop Sign		Two Way - U	Blacktop	Passenger Car
Turning Right	Unknown o	Pickup,Pan	Making Right	Northwest	South	No Traffic C	30	Other	Blacktop	

VEHICLE 2 ACTION	VEHICLE 2 COMPASS DIRECTION FROM	VEHICLE 2 COMPASS DIRECTION TO	VEHICLE 2 TRAFFIC CONTROL	VEHICLE 2 POSTED SPEED	VEHICLE 2 ROADWAY TYPE	VEHICLE 2 ROADWAY SURFACE TYPE	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 2)	WA STATE PLANE SOUTH - X	WA STATE PLANE SOUTH - Y
Going Straight Ahead	North	South	No Traffic Control	35	Other	Blacktop	Disregard Stop Sign - Flashing Red	None	2384506.39	882956.72
Going Straight Ahead	West	East	No Traffic Control	35	Two Way - Divided, with Barrier	Blacktop	Did Not Grant RW to Vehicle	None	2384506.18	882956.86
							Exceeding Reas. Safe Speed		2384289.72	883096.23
Going Straight Ahead	North	East	No Traffic Control		Two Way - Divided, with Barrier	Blacktop	Did Not Grant RW to Vehicle	None	2384507.55	882956.83
Going Straight Ahead	West	East	No Traffic Control	35	Other	Blacktop	Improper Turn/Merge	None	2384506.33	882956.33
Going Straight Ahead	Northwest	East	No Traffic Control	35	Two Way - Divided, with Barrier	Blacktop	Did Not Grant RW to Vehicle	None	2384507.62	882957.21
Going Straight Ahead	Northwest	East	No Traffic Control	30	Two Way - Divided, with Barrier	Blacktop	Did Not Grant RW to Vehicle	None	2384509.04	882955.75
Making Left Turn	North	East	No Traffic Control		Two Way - Divided, with Barrier	Blacktop	Did Not Grant RW to Vehicle	None	2384495.59	882941.51
Going Straight Ahead	North	East	No Traffic Control	30	One Way	Blacktop	Did Not Grant RW to Vehicle	None	2384506.44	882957.25
Going Straight Ahead	North	East	No Traffic Control		Two Way - Divided, with Barrier	Blacktop	Disregard Traffic Sign and Signals	None	2384504.01	882958.36
Going Straight Ahead	West	East	No Traffic Control		Two Way - Divided, with Barrier	Blacktop	Unknown Distraction	None	2384506.44	882976.24
Going Straight Ahead	West	East	No Traffic Control	25	Other	Blacktop	Unknown Distraction	None	2384500.36	882960.38
							Operating Other Electronic Devices (comp		2384505.35	882959.71
Going Straight Ahead	Northwest	Southeast	No Traffic Control		Two Way - Divided, no Barrier	Blacktop	Did Not Grant RW to Vehicle	None	2384504.59	882958.8
Going Straight Ahead	West	East	No Traffic Control	30	Two Way - Divided, with Barrier	Blacktop	None	None	2384508.69	882936.8
Negotiating a Curve	North	South	No Traffic Control	30	Two Way - Divided, with Barrier	Concrete	Disregard Traffic Sign and Signals	None	2384507.28	882955.53
Going Straight Ahead	Northwest	East	No Traffic Control	35	Two Way - Divided, with Barrier	Blacktop	Did Not Grant RW to Vehicle	None	2384506.44	882976.24
Going Straight Ahead	West	East	No Traffic Control	30	Two Way - Divided, no Barrier	Blacktop	Did Not Grant RW to Vehicle	None	2384506.44	882976.24
Going Straight Ahead	Northwest	East	No Traffic Control			Blacktop	Did Not Grant RW to Vehicle	None	2384506.44	882976.24
Going Straight Ahead	Northwest	Southeast	No Traffic Control	35	Two Way - Divided, with Barrier	Blacktop	Inattention	None	2384506.69	882937.73
Going Straight Ahead	Southwest	Northeast	No Traffic Control		Two Way - Divided, with Barrier	Blacktop	Other Contributing Circ Not Listed	None	2384761.94	882699.56
Going Straight Ahead	Northwest	East	No Traffic Control	35	Two Way - Divided, with Barrier	Blacktop	None	None	2384507.55	882956.83
Going Straight Ahead	Northwest	Southeast	No Traffic Control	35	Two Way - Divided, no Barrier	Blacktop	Disregard Traffic Sign and Signals	None	2384507.31	882977.43
							Other Contributing Circ Not Listed		2384372.47	883024.38
Going Straight Ahead	South	North	No Traffic Control		Two Way - Undivided	Blacktop	Disregard Traffic Sign and Signals	None	2384744.99	882677.16
							Improper Turn/Merge		2384500.58	882961.49

