



LSC TRANSPORTATION CONSULTANTS, INC.

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March 19, 2019

Mr. Joseph Huey
Lennar
9193 S. Jamaica Street, 4th Floor
Englewood, CO 80112

Re: Murphy Creek East
Aurora, CO
LSC #181110

Dear Mr. Huey:

In response to your request, LSC Transportation Consultants, Inc. has prepared this updated traffic impact analysis for the proposed Murphy Creek East development to address City comments. As shown on Figure 1, the site is located south of E. Jewell Avenue and west of Harvest Road in the City of Aurora, Colorado.

REPORT CONTENTS

The report contains the following: the existing roadway and traffic conditions in the vicinity of the site including the lane geometries, traffic controls, posted speed limits, etc.; the existing weekday peak-hour traffic volumes; the existing daily traffic volumes in the area; the typical weekday site-generated traffic volume projections for the site; the assignment of the projected traffic volumes to the area roadways; the proposed pedestrian and trail connectivity; the projected short-term and long-term background and resulting total traffic volumes on the area roadways; the site's projected traffic impacts; and any recommended roadway improvements to mitigate the site's traffic impacts.

LAND USE AND ACCESS

The site is proposed to include about 538 single-family dwelling units, about 269 multi-family dwelling units, and a Pre-K through 8 public school with about 700 students. Figure 2 shows the conceptual site plan and the traffic analysis zones. The details for the school site are not yet available so the school trips were loaded to S. Flat Rock Trail south of Intersection #10.

ROADWAY AND TRAFFIC CONDITIONS

Area Roadways

The major roadways in the site's vicinity are shown on Figure 1 and are described below.

- **Gun Club Road (State Highway 30)** is a two-lane arterial roadway in the vicinity of the site. The intersection with E. Jewell Avenue is signalized with auxiliary turn lanes. The posted speed limit is 55 mph in the vicinity of the site. The City of Aurora *Northeast Aurora Transportation Study* (NEATS) shows this roadway as a six-lane arterial in the long term so it is assumed to be six lanes by 2040.
- **Harvest Road** is a two-lane roadway northeast of the site. The intersection with E. Jewell Avenue is stop-sign controlled. The NEATS shows a six-lane arterial north of E. Jewell Avenue and a two-lane collector south of E. Jewell Avenue, so these widths are assumed by 2040.
- **E. Yale Avenue** does not exist but is planned to pass through the site from Harvest Road to S. Gun Club Road. The NEATS shows a four-lane minor arterial through the site, but this analysis supports a four-lane roadway for the first block east from S. Gun Club Road and then transitioning to a two/three-lane section after passing through a proposed roundabout at intersection #12.
- **E. Jewell Avenue** is a two-lane roadway north of the site. The intersection with S. Gun Club Road (SH 30) is signalized with auxiliary turn lanes. The posted speed limit is 40 mph in the vicinity of the site. The NEATS shows a six-lane arterial in the long term so it is assumed to be six lanes by 2040.

Existing Traffic Conditions

Figure 3 shows the existing lane geometries, traffic controls, posted speed limits and traffic volumes in the site's vicinity on a typical weekday. Figure 3 also shows the existing turn lane lengths. The weekday peak-hour traffic volumes and daily traffic counts are based on the attached traffic counts conducted by Counter Measures in September, 2018.

2023 and 2040 Background Traffic

Figures 4a and 5a show the estimated 2023 and 2040 background traffic. The 2023 background traffic assumes two percent annual growth for five years. The 2040 background traffic is based on recent NEATS modeling updates completed by the City and buildout of the balance of Murphy Creek. Figures 4b and 5b show the recommended 2023 and 2040 lane geometry and traffic control.

Existing, 2023, and 2040 Background Levels of Service

Level of service (LOS) is a quantitative measure of the level of congestion or delay at an intersection. Level of service is indicated on a scale from "A" to "F." LOS A is indicative of little congestion or delay and LOS F is indicative of a high level of congestion or delay. Attached are specific level of service definitions for signalized and unsignalized intersections.

The intersections in Figures 3, 4a, and 5a were analyzed to determine the existing, 2023, and 2040 background levels of service using Synchro. Table 1 shows the level of service analysis results. The level of service reports are attached.

1. **S. Gun Club Road (SH 30)/E. Jewell Avenue:** This signalized intersection currently operates at an overall LOS “C” or better during both morning and afternoon peak-hours. In 2023, the morning peak-hour is expected to operate at LOS “D”. In 2040, with the recommended improvements, both peak-hours are expected to operate at LOS “D”. There are a few individual movement expected to operate at LOS “E” or “F” but no further mitigation is recommended because all four approaches are already planned to include dual left-turn lanes and dedicated right-turn deceleration and acceleration lanes.
2. **E. Jewell Avenue/S. Old Tom Morris Road:** All movements at this unsignalized intersection currently operate at LOS “B” or better during both morning and afternoon peak-hours and are expected to do so through 2023. By 2040, this intersection is expected to be signalized and as such is expected to operate at an overall LOS “C” during both peak-hours. There are few movements expected to operate at LOS “E” but no further mitigation is recommended.
3. **E. Jewell Avenue/Full Movement Access:** Several movements at this future unsignalized intersection are expected to operate at LOS “E” or “F” during one or both peak-hours through 2040. This intersection was shown as three-quarter movement in the original GDP and will not likely meet a traffic signal warrant per Table 3 so may need to be converted to three-quarter movement in the long term. The left-turn movements from E. Jewell Avenue are expected to benefit from gaps created by upstream traffic signals.
4. **E. Jewell Avenue/S. Flat Rock Trail:** All movements at this unsignalized intersection currently operate at LOS “A” during both morning and afternoon peak-hours and are expected to operate at LOS “B” or better through 2023. By 2040, this intersection is expected to be signalized and as such is expected to operate at an overall LOS “A” during the morning peak-hour and LOS “B” during the afternoon peak-hour.
5. **E. Jewell Avenue/Harvest Road:** All movements at this unsignalized intersection currently operate at LOS “A” or better during both morning and afternoon peak-hours and are expected to do so through 2023. By 2040, this intersection is expected to be signalized and as such is expected to operate at an overall LOS “D” during both peak-hours. There are a few individual movements expected to operate at LOS “E” but no further mitigation is recommended.
6. **S. Gun Club Road/Commercial Access:** This future signalized intersection is expected to operate at LOS “A” during both peak-hours through 2040. There are a few individual movements expected to operate at LOS “E” but no further mitigation is recommended.
7. **S. Flat Rock Trail/East-West Internal Road:** All movements at this future unsignalized intersection are expected to operate at LOS “A” during both morning and afternoon peak-hours in 2040.
8. **Harvest Road/East-West Internal Road:** All movements at this future unsignalized intersection are expected to operate at LOS “C” or better during both morning and afternoon peak-hours in 2040.

9. **S. Gun Club Road/E. Yale Avenue:** This future signalized intersection is expected to operate at an overall LOS “C” during both peak-hours in 2040. There are a few individual movements expected to operate at LOS “E” but no further mitigation is recommended.
10. **S. Flat Rock Trail/Warren Street:** All movements at this future unsignalized intersection are expected to operate at LOS “A” during both morning and afternoon peak-hours in 2040.
11. **Harvest Road/Warren Street:** All movements at this future unsignalized intersection are expected to operate at LOS “C” or better during both morning and afternoon peak-hours in 2040.
12. **E. Yale Avenue/Roundabout Access:** This future roundabout controlled intersection is expected to operate at an overall LOS “B” or better during both peak-hours in 2040. A Rodel analysis would also show very good operations.
13. **E. Yale Avenue/Full Movement Access:** All movements at this future unsignalized intersection are expected to operate at LOS “C” or better during both morning and afternoon peak-hours in 2040.
14. **E. Yale Avenue/S. Flat Rock Trail:** This future roundabout controlled intersection is expected to operate at an overall LOS “A” during both peak-hours in 2040. A Rodel analysis would also show very good operations. The roundabout will likely not be needed until E. Yale Avenue connects west to S. Gun Club Road.
17. **E. Yale Avenue/Harvest Road:** This future roundabout controlled intersection is expected to operate at an overall LOS “A” during both peak-hours in 2040. A Rodel analysis would also show very good operations. The roundabout will likely not be needed until E. Yale Avenue connects west to S. Gun Club Road.
18. **S. Gun Club Road/RIRO Access:** All movements at this future unsignalized intersection are expected to operate at LOS “A” during both morning and afternoon peak-hours in 2040. This is due to a future right-turn acceleration lane on S. Gun Club Road.
19. **S. Gun Club Road/Three-Quarter Access:** The southbound left-turn movement at this future unsignalized intersection is expected to operate at LOS “F” during both peak-hours in 2040. Operations will be improved by periodic gaps created by upstream traffic signals. The southbound left-turn movement is recommended to remain to provide relief to the southbound left-turn movement at Intersection #9 to the north.
20. **Harvest Road/Local Access:** All movements at this future unsignalized intersection are expected to operate at LOS “C” or better during both morning and afternoon peak-hours in 2040.

TRIP GENERATION

Table 2 shows the estimated average weekday, morning peak-hour, and afternoon peak-hour trip generation for the proposed land use based on the rates from *Trip Generation, 10th Edition, 2017* by the Institute of Transportation Engineers (ITE).

The proposed Murphy Creek East site is projected to generate about 8,403 vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. During the morning peak-hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 375 vehicles would enter and about 602 vehicles would exit the site. During the afternoon peak-hour, which generally occurs for one hour between 4:00 and 6:00 p.m., about 487 vehicles would enter and about 314 vehicles would exit.

DIRECTIONAL DISTRIBUTION

Figure 6 shows the estimated directional distribution of the site-generated traffic volumes on the area roadways. The estimates were based on the location of the site with respect to the regional population, employment, and activity centers; and the site's proposed land use.

TRIP ASSIGNMENT

Figure 7a shows the estimated 2023 assignment of site-generated traffic volumes based on the trip generation estimate (from Table 2), the directional distribution shown in Figure 6, and the roadway network expected to be in place by 2023.

Figure 7b shows the estimated 2040 assignment of buildout site-generated traffic based on the trip generation estimate (from Table 2), the directional distribution shown in Figure 6, and the buildout roadway network.

2023 AND 2040 TOTAL TRAFFIC

Figure 8a shows the estimated 2023 total traffic which is the sum of the 2023 background traffic volumes (from Figure 4a) and the 2023 site-generated traffic volumes (from Figure 7a). Figure 8b shows the recommended 2023 lane geometry and traffic control. The future roundabouts at Intersections #14 and #17 will likely not be needed until E. Yale Avenue connects west to S. Gun Club Road. Interim conditions will need to be coordinated with City staff.

Figure 9a shows the estimated 2040 total traffic which is the sum of the 2040 background traffic volumes (from Figure 5a) and the 2040 site-generated traffic volumes (from Figure 7b). Figure 9b shows the recommended 2040 lane geometry and traffic control.

Figure 9c shows the estimated 95th percentile queue lengths and recommended turn lane lengths for various movements as well as the recommended number of through lanes and street classifications on the major roadways. The queuing reports are attached for reference.

PROJECTED LEVELS OF SERVICE

The intersections in Figures 8a and 9a were analyzed to determine the 2023 and 2040 total levels of service. Table 1 shows the level of service analysis results. The level of service reports are attached.

1. **S. Gun Club Road (SH 30)/E. Jewell Avenue:** This signalized intersection is expected to operate at an overall LOS "E" during the morning peak-hour and LOS "D" during the afternoon peak-hour through 2023. Two through lanes will be needed on S. Gun Club Road through the intersection by 2023 to mitigate the overall LOS "E". In 2040, with the recom-

mended improvements, both peak-hours are expected to operate at LOS "D". There are a few individual movements expected to operate at LOS "E" or "F" but no further mitigation is recommended because all four approaches are already planned to include dual left-turn lanes and dedicated right-turn deceleration and acceleration lanes.

2. **E. Jewell Avenue/S. Old Tom Morris Road:** All movements at this unsignalized intersection are expected to operate at LOS "C" or better during both morning and afternoon peak-hours through 2023. By 2040, this intersection is expected to be signalized and as such is expected to operate at an overall LOS "D" or better during both peak-hours. There are a few individual movements expected to operate at LOS "E" but no further mitigation is recommended.
3. **E. Jewell Avenue/Full Movement Access:** Several movements at this future unsignalized intersection are expected to operate at LOS "E" or "F" during one or both peak-hours through 2040. This intersection was shown as full movement in the original GDP and will not likely meet a traffic signal warrant per Table 3 so may need to be converted to three-quarter movement in the long term. The left-turn movements from E. Jewell Avenue are expected to benefit from gaps created by upstream traffic signals.
4. **E. Jewell Avenue/S. Flat Rock Trail:** All movements at this unsignalized intersection are expected to operate at LOS "D" or better during both morning and afternoon peak-hours through 2023. By 2040, this intersection is expected to be signalized and as such is expected to operate at an overall LOS "B" during the morning peak-hour and LOS "C" during the afternoon peak-hour. The eastbound left-turn movement is expected to operate at LOS "E" in the afternoon peak-hour by 2040 but no further mitigation is recommended.
5. **E. Jewell Avenue/Harvest Road:** All movements at this future unsignalized intersection are expected to operate at LOS "B" or better during both morning and afternoon peak-hours through 2023. By 2040, this intersection is expected to be signalized and as such is expected to operate at an overall LOS "D" during both peak-hours. There are a few individual movements expected to operate at LOS "E" but no further mitigation is recommended.
6. **S. Gun Club Road/Commercial Access:** This future signalized intersection is expected to operate at LOS "A" during both peak-hours through 2040. There are a few individual movements expected to operate at LOS "E" but no further mitigation is recommended.
7. **S. Flat Rock Trail/East-West Internal Road:** All movements at this future unsignalized intersection are expected to operate at LOS "B" or better during both morning and afternoon peak-hours through 2040.
8. **Harvest Road/East-West Internal Road:** All movements at this future unsignalized intersection are expected to operate at LOS "D" or better during both morning and afternoon peak-hours through 2040.
9. **S. Gun Club Road/E. Yale Avenue:** This future signalized intersection is expected to operate at an overall LOS "C" during both peak-hours in 2040.

10. **S. Flat Rock Trail/Warren Street:** All movements at this future unsignalized intersection are expected to operate at LOS “B” or better during both morning and afternoon peak-hours through 2040. An enhanced pedestrian crossing is proposed at or near this intersection and should be located based on the details of the future school site plan. The recommended enhancement is a rectangular rapid flashing beacon (RRFB) and will be at the cost of the master developer.
11. **Harvest Road/Warren Street:** All movements at this future unsignalized intersection are expected to operate at LOS “D” or better during both morning and afternoon peak-hours through 2040.
12. **E. Yale Avenue/Roundabout Access:** This future roundabout controlled intersection is expected to operate at an overall LOS “C” or better during both peak-hours through 2040. A Rodel analysis would also show good operations.
13. **E. Yale Avenue/Full Movement Access:** All movements at this future unsignalized intersection are expected to operate at LOS “D” or better during both morning and afternoon peak-hours through 2040.
14. **E. Yale Avenue/S. Flat Rock Trail:** This future roundabout controlled intersection is expected to operate at an overall LOS “A” during both peak-hours through 2040. A Rodel analysis would also show very good operations.
15. **E. Yale Avenue/Southwest Site Access:** All movements at this future unsignalized intersection are expected to operate at LOS “C” or better during both morning and afternoon peak-hours through 2040.
16. **E. Yale Avenue/Southeast Site Access:** All movements at this future unsignalized intersection are expected to operate at LOS “B” or better during both morning and afternoon peak-hours through 2040.
17. **E. Yale Avenue/Harvest Road:** This future roundabout controlled intersection is expected to operate at an overall LOS “A” during both peak-hours in 2040. A Rodel analysis would also show very good operations.
18. **S. Gun Club Road/RIRO Access:** All movements at this future unsignalized intersection are expected to operate at LOS “A” during both morning and afternoon peak-hours through 2040. This is due to a future right-turn acceleration lane on S. Gun Club Road.
19. **S. Gun Club Road/Three-Quarter Access:** The southbound left-turn movement at this future unsignalized intersection is expected to operate at LOS “F” during both peak-hours through 2040. Operations will be improved by periodic gaps created by upstream traffic signals. The southbound left-turn movement is recommended to remain to provide relief to the southbound left-turn movement at Intersection #9 to the north.
20. **Harvest Road/Local Access:** All movements at this future unsignalized intersection are expected to operate at LOS “C” or better during both peak-hours through 2040.

PEDESTRIAN/TRAIL CONNECTIVITY

Figure 10 shows the proposed pedestrian and trail connectivity within the study area.

TRAFFIC SIGNAL WARRANT ANALYSES

Figures 11a through 17b show the projected 2023 and 2040 peak-hour turning volumes at the E. Jewell Avenue/S. Old Tom Morris Road, E. Jewell Avenue/Full Movement Access, E. Jewell Avenue/S. Flat Rock Trail, E. Jewell Avenue/Harvest Road, E. Jewell Avenue/Commercial Access, E. Jewell Avenue/E. Yale Avenue, and Harvest Road/E. Yale Avenue intersections plotted on both a four-hour and peak-hour warrant chart. Table 3 summarizes the results.

CONCLUSIONS AND RECOMMENDATIONS**Trip Generation**

1. The proposed Murphy Creek East site is projected to generate about 8,403 vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. During the morning peak-hour, about 375 vehicles would enter and about 602 vehicles would exit the site. During the afternoon peak-hour, about 487 vehicles would enter and about 314 vehicles would exit.

Projected Levels of Service

2. All movements at the unsignalized intersections analyzed are expected to operate at LOS "D" or better during both morning and afternoon peak-hours through 2040 with the recommended improvements with the following exceptions: Several movements at the E. Jewell Avenue/Full Movement Site Access intersection (Intersection #3) are expected to operate at LOS "E" or "F" during one or both peak-hours. The southbound left-turn movement at the S. Gun Club Road/Three-Quarter Access intersection is expected to operate at LOS "F" in both peak-hours in 2040. Operations will be improved by periodic gaps created by upstream traffic signals. Further detail is provided in the report narrative.
3. All signalized or roundabout controlled intersections are expected to operate at overall acceptable levels of service with the following exception: The S. Gun Club Road/E. Jewell Avenue intersection (Intersection #1) is expected to operate at an overall LOS "E" in the morning peak-hour in 2023. This would be mitigated by providing two through lanes in each direction of S. Gun Club Road through the intersection. Further detail is provided in the report narrative.

Conclusions

4. The impact of the site can be accommodated by the existing and planned roadway improvements with the following recommended improvements.

Recommendations

5. The recommended lane geometry for 2023 and 2040 is shown in Figures 8b and 9b with additional detail provided in Figure 9c. The future roundabouts at Intersections #14 and #17 will likely not be needed until E. Yale Avenue connects west to S. Gun Club Road.
6. Figure 9c shows the projected 2040 95th percentile queue lengths, the recommended turn lane lengths, and the recommended number of through lanes and street classifications on each major roadway.
7. Table 3 summarizes the traffic signal warrant analyses that were completed at several intersections within the study area.

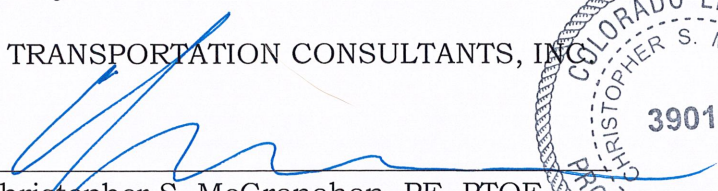
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We trust our findings will assist you in gaining approval of the proposed Murphy Creek East development. Please contact me if you have any questions or need further assistance.

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.

By


Christopher S. McGranahan, PE, PTOE
Principal



CSM/wc

3-19-19

Enclosures: Tables 1 - 3
Figures 1 - 17b
Traffic Counts
Level of Service Definitions
Level of Service Reports
Queuing Reports

Table 1 (Page 1 of 6)
Intersection Levels of Service Analysis
Murphy Creek East
Aurora, Colorado
LSC #181110; March, 2019

Intersection Location	Traffic Control	Existing Traffic		2023 Background Traffic		2023 Total Traffic		2023 Total Traffic Mitigated ⁽¹⁾		2040 Background Traffic		2040 Total Traffic	
		Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
<hr/>													
1) <u>S. Gun Club Road/E. Jewell Avenue</u>	Signalized												
EB Left		D	D	D	E	E	D	D	D	E	E	E	E
EB Through		D	D	D	D	D	D	D	D	D	E	D	E
EB Right		A	A	A	A	A	A	A	A	A	A	A	A
WB Left		C	C	C	C	E	E	D	D	F	F	E	F
WB Through		D	D	D	D	E	D	D	D	D	C	D	D
WB Right		A	A	A	A	A	A	A	A	A	A	A	A
NB Left		B	C	B	C	C	D	B	B	E	F	E	F
NB Through		C	B	E	B	F	C	C	B	E	D	E	D
NB Right		A	A	A	A	A	A	A	A	A	A	A	A
SB Left		A	A	B	A	B	B	B	B	E	E	E	E
SB Through		C	C	C	D	C	E	C	C	D	E	D	E
SB Right		A	A	A	A	A	A	A	A	A	A	A	A
Entire Intersection Delay (sec /veh)		27.6	26.2	40.0	30.6	62.0	42.9	28.8	24.7	49.9	50.7	49.9	54.3
Entire Intersection LOS		C	C	D	C	E	D	C	C	D	D	D	D
<hr/>													
2) <u>E. Jewell Avenue/S. Old Tom Morris Road</u>	TWSC												
EB Left		A	A	B	A	B	B			--	--	--	--
SB Approach		B	B	B	B	C	B			--	--	--	--
Critical Movement Delay(sec /veh)		12.6	10.0	12.8	10.0	17.9	11.5			--	--	--	--
<hr/>													
	Signalized												
EB Left		--	--	--	--	--	--			D	D	D	D
EB Through		--	--	--	--	--	--			D	D	D	D
EB Right		--	--	--	--	--	--			B	B	B	B
WB Left		--	--	--	--	--	--			B	D	B	D
WB Through		--	--	--	--	--	--			C	B	C	B
NB Left		--	--	--	--	--	--			D	E	D	E
NB Through/Right		--	--	--	--	--	--			C	C	C	C
SB Left		--	--	--	--	--	--			D	D	D	D
SB Through/Right		--	--	--	--	--	--			E	D	E	D
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--			34.7	30.0	35.2	33.2
Entire Intersection LOS		--	--	--	--	--	--			C	C	D	C

Note:

- (1) Two through lanes in each direction will likely be needed on S. Gun Club Road at the intersection with E. Jewell Avenue by 2023 and both roadways will need three through lanes in each direction by 2040.

Table 1 (Page 2 of 6)
Intersection Levels of Service Analysis
Murphy Creek East
Aurora, Colorado
LSC #181110; March, 2019

Intersection Location	Traffic Control	Existing Traffic		2023 Background Traffic		2023 Total Traffic		2023 Total Traffic Mitigated ⁽¹⁾		2040 Background Traffic		2040 Total Traffic	
		Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
3) <u>E. Jewell Avenue/Full Movement Intersection</u> ⁽¹⁾	TWSC												
NB Approach		--	--	--	--	--	--			F	F	F	F
EB Left		--	--	--	--	--	--			D	D	E	E
WB Left		--	--	--	--	--	--			C	E	C	F
SB Approach		--	--	--	--	--	--			F	F	F	F
Critical Movement Delay(sec /veh)		--	--	--	--	--	--			>240	>240	>240	>240
4) <u>E. Jewell Avenue/S. Flat Rock Trail</u>	TWSC												
NB Left		--	--	--	--	D	C			--	--	--	--
NB Through/Right		--	--	--	--	B	B			--	--	--	--
EB Left		A	A	A	A	A	A			--	--	--	--
WB Left		--	--	--	--	A	B			--	--	--	--
SB Left		A	A	A	B	B	B			--	--	--	--
SB Through/Right or Right		A	A	A	A	B	B			--	--	--	--
Critical Movement Delay(sec /veh)		9.0	8.7	9.6	10.9	25.7	20.9			--	--	--	--
	Signalized												
EB Left		--	--	--	--	--	--			C	D	D	E
EB Through		--	--	--	--	--	--			A	B	A	B
EB Right		--	--	--	--	--	--			A	A	A	A
WB Left		--	--	--	--	--	--			A	A	B	A
WB Through/Right		--	--	--	--	--	--			B	B	B	B
NB Left		--	--	--	--	--	--			D	D	D	D
NB Through/Right		--	--	--	--	--	--			C	C	C	C
SB Left		--	--	--	--	--	--			D	D	C	D
SB Through/Right		--	--	--	--	--	--			B	B	D	B
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--			8.9	15.8	17.9	20.5
Entire Intersection LOS		--	--	--	--	--	--			A	B	B	C

Note:

(1) The original GDP showed this intersection as three-quarter movement. A traffic signal warrant is unlikely to be met per Table 3. The intersection may need to be converted to three-quarter movement in the long term.

Table 1 (Page 3 of 6)
Intersection Levels of Service Analysis
Murphy Creek East
Aurora, Colorado
LSC #181110; March, 2019

Intersection Location	Traffic Control	Existing Traffic		2023 Background Traffic		2023 Total Traffic		2023 Total Traffic Mitigated ⁽¹⁾		2040 Background Traffic		2040 Total Traffic	
		Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
5) <u>E. Jewell Avenue/Harvest Road</u>	TWSC												
NB Left		--	--	--	--	A	B			--	--	--	--
NB Through/Right		--	--	--	--	A	A			--	--	--	--
EB Left		A	A	A	A	A	A			--	--	--	--
WB Approach		--	--	--	--	A	A			--	--	--	--
SB Approach		A	A	A	A	A	A			--	--	--	--
Critical Movement Delay(sec /veh)		8.7	8.5	8.7	8.6	9.9	10.3			--	--	--	--
	Signalized												
EB Left		--	--	--	--	--	--			E	E	E	E
EB Through/Right		--	--	--	--	--	--			D	D	D	D
WB Left		--	--	--	--	--	--			B	C	B	C
WB Through		--	--	--	--	--	--			C	D	C	D
WB Right		--	--	--	--	--	--			A	A	B	A
NB Left		--	--	--	--	--	--			D	C	D	C
NB Through/Right		--	--	--	--	--	--			D	D	D	D
SB Left		--	--	--	--	--	--			D	E	D	E
SB Through		--	--	--	--	--	--			D	D	D	D
SB Left		--	--	--	--	--	--			B	B	B	B
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--			36.9	40.3	37.5	40.4
Entire Intersection LOS		--	--	--	--	--	--			D	D	D	D
6) <u>S. Gun Club Road/Commercial Access</u>	Signalized												
WB Left		--	--	--	--	--	--			E	E	D	E
WB Right		--	--	--	--	--	--			A	A	A	A
NB Through		--	--	--	--	--	--			A	A	A	B
NB Right		--	--	--	--	--	--			A	A	A	A
SB Left		--	--	--	--	--	--			E	E	D	E
SB Through		--	--	--	--	--	--			A	A	A	A
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--			5.5	9.0	5.7	9.7
Entire Intersection LOS		--	--	--	--	--	--			A	A	A	A

Table 1 (Page 4 of 6)
Intersection Levels of Service Analysis
Murphy Creek East
Aurora, Colorado
LSC #181110; March, 2019

Intersection Location	Traffic Control	Existing Traffic		2023 Background Traffic		2023 Total Traffic		2023 Total Traffic Mitigated ⁽¹⁾		2040 Background Traffic		2040 Total Traffic	
		Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
7) <u>S. Flat Rock Trail/East-West Internal Road</u>	TWSC												
NB Left		--	--	--	--	--	--			A	A	A	A
EB Approach		--	--	--	--	--	--			A	A	B	B
WB Approach		--	--	--	--	B	B			A	A	B	B
SB Left		--	--	--	--	A	A			A	A	A	A
Critical Movement Delay(sec /veh)		--	--	--	--	13.6	11.8			9.8	9.9	12.0	14.1
8) <u>Harvest Road/East-West Internal Road</u>	TWSC												
NB Left/Through or Left		--	--	--	--	A	A			A	A	A	A
EB Left		--	--	--	--	A	A			A	A	C	D
EB Through/Right or Right		--	--	--	--	A	A			C	C	B	C
WB Left		--	--	--	--	--	--			C	C	C	D
WB Through/Right		--	--	--	--	--	--			B	B	B	B
SB Left		--	--	--	--	--	--			A	A	A	A
Critical Movement Delay(sec /veh)		--	--	--	--	8.9	9.0			16.8	23.9	19.9	29.8
9) <u>S. Gun Club Road/E. Yale Avenue</u>	Signalized												
WB Left		--	--	--	--	--	--			E	E	E	E
WB Right		--	--	--	--	--	--			A	A	A	A
NB Through		--	--	--	--	--	--			C	C	C	D
NB Right		--	--	--	--	--	--			A	A	A	B
SB Left		--	--	--	--	--	--			E	E	E	E
SB Through		--	--	--	--	--	--			B	B	B	C
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--			22.9	28.3	24.8	31.6
Entire Intersection LOS		--	--	--	--	--	--			C	C	C	C
10) <u>S. Flat Rock Trail/Warren Street</u>	TWSC												
NB Left		--	--	--	--	--	--			A	A	A	A
EB Approach		--	--	--	--	--	--			A	A	B	B
WB Approach		--	--	--	--	B	B			A	A	B	B
SB Left		--	--	--	--	A	A			A	A	A	A
Critical Movement Delay(sec /veh)		--	--	--	--	11.8	10.2			9.1	9.1	14.2	11.6

Table 1 (Page 5 of 6)
Intersection Levels of Service Analysis
Murphy Creek East
Aurora, Colorado
LSC #181110; March, 2019

Intersection Location	Traffic Control	Existing Traffic		2023 Background Traffic		2023 Total Traffic		2023 Total Traffic Mitigated ⁽¹⁾		2040 Background Traffic		2040 Total Traffic	
		Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
11) <u>Harvest Road/Warren Street</u>	TWSC												
NB Left/Through or Left		--	--	--	--	A	A			A	A	A	A
EB Left		--	--	--	--	A	A			C	C	C	D
EB Through/Right or Right		--	--	--	--	A	A			C	C	B	C
WB Left		--	--	--	--	--	--			C	C	C	D
WB Through/Right		--	--	--	--	--	--			B	B	B	B
SB Left		--	--	--	--	--	--			A	A	A	A
Critical Movement Delay(sec /veh)		--	--	--	--	8.8	8.9			17.4	24.0	20.0	29.7
12) <u>E. Yale Avenue/Roundabout Access</u>	Roundabout												
EB Approach		--	--	--	--	--	--			A	B	A	C
WB Approach		--	--	--	--	--	--			A	B	A	C
NB Approach		--	--	--	--	--	--			A	B	A	C
SB Approach		--	--	--	--	--	--			A	A	A	B
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--			6.8	12.8	8.6	20.1
Entire Intersection LOS		--	--	--	--	--	--			A	B	A	C
13) <u>E. Yale Avenue/Full Movement Access</u>	TWSC												
NB Approach		--	--	--	--	--	--			B	B	B	C
EB Left		--	--	--	--	--	--			A	A	A	A
WB Left		--	--	--	--	--	--			A	A	A	A
SB Approach		--	--	--	--	--	--			B	C	C	D
Critical Movement Delay(sec /veh)		--	--	--	--	--	--			13.0	17.0	18.7	26.6
14) <u>E. Yale Avenue/S. Flat Rock Trail</u>	Roundabout												
EB Approach		--	--	--	--	--	--			A	A	A	A
WB Approach		--	--	--	--	--	--			A	A	A	A
SB Approach		--	--	--	--	--	--			A	A	A	A
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--			4.9	6.2	6.4	8.3
Entire Intersection LOS		--	--	--	--	--	--			A	A	A	A