JURISDICTION	COUNTY	CITY	INVESTIGATIVE AGENCY	REPORT NUMBER	INDEXED PRIMARY TRAFFICWAY	PRIMARY TRAFFICWAY	BLOCK NUMBER	SR ONLY HISTORY/ SUSPENSE	INTERSECTING TRAFFICWAY	DATE	DAY NAME	TIME 24	TIME	MOST SEVERE INJURY TYPE CODE	MOST SEVERE INJURY TYPE
City Street	Spokane	Spokane	Municipal/City Pc	EC29584	N ASSEMBLY ST	N ASSEMBLY ST	6087	No	W NINE MILE RD	03/18/2022	Friday	22:27	10:27 PM	7	Possible Injury
City Street	Spokane	Spokane	Municipal/City Pc	EA08188	N ASSEMBLY ST	N ASSEMBLY ST	6200	No	ACCESS RD TO W NINE MILE RD	01/09/2020	Thursday	00:22	12:22 AM	7	Possible Injury
City Street	Spokane	Spokane	Municipal/City Pc	ED84533	N ASSEMBLY ST	N ASSEMBLY ST		No	W NINE MILE RD	07/29/2023	Saturday	23:19	11:19 PM	7	Possible Injury
City Street	Spokane	Spokane	Municipal/City Pc	EB32005	N ASSEMBLY ST	N ASSEMBLY ST		No	W NINE MILE RD	05/20/2021	Thursday	13:02	1:02 PM	7	Possible Injury

FATAL COLS	SUSP SER INJ COLS	SUSP MINOR INJ COLS	POSS INJ COLS	TOTAL INJ COLS	# FAT	# SUSP SER INJ	# SUSP MINOR INJ	# POS INJ	TOTAL # INJ	# VEH	# PEDS	# PEDAL	FIRST COLLISION TYPE CODE	FIRST COLLISION TYPE	FIRST OBJECT STRUCK CODE	FIRST OBJECT STRUCK	SECOND COLLISION TYPE CODE	SECOND COLLISION TYPE	JUNCTION RELATIONSHIP CODE	JUNCTION RELATIONSHIP
0	0	0	1	1	0	0	0	1	1	2	0	0	28	From opposite direction - one left turn - one straight					1	At Intersect
0	0	0	1	1	0	0	0	1	1	2	0	0	28	From opposite direction - one left turn - one straight					1	At Intersect
0	0	0	1	1	0	0	0	2	2	2	0	0	10	Entering at angle					1	At Intersect
0	0	0	1	1	0	0	0	1	1	2	0	0	28	From opposite direction - one left turn - one straight					1	At Intersect