Table 1 (Page 6 of 6)
Intersection Levels of Service Analysis
Murphy Creek East
Aurora, Colorado
LSC #181110; March, 2019

Intersection Location	Traffic Control	Existing Traffic		2023 Background Traffic		2023 Total Traffic		2023 Total Traffic Mitigated ⁽¹⁾		2040 Background Traffic		2040 Total Traffic	
		Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
15) <u>E. Yale Avenue/Southwest Site Access</u>	TWSC												
NB Approach		--	--	--	--	A	A			--	--	B	C
EB Left		--	--	--	--	A	A			--	--	A	A
WB Left		--	--	--	--	A	A			--	--	A	A
SB Approach		--	--	--	--	A	A			--	--	B	B
Critical Movement Delay(sec /veh)		--	--	--	--	9.0	9.3			--	--	12.6	16.3
16) <u>E. Yale Avenue/Southeast Site Access</u>	TWSC												
NB Approach		--	--	--	--	A	A			--	--	B	B
WB Left		--	--	--	--	A	A			--	--	A	A
Critical Movement Delay(sec /veh)		--	--	--	--	8.6	8.7			--	--	10.8	12.4
17) <u>E. Yale Avenue/Harvest Road</u>	Roundabout												
EB Approach		--	--	--	--	--	--			A	A	A	A
WB Approach		--	--	--	--	--	--			A	A	A	A
SB Approach		--	--	--	--	--	--			A	A	A	A
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--			7.1	8.6	7.4	9.2
Entire Intersection LOS		--	--	--	--	--	--			A	A	A	A
18) <u>S. Gun Club Road/RIRO Access</u>	TWSC												
WB Right		--	--	--	--	--	--			A	A	A	A
Critical Movement Delay(sec /veh)		--	--	--	--	--	--			0.0	0.0	0.0	0.0
19) <u>S. Gun Club Road/Three-Quarter Access</u>	TWSC												
WB Right		--	--	--	--	--	--			A	A	A	A
SB Left		--	--	--	--	--	--			F	F	F	F
Critical Movement Delay(sec /veh)		--	--	--	--	--	--			112.3	>240	121.5	>240
20) <u>Harvest Road/Local Access</u>	TWSC												
NB Left or Through/Left		--	--	--	--	A	A			--	--	A	A
EB Left		--	--	--	--	A	A			--	--	C	C
EB Through/Right or Right		--	--	--	--	A	A			--	--	A	B
WB Left		--	--	--	--	--	--			B	C	C	C
WB Through/Right or Right		--	--	--	--	--	--			B	B	B	B
SB Left		--	--	--	--	--	--			A	A	A	A
Critical Movement Delay(sec /veh)		--	--	--	--	8.7	8.8			13.3	16.1	15.8	20.0

Table 2
ESTIMATED TRAFFIC GENERATION
Murphy Creek East
Aurora, CO
LSC #181110; March, 2019

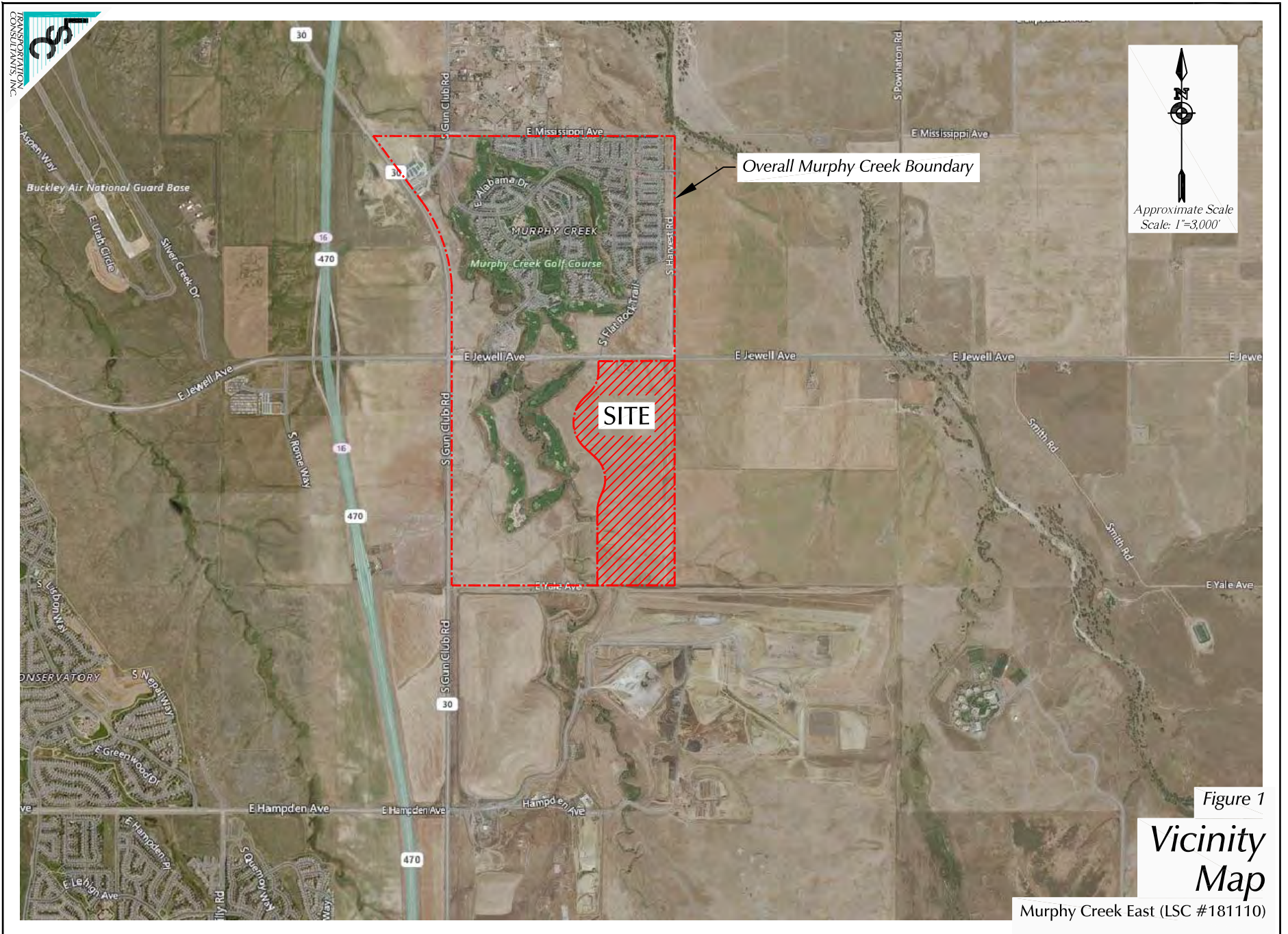
Zone	Trip Generating Category	Quantity	Trip Generation Rates ⁽¹⁾						Vehicle-Trips Generated				
			Average Weekday	AM Peak-Hour		PM Peak-Hour		Average Weekday	AM Peak-Hour		PM Peak-Hour		
				In	Out	In	Out		In	Out	In	Out	
A	Single-Family Homes ⁽²⁾	60 DU ⁽³⁾	9.44	0.185	0.555	0.624	0.366	566	11	33	37	22	
B	Townhomes ⁽⁴⁾	119 DU	7.32	0.106	0.354	0.353	0.207	871	13	42	42	25	
C	Single-Family Homes	112 DU	9.44	0.185	0.555	0.624	0.366	1,057	21	62	70	41	
D	Single-Family Homes	103 DU	9.44	0.185	0.555	0.624	0.366	972	19	57	64	38	
E	Single-Family Homes	20 DU	9.44	0.185	0.555	0.624	0.366	189	4	11	12	7	
F	Single-Family Homes	243 DU	9.44	0.185	0.555	0.624	0.366	2,294	45	135	152	89	
G	Townhomes	150 DU	7.32	0.106	0.354	0.353	0.207	1,098	16	53	53	31	
H	Elementary School ⁽⁵⁾	560 Students	1.89	0.362	0.308	0.082	0.088	1,058	203	172	46	49	
	Middle/High School ⁽⁶⁾	140 Students	2.13	0.313	0.267	0.083	0.087	298	44	37	12	12	
Total =								8,403	375	602	487	314	

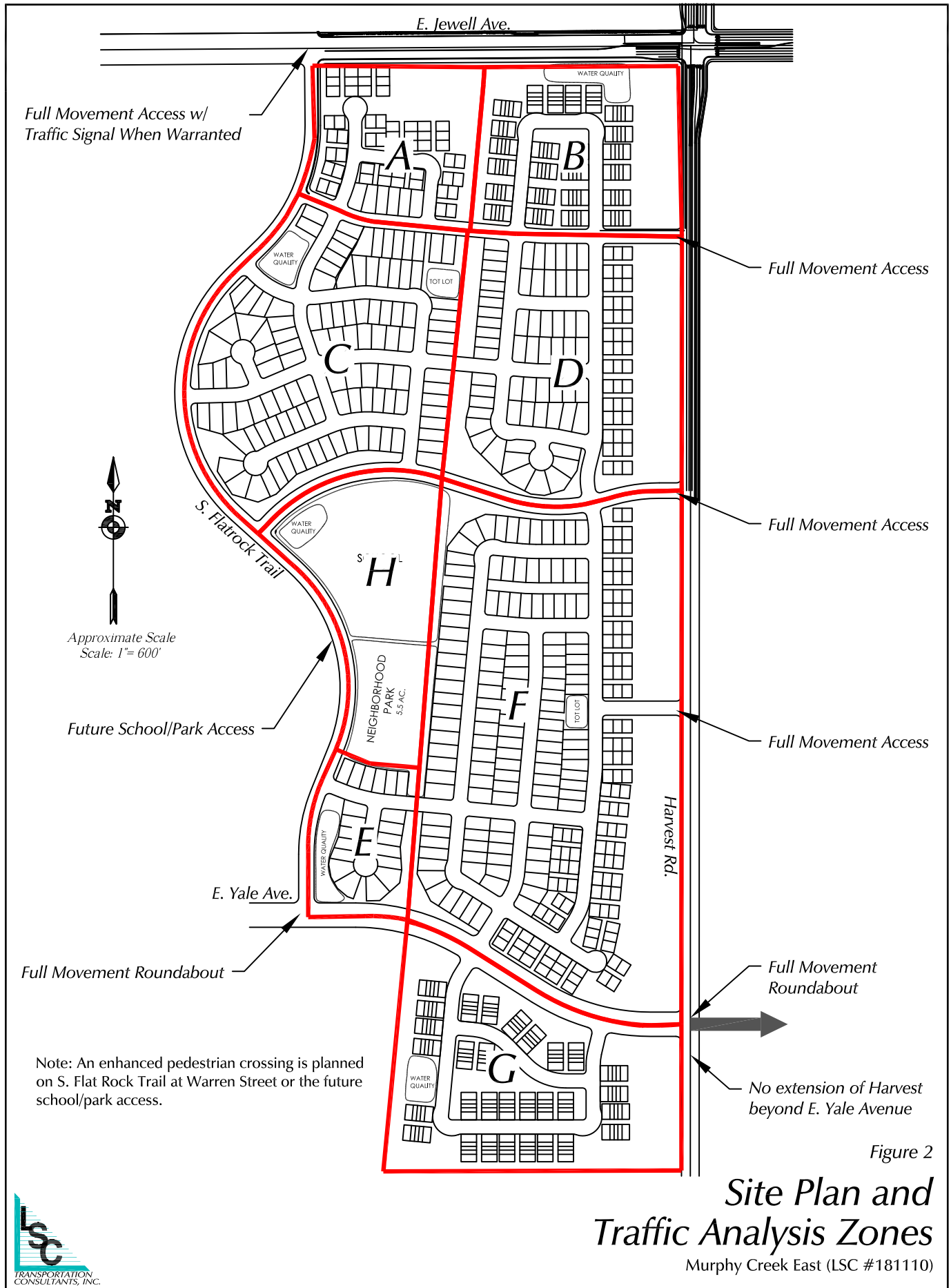
Notes:

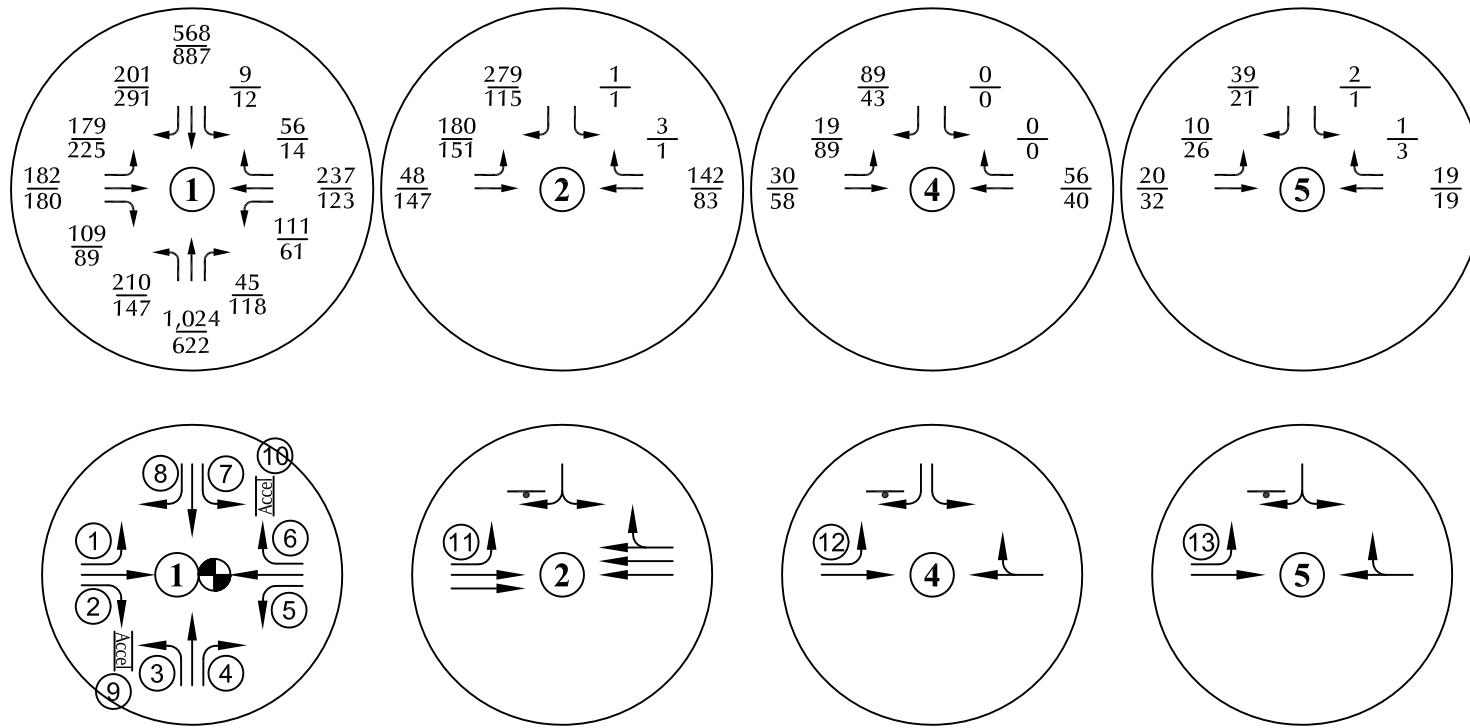
- (1) Source: *Trip Generation*, Institute of Transportation Engineers, 10th Edition, 2017.
- (2) ITE Land Use No. 210 - Single-Family Detached Homes
- (3) DU = Dwelling Units
- (4) ITE Land Use No. 220 - Multi-Family Housing (Low-Rise)
- (5) ITE Land Use No. 520 - Elementary School
- (6) ITE Land Use No. 522 - Middle School/Junior High School

Table 3
Traffic Signal Warrant Analyses Summary
Murphy Creek East
Aurora, CO
LSC #181110; March, 2019

Intersection Number	Intersection Name	Figure Number	Warrant 2 - Four-Hour		Warrant 3 - Peak-Hour	
			2023 Total	2040 Total	2023 Total	2040 Total
2	E. Jewell Avenue/S. Old Tom Morris Road	11a & 11b	No	Yes	Yes	Yes
3	E. Jewell Avenue/Full Movement Access	12a & 12b	No	No	No	No
4	E. Jewell Avenue/S. Flat Rock Trail	13a & 31b	Yes	Yes	Yes	Yes
5	E. Jewell Avenue/Harvest Road	14a & 14b	No	Yes	No	Yes
6	S. Gun Club Road/Commercial Access	15a & 15b	--	Yes	--	Yes
9	S. Gun Club Road/E. Yale Avenue	16a & 16b	--	Yes	--	Yes
17	Harvest Road/E. Yale Avenue	17a & 17b	--	Yes	--	No

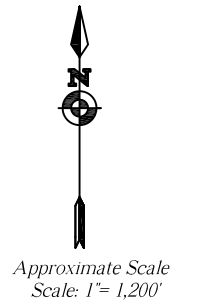






LEGEND:

- Stop Sign
- Traffic Signal
- 26/35 = AM Peak Hour Traffic / PM Peak Hour Traffic
- 1,000 = Average Daily Traffic



- 1 = EB LT = 330 feet
- 2 = EB RT = 330 feet
- 3 = NB LT = 490 feet
- 4 = EB RT = 365 feet
- 5 = WB LT = 300 feet
- 6 = WB RT = outside through lane is striped as a right-turn lane drop
- 7 = SB LT = 215 feet
- 8 = SB RT = 330 feet
- 9 = EB RT to SB Acceleration Lane = 750 feet
- 10 = WB RT to NB Acceleration Lane = 700 feet
- 11 = EB LT = 225 feet
- 12 = EB LT = 100 feet
- 13 = EB LT = 100 feet

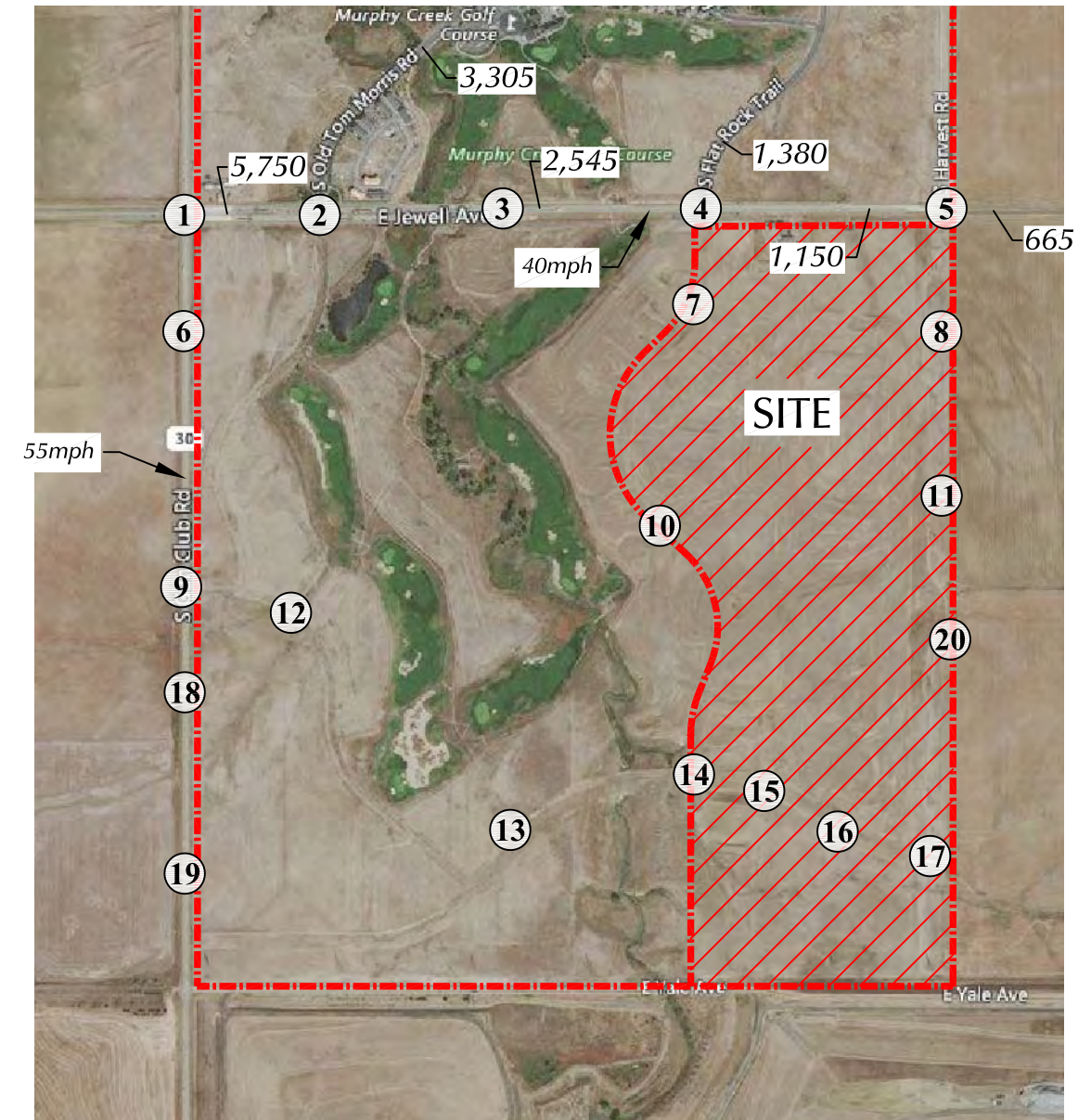
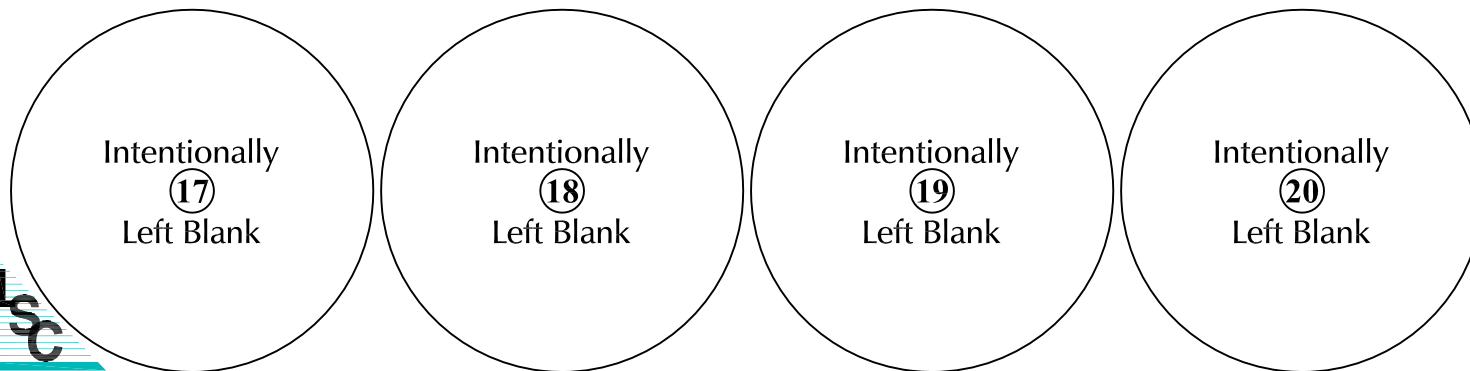
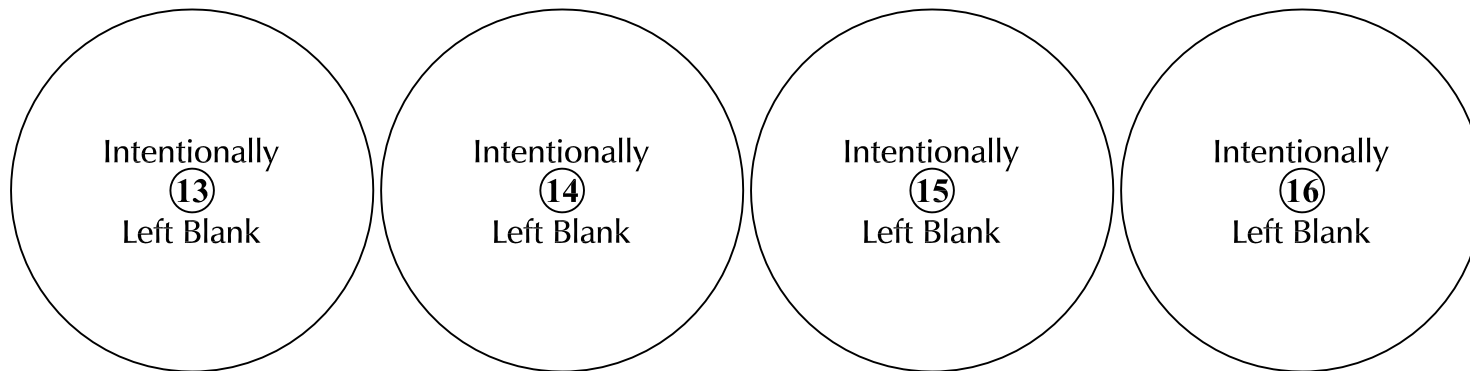
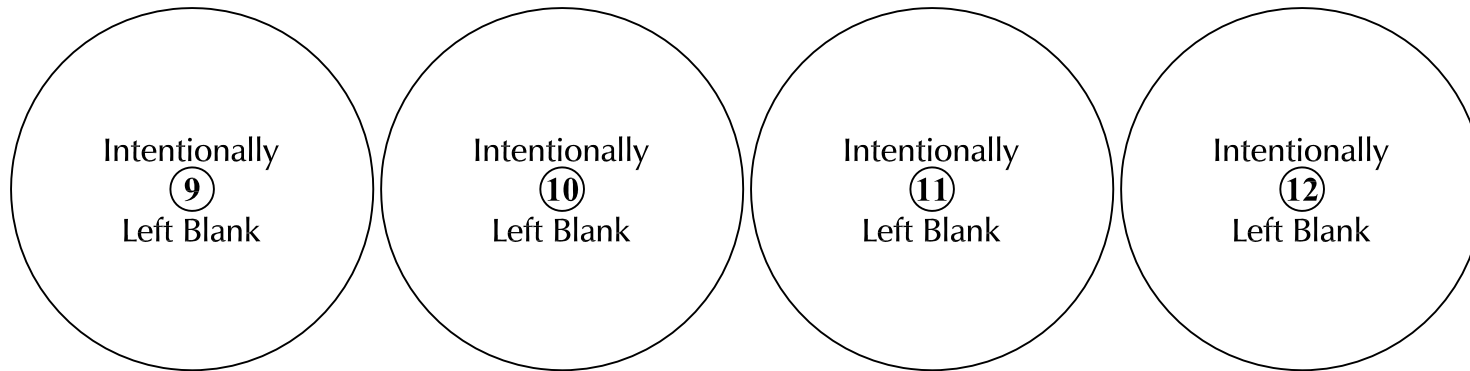
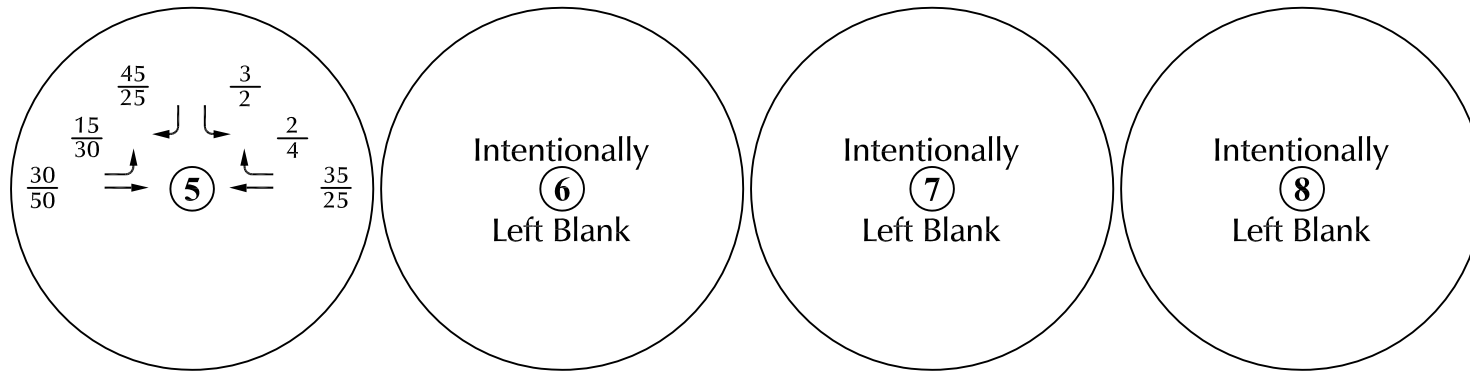
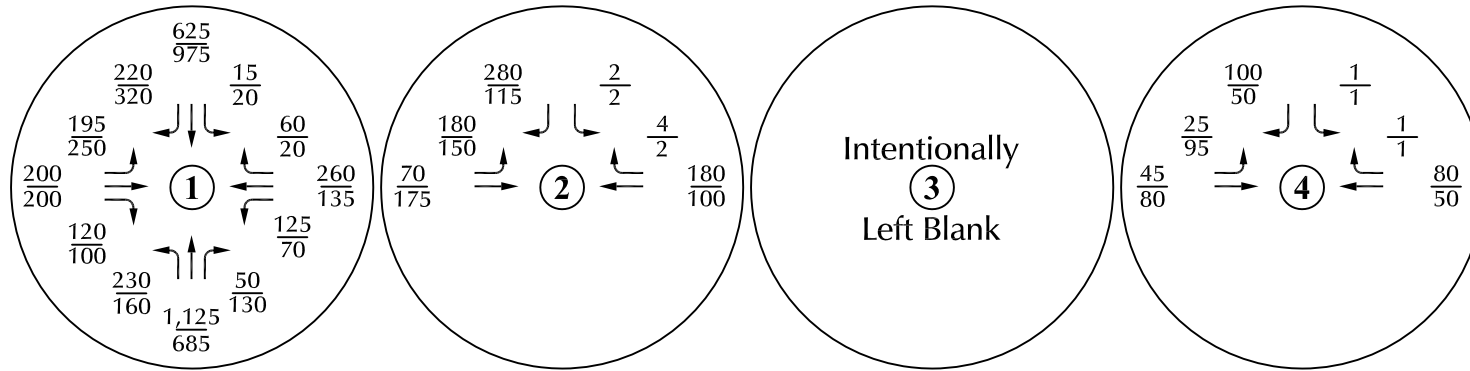


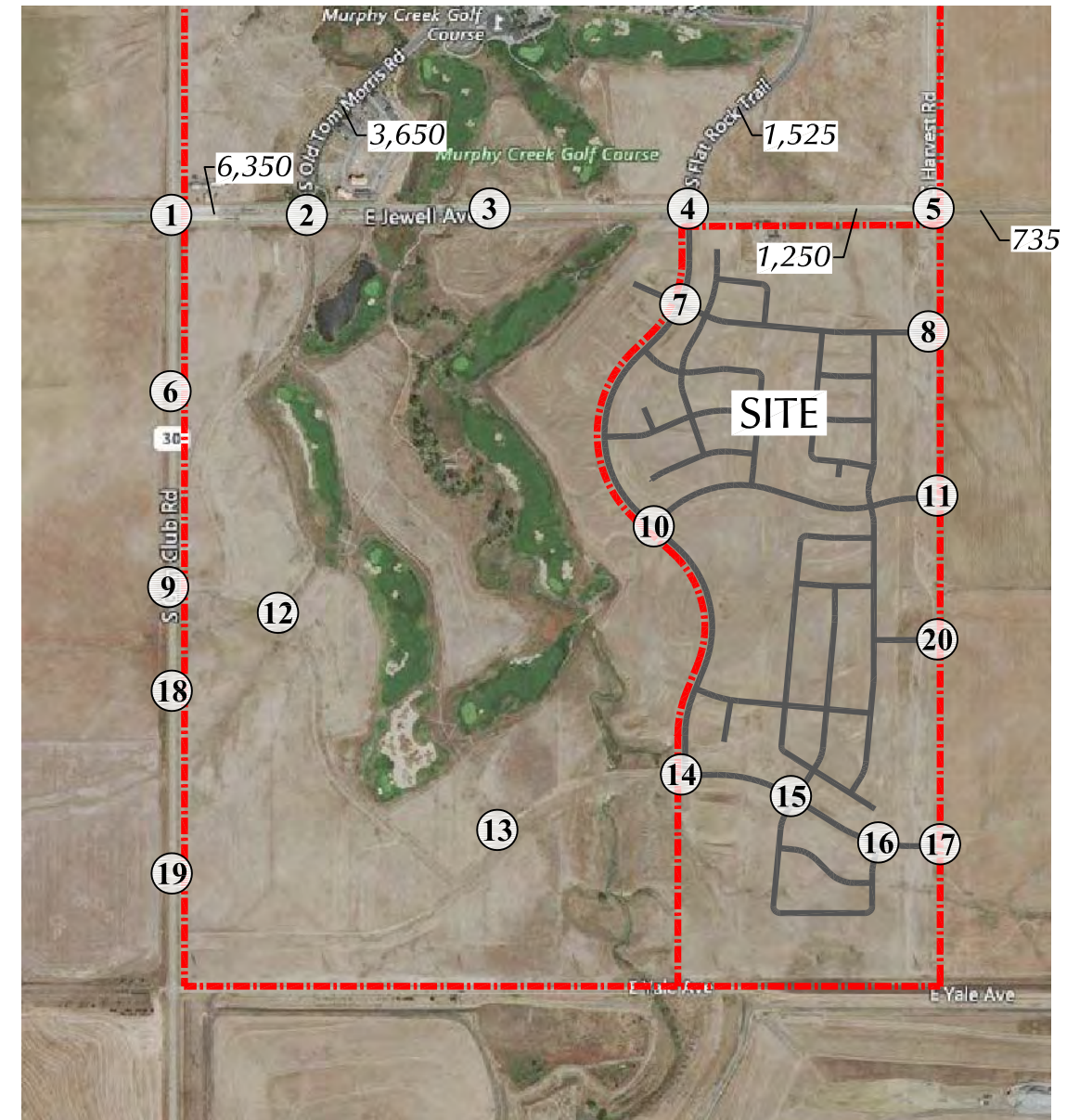
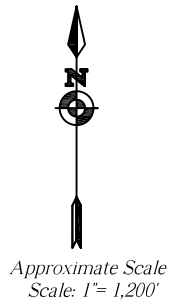
Figure 3

Existing Traffic, Lane
Geometry and Traffic Control
Murphy Creek East (LSC #181110)



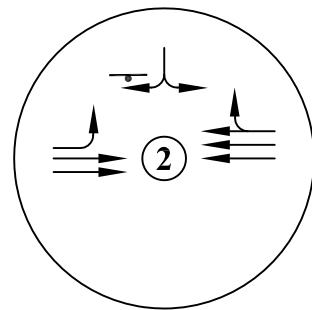
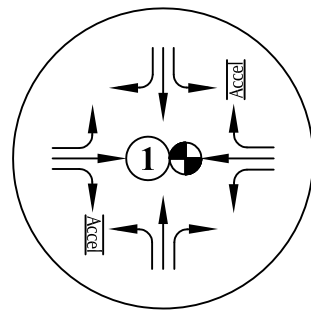
LEGEND:

$\frac{26}{35}$ = AM Peak Hour Traffic
 $\frac{35}{26}$ = PM Peak Hour Traffic
 1,000 = Average Daily Traffic

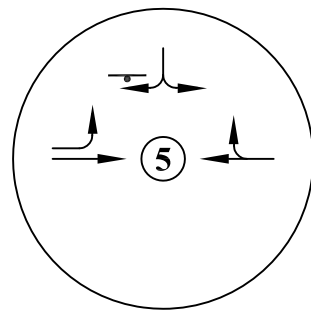
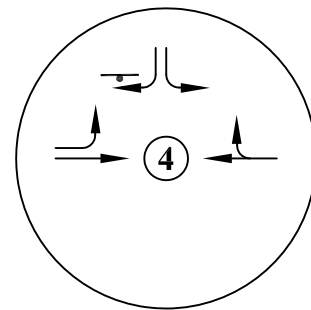


Note: Assumes two percent annual growth for five years.

Figure 4a
Year 2023
Background Traffic
 Murphy Creek East (LSC #181110)



Intentionally
③
Left Blank



Intentionally
⑥
Left Blank

Intentionally
⑦
Left Blank

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Intentionally
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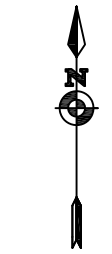
Intentionally
⑱
Left Blank

Intentionally
⑲
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Intentionally
⑳
Left Blank

LEGEND:

-  = Stop Sign
-  = Traffic Signal



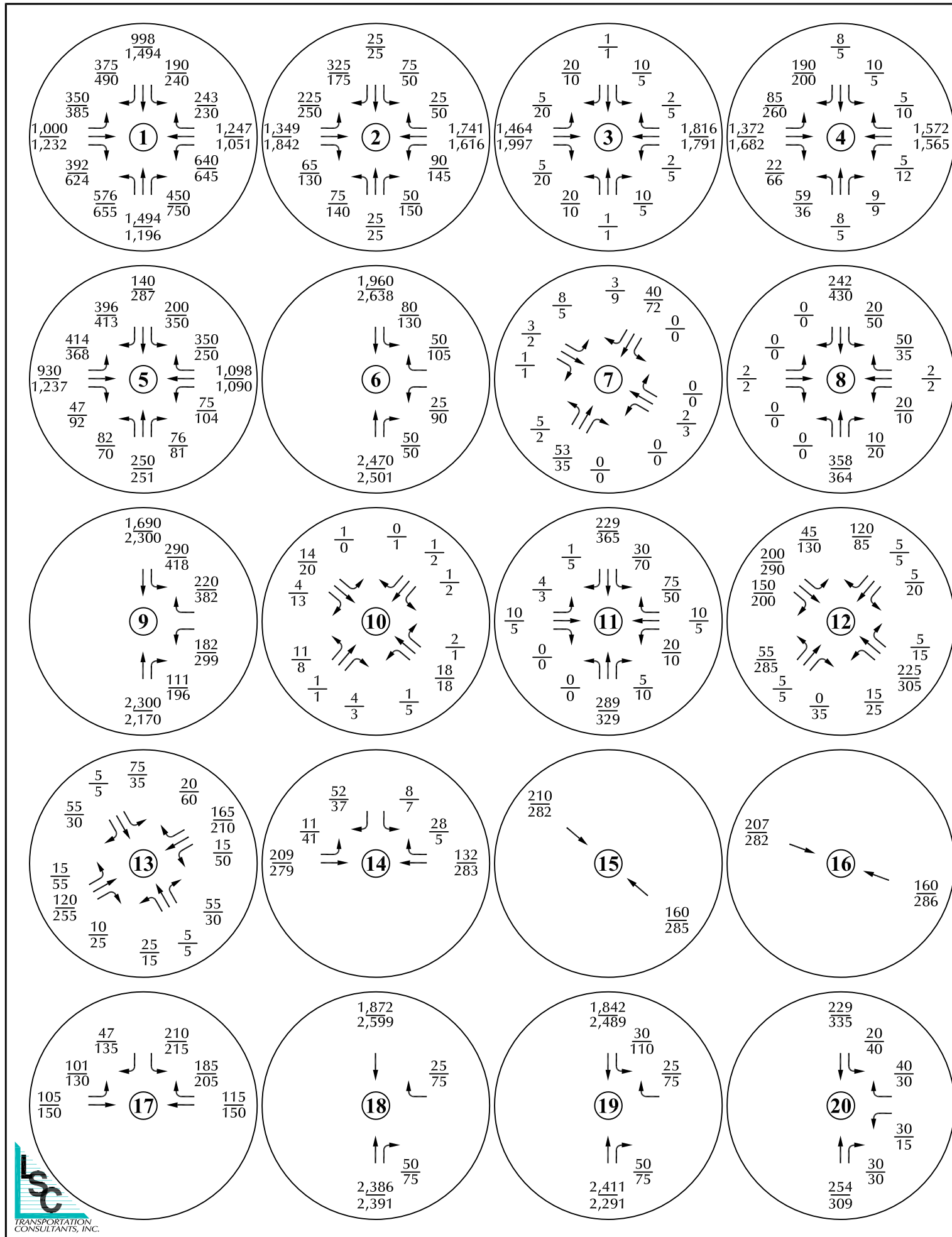
Approximate Scale
Scale: 1"= 1,200'



Figure 4b

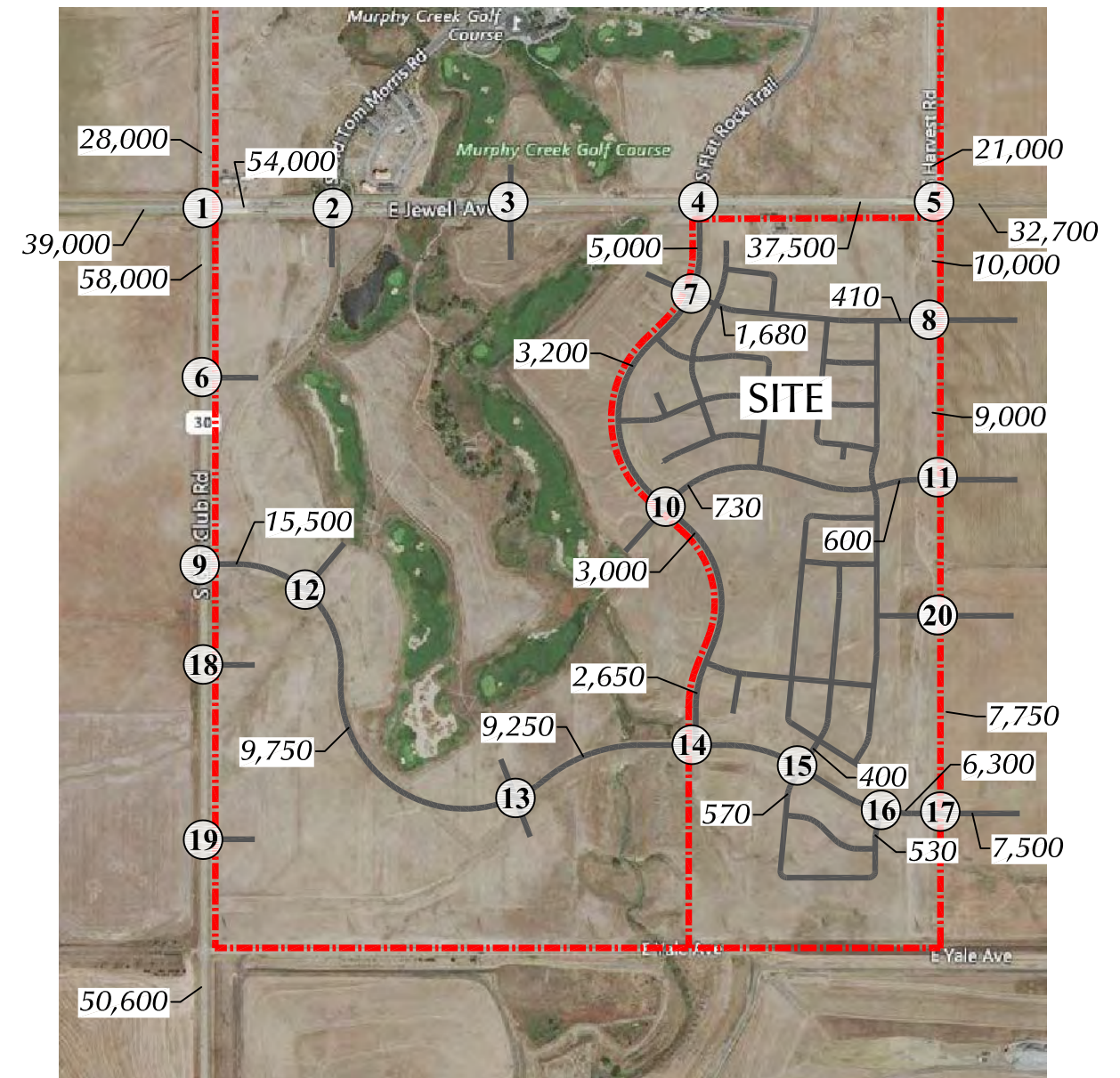
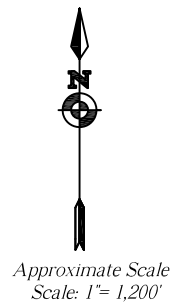
Year 2023 Background Lane Geometry and Traffic Control

Murphy Creek East (LSC #181110)



LEGEND:

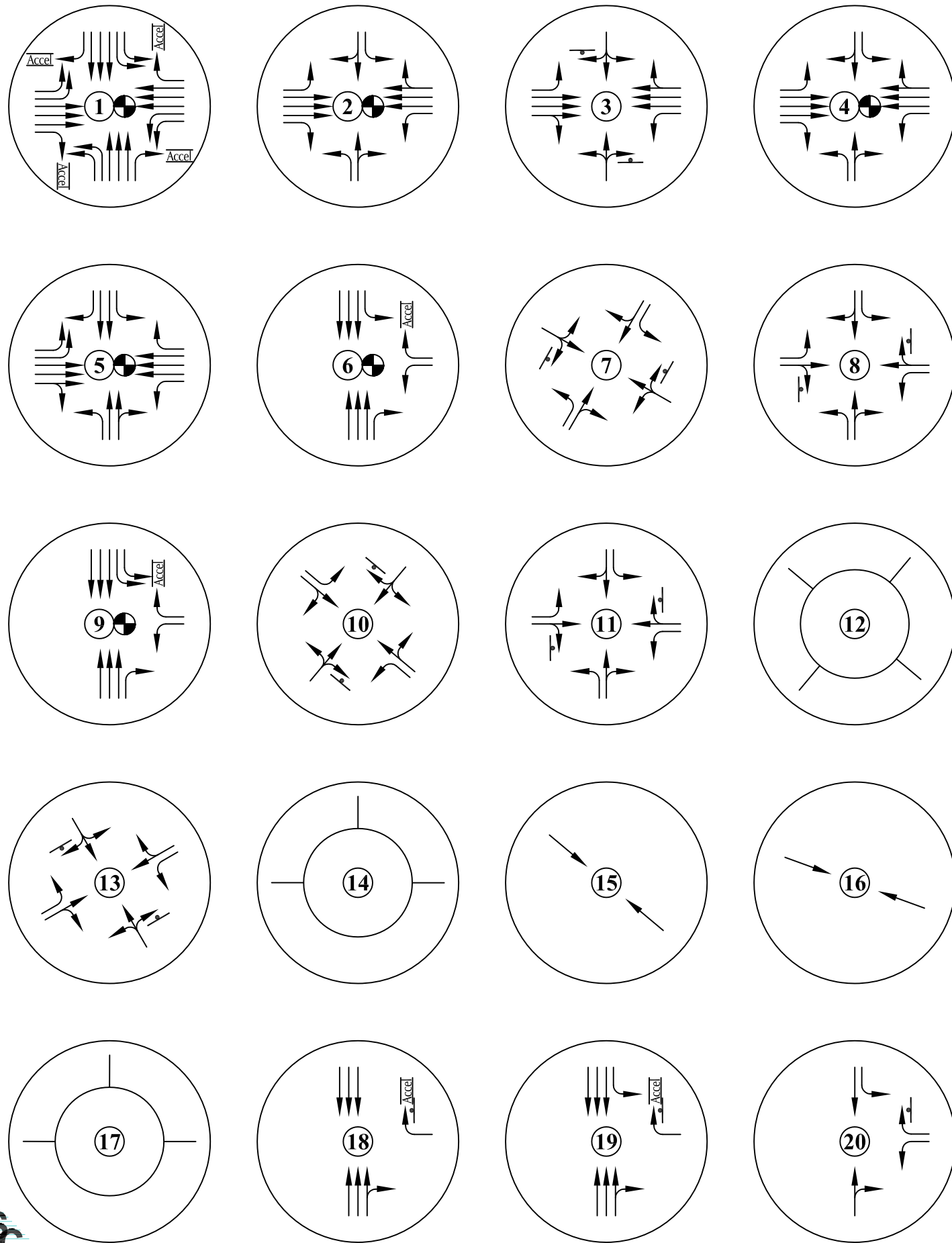
$\frac{26}{35}$ = AM Peak Hour Traffic
 $\frac{35}{26}$ = PM Peak Hour Traffic
 1,000 = Average Daily Traffic



Note: Assumes build-out of the balance of Murphy Creek per GDP Amendment #2 and the updated 2040 NEATS projections provided by the City.

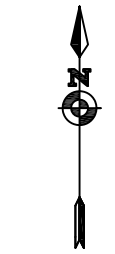
Figure 5a

Year 2040
Background Traffic
 Murphy Creek East (LSC #181110)



LEGEND:

- = Stop Sign
- = Traffic Signal
- = Modern Roundabout



Approximate Scale
Scale: 1"= 1,200'

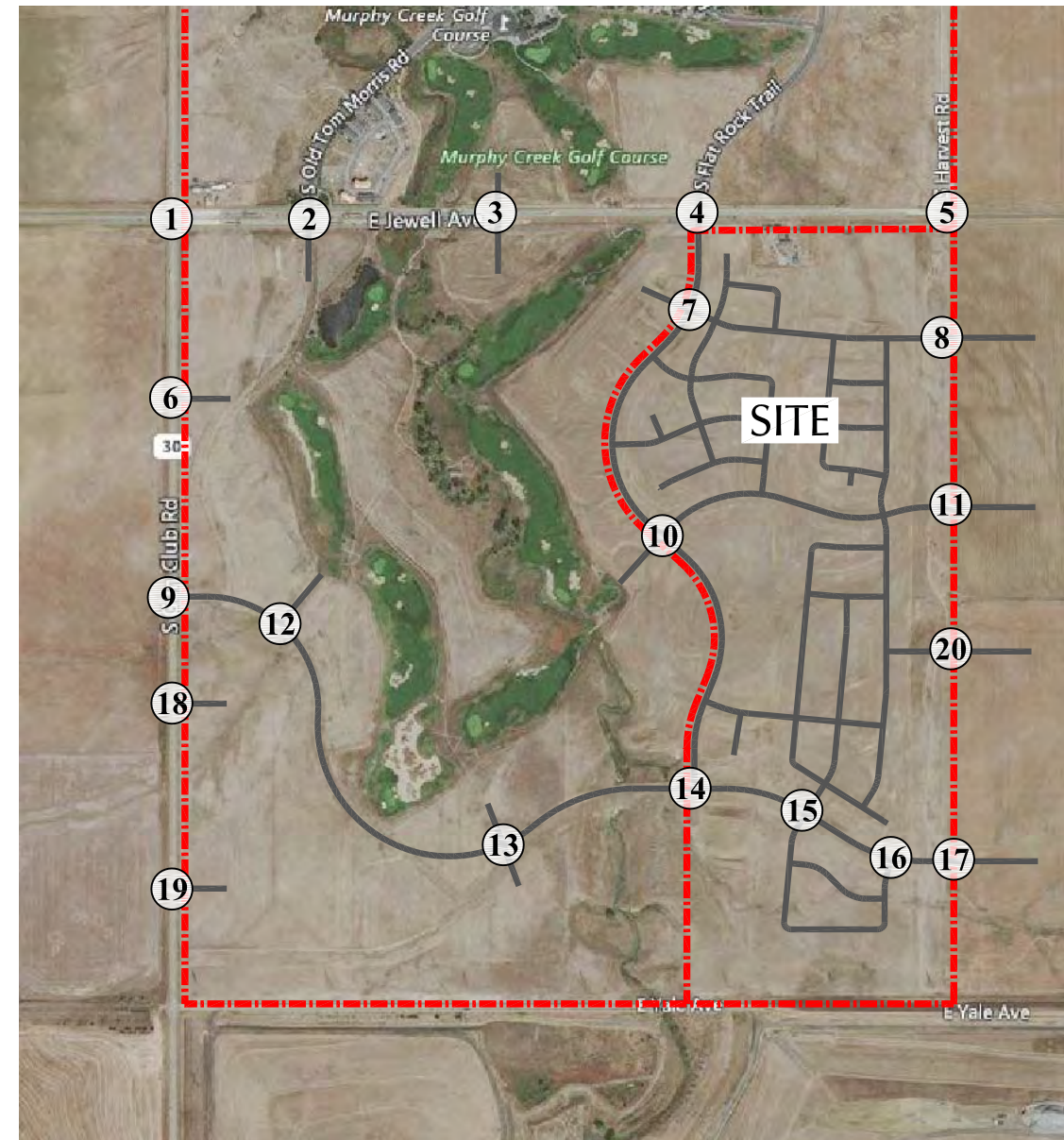
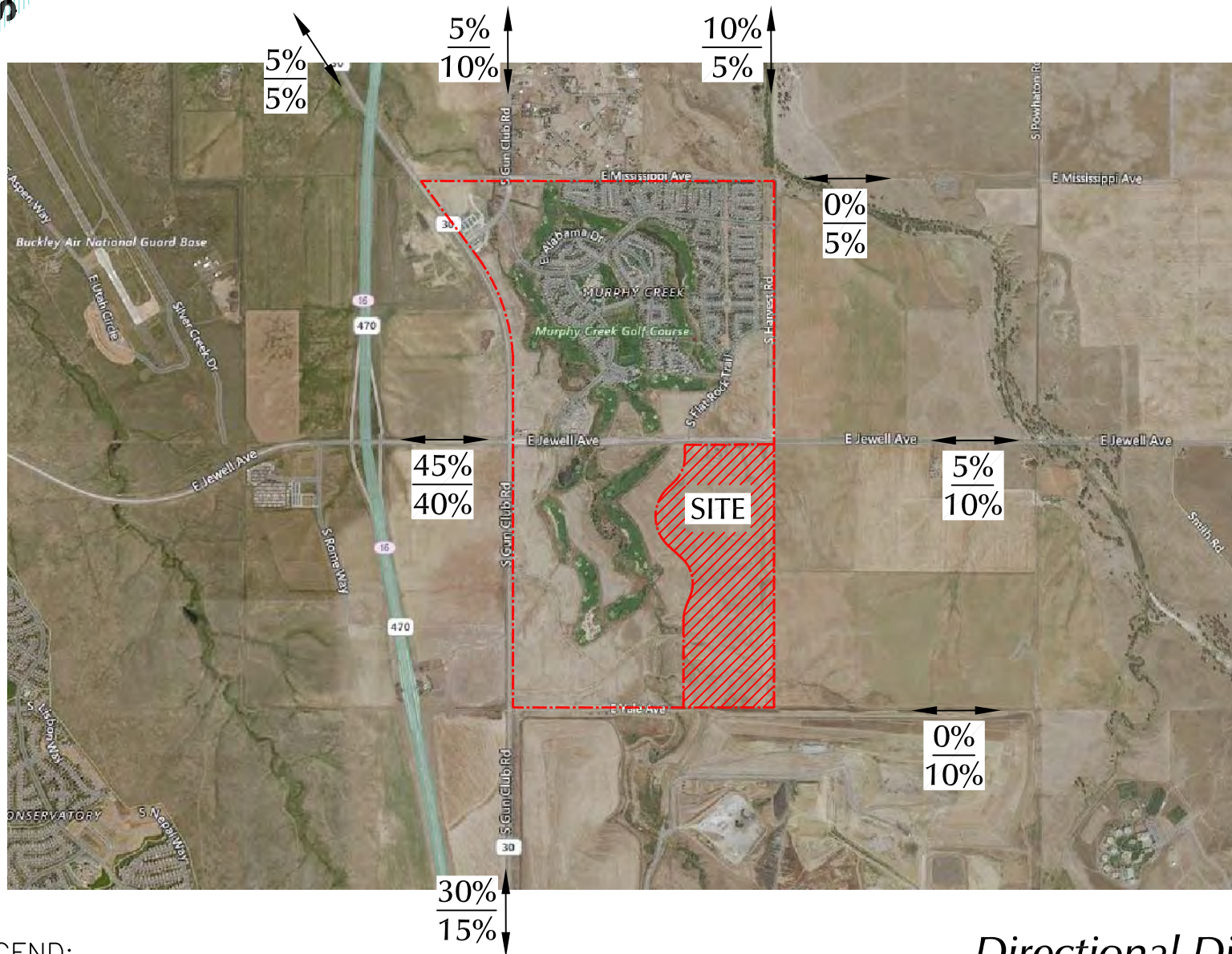


Figure 5b

Year 2040 Background Lane Geometry and Traffic Control

Murphy Creek East (LSC #181110)



Approximate Scale
Scale: 1"=3,000'

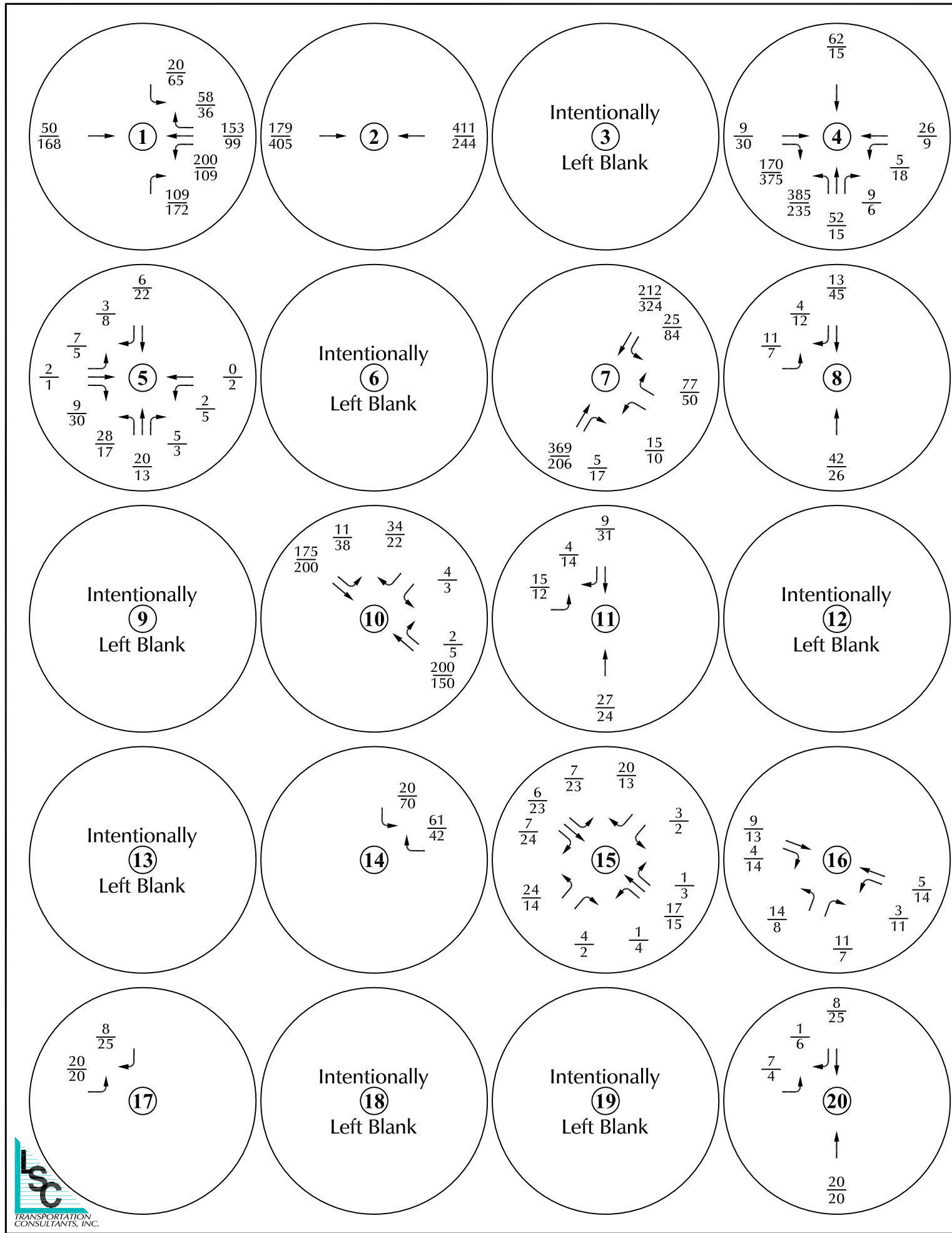
LEGEND:

$\frac{5\%}{5\%}$ = Residential Percent Directional Distribution
Commercial Percent Directional Distribution