WEATHER CODE	WEATHER	ROADWAY SURFACE CONDITION CODE	ROADWAY SURFACE CONDITION	ROADWAY CHARACTERICTIC CODE	ROADWAY CHARACTERISTIC	LIGHTING CONDITION CODE	LIGHTING CONDITION	MISCELLANEOUS TRAFFICWAY TYPE	FIRST IMPACT LOCATION CODE	FIRST IMPACT LOCATION (City, County & Misc Traffickways - 2010 forward)	SR ONLY VEH 1 MOVEMENT	SR ONLY VEH 2 MOVEMENT	VEHICLE 1 TYPE	VEHICLE 1 ACTION	VEHICLE 1 COMPASS DIRECTION FROM	VEHICLE 1 COMPASS DIRECTION TO	VEHICLE 1 TRAFFIC CONTROL	VEHICLE 1 POSTED SPEED	VEHICLE 1 ROADWAY TYPE	VEHICLE 1 ROADWAY SURFACE TYPE
1	Clear	1	Dry	6	Curve & Gra	4	Dark-Street Lights On		C1	Lane of Primary Trafficway			Passenger (	Going Strai	North	South	Stop Sign		Two Way - U	Blacktop
2	Overcast	1	Dry	1	Straight & L	6	Dark-No Street Lights		C1	Lane of Primary Trafficway			Pickup,Pan	Going Strai	South	North	No Traffic C	30	Two Way - D	Blacktop
1	Clear	1	Dry	5	Curve & Lev	6	Dark-No Street Lights		C1	Lane of Primary Trafficway			Passenger (	Making Left	North	South	Stop Sign	30	Two Way - U	Blacktop
1	Clear	1	Dry			1	Daylight		C1	Lane of Primary Trafficway			Pickup,Pan	Going Strai	North	South	Stop Sign		Two Way - D	Blacktop

VEHICLE 2 TYPE	VEHICLE 2 ACTION	VEHICLE 2 COMPASS DIRECTION FROM	VEHICLE 2 COMPASS DIRECTION TO	VEHICLE 2 TRAFFIC CONTROL	VEHICLE 2 POSTED SPEED	VEHICLE 2 ROADWAY TYPE	VEHICLE 2 ROADWAY SURFACE TYPE	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 2)	WA STATE PLANE SOUTH - X	WA STATE PLANE SOUTH - Y
Passenger (	Going Strai	South	North	No Traffic Control		Two Way - U	Blacktop	Other Distractions	None	2384881.07	882430.57
Passenger (	Making Left	Southeast	West	No Traffic C	30	Two Way - D	Blacktop	None	Under Influence of Alcohol	2384879.57	882707.35
Pickup,Pan	Going Strai	South	Northwest	No Traffic Control		One Way	Blacktop	Under Influence of Alcohol	None	2384884.29	882548.98
Pickup,Pan	Making Left	South	North	No Traffic Control		Two Way - D	Blacktop	Other Contributing Circ Not Listed	None	2384884.29	882548.98

Nine Mile & Francis

Intersection Crash rates

Daily Entering Vehicles	Number of Crashes	Number of Years		Intersection Crash rate	
20600	8	6	1	0.177328545	crashes per million entering vehicles

Average rate 92.46 per 100,000,000 miles

avg(am/0.08, PM/0.1)

Nine Mile Rd/Francis Ave & Driscoll

Intersection Crash rates

Daily Entering Vehicles	Number of Crashes	Number of Years		Intersection Crash rate	
30955	26	6	1	0.383529191	crashes per million entering vehicles

Assembly St & Driscoll

Intersection Crash rates

Daily Entering Vehicles	Number of Crashes	Number of Years		Intersection Crash rate	
7088	4	5	1	0.309224157	crashes per million entering vehicles

Date Prepared:	**4/3/2025**		**Prepared by:**	**J. BALL**
Date Updated:	**8/12/2025**		**Updated by:**	**J. BALL**

Project Name: Francis - Assembly & Assembly- Driscoll Roundabouts & Street only **$8,978,173** **Proj ID: 2021079**

Description: Construct 2 lane roundabouts at Francis & Assembly & Assembly & Driscoll. Full depth rebuild (SR 291 8" over 8", Discroll & Assemlby 5" over 6"). Includes stormwater upgrades, Ramp Meter & Fiber Conduit to Fire Station.