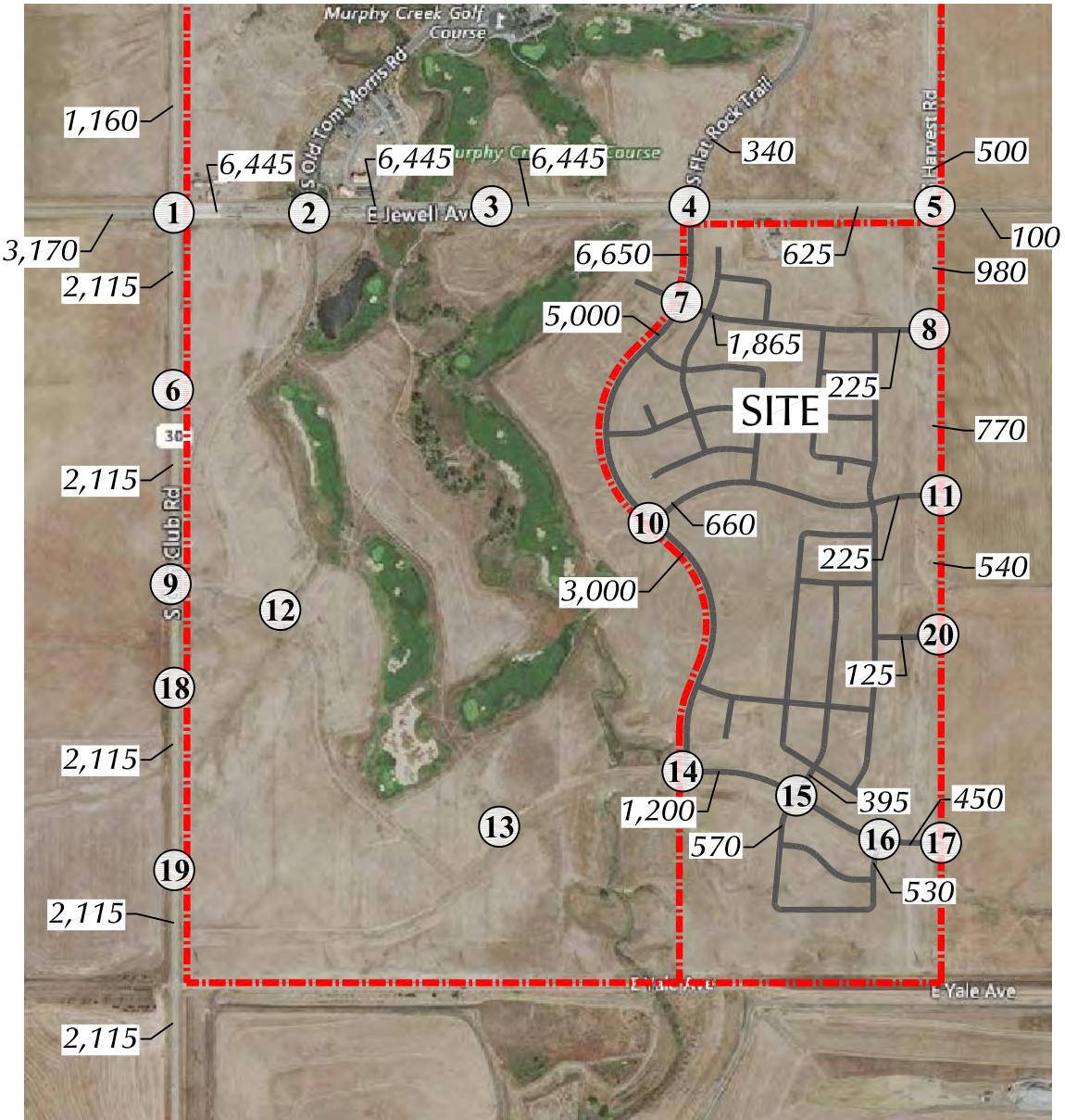
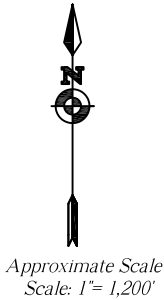
Directional Distribution of Site-Generated Traffic

Murphy Creek East (LSC #181110)

Figure 6



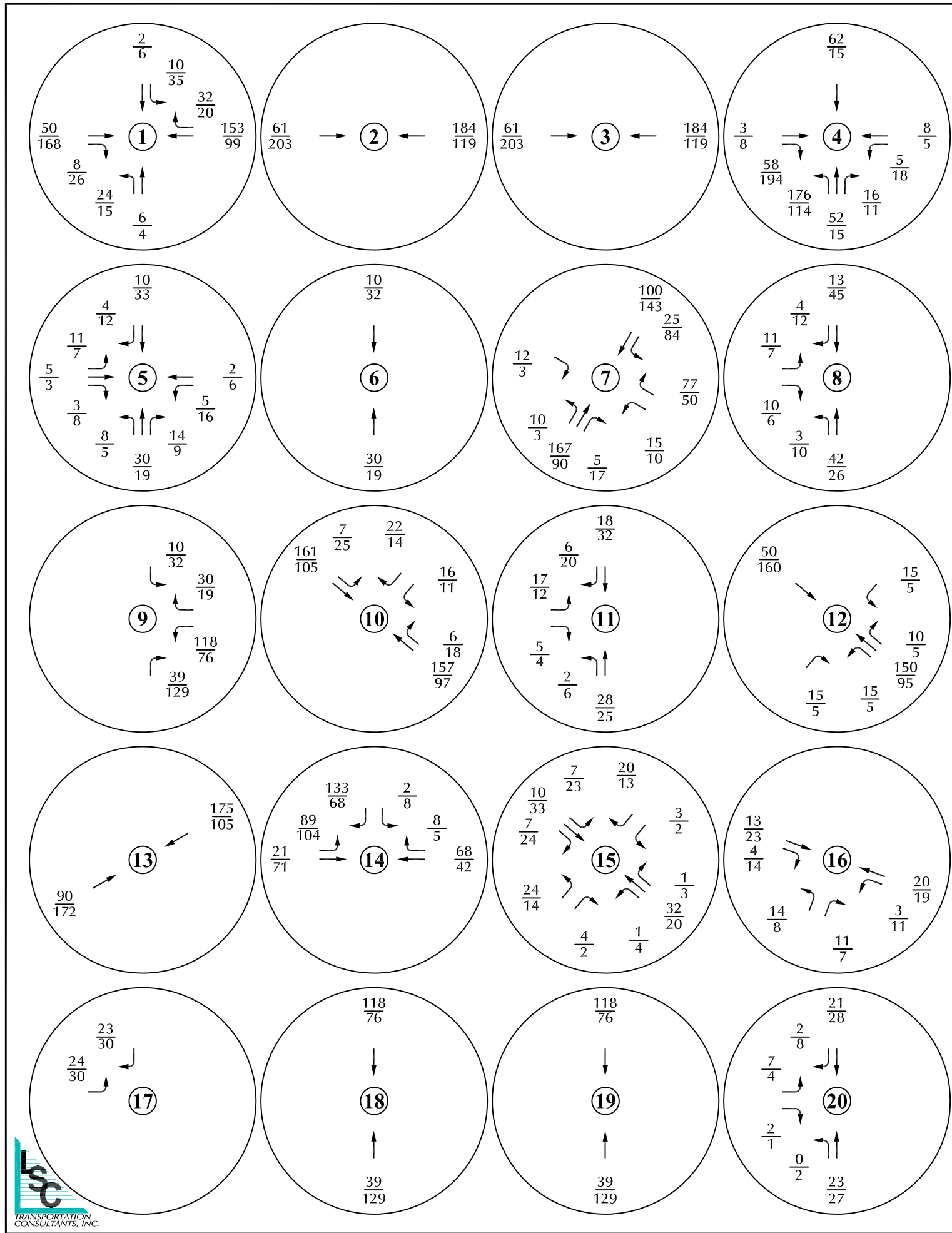
LEGEND:
 $\frac{26}{35}$ = AM Peak Hour Traffic
 PM Peak Hour Traffic
 1,000 = Average Daily Traffic



Note: The proposed school site does not have a site plan so trips were loaded to S. Flat Rock Trail south of intersection #10

Figure 7a

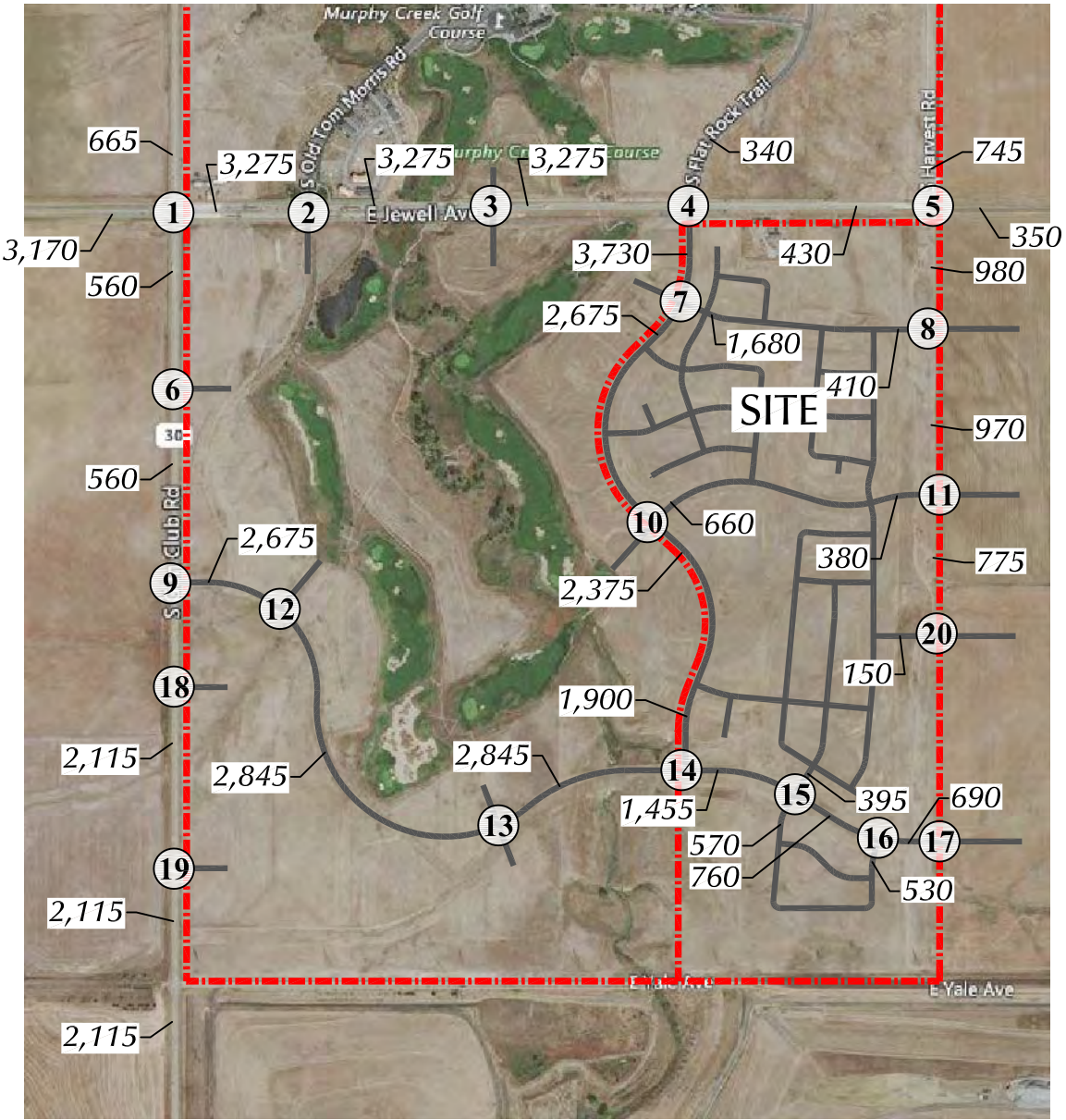
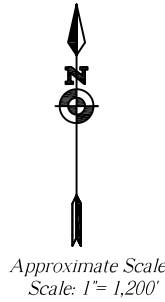
2023 Assignment of
 Site-Generated Traffic
 Murphy Creek East (LSC #181110)



LEGEND:

$\frac{26}{35}$ = AM Peak Hour Traffic
 = PM Peak Hour Traffic

1,000 = Average Daily Traffic

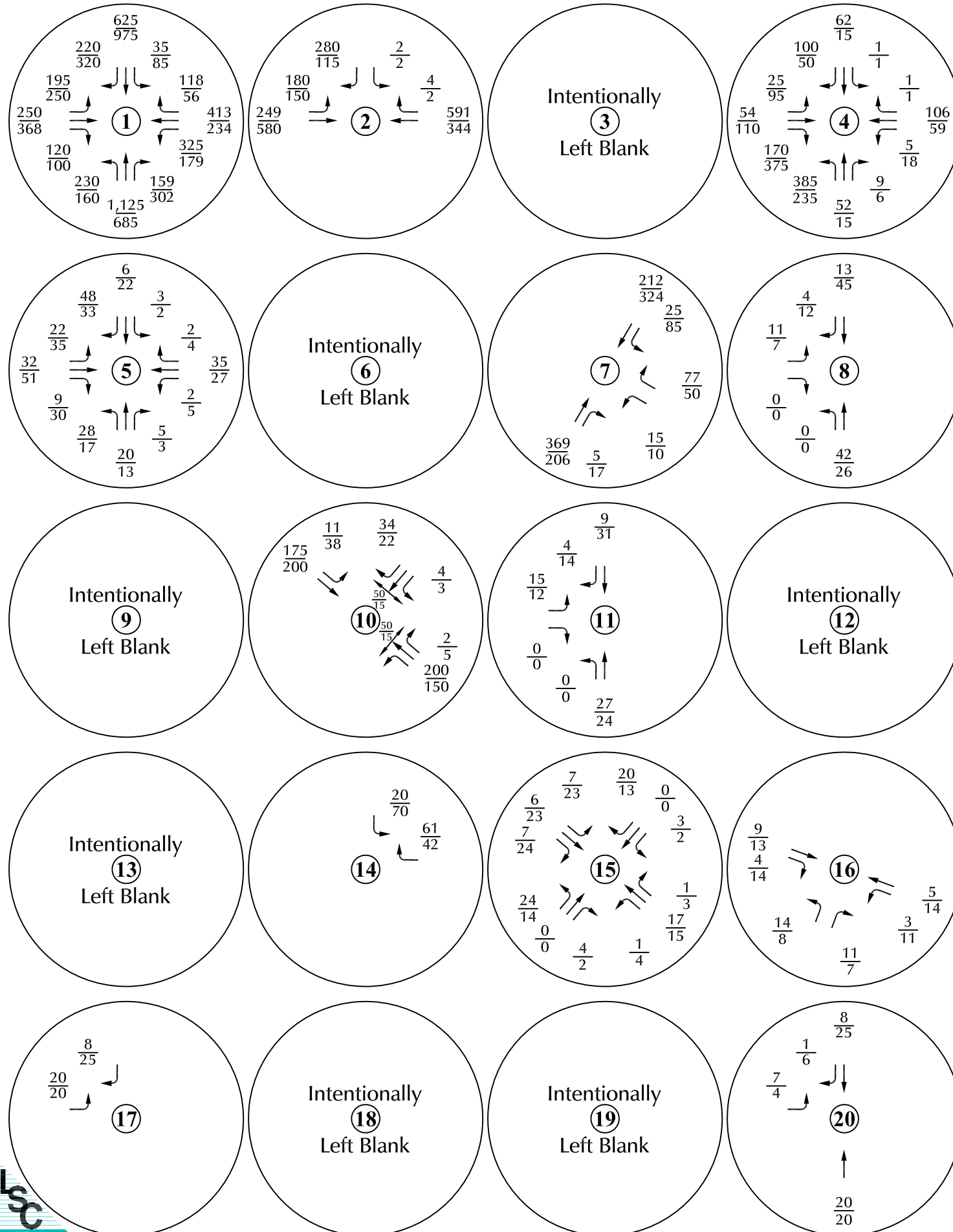


Note: The proposed school site does not have a site plan so trips were loaded to S. Flat Rock Trail south of intersection #10

Figure 7b

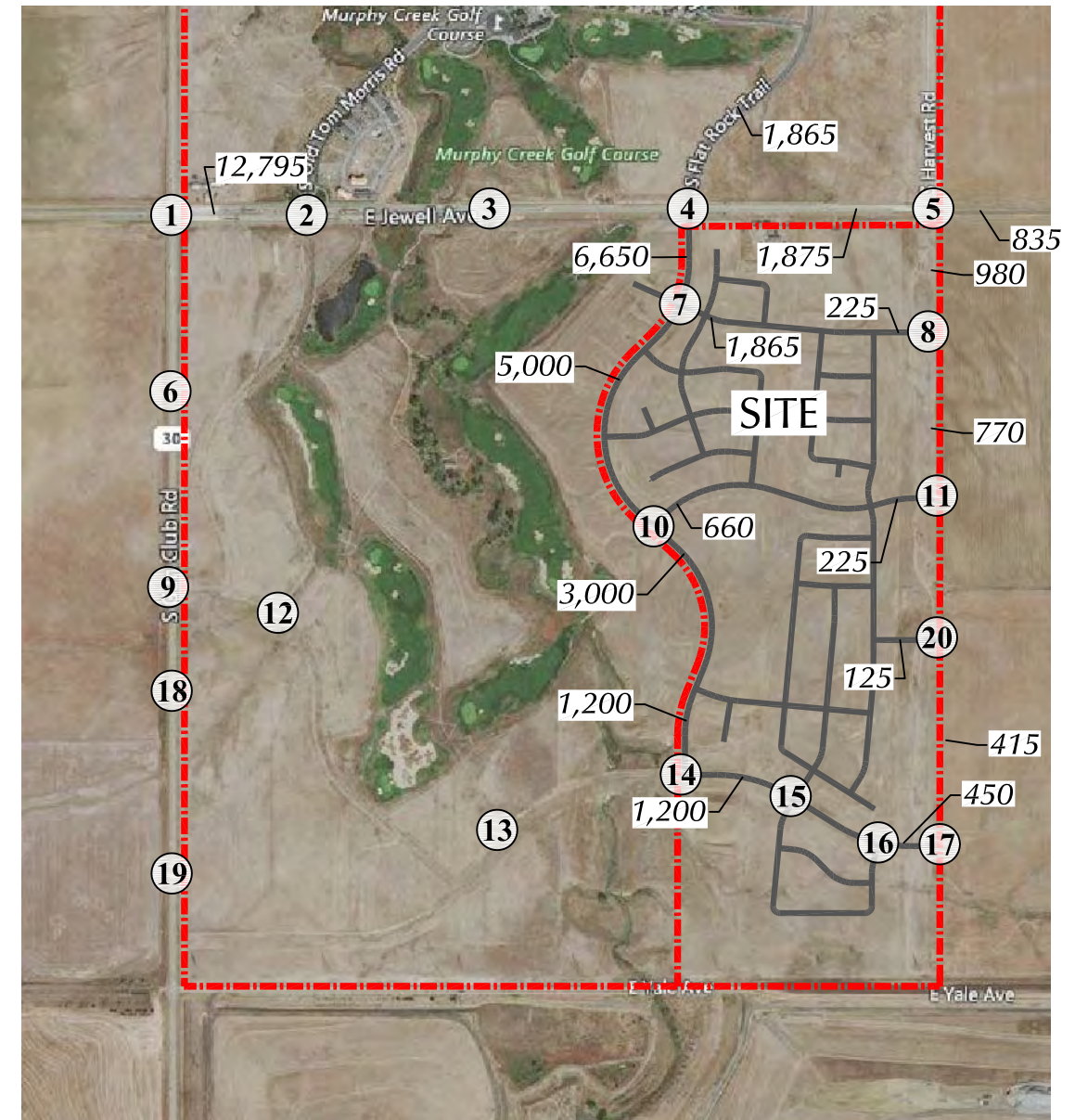
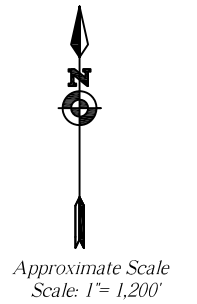
Assignment of 2040 Buildout Site-Generated Traffic

Murphy Creek East (LSC #181110)



LEGEND:

$\frac{26}{35}$ = AM Peak Hour Traffic
 $\frac{35}{26}$ = PM Peak Hour Traffic
 1,000 = Average Daily Traffic

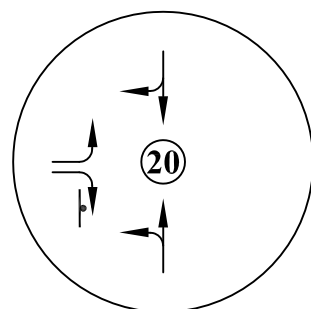
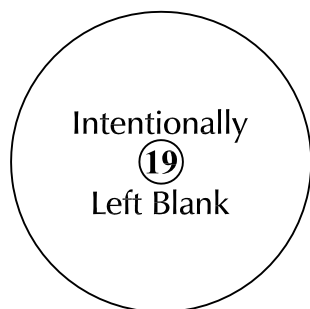
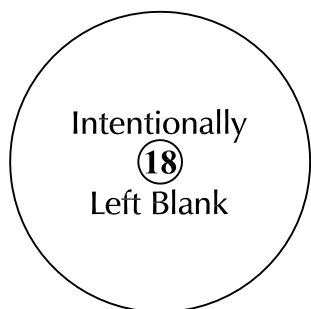
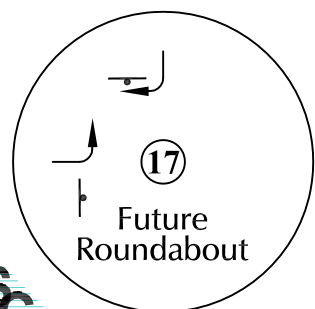
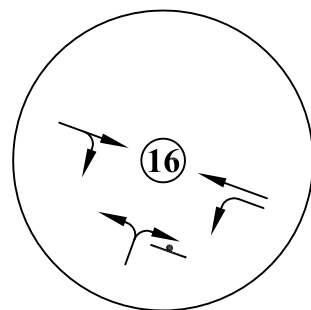
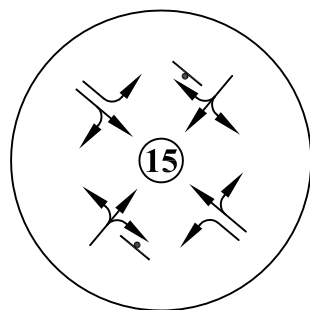
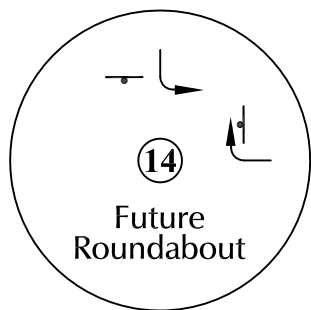
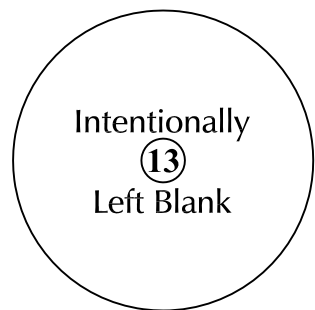
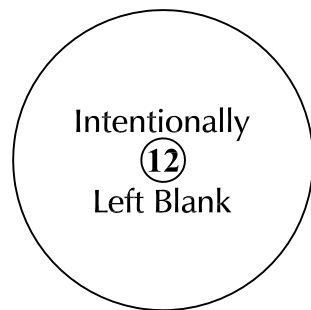
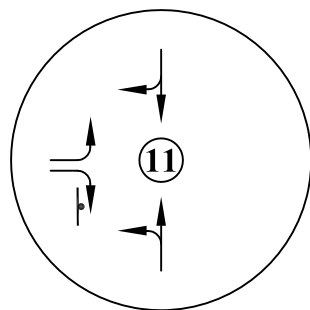
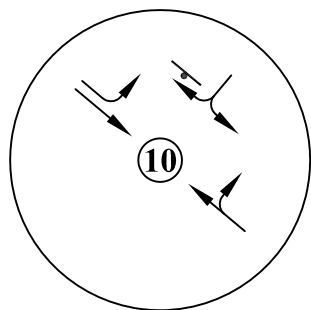
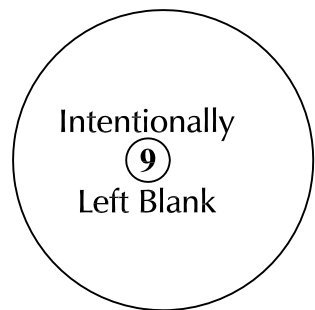
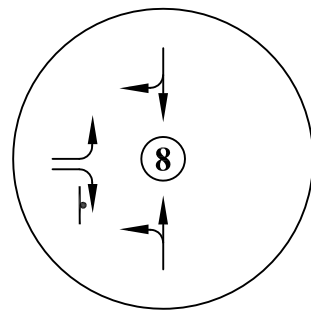
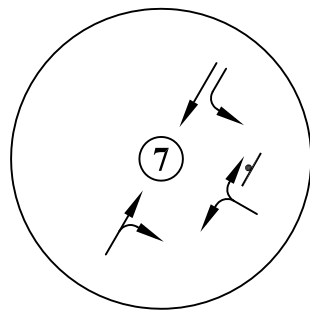
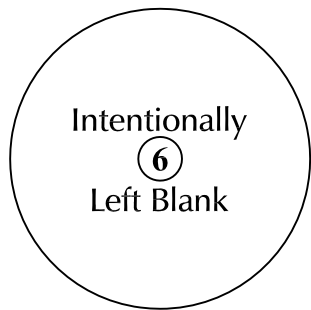
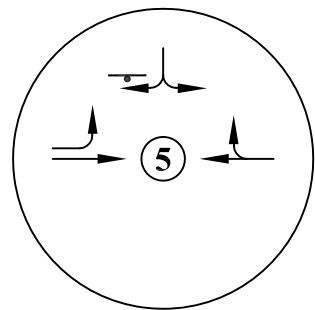
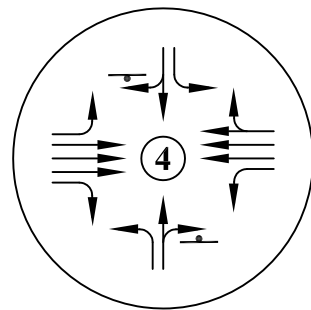
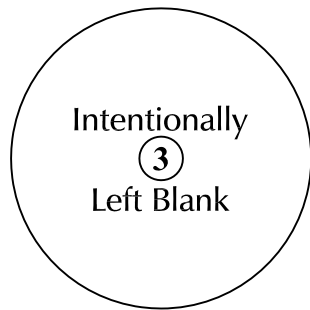
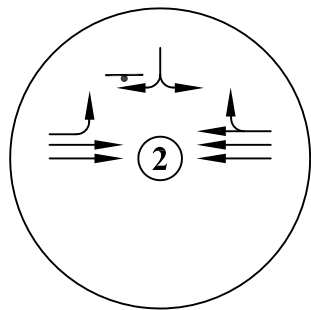
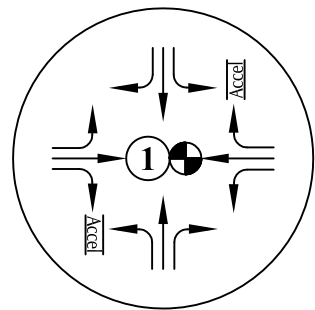


Note: The proposed school site does not have a site plan so trips were loaded to S. Flat Rock Trail south of intersection #10

Figure 8a

Year 2023
 Total Traffic

Murphy Creek East (LSC #181110)



LEGEND:

- = Stop Sign
- = Traffic Signal

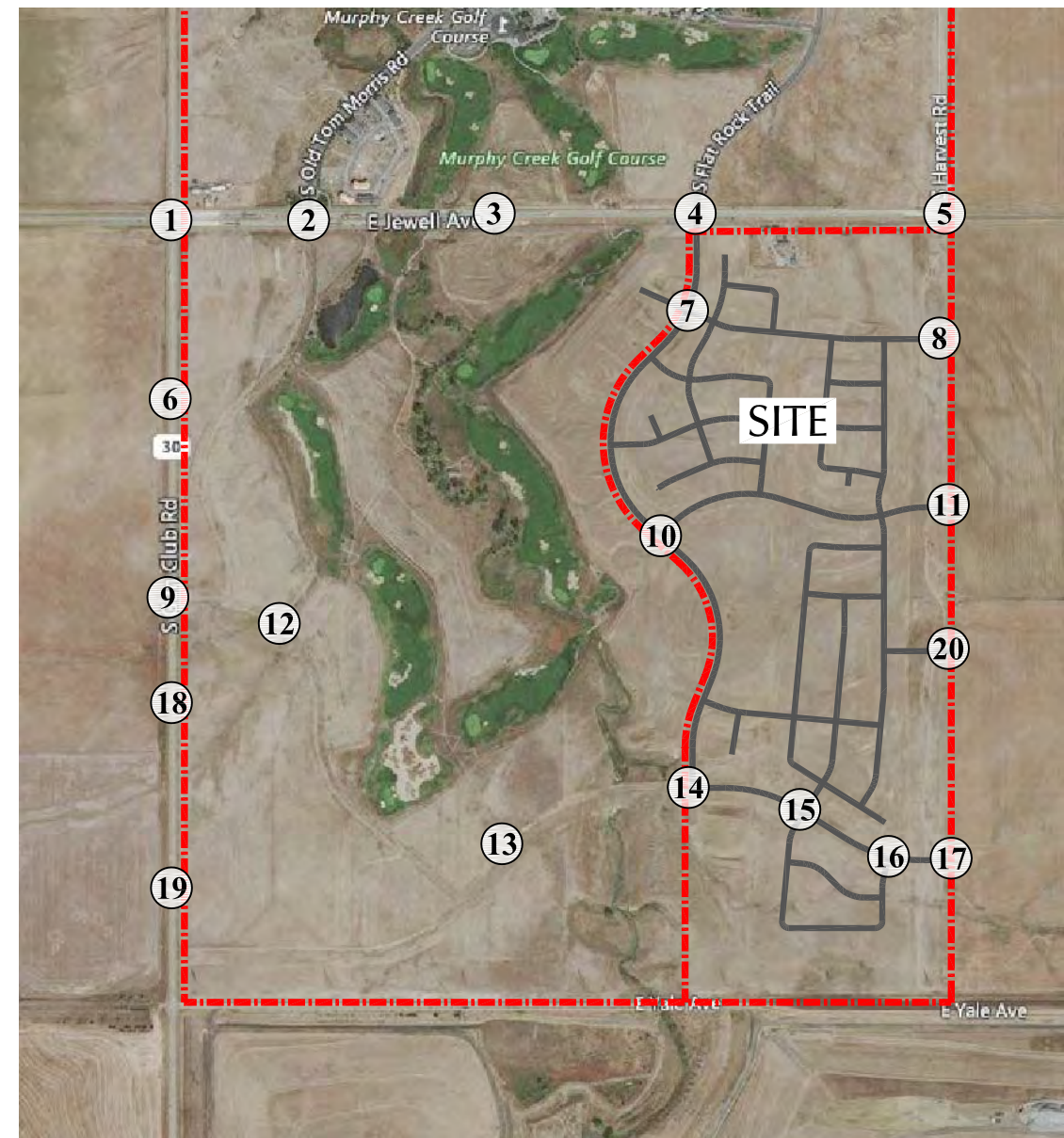
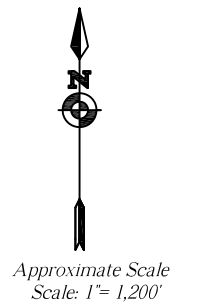
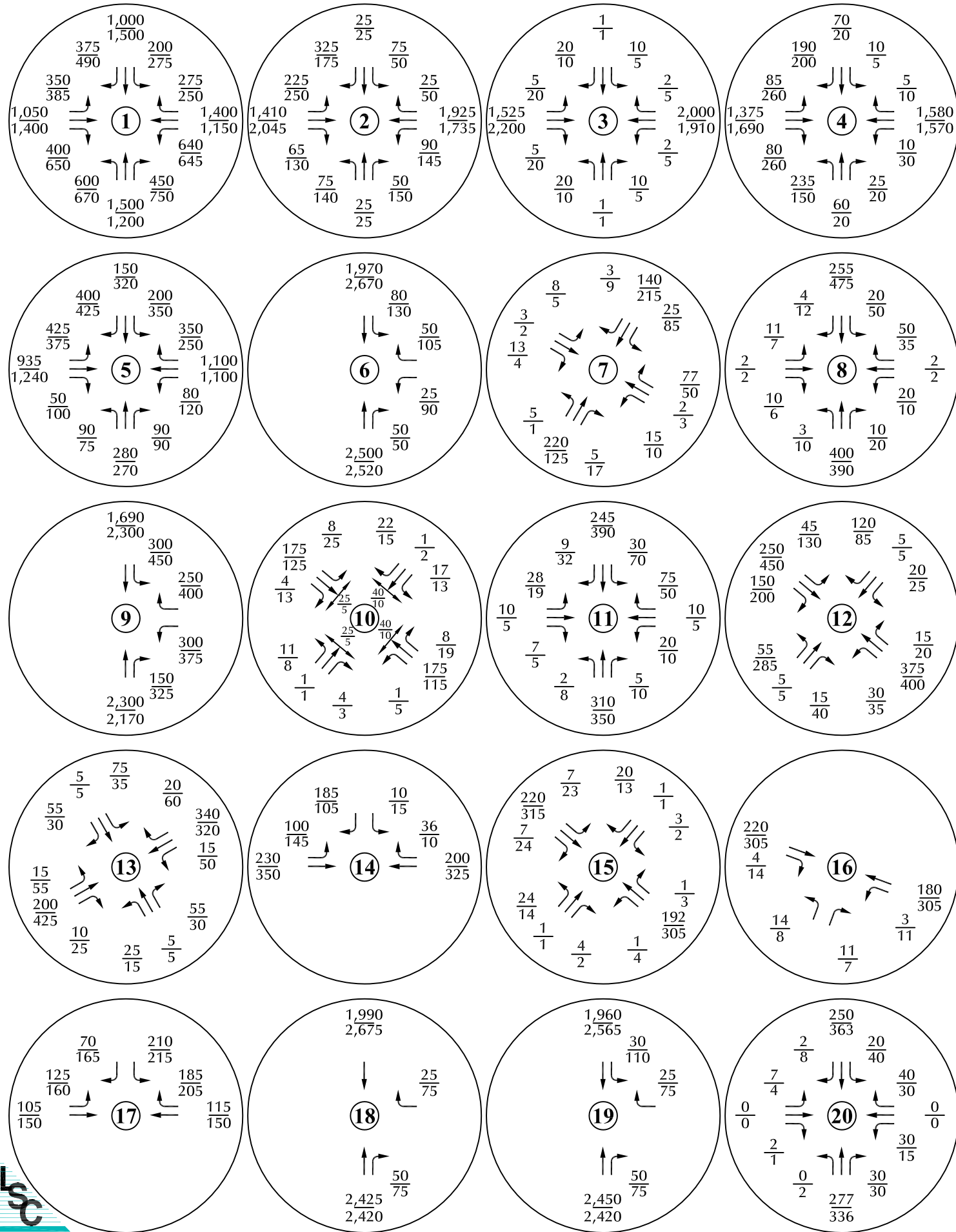


Figure 8b

Year 2023 Total Lane Geometry and Traffic Control

Murphy Creek East (LSC #181110)

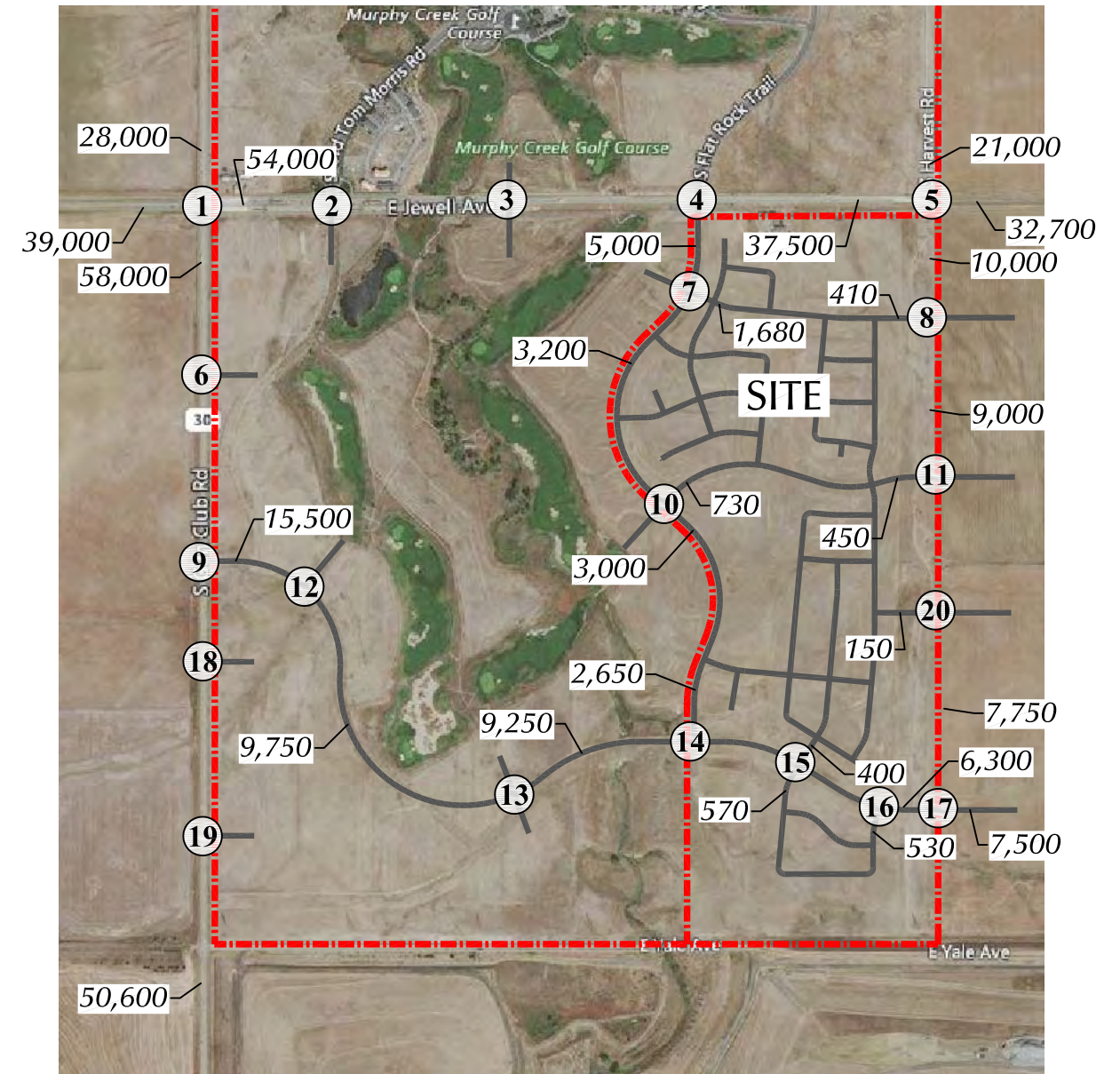


LEGEND:

$\frac{26}{35}$ = AM Peak Hour Traffic
 PM Peak Hour Traffic
 1,000 = Average Daily Traffic



Approximate Scale
 Scale: 1"= 1,200'

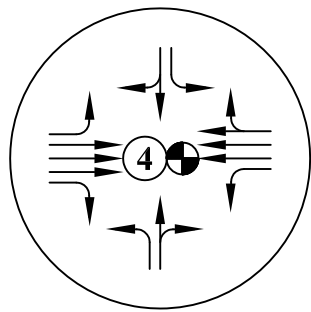
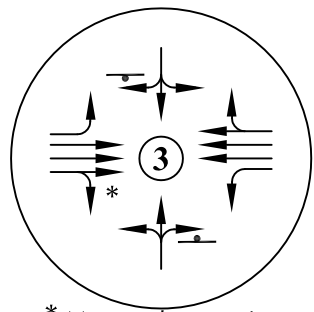
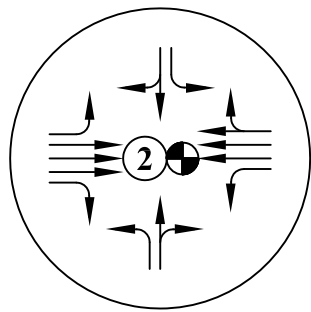
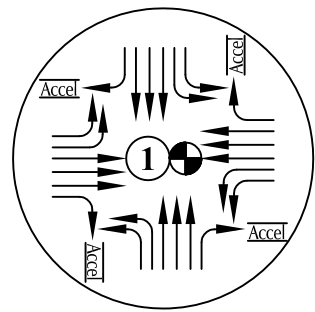


Note: The proposed school site does not have a site plan so trips were loaded to S. Flat Rock Trail south of intersection #10

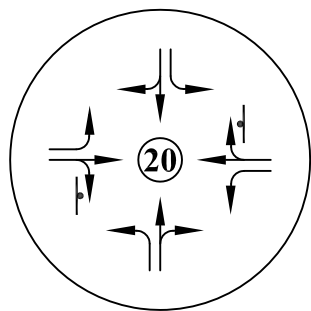
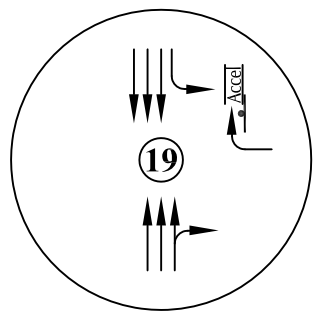
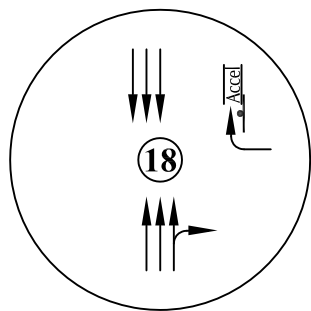
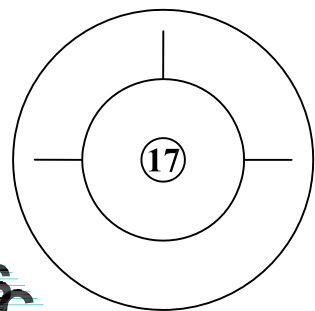
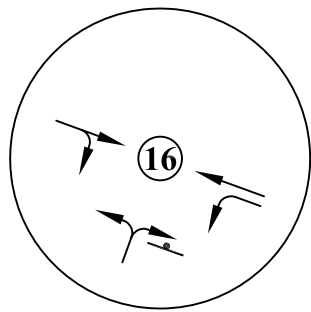
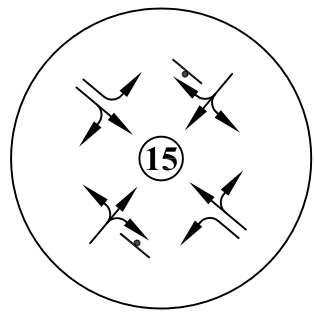
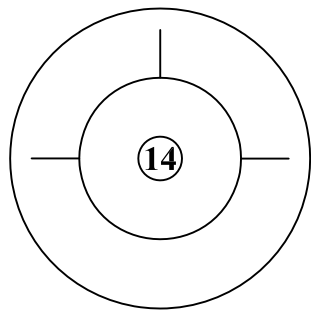
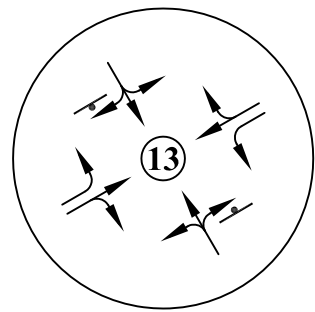
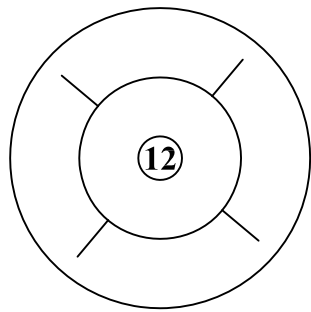
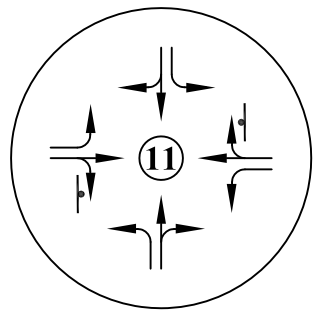
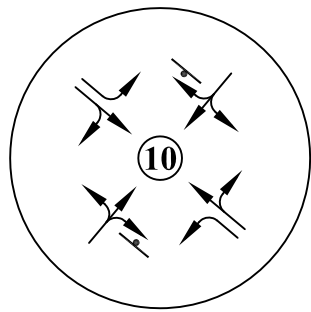
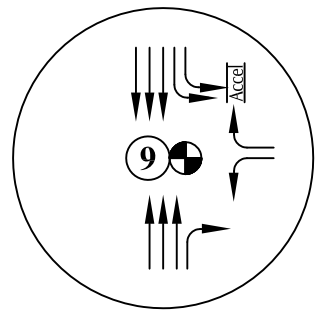
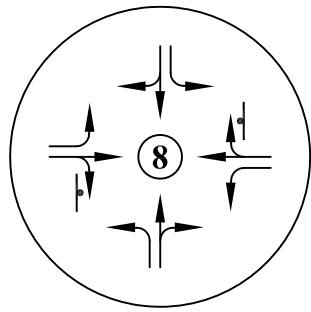
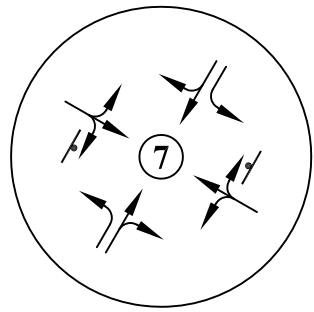
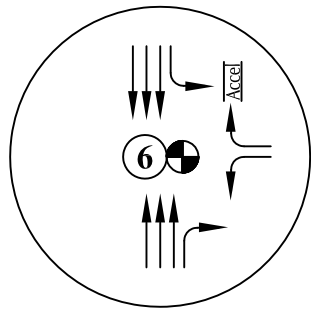
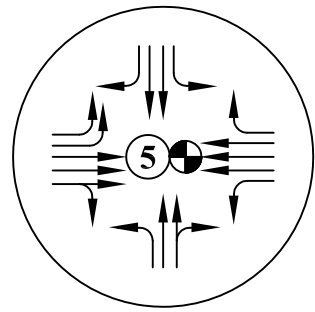
Figure 9a

**Year 2040
 Total Traffic**

Murphy Creek East (LSC #181110)

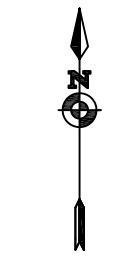


* May need conversion to three-quarter movement by 2040.



LEGEND:

- = Stop Sign
- = Traffic Signal
- = Modern Roundabout



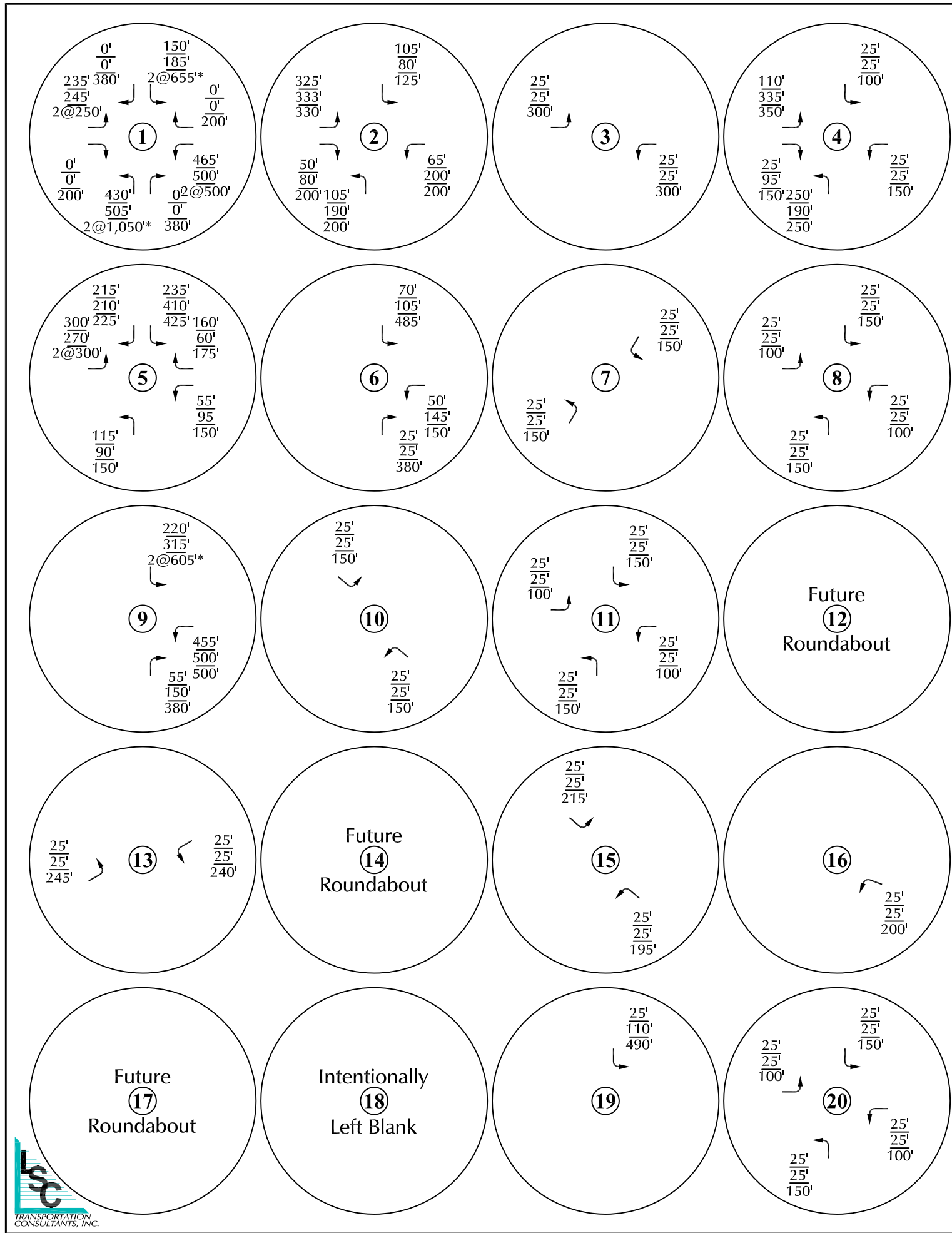
Approximate Scale
Scale: 1"= 1,200'



Figure 9b

Year 2040 Total Lane Geometry and Traffic Control

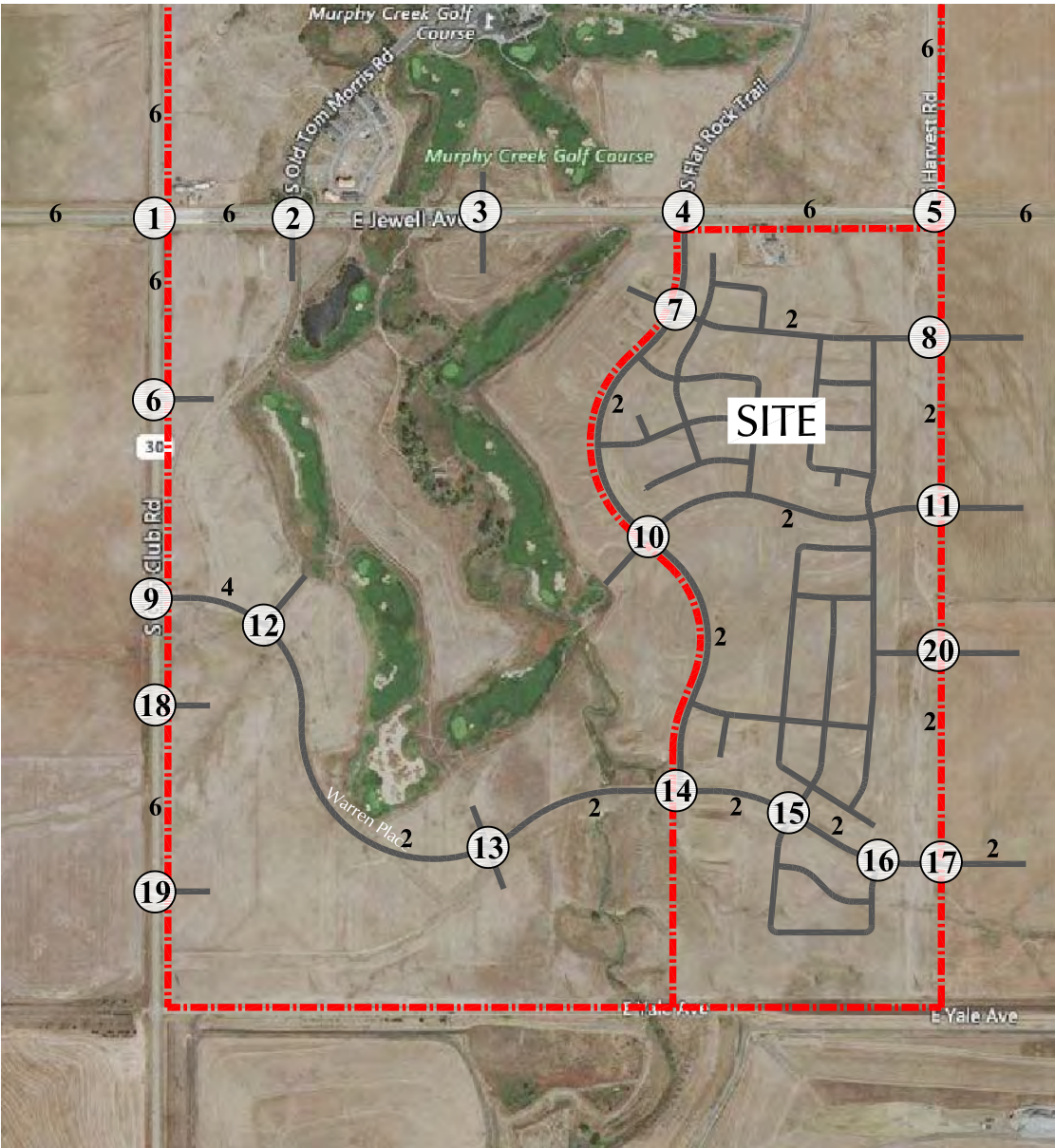
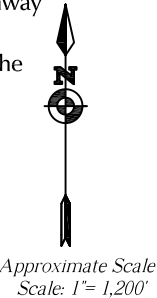
Murphy Creek East (LSC #181110)



Note: Turn lane lengths for signalized intersections are based on the 95th percentile queue lengths with a minimum of 150 feet and for unsignalized intersections are based on the requirements of the State Highway Access Code. All turn lane lengths on S. Gun Club Road are based on the requirements of the State Highway Access Code.

* Both lanes will be the length of the longest 95th percentile queue length with one of the lanes having the additional deceleration length.

- LEGEND:
- 25' = 2040 AM Peak 95th Percentile Length
- 25' = 2040 PM Peak 95th Percentile Length
- 25' = Recommended Turn Lane Length
- 4 = Number of Proposed Through Lanes



Major Street Classifications/ROW Widths

E. Jewell Avenue - 140' Arterial

E. Yale Avenue - 110' Arterial(modified)

Harvest Road - 80' Collector

Warren Place - 70' Collector

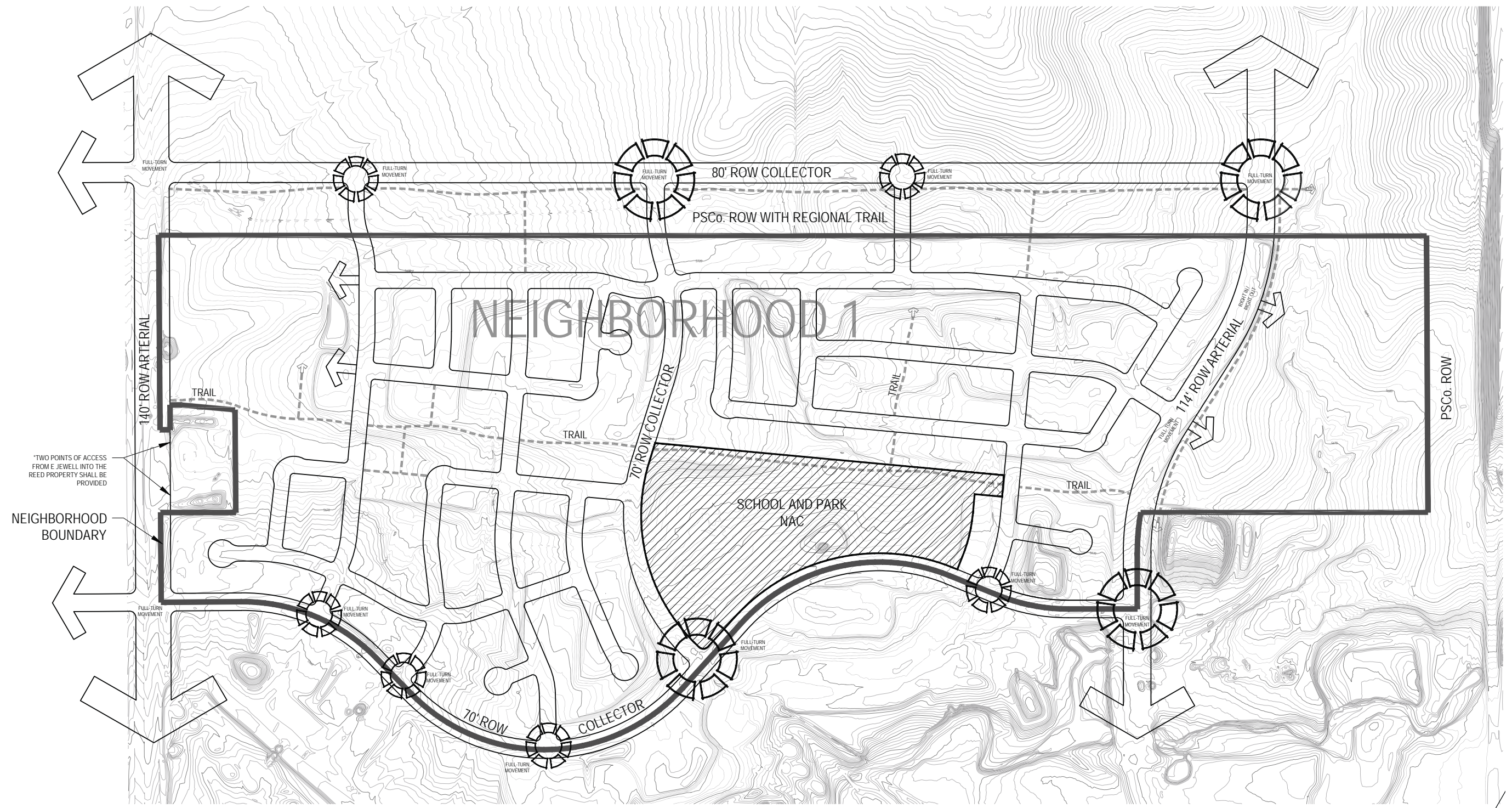
S. Flat Rock Trail - 70' Collector

All other streets are 60' or 64' Local Streets

Figure 9c

**Year 2040 Total Traffic
Turn Lane Lengths**

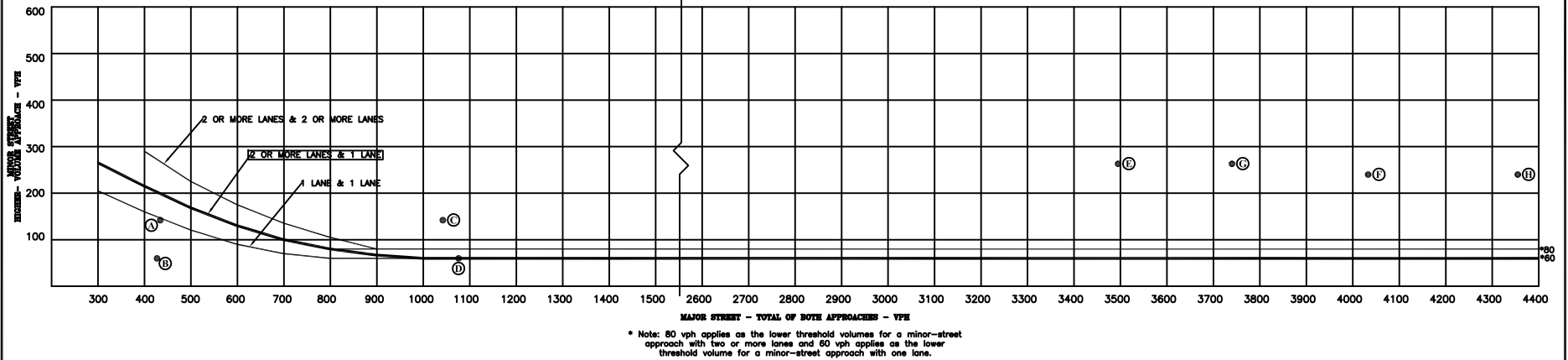
Murphy Creek East (LSC #181110)



A future enhanced pedestrian crossing is recommended at the intersection of S. Flat Rock Trail/Warren Street or at the future school access on S. Flat Rock Trail. The location should be determined when the school site plan is developed.

Figure 10
Pedestrian/Trail Connectivity
Murphy Creek East (LSC #181110)

Figure 4C-2. Warrant 2 Four-Hour Vehicular Volume (70% Factor)
(Constantly Less Than 10,000 population or above 40 mph on Major Street)



Data Points = (Major Street, Minor Street)

- (A) 2023 Background AM Peak = (434,142)
- (B) 2023 Background PM Peak = (427,60)
- (C) 2023 Total AM Peak = (1024,142)
- (D) 2023 Total PM Peak = (1076,60)
- (E) 2040 Background AM Peak = (3495,263)
- (F) 2040 Background PM Peak = (4033,240)
- (G) 2040 Total AM Peak = (3740,263)
- (H) 2040 Total PM Peak = (4355,240)

This warrant will not likely be met by 2023 but will be met prior to 2040.