Item Description	Qty	Unit	Unit Cost	Extension
Division 1 - General Requirements				
SPCC Plan	1.0	LS	$2,000	$2,000
Public Liaison Representative	1.0	LS	$5,000	$5,000
Reference and Reestablish Survey Monument	6	EA	$1,000	$6,000
Mobilization	1.0	LS	$393,000	$393,000
Project Tremporary Traffic Control	1.0	LS	$393,000	$393,000
			subtotal:	**$799,000**
Division 2 - Earthwork				
Clearing & Grubbing	1	LS	$15,000	$15,000
Remove Existing Curb and/or Gutter	7,900	LF	$12	$94,800
Remove Cement Concrete Sidewalk & Driveway	3,106	SY	$20	$62,120
Remove Manhole, Catch Basin, or Drywell	14	EA	$1,200	$16,800
Sawcutting Curb	14	EA	$45	$630
Sawcutting Rigid and Flexible Pavement	14,210	LFI	$1.50	$21,315
Roadway Excavation Including Haul	7,758	CY	$30	$232,740
Common Borrow Incl. Haul	2,000	CY	$30	$60,000
Preparation of Untreated Roadway	17,767	SY	$3	$53,301
			subtotal:	**$556,706**
Division 4 - Bases				
Crushed Surfacing Base Course	3,546	CY	$75	$265,950
CSTC for Sidewalk and Driveways	141	CY	$150	$21,150
			subtotal:	**$287,100**
Division 5 - Surface Treatments & Pavements				
HMA CL 1/2 IN. Heavy Traffic, 8 INCH THICK - SR291	10,667	SY	$58	$618,686
HMA CL 1/2 IN. Heavy Traffic, 5 INCH THICK - Driscoll & Assembly	7,100	SY	$37	$262,700
HMA for Pavement Repair, CL 1/2 IN. Heavy Traffic, 5 In. Thick	556	SY	$45	$25,020
Soil Residual Herbicide	18,287	SY	$1	$18,287
Pavement Repair Excavaton Including Haul	556	SY	$40	$22,240
Furnishing Concrete for Cement Concrete Pavement-Truck Apron	116	CY	$350	$40,600
Portland Cement Concrete Pavement, 8 Depth - Truck Apron	520	SY	$75	$39,000
			subtotal:	**$1,026,533**
Division 6 - Structures				
Reinforced Concrete Retaining Wall	800	SF	$100	$80,000
Cement Concrete Curb Wall	185	LF	$85	$15,725
			subtotal:	**$95,725**
Division 7 - Drainage Structures, Storm Sewers, Sanitary Sewers, Water mains & Conduits				
Catch basin Type 1	19	EA	$3,500	$66,500
MH or DW Frame & Cover	20	EA	$1,300	$26,000
Connect ___In. Dia. Pipe to Existing CB, DW or MH	13	EA	$850	$11,050
Trench Safety	1	LS	$5,000	$5,000
Catch Basin Ductile Iron Sewer Pipe 8 In. Diam.	775	LF	$85	$65,875
			subtotal:	**$174,425**
Division 8 - Miscellaneous Construction				
Landscaping	1	LS	$15,000	$15,000
Topsoil Type A, 2 Inch Thick	8,617	SY	$6	$51,702
Hydroseeding	6,667	SY	$5	$33,335
Sod Installation	1,950	SY	$25	$48,750
Irrigation System - new and modify	1	LS	$15,000	$15,000
Cement Concrete Curb and/or Gutter	4,400	LF	$45	$198,000
Roundabout Central Island Cement Concrete Curb	625	LF	$50	$31,250
Roundabout Cement Concrete Curb & Gutter	4,525	LF	$50	$226,250
Cement Concrete Driveway	261	SY	$95	$24,795
Cement Concrete Sidewalk	2,000	SY	$110	$220,000
Ramp Detectable Warning	112	SF	$35	$3,920
Traffic Signal System - Ramp Meter	1	LS	$300,000	$300,000
Illumination System (Street Lights)	10	EA	$10,000	$100,000
Communication Conduit System - Ramp Meter	3,675	LF	$50	$183,750
Communication Cables and Interfaces - Ramp Meter	3,675	LF	$15	$55,125
Signing, Permanent - City Manufactured Signs	1	LS	$30,000	$30,000
Pavement Marking (Durable Heat Applied, Inlay Tape, Durable, Paint)	1	LS	$45,000	$45,000
Reinforced Doweled Curb	550	LF	$50	$27,500
Traffic Island Concrete - 4 Inch Thick	1,475	SY	$70	$103,250
Traffic Island Fill - CSTC	165	CY	$150	$24,750
			subtotal:	**$1,737,377**
Legacy ICM Items				
Utility Relocate - power pole	9	EA	$5,000	$45,000
			subtotal:	**$45,000**
			Construction Subtotal	**$4,721,866**
Scope Contingency	20.0%			$944,373
			Construction Subtotal	**$5,666,239**
Construction Contingency	15.0%			$849,936
Construction total			**Construction Total**	**$6,516,175**
Property Purchase - 125 SF +/-				$5,000
Geotech	1.0%			$65,162
Surveying	3.0%			$195,485
Design & Bid Docs	7.0%			$456,132
Admin, Legal, & Permits	1.5%			$97,743
Construction Mgmt	15.0%			$977,426
			Project Total	**$8,313,123**