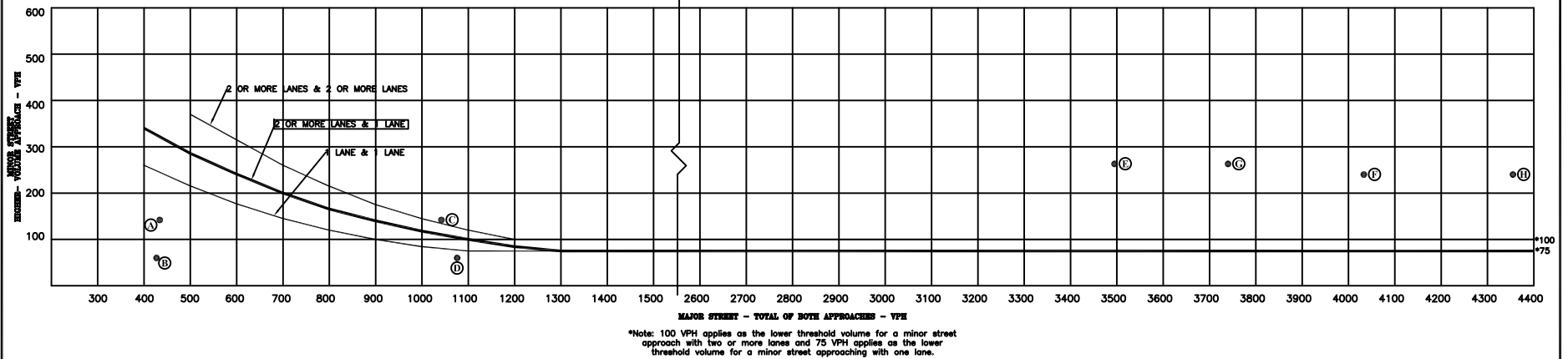
This is intersection #2 on Figures 4a, 5a, 8a and 9a.

Figure 11a

Warrant 2 - Four-Hour Vehicular Volume
E. Jewell Avenue/S. Old Tom Morris Road

Murphy Creek East (LSC #181110)

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
(Constantly Less Than 10,000 population or above 40 mph on Major Street)



Data Points = (Major Street, Minor Street)

- (A) 2023 Background AM Peak = (434,142)
- (B) 2023 Background PM Peak = (427,60)
- (C) 2023 Total AM Peak = (1024,142)
- (D) 2023 Total PM Peak = (1076,60)
- (E) 2040 Background AM Peak = (3495,263)
- (F) 2040 Background PM Peak = (4033,240)
- (G) 2040 Total AM Peak = (3740,263)
- (H) 2040 Total PM Peak = (4355,240)

This warrant will likely be met by 2023.

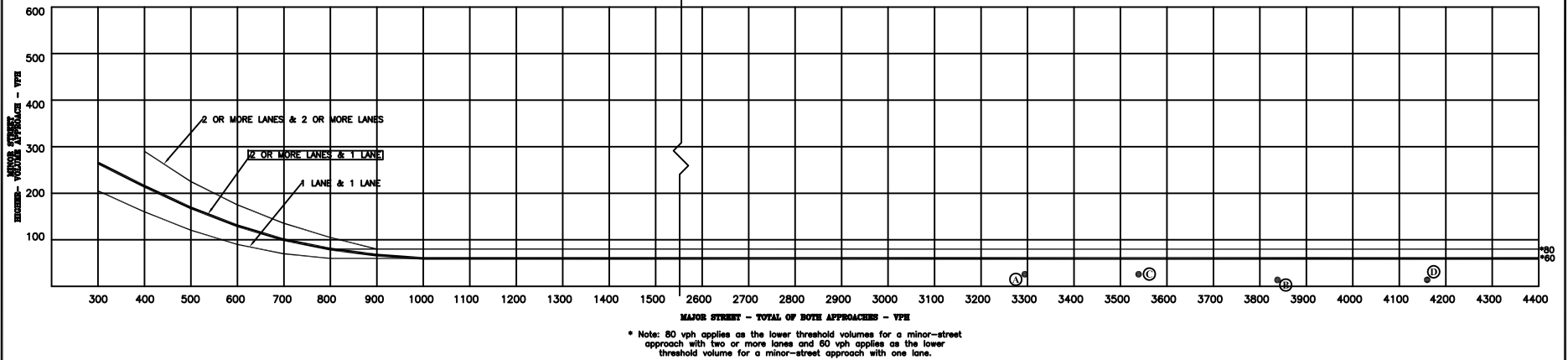
This is intersection #2 on Figures 4a, 5a, 8a and 9a.

Figure 11b

Warrant 3 - Peak-Hour Vehicular Volume
E. Jewell Avenue/S. Old Tom Morris Road

Murphy Creek East (LSC #181110)

Figure 4C-2. Warrant 2 Four-Hour Vehicular Volume (70% Factor)
(Constantly Less Than 10,000 population or above 40 mph on Major Street)



Data Points = (Major Street, Minor Street)

- A 2040 Background AM Peak = (3294,26)
- B 2040 Background PM Peak = (3838,14)
- C 2040 Total AM Peak = (3539,26)
- D 2040 Total PM Peak = (4160,14)

This is intersection #3 on Figures 4a, 5a, 8a and 9a.

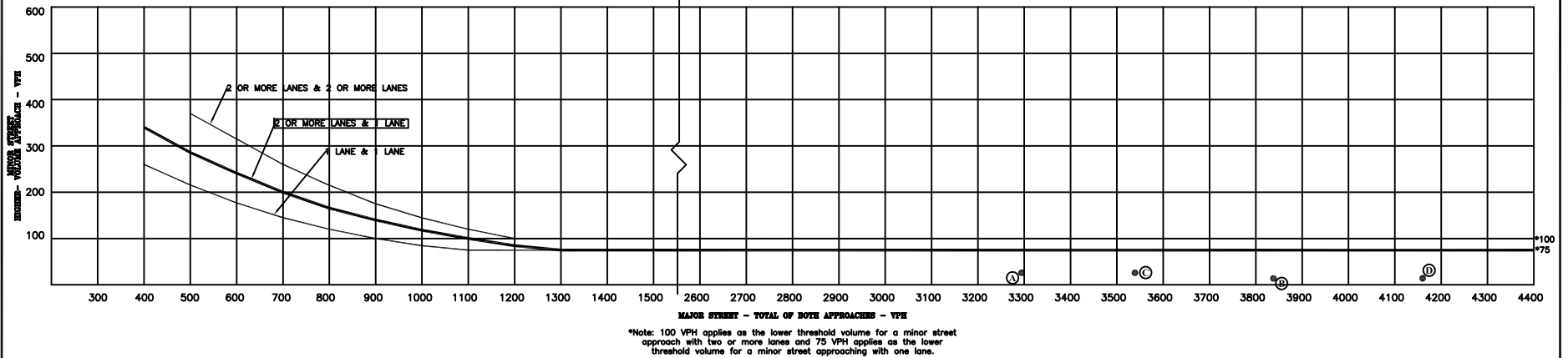
Figure 12a

Warrant 2 - Four-Hour Vehicular Volume E. Jewell Avenue/Full Movement Access

Murphy Creek East (LSC #181110)

This warrant will not likely be met by
2023 or 2040.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
(Constantly Less Than 10,000 population or above 40 mph on Major Street)



Data Points = (Major Street, Minor Street)

- A 2040 Background AM Peak = (3294,26)
- B 2040 Background PM Peak = (3838,14)
- C 2040 Total AM Peak = (3539,26)
- D 2040 Total PM Peak = (4160,14)

This is intersection #3 on Figures 4a, 5a, 8a and 9a.

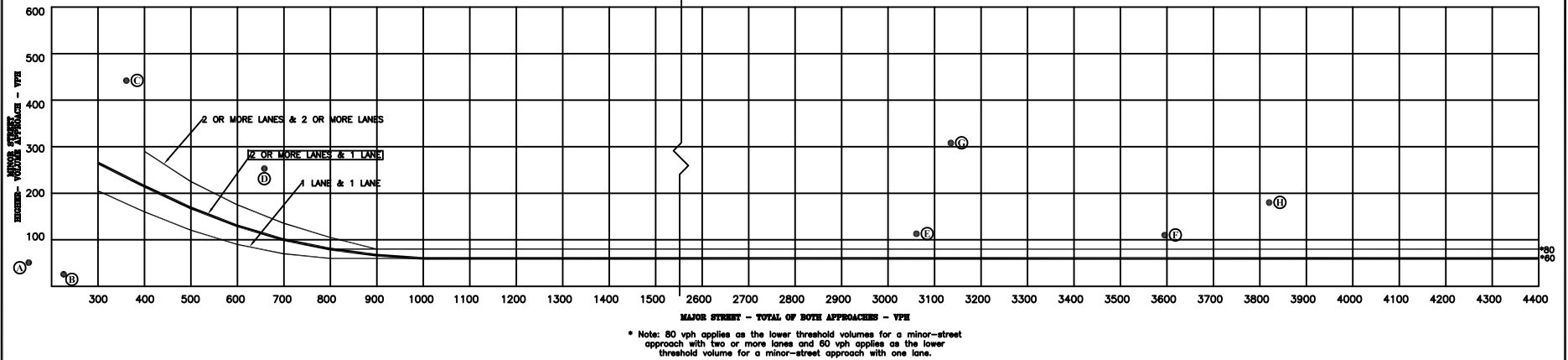
This warrant will not likely be met by
2023 or 2040.

Warrant 3 - Peak-Hour Vehicular Volume E. Jewell Avenue/Full Movement Access

Murphy Creek East (LSC #181110)

Figure 12b

Figure 4C-2. Warrant 2 Four-Hour Vehicular Volume (70% Factor)
(Constantly Less Than 10,000 population or above 40 mph on Major Street)



Data Points = (Major Street, Minor Street)

- (A) 2023 Background AM Peak = (151,51)
- (B) 2023 Background PM Peak = (226,26)
- (C) 2023 Total AM Peak = (361,442)
- (D) 2023 Total PM Peak = (658,253)
- (E) 2040 Background AM Peak = (3061,113)
- (F) 2040 Background PM Peak = (3595,110)
- (G) 2040 Total AM Peak = (3135,308)
- (H) 2040 Total PM Peak = (3820,180)

This warrant will likely be met by 2023.

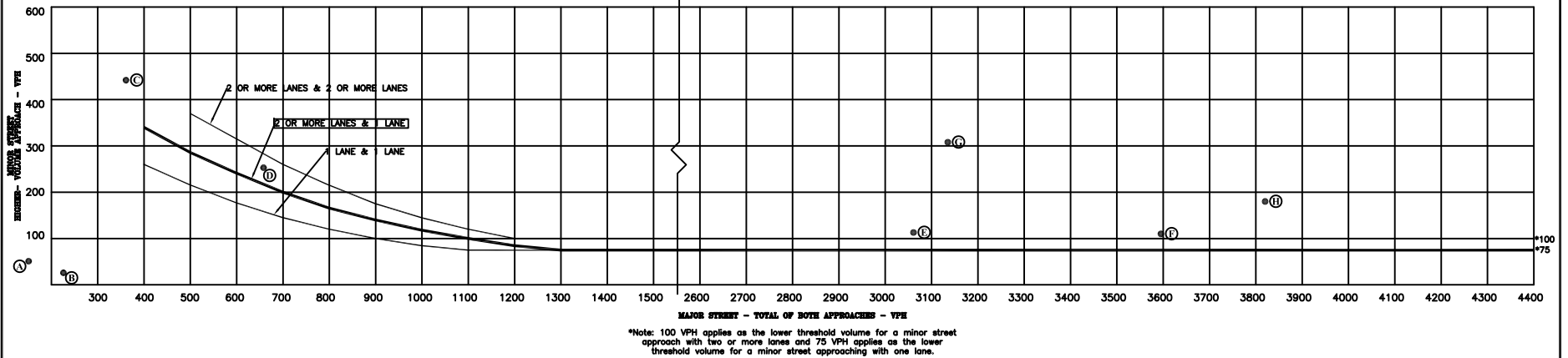
This is intersection #4 on Figures 4a, 5a, 8a and 9a.

Figure 13a

Warrant 2 - Four-Hour Vehicular Volume E. Jewell Avenue/S. Flat Rock Trail

Murphy Creek East (LSC #181110)

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
(Constantly Less Than 10,000 population or above 40 mph on Major Street)



Data Points = (Major Street, Minor Street)

- (A) 2023 Background AM Peak = (151,51)
- (B) 2023 Background PM Peak = (226,26)
- (C) 2023 Total AM Peak = (361,442)
- (D) 2023 Total PM Peak = (658,253)
- (E) 2040 Background AM Peak = (3061,113)
- (F) 2040 Background PM Peak = (3595,110)
- (G) 2040 Total AM Peak = (3135,308)
- (H) 2040 Total PM Peak = (3820,180)

This warrant will likely be met by 2023.

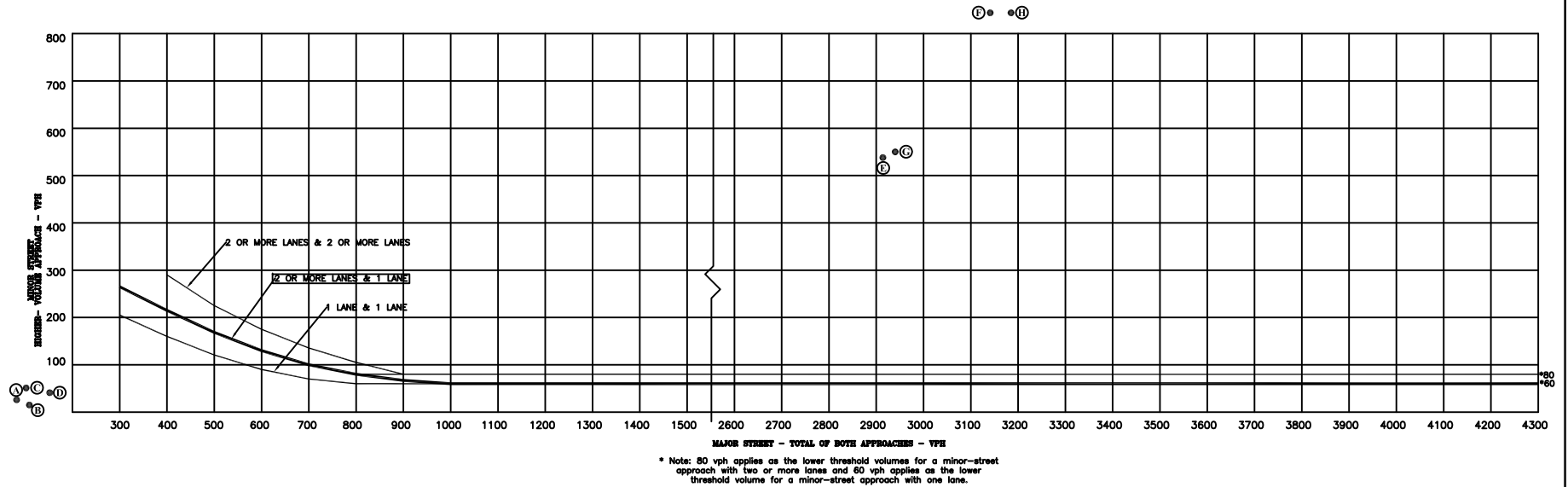
This is intersection #4 on Figures 4a, 5a, 8a and 9a.

Figure 13b

Warrant 3 - Peak-Hour Vehicular Volume
E. Jewell Avenue/S. Flat Rock Trail

Murphy Creek East (LSC #181110)

Figure 4C-2. Warrant 2 Four-Hour Vehicular Volume (70% Factor)
(Community Less Than 10,000 population or above 40 mph on Major Street)



Data Points = (Major Street, Minor Street)

- (A) 2023 Background AM Peak = (82,26)
- (B) 2023 Background PM Peak = (109,15)
- (C) 2023 Total AM Peak = (102,51)
- (D) 2023 Total PM Peak = (152,41)
- (E) 2040 Background AM Peak = (2914,538)
- (F) 2040 Background PM Peak = (3141,844)
- (G) 2040 Total AM Peak = (2940,550)
- (H) 2040 Total PM Peak = (3185,883)

This warrant will not likely be met by 2023 but will be met prior to 2040.

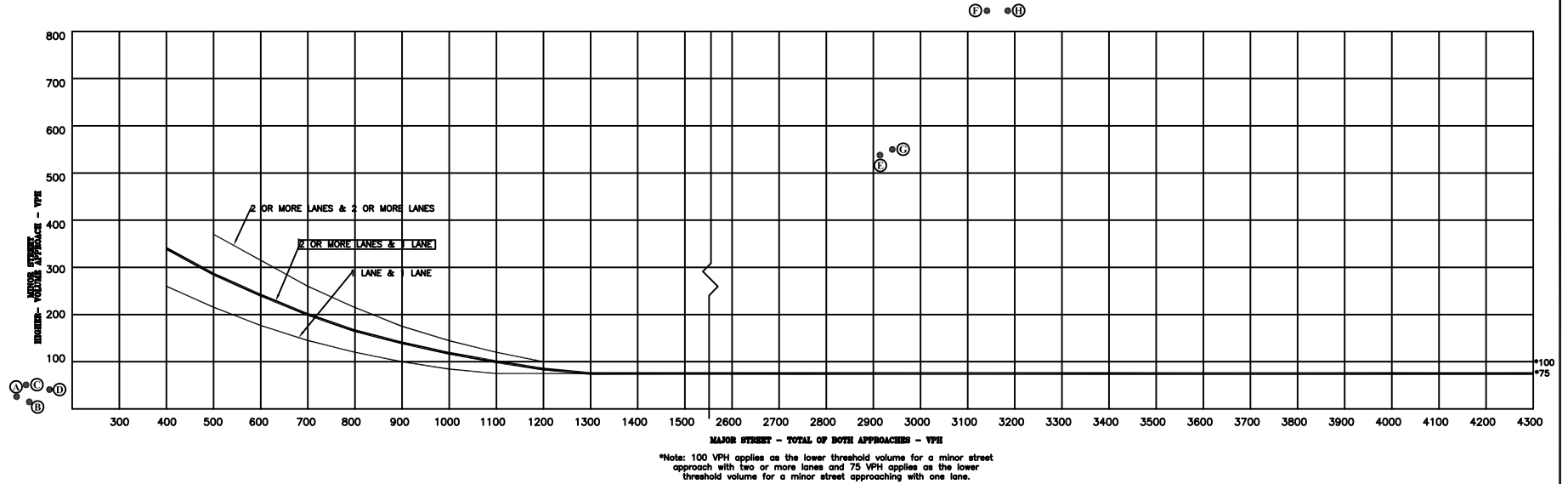
This is intersection #5 on Figures 4a, 5a, 8a and 9a.

Figure 14a

Warrant 2 - Four-Hour Vehicular Volume E. Jewell Avenue/Harvest Road

Murphy Creek East (LSC #181110)

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
(Community Less than 10,000 population or above 40 mph on Major Street)



Data Points = (Major Street, Minor Street)

- (A) 2023 Background AM Peak = (82,26)
- (B) 2023 Background PM Peak = (109,15)
- (C) 2023 Total AM Peak = (102,51)
- (D) 2023 Total PM Peak = (152,41)
- (E) 2040 Background AM Peak = (2914,538)
- (F) 2040 Background PM Peak = (3141,844)
- (G) 2040 Total AM Peak = (2940,550)
- (H) 2040 Total PM Peak = (3185,883)

This warrant will not likely be met by 2023 but will be met prior to 2040.

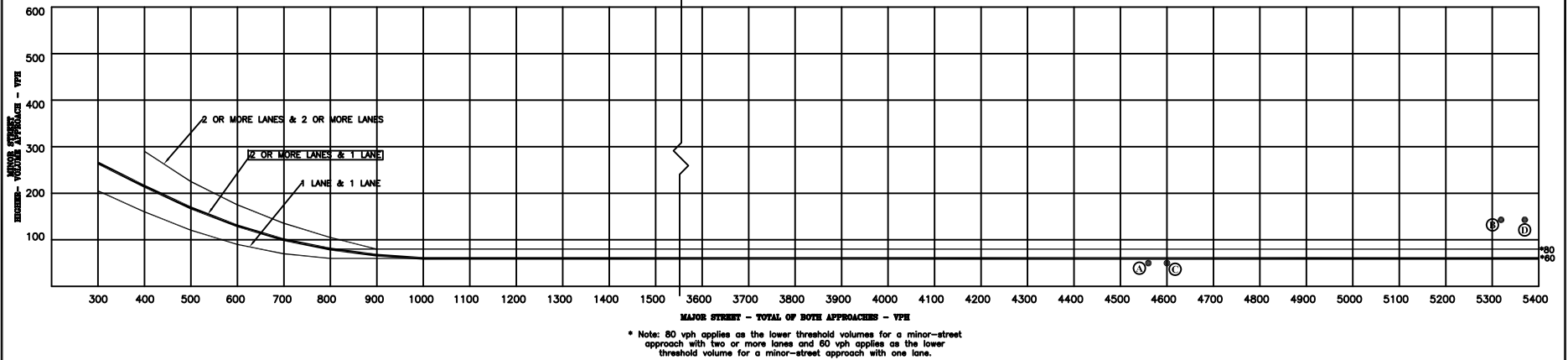
This is intersection #5 on Figures 4a, 5a, 8a and 9a.

Figure 14b

Warrant 3 - Peak-Hour Vehicular Volume E. Jewell Avenue/Harvest Road

Murphy Creek East (LSC #181110)

Figure 4C-2. Warrant 2 Four-Hour Vehicular Volume (70% Factor)
(Constantly Less Than 10,000 population or above 40 mph on Major Street)



Data Points = (Major Street, Minor Street)

- Ⓐ 2040 Background AM Peak = (4560,50)
- Ⓑ 2040 Background PM Peak = (5319,143)
- Ⓒ 2040 Total AM Peak = (4600,50)
- Ⓓ 2040 Total PM Peak = (5370,143)

This warrant will likely be met by 2040 due to afternoon early evening commercial trips.

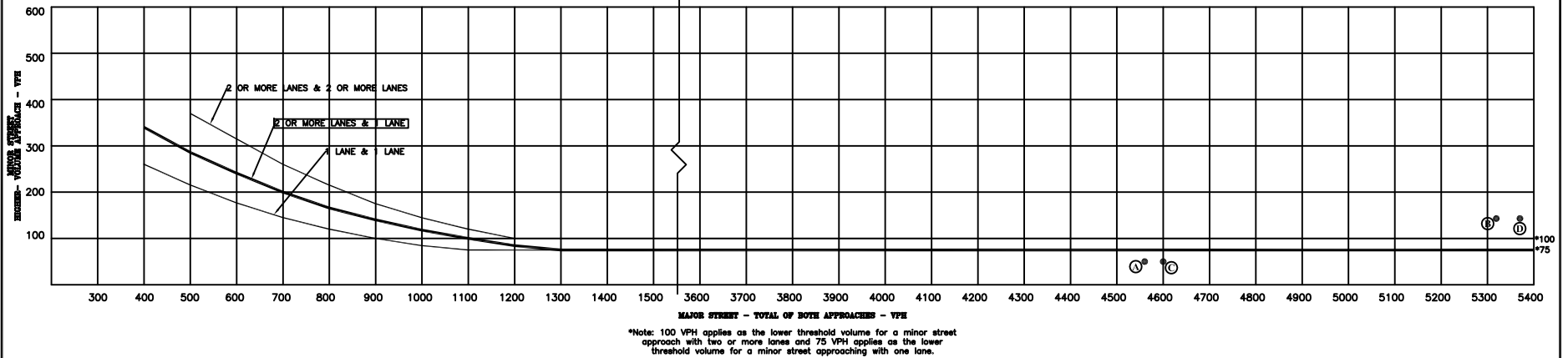
This is intersection #6 on Figures 5a and 9a.

Figure 15a

Warrant 2 - Four-Hour Vehicular Volume E. Jewell Avenue/Commercial Access

Murphy Creek East (LSC #181110)

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
(Constantly Less Than 10,000 population or above 40 mph on Major Street)



Data Points = (Major Street, Minor Street)

- Ⓐ 2040 Background AM Peak = (4560,50)
- Ⓑ 2040 Background PM Peak = (5319,143)
- Ⓒ 2040 Total AM Peak = (4600,50)
- Ⓓ 2040 Total PM Peak = (5370,143)

This warrant will likely be met by 2040 due to afternoon early evening commercial trips.

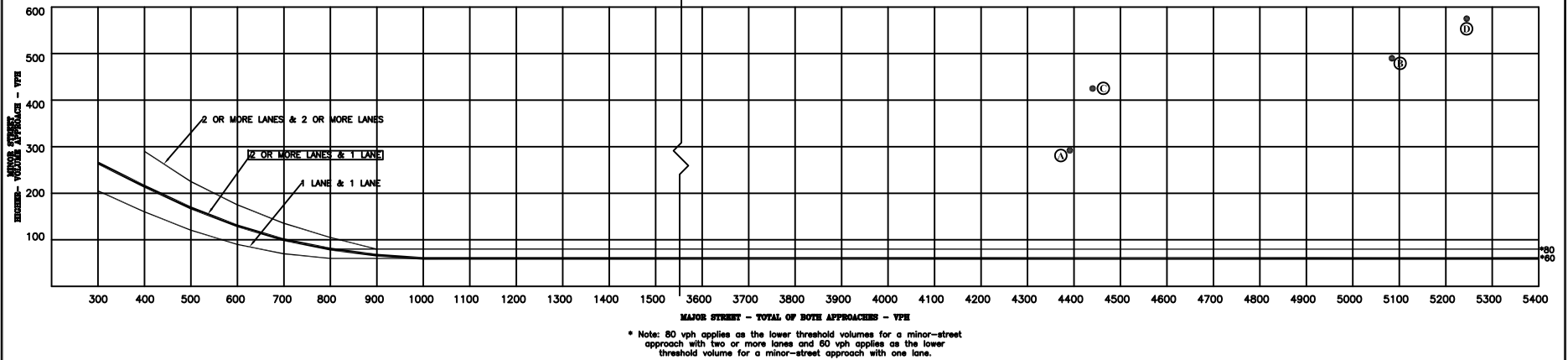
This is intersection #6 on Figures 5a and 9a.

Figure 15b

Warrant 3 - Peak-Hour Vehicular Volume E. Jewell Avenue/Commercial Access

Murphy Creek East (LSC #181110)

Figure 4C-2. Warrant 2 Four-Hour Vehicular Volume (70% Factor)
(Constantly Less Than 10,000 population or above 40 mph on Major Street)



Data Points = (Major Street, Minor Street)

- A 2040 Background AM Peak = (4391,292)
- B 2040 Background PM Peak = (5084,490)
- C 2040 Total AM Peak = (4440,425)
- D 2040 Total PM Peak = (5245,575)

This is intersection #9 on Figures 5a and 9a.

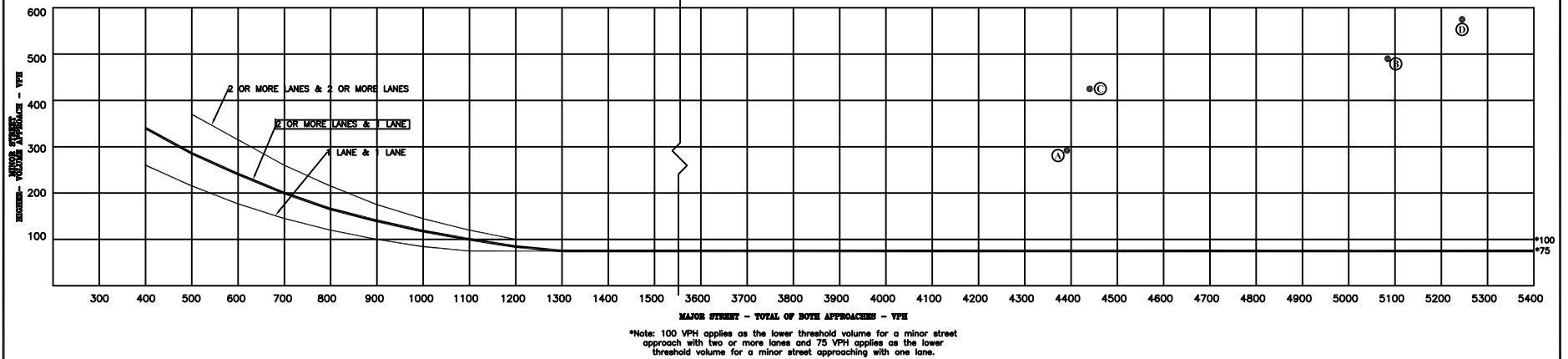
This warrant will likely be met by 2040.

Figure 16a

Warrant 2 - Four-Hour Vehicular Volume E. Jewell Avenue/E. Yale Avenue

Murphy Creek East (LSC #181110)

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
(Constantly Less Than 10,000 population or above 40 mph on Major Street)



Data Points = (Major Street, Minor Street)

- A 2040 Background AM Peak = (4391,292)
- B 2040 Background PM Peak = (5084,490)
- C 2040 Total AM Peak = (4440,425)
- D 2040 Total PM Peak = (5245,575)

This is intersection #9 on Figures 5a and 9a.

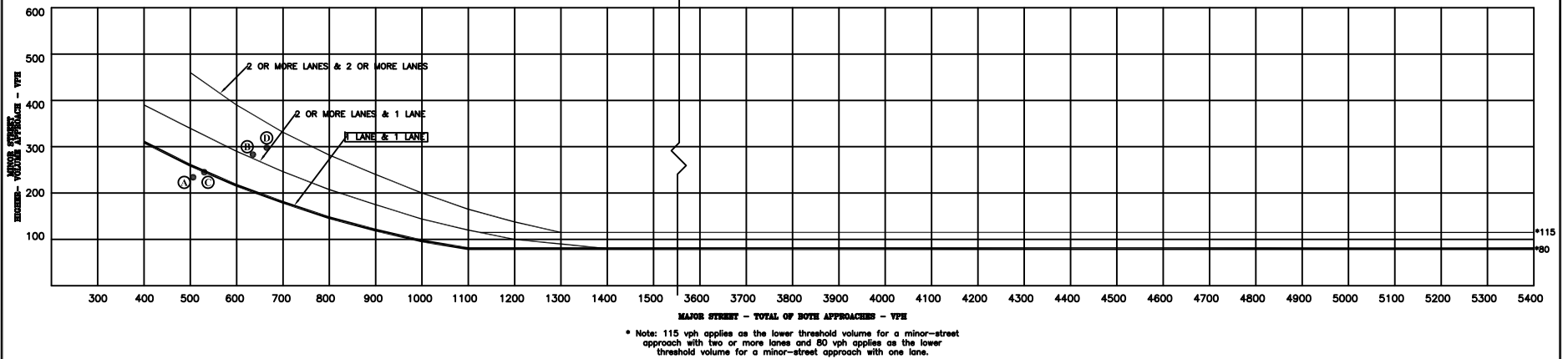
This warrant will likely be met by 2040.

Figure 16b

Warrant 3 - Peak-Hour Vehicular Volume E. Jewell Avenue/E. Yale Avenue

Murphy Creek East (LSC #181110)

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



Data Points = (Major Street, Minor Street)

- Ⓐ 2040 Background AM Peak = (506,234)
- Ⓑ 2040 Background PM Peak = (635,283)
- Ⓒ 2040 Total AM Peak = (530,245)
- Ⓓ 2040 Total PM Peak = (665,298)

This warrant could possibly be met by 2040 so is proposed as a single-lane roundabout.

This is intersection #17 on Figures 5a and 9a.

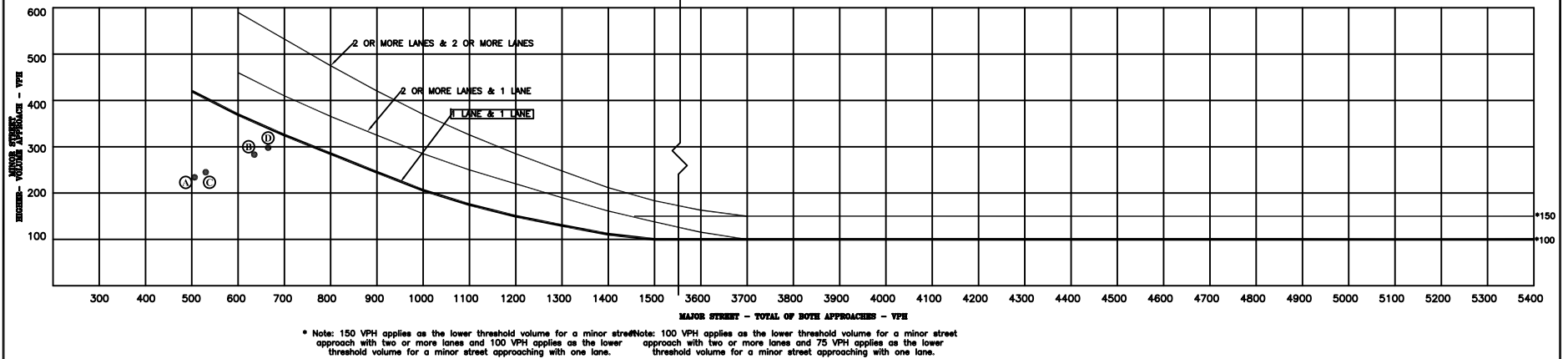
Figure 17a

Warrant 2 - Four-Hour Vehicular Volume Harvest Road/E. Yale Avenue

Murphy Creek East (LSC #181110)

Figure 4C-3. Warrant 3, Peak Hour

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
(Constantly Less Than 10,000 population or above 40 mph on Major Street)



Data Points = (Major Street, Minor Street)

- Ⓐ 2040 Background AM Peak = (506,234)
- Ⓑ 2040 Background PM Peak = (635,283)
- Ⓒ 2040 Total AM Peak = (530,245)
- Ⓓ 2040 Total PM Peak = (665,298)

- This warrant will not likely be met by 2040.
- This intersection is proposed as single-lane roundabout.

This is intersection #17 on Figures 5a and 9a.

Figure 17b

Warrant 3 - Peak-Hour Vehicular Volume Harvest Road/E. Yale Avenue

Murphy Creek East (LSC #181110)

COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: HARVEST RD
E/W STREET: JEWELL AVE
CITY: AURORA
COUNTY: ARAPAHOE

File Name : HARVJEW
Site Code : 00000013
Start Date : 9/25/2018
Page No : 1

Groups Printed- VEHICLES

	HARVEST RD Southbound				JEWELL AVE Westbound				Northbound				JEWELL AVE Eastbound				Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	1	0	10	0	0	6	0	0	0	0	0	0	1	2	0	0	20
06:45 AM	1	0	3	0	0	3	1	0	0	0	0	0	4	2	0	0	14
Total	2	0	13	0	0	9	1	0	0	0	0	0	5	4	0	0	34
07:00 AM	0	0	13	0	0	1	0	0	0	0	0	0	1	5	0	0	20
07:15 AM	0	0	11	0	0	10	1	0	0	0	0	0	2	4	0	0	28
07:30 AM	1	0	9	0	0	9	0	0	0	0	0	0	1	5	0	0	25
07:45 AM	1	0	4	0	0	3	0	0	0	0	0	0	2	6	0	0	16
Total	2	0	37	0	0	23	1	0	0	0	0	0	6	20	0	0	89
08:00 AM	0	0	4	0	0	6	0	0	0	0	0	0	4	2	0	0	16
08:15 AM	0	0	10	0	0	1	0	0	0	0	0	0	3	2	0	0	16
Total	0	0	14	0	0	7	0	0	0	0	0	0	7	4	0	0	32
04:00 PM	0	0	3	0	0	4	0	0	0	0	0	0	5	7	0	0	19
04:15 PM	0	0	5	0	0	5	3	0	0	0	0	0	7	11	0	0	31
04:30 PM	1	0	6	0	0	6	2	0	0	0	0	1	9	9	0	0	34
04:45 PM	1	0	5	0	0	6	0	0	0	0	0	1	5	11	0	0	29
Total	2	0	19	0	0	21	5	0	0	0	0	2	26	38	0	0	113
05:00 PM	0	0	1	0	0	6	1	0	0	0	0	0	3	10	0	0	21
05:15 PM	0	0	0	0	0	2	0	0	0	0	0	0	1	3	0	0	6
05:30 PM	0	0	2	0	0	6	0	1	0	0	0	0	10	6	0	0	25
05:45 PM	1	0	5	0	0	5	2	0	0	0	0	0	5	6	0	0	24
Total	1	0	8	0	0	19	3	1	0	0	0	0	19	25	0	0	76
Grand Total	7	0	91	0	0	79	10	1	0	0	0	2	63	91	0	0	344
Apprch %	7.1	0.0	92.9	0.0	0.0	87.8	11.1	1.1	0.0	0.0	0.0	100.0	40.9	59.1	0.0	0.0	
Total %	2.0	0.0	26.5	0.0	0.0	23.0	2.9	0.3	0.0	0.0	0.0	0.6	18.3	26.5	0.0	0.0	

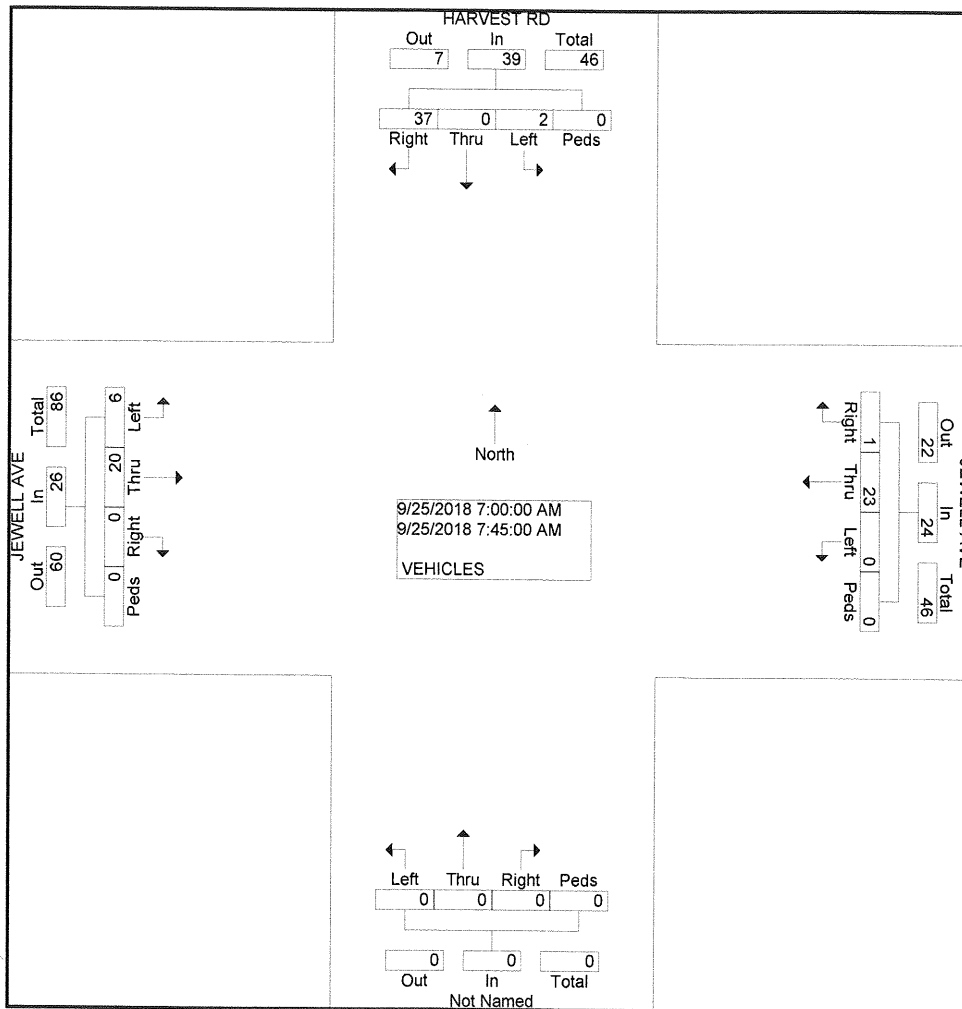
COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: HARVEST RD
E/W STREET: JEWELL AVE
CITY: AURORA
COUNTY: ARAPAHOE

File Name : HARVJEW
Site Code : 00000013
Start Date : 9/25/2018
Page No : 2

	HARVEST RD Southbound					JEWELL AVE Westbound					Northbound					JEWELL AVE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour	From 06:30 AM to 08:30 AM - Peak 1 of 1																				
Intersection	07:00 AM																				
Volume	2	0	37	0	39	0	23	1	0	24	0	0	0	0	0	6	20	0	0	26	89
Percent	5.1	0.0	94.9	0.0		0.0	95.8	4.2	0.0		0.0	0.0	0.0	0.0		23.1	76.9	0.0	0.0		
07:15 Volume	0	0	11	0	11	0	10	1	0	11	0	0	0	0	0	2	4	0	0	6	28
Peak Factor																					0.795
High Int.	07:00 AM					07:15 AM					6:15:00 AM					07:45 AM					
Volume	0	0	13	0	13	0	10	1	0	11	0	0	0	0	0	2	6	0	0	8	
Peak Factor	0.75					0.54										0.81					3



COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: HARVEST RD
E/W STREET: JEWELL AVE
CITY: AURORA
COUNTY: ARAPAHOE

File Name : HARVJEWE
Site Code : 00000013
Start Date : 9/25/2018
Page No : 2

	HARVEST RD Southbound					JEWELL AVE Westbound					Northbound					JEWELL AVE Eastbound								
Start Time	Left	Thr u	Rig ht	Ped s	App. Total	Left	Thr u	Rig ht	Ped s	App. Total	Left	Thr u	Rig ht	Ped s	App. Total	Left	Thr u	Rig ht	Ped s	App. Total	Int. Total			
Peak Hour	From 05:00 PM to 05:45 PM - Peak 1 of 1																							
Intersection	05:00 PM																							
Volume	1	0	8	0	9	0	19	3	1	23	0	0	0	0	0	19	25	0	0	44	76			
Percent	11.1	0.0	88.9	0.0		0.0	82.6	13.0	4.3		0.0	0.0	0.0	0.0		43.2	56.8	0.0	0.0					
05:30 Volume	0	0	2	0	2	0	6	0	1	7	0	0	0	0	0	10	6	0	0	16	25			
Peak Factor																					0.760			
High Int.	05:45 PM										05:00 PM					05:30 PM								
Volume	1	0	5	0	6	0	6	1	0	7	0	0	0	0	0	10	6	0	0	16				
Peak Factor						0.375						0.821											0.688	

COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: FLATROCK TRAIL
E/W STREET: JEWELL AVE
CITY: AURORA
COUNTY: ARAPAHOE

File Name : FLATJEWL
Site Code : 00000014
Start Date : 9/25/2018
Page No : 1

Groups Printed- VEHICLES

	FLATROCK TRAIL Southbound				JEWELL AVE Westbound				FLATROCK TRAIL Northbound				JEWELL AVE Eastbound				Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	0	0	17	0	0	15	0	0	0	0	0	0	3	3	0	0	38
06:45 AM	0	0	18	0	0	7	0	0	0	0	0	0	4	6	0	0	35
Total	0	0	35	0	0	22	0	0	0	0	0	0	7	9	0	0	73
07:00 AM	0	0	29	0	0	12	0	0	0	0	0	0	4	8	0	0	53
07:15 AM	0	0	20	0	0	17	0	0	0	0	0	0	5	6	0	0	48
07:30 AM	0	0	21	0	0	22	0	0	0	0	0	0	4	7	0	0	54
07:45 AM	0	0	18	0	0	7	0	0	0	0	0	0	3	8	0	0	36
Total	0	0	88	0	0	58	0	0	0	0	0	0	16	29	0	0	191
08:00 AM	0	0	18	0	0	11	0	0	0	0	0	0	10	5	0	0	44
Total	0	0	18	0	0	11	0	0	0	0	0	0	10	5	0	0	44
04:00 PM	0	0	13	0	0	7	0	0	0	0	0	0	18	12	0	0	50
04:15 PM	0	0	13	0	0	10	0	0	0	0	0	0	13	18	0	0	54
04:30 PM	0	0	15	0	0	10	1	0	0	0	0	0	15	15	0	0	56
04:45 PM	0	0	8	0	0	10	0	1	0	0	0	0	22	16	0	0	57
Total	0	0	49	0	0	37	1	1	0	0	0	0	68	61	0	0	217
05:00 PM	0	0	9	0	0	12	0	0	0	0	0	0	21	19	0	0	61
05:15 PM	0	0	10	0	0	10	0	0	0	0	0	0	24	17	0	0	61
05:30 PM	0	0	8	0	0	9	0	0	0	0	0	0	19	17	0	0	53
05:45 PM	0	0	8	0	0	10	0	1	0	0	0	0	17	18	0	0	54
Total	0	0	35	0	0	41	0	1	0	0	0	0	81	71	0	0	229
Grand Total	0	0	225	0	0	169	1	2	0	0	0	0	182	175	0	0	754
Apprch %	0.0	0.0	100.0	0.0	0.0	98.3	0.6	1.2	0.0	0.0	0.0	0.0	51.0	49.0	0.0	0.0	
Total %	0.0	0.0	29.8	0.0	0.0	22.4	0.1	0.3	0.0	0.0	0.0	0.0	24.1	23.2	0.0	0.0	

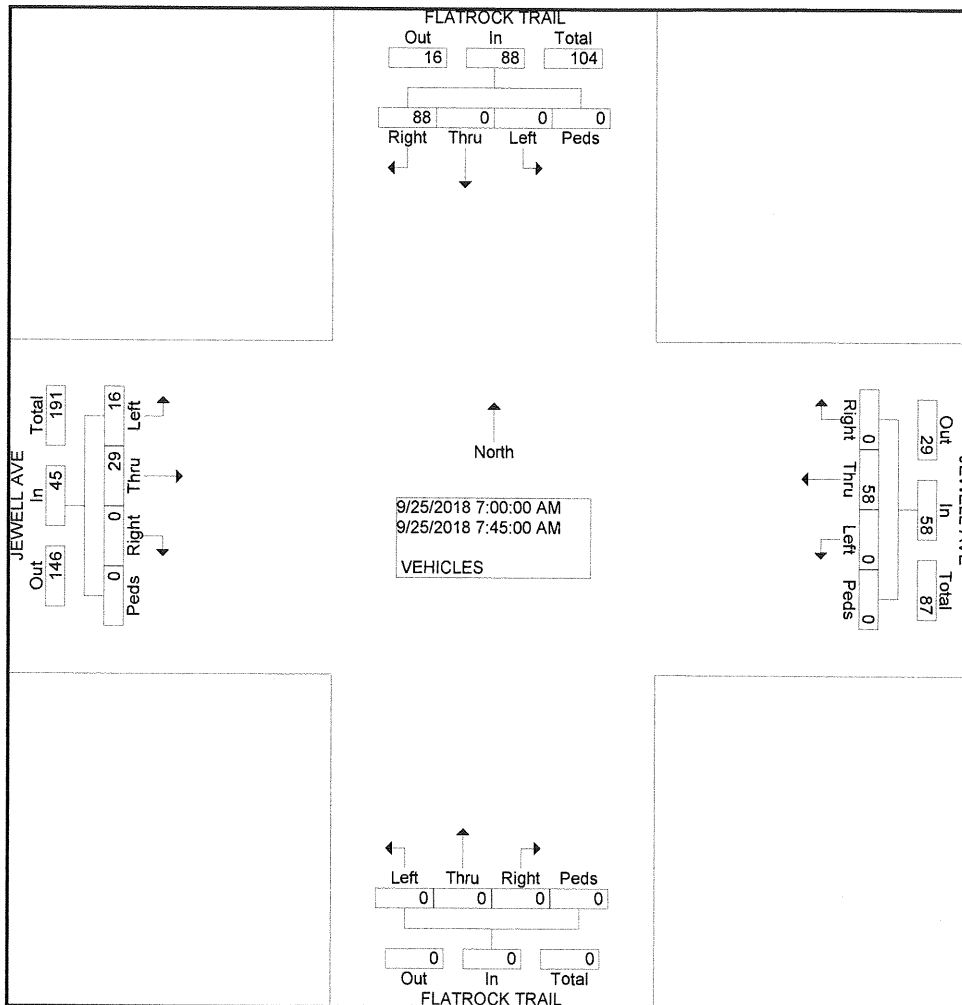
COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: FLATROCK TRAIL
E/W STREET: JEWELL AVE
CITY: AURORA
COUNTY: ARAPAHOE

File Name : FLATJEWL
Site Code : 00000014
Start Date : 9/25/2018
Page No : 2

	FLATROCK TRAIL Southbound					JEWELL AVE Westbound					FLATROCK TRAIL Northbound					JEWELL AVE Eastbound					
Start Time	Left	Thr u	Rig ht	Ped s	App. Total	Left	Thr u	Rig ht	Ped s	App. Total	Left	Thr u	Rig ht	Ped s	App. Total	Left	Thr u	Rig ht	Ped s	App. Total	Int. Total
Peak Hour From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	0	0	88	0	88	0	58	0	0	58	0	0	0	0	0	16	29	0	0	45	191
Percent	0.0	0.0	100.0	0.0		0.0	100.0	0.0	0.0		0.0	0.0	0.0	0.0		35.6	64.4	0.0	0.0		
07:30 Volume	0	0	21	0	21	0	22	0	0	22	0	0	0	0	0	4	7	0	0	11	54
Peak Factor																					0.884
High Int.	07:00 AM					07:30 AM										07:00 AM					
Volume	0	0	29	0	29	0	22	0	0	22	0	0	0	0	0	4	8	0	0	12	
Peak Factor	0.759					0.659										0.938					



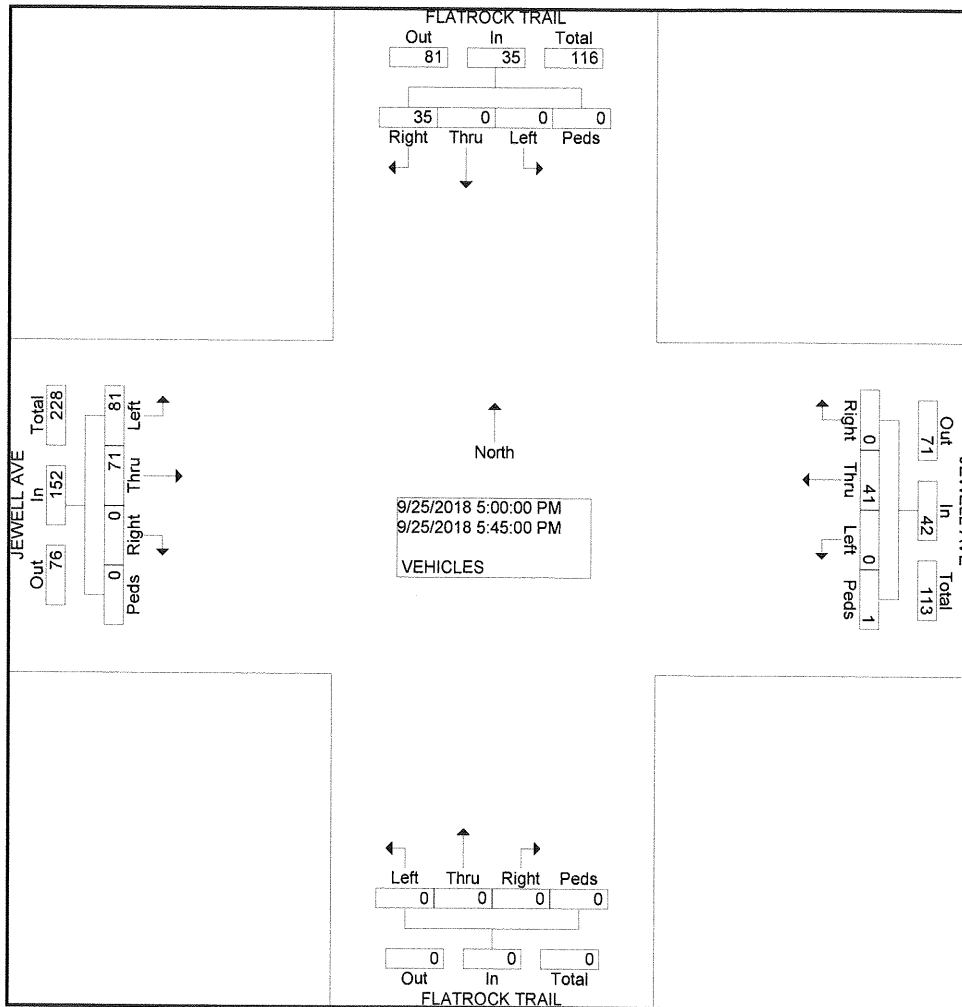
COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: FLATROCK TRAIL
E/W STREET: JEWELL AVE
CITY: AURORA
COUNTY: ARAPAHOE

File Name : FLATJEWL
Site Code : 00000014
Start Date : 9/25/2018
Page No : 2

	FLATROCK TRAIL Southbound					JEWELL AVE Westbound					FLATROCK TRAIL Northbound					JEWELL AVE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour	From 05:00 PM to 05:45 PM - Peak 1 of 1																				
Intersection	05:00 PM																				
Volume	0	0	35	0	35	0	41	0	1	42	0	0	0	0	0	81	71	0	0	152	229
Percent	0.0	0.0	100.0	0.0		0.0	97.6	0.0	2.4		0.0	0.0	0.0	0.0		53.3	46.7	0.0	0.0		
05:15 Volume	0	0	10	0	10	0	10	0	0	10	0	0	0	0	0	24	17	0	0	41	61
Peak Factor																					0.939
High Int.	05:15 PM										05:00 PM					05:15 PM					
Volume	0	0	10	0	10	0	12	0	0	12	0	0	0	0	0	24	17	0	0	41	
Peak Factor	0.875					0.875					0.927					0.927					



COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: OLD TOM MORRIS RD
E/W STREET: JEWELL AVE
CITY: AURORA
COUNTY: ARAPAHOE

File Name : untitled9
Site Code : 00000015
Start Date : 9/25/2018
Page No : 1

Groups Printed- VEHICLES

	OLD TOM MORRIS RD Southbound				JEWELL AVE Westbound				Northbound				JEWELL AVE Eastbound				Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	0	0	39	0	0	26	1	0	0	0	0	0	6	6	0	0	78
06:45 AM	0	0	34	0	0	29	2	0	0	0	0	0	21	11	0	0	97
Total	0	0	73	0	0	55	3	0	0	0	0	0	27	17	0	0	175
07:00 AM	0	0	65	0	0	39	1	0	0	0	0	0	42	13	0	0	160
07:15 AM	0	0	50	0	0	35	0	0	0	0	0	0	46	11	0	0	142
07:30 AM	1	0	84	0	0	44	2	0	0	0	0	0	52	10	0	0	193
07:45 AM	0	0	80	0	0	24	0	0	0	0	0	0	15	11	0	0	130
Total	1	0	279	0	0	142	3	0	0	0	0	0	155	45	0	0	625
08:00 AM	0	0	30	0	0	28	0	0	0	0	0	0	11	15	0	0	84
08:15 AM	0	0	28	0	0	32	0	0	0	0	0	0	26	10	0	0	96
Total	0	0	58	0	0	60	0	0	0	0	0	0	37	25	0	0	180
04:00 PM	0	0	22	0	0	17	3	0	0	0	0	0	31	28	0	0	101
04:15 PM	0	0	22	0	0	22	0	0	0	0	0	0	50	32	0	0	126
04:30 PM	0	0	32	0	0	22	2	0	0	0	0	0	37	34	0	0	127
04:45 PM	0	0	29	0	0	15	0	0	0	0	0	0	40	39	0	0	123
Total	0	0	105	0	0	76	5	0	0	0	0	0	158	133	0	0	477
05:00 PM	1	0	25	1	0	20	0	0	0	0	0	0	36	37	0	0	120
05:15 PM	0	0	31	0	0	20	0	0	0	0	0	0	30	43	0	0	124
05:30 PM	0	0	25	0	0	17	0	1	0	0	0	0	48	32	0	0	123
05:45 PM	0	0	34	1	0	25	1	0	0	0	0	0	37	27	0	0	125
Total	1	0	115	2	0	82	1	1	0	0	0	0	151	139	0	0	492
Grand Total	2	0	630	2	0	415	12	1	0	0	0	0	528	359	0	0	1949
Apprch %	0.3	0.0	99.4	0.3	0.0	97.0	2.8	0.2	0.0	0.0	0.0	0.0	59.5	40.5	0.0	0.0	
Total %	0.1	0.0	32.3	0.1	0.0	21.3	0.6	0.1	0.0	0.0	0.0	0.0	27.1	18.4	0.0	0.0	

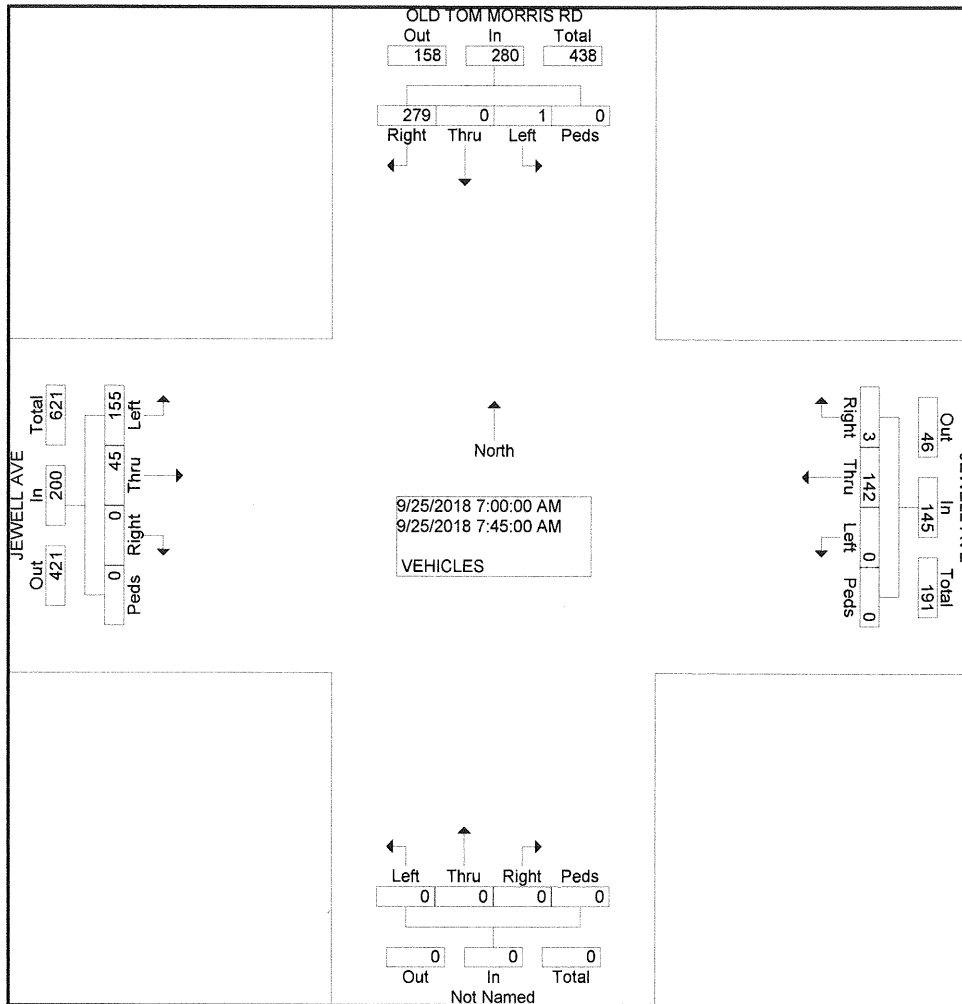
COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: OLD TOM MORRIS RD
E/W STREET: JEWELL AVE
CITY: AURORA
COUNTY: ARAPAHOE

File Name : untitled9
Site Code : 00000015
Start Date : 9/25/2018
Page No : 2

	OLD TOM MORRIS RD Southbound					JEWELL AVE Westbound					Northbound					JEWELL AVE Eastbound									
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total				
Peak Hour	From 06:30 AM to 08:30 AM - Peak 1 of 1																								
Intersection	07:00 AM																								
Volume	1	0	279	0	280	0	142	3	0	145	0	0	0	0	0	155	45	0	0	200	625				
Percent	0.4	0.0	99.6	0.0		0.0	97.9	2.1	0.0		0.0	0.0	0.0	0.0		77.5	22.5	0.0	0.0						
07:30 Volume	1	0	84	0	85	0	44	2	0	46	0	0	0	0	0	52	10	0	0	62	193				
Peak Factor																					0.810				
High Int.	07:30 AM										07:30 AM					6:15:00 AM					07:30 AM				
Volume	1	0	84	0	85	0	44	2	0	46	0	0	0	0	0	52	10	0	0	62					
Peak Factor	0.824										0.788										0.806				