	Unit costs from year…	for construction in…	
	2025	**2027**	
For Program			
Preconstruction	815	$879,684	
Property Purchase	5	$5,400	
Construction Total	6,516	$7,037,469	
Const mgmt	977	$1,055,620	
	8,313	**$8,978,173**	Project Cost

Attachment E

		Date Prepared:	**4/3/2025**	**Prepared by:**	**J. BALL**
		Date Updated:	**7/17/2025**	**Updated by:**	**J. BALL**
Project Name: Francis, Assembly & Driscoll Intersection - Street work only				**$8,748,655**	**Proj ID: 2021079**
Description: Construct Signals at Francis/Driscoll & Assembly/Driscoll. Full depth rebuild (SR 291 = 8" over 8", Dris & Assem = 5" over 6").					
Item Description	**Bid Item No.**	**Qty**	**Unit**	**Unit Cost**	**Extension**
Division 1 - General Requirements					
SPCC Plan	1071020	1.0	LS	$2,000	$2,000
Public Liaison Representative	1070050	1.0	LS	$5,000	$5,000
Reference and Reestablish Survey Monument	1070060	6	EA	$1,000	$6,000
Mobilization	1090000	1.0	LS	$391,000	$391,000
Project Tremporary Traffic Control	1100000	1.0	LS	$391,000	$391,000
				subtotal:	**$795,000**
Division 2 - Earthwork					
Clearing & Grubbing	2010000	1	LS	$10,000	$10,000
Remove Existing Curb and/or Gutter	20200_0	6,625	LF	$12	$79,500
Remove Cement Concrete Sidewalk & Driveway	2020040	3,206	SY	$20	$64,120
Remove Manhole, Catch Basin, or Drywell	2020050	11	EA	$1,200	$13,200
Sawcutting Curb	2020130	18	EA	$45	$810
Sawcutting Rigid and Flexible Pavement	202015_	13,950	LFI	$1.50	$20,925
Roadway Excavation Including Haul	2030000	7,866	CY	$30	$235,980
Preparation of Untreated Roadway	2030090	18,577	SY	$3	$55,731
				subtotal:	**$480,266**
Division 4 - Bases					
Crushed Surfacing Base Course	4040020	3,794	CY	$75	$284,550
CSTC for Sidewalk and Driveways	4040030	144	CY	$150	$21,600
				subtotal:	**$306,150**
Division 5 - Surface Treatments & Pavements					
HMA CL 1/2 IN. Heavy Traffic, 8 INCH THICK - SR291	50400__	10,333	SY	$58	$599,314
HMA CL 1/2 IN. Heavy Traffic, 5 INCH THICK - Driscoll & Assembly	50400__	8,244	SY	$37	$305,028
HMA for Pavement Repair, CL 1/2 IN. Heavy Traffic, 5 In. Thick	50401__	534	SY	$85	$45,390
Soil Residual Herbicide	5040300	18,577	SY	$1	$18,577
Pavement Repair Excavaton Including Haul	5040320	534	SY	$40	$21,360
				subtotal:	**$989,669**
Division 6 - Structures					
Cement Concrete Curb Wall	6020080	325	LF	$85	$27,625
				subtotal:	**$27,625**
Division 7 - Drainage Structures, Storm Sewers, Sanitary Sewers, Water mains & Conduits					
Adjust Existing MH, CB, DW or Grate Inlet in Asphalt or Concrete	70502__	6	EA	$800	$4,800
Catch basin Type 1	7050221	14	EA	$3,500	$49,000
MH or DW Frame & Cover	705028_	20	EA	$1,300	$26,000
Valve Box and Cover	7050283	12	EA	$650	$7,800
Connect ___In. Dia. Pipe to Existing CB, DW or MH	705029_	7	EA	$850	$5,950
Connect ___In. Dia. Sewer Pipe to Existing Sewer Pipe	705032_	3	EA	$750	$2,250
Trench Safety	7080030	1	LS	$5,000	$5,000
Catch Basin Ductile Iron Sewer Pipe 8 In. Diam.	7080082	400	LF	$85	$34,000
				subtotal:	**$134,800**
Division 8 - Miscellaneous Construction					
Landscaping	8020000	1	LS	$15,000	$15,000
Topsoil Type A, 2 Inch Thick	8020010	3,589	SY	$6	$21,534
Hydroseeding	8020260	1,456	SY	$5	$7,280
Sod Installation	8020300	2,133	SY	$25	$53,325
Irrigation System - new and modify	8030000	1	LS	$15,000	$15,000
Cement Concrete Curb and/or Gutter	80400__	3,425	LF	$45	$154,125
Cement Concrete Driveway	8060000	194	SY	$95	$18,430
Cement Concrete Driveway Transition	8060020	50	SY	$90	$4,500
Cement Concrete Sidewalk	8140000	2,197	SY	$90	$197,730
Ramp Detectable Warning	8140040	152	SF	$35	$5,320
Traffic Signal System	8200000	2	LS	$400,000	$800,000
Illumination System (Street Lights)	8200040	5	EA	$10,000	$50,000
Communication Conduit System	8200060	3,100	LF	$50	$155,000
Communication Cables and Interfaces	8200070	3,100	LF	$15	$46,500
Signing, Permanent - City Manufactured Signs	8210070	1	LS	$20,000	$20,000
Pavement Marking (Durable Heat Applied, Inlay Tape, Durable, Paint)	82200_0	1	LS	$74,000	$74,000
Reinforced Doweled Curb	8910000	3,250	LF	$50	$162,500
Traffic Island Concrete - 4 Inch Thick	8910050	1,525	SY	$70	$106,750
Traffic Island Fill - CSTC		170	CY	$150	$25,500
				subtotal:	**$1,932,494**
Legacy ICM Items					
Utility Relocate - power pole		6	EA	$5,000	$30,000
				subtotal:	**$30,000**
				Construction Subtotal	**$4,696,004**
Scope Contingency		20.0%			$939,201
				Construction Subtotal	**$5,635,205**
Construction Contingency		15.0%			$845,281
Construction total				**Construction Total**	**$6,480,486**
Property Purchase					$0
Geotech		0.5%			$32,402
Surveying		1.0%			$64,805
Design & Bid Docs		7.0%			$453,634
Admin, Legal, & Permits		1.5%			$97,207
Construction Mgmt		15.0%			$972,073
				Project Total	**$8,100,607**

	Unit costs from year…	for construction in…	
	2025	**2027**	
For Program			
Preconstruction	648	$699,892	
Property Purchase	0	$0	
Construction Total	6,480	$6,998,924	
Const mgmt	972	$1,049,839	
	8,101	**$8,748,655**	Project Cost

Attachment E

Crash Type	Cost
Fatality (K)	$11,295,400
Suspected Serious Injury (A)	$655,000
Suspected Minor Injury (B)	$198,500
Possible Injury (C)	$125,600
Property Damage Only (O)	$11,900
CMF ID:	7966
CMF	0.541
CRF	0.459

Source:
Crash Costs for Highway Safety Analysis, January 2018

For WSDOT facilities only

Crash Type	2018-2023	Crash Costs	CMF	Expected Crashes	Difference	Crash Benefits
Fatality (K)	0	$0	0.54	0.00	0.00	$0
Suspected Serious Injury (A)	1	$655,000	0.54	0.54	0.46	$300,645
Suspected Minor Injury (B)	8	$1,588,000	0.54	4.33	3.67	$728,892
Possible Injury (C)	14	$1,758,400	0.54	7.57	6.43	$807,106
Property Damage Only (O)	16	$190,400	0.54	8.66	7.34	$87,394
Total Crash Costs	**39**	**$4,191,800**		**21.099**	**17.901**	**$1,924,036**

Project Costs (C)	**$8,748,655**
Worth of Benefits (WB)	**$23,049,954**
From 2017 FHWA guidance	
Net Benefits (B = WB - C)	**$14,301,298**
Benefit to Cost Ratio	**2.63**

Crash Type	Cost
Fatality (K)	$11,295,400
Suspected Serious Injury (A)	$655,000
Suspected Minor Injury (B)	$198,500
Possible Injury (C)	$125,600
Property Damage Only (O)	$11,900
CMF ID:	10082
CMF	0.623
CRF	0.377

Source:
Crash Costs for Highway Safety Analysis, January 2018

For WSDOT facilities only

Crash Type	2018-2023	Crash Costs	CMF	Expected Crashes	Difference	Crash Benefits
Fatality (K)	0	$0	0.62	0.00	0.00	$0
Suspected Serious Injury (A)	1	$655,000	0.62	0.62	0.38	$246,935
Suspected Minor Injury (B)	8	$1,588,000	0.62	4.98	3.02	$598,676
Possible Injury (C)	14	$1,758,400	0.62	8.72	5.28	$662,917
Property Damage Only (O)	16	$190,400	0.62	9.97	6.03	$71,781
Total Crash Costs	**39**	**$4,191,800**		**24.297**	**14.703**	**$1,580,309**

Project Costs (C)	**$8,978,173**
Worth of Benefits (WB)	**$18,932,097**
From 2017 FHWA guidance	
Net Benefits (B = WB - C)	**$9,953,924**
Benefit to Cost Ratio	**2.11**

Crash Type	Cost
Fatality (K)	$11,295,400
Suspected Serious Injury (A)	$655,000
Suspected Minor Injury (B)	$198,500
Possible Injury (C)	$125,600
Property Damage Only (O)	$11,900
CMF ID:	7966
CMF	0.541
CRF	0.459

Source:
Crash Costs for Highway Safety Analysis, January 2018

For WSDOT facilities only

Crash Type	2018-2023	Crash Costs	CMF	Expected Crashes	Difference	Crash Benefits
Fatality (K)	0	$0	0.54	0.00	0.00	$0
Suspected Serious Injury (A)	1	$655,000	0.54	0.54	0.46	$300,645
Suspected Minor Injury (B)	8	$1,588,000	0.54	4.33	3.67	$728,892
Possible Injury (C)	10	$1,256,000	0.54	5.41	4.59	$576,504
Property Damage Only (O)	16	$190,400	0.54	8.66	7.34	$87,394
Total Crash Costs	**35**	**$3,689,400**		**18.935**	**16.065**	**$1,693,435**

Project Costs (C)	**$4,905,322**
Worth of Benefits (WB)	**$20,287,347**
From 2017 FHWA guidance	
Net Benefits (B = WB - C)	**$15,382,025**
Benefit to Cost Ratio	**4.14**

Crash Type	Cost
Fatality (K)	$11,295,400
Suspected Serious Injury (A)	$655,000
Suspected Minor Injury (B)	$198,500
Possible Injury (C)	$125,600
Property Damage Only (O)	$11,900
CMF ID:	10082
CMF	0.623
CRF	0.377

Source:
Crash Costs for Highway Safety Analysis, January 2018

For WSDOT facilities only

Crash Type	2018-2023	Crash Costs	CMF	Expected Crashes	Difference	Crash Benefits
Fatality (K)	0	$0	0.62	0.00	0.00	$0
Suspected Serious Injury (A)	1	$655,000	0.62	0.62	0.38	$246,935
Suspected Minor Injury (B)	8	$1,588,000	0.62	4.98	3.02	$598,676
Possible Injury (C)	10	$1,256,000	0.62	6.23	3.77	$473,512
Property Damage Only (O)	16	$190,400	0.62	9.97	6.03	$71,781
Total Crash Costs	**35**	**$3,689,400**		**21.805**	**13.195**	**$1,390,904**

Project Costs (C)	**$5,921,856**
Worth of Benefits (WB)	**$16,663,028**
From 2017 FHWA guidance	
Net Benefits (B = WB - C)	**$10,741,171**
Benefit to Cost Ratio	**2.81**