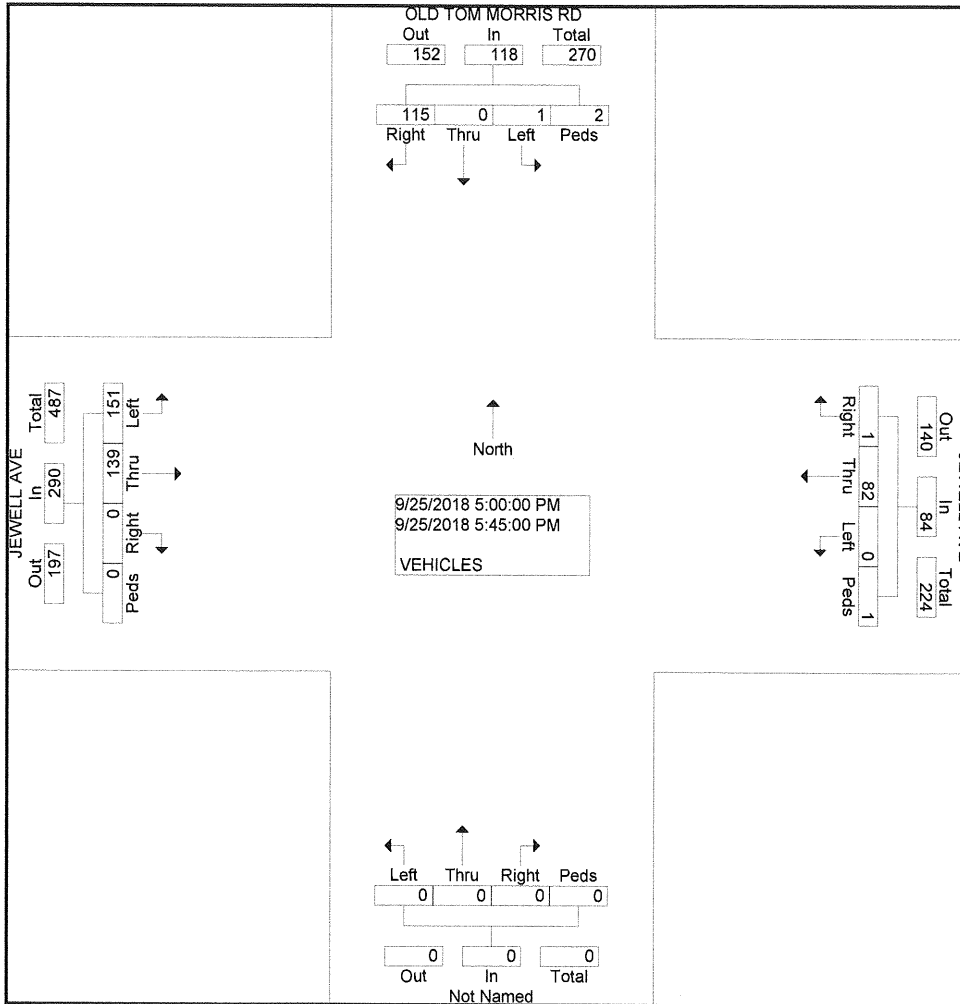
COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: OLD TOM MORRIS RD
E/W STREET: JEWELL AVE
CITY: AURORA
COUNTY: ARAPAHOE

File Name : OLDTJEWE
Site Code : 00000015
Start Date : 9/25/2018
Page No : 2

	OLD TOM MORRIS RD Southbound					JEWELL AVE Westbound					Northbound					JEWELL AVE Eastbound					Int. Total
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour	From 05:00 PM to 05:45 PM - Peak 1 of 1																				
Intersection	05:00 PM																				
Volume	1	0	115	2	118	0	82	1	1	84	0	0	0	0	0	151	139	0	0	290	492
Percent	0.8	0.0	97.5	1.7		0.0	97.6	1.2	1.2		0.0	0.0	0.0	0.0		52.1	47.9	0.0	0.0		
05:45																					
Volume	0	0	34	1	35	0	25	1	0	26	0	0	0	0	0	37	27	0	0	64	125
Peak Factor	0.984																				
High Int.																					
Volume	0	0	34	1	35	0	25	1	0	26	0	0	0	0	0	48	32	0	0	80	
Peak Factor	0.843																				



COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: GUN CLUB RD
E/W STREET: JEWELL AVE
CITY: AURORA
COUNTY: ARAPAHOE

File Name : untitled9
Site Code : 00000020
Start Date : 9/25/2018
Page No : 1

Groups Printed- VEHICLES

	GUN CLUB RD Southbound				JEWELL AVE Westbound				GUN CLUB RD Northbound				JEWELL AVE Eastbound				Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	1	151	37	0	13	40	8	0	39	207	2	0	39	9	16	0	562
06:45 AM	1	179	41	0	29	27	7	1	49	278	11	0	43	16	31	1	714
Total	2	330	78	0	42	67	15	1	88	485	13	0	82	25	47	1	1276
07:00 AM	3	123	54	0	20	60	21	0	55	259	10	0	47	60	29	0	741
07:15 AM	3	148	55	0	28	47	14	0	50	272	12	0	48	48	30	0	755
07:30 AM	1	151	50	0	34	67	8	0	48	255	11	0	37	53	15	0	730
07:45 AM	2	146	42	0	33	82	13	1	57	238	8	0	47	21	35	0	725
Total	9	568	201	0	115	256	56	1	210	1024	41	0	179	182	109	0	2951
08:00 AM	2	125	31	0	17	33	11	0	46	224	11	0	46	22	35	0	603
08:15 AM	2	124	37	0	23	44	6	0	40	159	17	0	44	14	34	0	544
Total	4	249	68	0	40	77	17	0	86	383	28	0	90	36	69	0	1147
04:00 PM	2	223	69	0	8	27	7	0	47	132	23	0	41	39	30	0	648
04:15 PM	4	215	85	0	12	36	3	0	37	147	35	0	60	45	15	0	694
04:30 PM	2	208	68	0	17	35	8	0	37	128	28	0	55	45	22	0	653
04:45 PM	3	225	77	0	6	31	9	0	40	132	36	0	40	41	26	0	666
Total	11	871	299	0	43	129	27	0	161	539	122	0	196	170	93	0	2661
05:00 PM	3	212	70	0	11	34	10	0	43	141	25	0	62	57	24	0	692
05:15 PM	6	224	76	0	14	36	2	0	39	174	32	0	42	32	17	0	694
05:30 PM	2	218	74	0	14	28	3	1	34	121	36	0	72	54	33	0	690
05:45 PM	1	233	71	0	21	32	5	0	31	186	25	0	49	37	15	0	706
Total	12	887	291	0	60	130	20	1	147	622	118	0	225	180	89	0	2782
Grand Total	38	2905	937	0	300	659	135	3	692	3053	322	0	772	593	407	1	10817
Apprch %	1.0	74.9	24.1	0.0	27.3	60.1	12.3	0.3	17.0	75.1	7.9	0.0	43.5	33.4	23.0	0.1	
Total %	0.4	26.9	8.7	0.0	2.8	6.1	1.2	0.0	6.4	28.2	3.0	0.0	7.1	5.5	3.8	0.0	

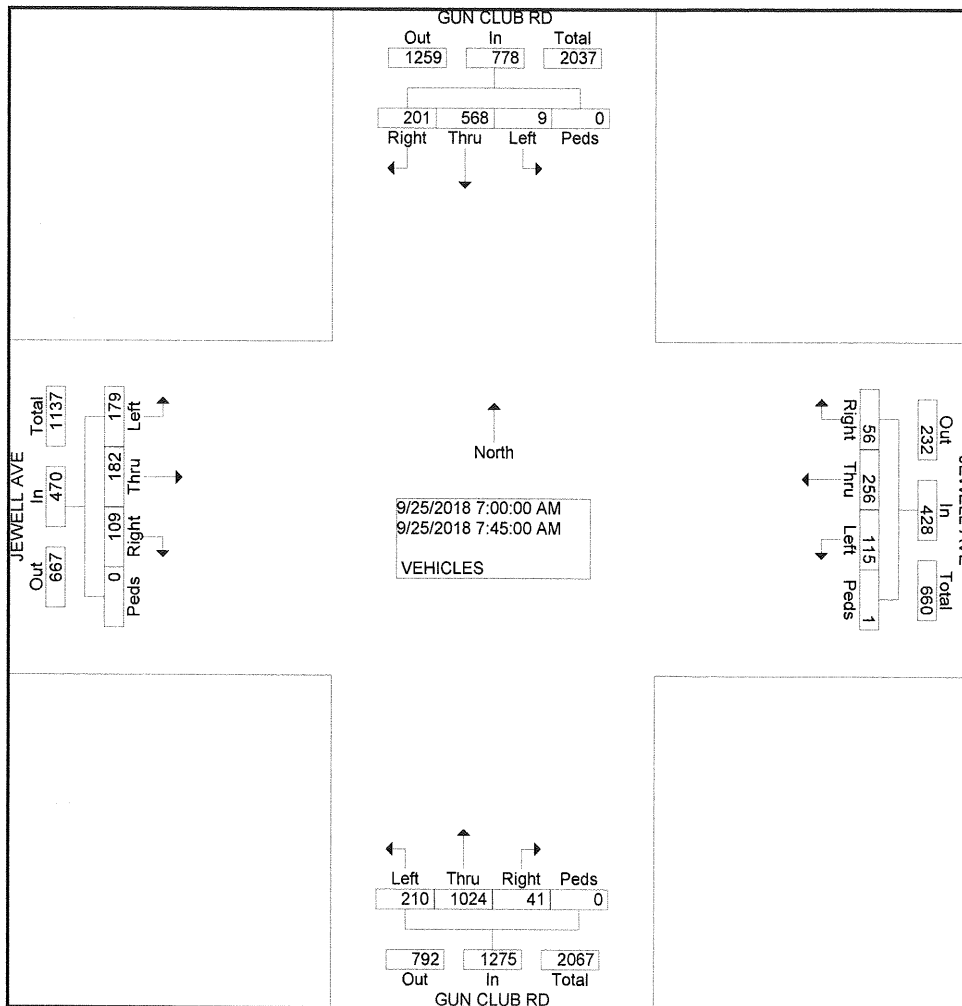
COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: GUN CLUB RD
E/W STREET: JEWELL AVE
CITY: AURORA
COUNTY: ARAPAHOE

File Name : untitled9
Site Code : 00000020
Start Date : 9/25/2018
Page No : 2

	GUN CLUB RD Southbound					JEWELL AVE Westbound					GUN CLUB RD Northbound					JEWELL AVE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 06:30 AM to 08:30 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	9	568	201	0	778	115	256	56	1	428	210	1024	41	0	1275	179	182	109	0	470	2951
Percent	1.2	73.0	25.8	0.0		26.9	59.8	13.1	0.2		16.5	80.3	3.2	0.0		38.1	38.7	23.2	0.0		
07:15 Volume Peak Factor	3	148	55	0	206	28	47	14	0	89	50	272	12	0	334	48	48	30	0	126	755
High Int.	07:15 AM					07:45 AM					07:15 AM					07:00 AM					
Volume Peak Factor	3	148	55	0	206 0.94 4	33	82	13	1	129 0.82 9	50	272	12	0	334 0.95 4	47	60	29	0	136 0.86 4	



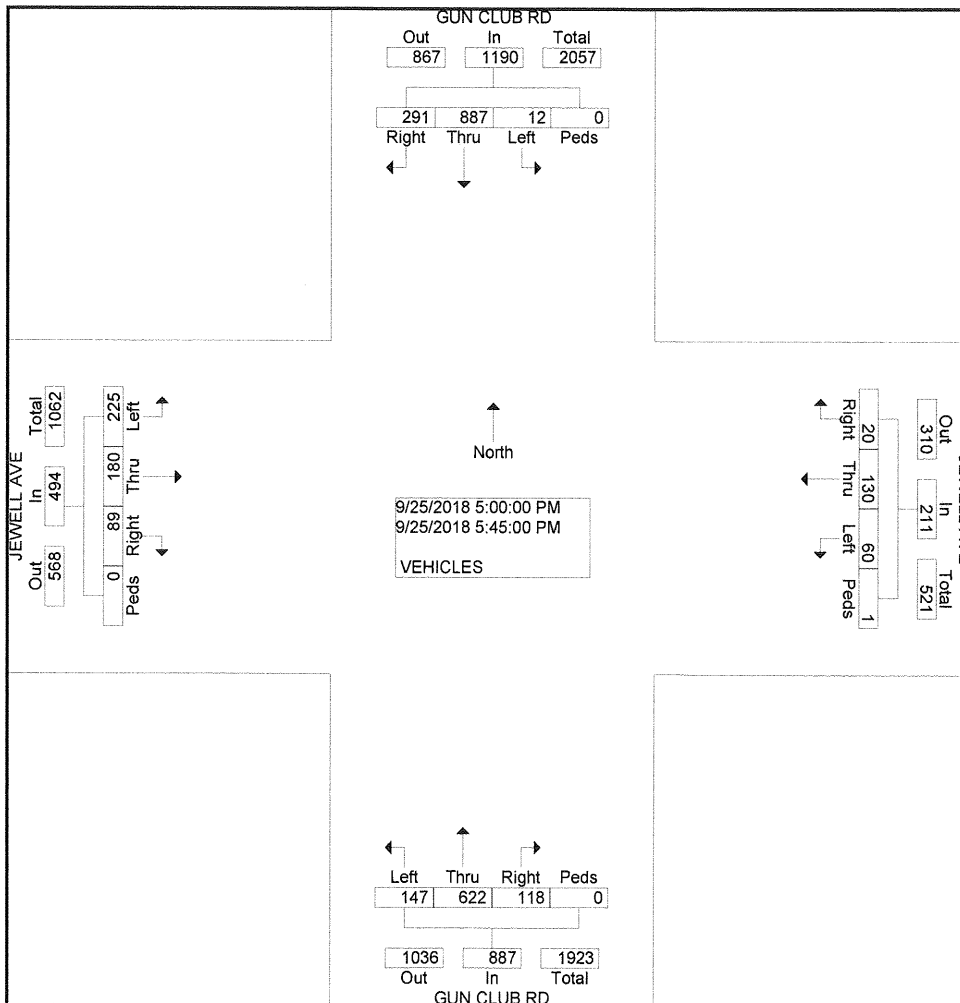
COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: GUN CLUB RD
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	GUN CLUB RD Southbound					JEWELL AVE Westbound					GUN CLUB RD Northbound					JEWELL AVE Eastbound					Int. Total
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Intersection	05:00 PM																				
Volume	12	887	291	0	1190	60	130	20	1	211	147	622	118	0	887	225	180	89	0	494	2782
Percent	1.0	74.5	24.5	0.0		28.4	61.6	9.5	0.5		16.6	70.1	13.3	0.0		45.5	36.4	18.0	0.0		
05:45 Volume	1	233	71	0	305	21	32	5	0	58	31	186	25	0	242	49	37	15	0	101	706
Peak Factor																					0.985
High Int.	05:15 PM					05:45 PM					05:15 PM					05:30 PM					
Volume	6	224	76	0	306	21	32	5	0	58	39	174	32	0	245	72	54	33	0	159	
Peak Factor	0.97					0.90					0.90					0.77					
	2					9					5					7					



COUNTER MEASURES INC.

Location: FLAT ROCK TRAIL N/O JEWELL AVE
 City: AURORA
 County: ARAPAHOE
 Direction: NORTHBOUND-SOUTHBOUND

1889 YORK STREET
 DENVER, COLORADO 80206
 303-333-7409

Site Code: 092413
 Station ID: 092413

Start Time	25-Sep-1 Tue	NB	SB							Total
12:00 AM		7	3							10
01:00		1	1							2
02:00		1	1							2
03:00		0	4							4
04:00		3	7							10
05:00		4	23							27
06:00		9	55							64
07:00		15	85							100
08:00		25	76							101
09:00		24	40							64
10:00		16	40							56
11:00		26	35							61
12:00 PM		38	42							80
01:00		32	24							56
02:00		37	27							64
03:00		66	34							100
04:00		71	48							119
05:00		78	42							120
06:00		92	44							136
07:00		58	29							87
08:00		31	14							45
09:00		28	10							38
10:00		19	4							23
11:00		9	2							11
Total		690	690							1380
Percent		50.0%	50.0%							
AM Peak	-	11:00	07:00	-	-	-	-	-	-	08:00
Vol.	-	26	85	-	-	-	-	-	-	101
PM Peak	-	18:00	16:00	-	-	-	-	-	-	18:00
Vol.	-	92	48	-	-	-	-	-	-	136

COUNTER MEASURES INC.

Location: OLD TOM MORRIS RD N/O JEWELL AVE
 City: AURORA
 County: ARAPAHOE
 Direction: NORTHBOUND-SOUTHBOUND

1889 YORK STREET
 DENVER, COLORADO 80206
 303-333-7409

Site Code: 092414
 Station ID: 092414

Start Time	25-Sep-1 Tue	NB	SB							Total
12:00 AM		8	2							10
01:00		4	0							4
02:00		3	1							4
03:00		0	2							2
04:00		0	12							12
05:00		9	47							56
06:00		30	95							125
07:00		170	270							440
08:00		70	134							204
09:00		62	78							140
10:00		46	70							116
11:00		62	64							126
12:00 PM		90	88							178
01:00		98	74							172
02:00		130	145							275
03:00		88	145							233
04:00		161	106							267
05:00		156	117							273
06:00		133	85							218
07:00		112	70							182
08:00		87	30							117
09:00		54	29							83
10:00		32	12							44
11:00		17	6							23
Total		1622	1682							3304
Percent		49.1%	50.9%							
AM Peak	-	07:00	07:00	-	-	-	-	-	-	07:00
Vol.	-	170	270	-	-	-	-	-	-	440
PM Peak	-	16:00	14:00	-	-	-	-	-	-	14:00
Vol.	-	161	145	-	-	-	-	-	-	275

COUNTER MEASURES INC.

Location: JEWELL AVE E/O HARVEST RD
 City: AURORA
 County: ARAPAHOE
 Direction: WESTBOUND-EASTBOUND

1889 YORK STREET
 DENVER, COLORADO 80206
 303-333-7409

Site Code: 092404
 Station ID: 092404

Start Time	25-Sep-1 Tue	WB	EB							Total
12:00 AM		3	1							4
01:00		0	0							0
02:00		1	1							2
03:00		0	1							1
04:00		3	1							4
05:00		8	4							12
06:00		20	10							30
07:00		24	24							48
08:00		18	14							32
09:00		8	17							25
10:00		16	20							36
11:00		24	12							36
12:00 PM		15	14							29
01:00		16	25							41
02:00		24	19							43
03:00		16	27							43
04:00		23	42							65
05:00		28	37							65
06:00		26	30							56
07:00		12	18							30
08:00		12	21							33
09:00		4	7							11
10:00		5	9							14
11:00		3	4							7
Total		309	358							667
Percent		46.3%	53.7%							
AM Peak	-	07:00	07:00	-	-	-	-	-	-	07:00
Vol.	-	24	24	-	-	-	-	-	-	48
PM Peak	-	17:00	16:00	-	-	-	-	-	-	16:00
Vol.	-	28	42	-	-	-	-	-	-	65

COUNTER MEASURES INC.

Location: JEWELL AVE W/O FLAT ROCK TRAIL
 City: AURORA
 County: ARAPAHOE
 Direction: WESTBOUND-EASTBOUND

1889 YORK STREET
 DENVER, COLORADO 80206
 303-333-7409

Site Code: 092419
 Station ID: 092419

Start Time	25-Sep-1 Tue	WB	EB							Total
12:00 AM		6	10							16
01:00		1	3							4
02:00		2	2							4
03:00		6	3							9
04:00		15	4							19
05:00		38	9							47
06:00		98	32							130
07:00		154	46							200
08:00		119	48							167
09:00		68	46							114
10:00		65	40							105
11:00		71	48							119
12:00 PM		69	62							131
01:00		58	72							130
02:00		67	62							129
03:00		60	114							174
04:00		85	134							219
05:00		89	142							231
06:00		82	140							222
07:00		46	93							139
08:00		38	69							107
09:00		14	46							60
10:00		14	38							52
11:00		5	14							19
Total		1270	1277							2547
Percent		49.9%	50.1%							
AM Peak	-	07:00	08:00	-	-	-	-	-	-	07:00
Vol.	-	154	48	-	-	-	-	-	-	200
PM Peak	-	17:00	17:00	-	-	-	-	-	-	17:00
Vol.	-	89	142	-	-	-	-	-	-	231

LEVEL OF SERVICE DEFINITIONS

From *Highway Capacity Manual*, Transportation Research Board, 2010

SIGNALIZED INTERSECTION LEVEL OF SERVICE (LOS)

LOS	<u>Average Vehicle Delay</u> sec/vehicle	<u>Operational Characteristics</u>
A	<10 seconds	Describes operations with low control delay, up to 10 sec/veh. This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.
B	10 to 20 seconds	Describes operations with control delay greater than 10 seconds and up to 20 sec/veh. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.
C	20 to 35 seconds	Describes operations with control delay greater than 20 and up to 35 sec/veh. These higher delays may result from only fair progression, longer cycle length, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles, and overflows occur. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.
D	35 to 55 seconds	Describes operations with control delay greater than 35 and up to 55 sec/veh. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	55 to 80 seconds	Describes operations with control delay greater than 55 and up to 80 sec/veh. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.
F	>80 seconds	Describes operations with control delay in excess of 80 sec/veh. This level, considered unacceptable to most drivers, often occurs with over-saturation, that is, when arrival flow rates exceed the capacity of lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

LEVEL OF SERVICE DEFINITIONS

From *Highway Capacity Manual*, Transportation Research Board, 2010

























UNSIGNALIZED INTERSECTION LEVEL OF SERVICE (LOS)

Applicable to Two-Way Stop Control, All-Way Stop Control, and Roundabouts

LOS	Average Vehicle Control Delay	Operational Characteristics
A	<10 seconds	Normally, vehicles on the stop-controlled approach only have to wait up to 10 seconds before being able to clear the intersection. Left-turning vehicles on the uncontrolled street do not have to wait to make their turn.
B	10 to 15 seconds	Vehicles on the stop-controlled approach will experience delays before being able to clear the intersection. <u>The delay could be up to 15 seconds.</u> Left-turning vehicles on the uncontrolled street may have to wait to make their turn.
C	15 to 25 seconds	Vehicles on the stop-controlled approach can expect delays in the range of 15 to 25 seconds before clearing the intersection. Motorists may begin to take chances due to the long delays, thereby posing a safety risk to through traffic. <u>Left-turning vehicles on the uncontrolled street will now be required to wait to make their turn causing a queue to be created in the turn lane.</u>
D	25 to 35 seconds	<u>This is the point at which a traffic signal may be warranted for this intersection.</u> The delays for the stop-controlled intersection are not considered to be excessive. The length of the queue may begin to block other public and private access points.
E	35 to 50 seconds	The delays for all critical traffic movements are considered to be unacceptable. The length of the queues for the stop-controlled approaches as well as the left-turn movements are extremely long. <u>There is a high probability that this intersection will meet traffic signal warrants.</u> The ability to install a traffic signal is affected by the location of other existing traffic signals. Consideration may be given to restricting the accesses by eliminating the left-turn movements from and to the stop-controlled approach.
F	>50 seconds	The delay for the critical traffic movements are probably in excess of 100 seconds. The length of the queues are extremely long. Motorists are selecting alternative routes due to the long delays. <u>The only remedy for these long delays is installing a traffic signal or restricting the accesses.</u> The potential for accidents at this intersection are extremely high due to motorist taking more risky chances. If the median permits, motorists begin making two-stage left-turns.

Timings 1: S. Gun Club Road & E. Jewell Avenue

Existing
AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	182	109	111	237	56	210	1024	45	9	568	201
Future Volume (vph)	179	182	109	111	237	56	210	1024	45	9	568	201
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0		10.0	23.0		10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	15.0	30.0		15.0	30.0		12.0	63.0	63.0	12.0	63.0	63.0
Total Split (%)	12.5%	25.0%		12.5%	25.0%		10.0%	52.5%	52.5%	10.0%	52.5%	52.5%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	36.7	23.8	120.0	35.6	23.2	120.0	77.5	75.5	75.5	72.7	63.9	63.9
Actuated g/C Ratio	0.31	0.20	1.00	0.30	0.19	1.00	0.65	0.63	0.63	0.61	0.53	0.53
v/c Ratio	0.64	0.50	0.07	0.34	0.67	0.04	0.48	0.89	0.04	0.05	0.58	0.22
Control Delay	41.1	47.3	0.1	31.7	54.0	0.0	13.0	31.6	0.1	9.4	22.8	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.1	47.3	0.1	31.7	54.0	0.0	13.0	31.6	0.1	9.4	22.8	2.7
LOS	D	D	A	C	D	A	B	C	A	A	C	A
Approach Delay		34.0			40.4			27.5			17.4	
Approach LOS		C			D			C			B	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 27.6

Intersection LOS: C

Intersection Capacity Utilization 93.8%

ICU Level of Service F

Analysis Period (min) 15







Splits and Phases: 1: S. Gun Club Road & E. Jewell Avenue

				
Ø1	Ø2 (R)		Ø3	Ø4
12 s	63 s		15 s	30 s
				
Ø5	Ø6 (R)		Ø7	Ø8
12 s	63 s		15 s	30 s

HCM 6th TWSC

2: E. Jewell Avenue & S. Old Tom Morris Road

Existing
AM Peak

Intersection						
Int Delay, s/veh	8.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	180	48	142	3	1	279
Future Vol, veh/h	180	48	142	3	1	279
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	214	57	169	4	1	332






Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	173	0	-	0	628	87
Stage 1	-	-	-	-	171	-
Stage 2	-	-	-	-	457	-
Critical Hdwy	5.34	-	-	-	6.29	7.14
Critical Hdwy Stg 1	-	-	-	-	6.64	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	3.12	-	-	-	3.67	3.92
Pot Cap-1 Maneuver	961	-	-	-	443	810
Stage 1	-	-	-	-	780	-
Stage 2	-	-	-	-	585	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	961	-	-	-	344	810
Mov Cap-2 Maneuver	-	-	-	-	344	-
Stage 1	-	-	-	-	606	-
Stage 2	-	-	-	-	585	-

Approach	EB	WB	SB
HCM Control Delay, s	7.8	0	12.6
HCM LOS	B		

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	961	-	-	-	806
HCM Lane V/C Ratio	0.223	-	-	-	0.414
HCM Control Delay (s)	9.8	-	-	-	12.6
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.9	-	-	-	2





HCM 6th TWSC
4: E. Jewell Avenue & S. Flat Rock Trail

Existing
AM Peak

Intersection						
Int Delay, s/veh	4.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	19	30	56	0	0	89
Future Vol, veh/h	19	30	56	0	0	89
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	36	67	0	0	106
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	67	0	-	0	149	67
Stage 1	-	-	-	-	67	-
Stage 2	-	-	-	-	82	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1535	-	-	-	843	997
Stage 1	-	-	-	-	956	-
Stage 2	-	-	-	-	941	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1535	-	-	-	830	997
Mov Cap-2 Maneuver	-	-	-	-	830	-
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	941	-
Approach	EB	WB	SB			
HCM Control Delay, s	2.9	0			9	
HCM LOS					A	
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1535	-	-	-	-	997
HCM Lane V/C Ratio	0.015	-	-	-	-	0.106
HCM Control Delay (s)	7.4	-	-	-	0	9
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	0.4

























HCM 6th TWSC
5: E. Jewell Avenue & Harvest Road

Existing
AM Peak

Intersection						
Int Delay, s/veh	4.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	20	19	1	2	39
Future Vol, veh/h	10	20	19	1	2	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	74	74	74	74	74	74
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	27	26	1	3	53
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	27	0	-	0	82	27
Stage 1	-	-	-	-	27	-
Stage 2	-	-	-	-	55	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1587	-	-	-	920	1048
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	968	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1587	-	-	-	912	1048
Mov Cap-2 Maneuver	-	-	-	-	912	-
Stage 1	-	-	-	-	987	-
Stage 2	-	-	-	-	968	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.4	0		8.7		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1587	-	-	-	1040	
HCM Lane V/C Ratio	0.009	-	-	-	0.053	
HCM Control Delay (s)	7.3	-	-	-	8.7	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.2	

Timings 1: S. Gun Club Road & E. Jewell Avenue

Existing
PM Peak

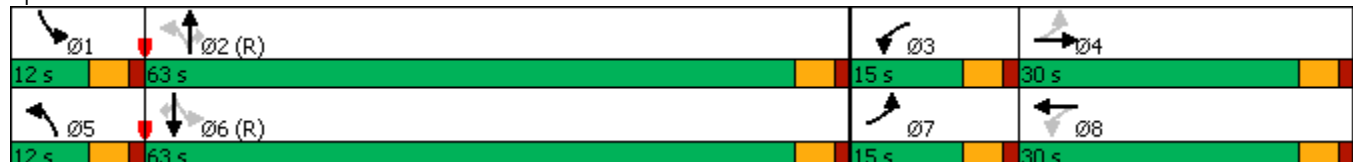
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	180	89	61	123	14	147	622	118	12	887	291
Future Volume (vph)	225	180	89	61	123	14	147	622	118	12	887	291
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0		10.0	23.0		10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	15.0	30.0		15.0	30.0		12.0	63.0	63.0	12.0	63.0	63.0
Total Split (%)	12.5%	25.0%		12.5%	25.0%		10.0%	52.5%	52.5%	10.0%	52.5%	52.5%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	32.8	22.5	120.0	30.0	18.7	120.0	82.3	77.8	77.8	76.6	67.8	67.8
Actuated g/C Ratio	0.27	0.19	1.00	0.25	0.16	1.00	0.69	0.65	0.65	0.64	0.56	0.56
v/c Ratio	0.70	0.53	0.06	0.21	0.43	0.01	0.57	0.53	0.11	0.03	0.86	0.29
Control Delay	47.4	50.0	0.1	32.0	49.2	0.0	26.1	15.5	2.6	7.9	33.8	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.4	50.0	0.1	32.0	49.2	0.0	26.1	15.5	2.6	7.9	33.8	3.7
LOS	D	D	A	C	D	A	C	B	A	A	C	A
Approach Delay		39.8			40.5			15.5			26.2	
Approach LOS		D			D			B			C	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 26.2
 Intersection Capacity Utilization 87.1%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service E







Splits and Phases: 1: S. Gun Club Road & E. Jewell Avenue



HCM 6th TWSC

2: E. Jewell Avenue & S. Old Tom Morris Road

Existing
PM Peak

Intersection						
Int Delay, s/veh	5.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	151	147	83	1	1	115
Future Vol, veh/h	151	147	83	1	1	115
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	164	160	90	1	1	125

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	91	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	5.34	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	3.12	-	-
Pot Cap-1 Maneuver	1048	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1048	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	4.6	0	10
HCM LOS	B		

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1048	-	-	-	852
HCM Lane V/C Ratio	0.157	-	-	-	0.148
HCM Control Delay (s)	9.1	-	-	-	10
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.6	-	-	-	0.5






HCM 6th TWSC

4: E. Jewell Avenue & S. Flat Rock Trail

Existing
PM Peak

Intersection

Int Delay, s/veh 4.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	89	58	40	0	0	43
Future Vol, veh/h	89	58	40	0	0	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	94	61	42	0	0	45

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	42	0	0 291 42
Stage 1	-	-	- - 42 -
Stage 2	-	-	- - 249 -
Critical Hdwy	4.12	-	- - 6.42 6.22
Critical Hdwy Stg 1	-	-	- - 5.42 -
Critical Hdwy Stg 2	-	-	- - 5.42 -
Follow-up Hdwy	2.218	-	- - 3.518 3.318
Pot Cap-1 Maneuver	1567	-	- - 700 1029
Stage 1	-	-	- - 980 -
Stage 2	-	-	- - 792 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1567	-	- - 658 1029
Mov Cap-2 Maneuver	-	-	- - 658 -
Stage 1	-	-	- - 921 -
Stage 2	-	-	- - 792 -






Approach	EB	WB	SB
HCM Control Delay, s	4.5	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1567	-	-	-	-	1029
HCM Lane V/C Ratio	0.06	-	-	-	-	0.044
HCM Control Delay (s)	7.4	-	-	-	0	8.7
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.1

HCM 6th TWSC

5: E. Jewell Avenue & Harvest Road

Existing
PM Peak

























Intersection						
Int Delay, s/veh	3.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	26	32	19	3	1	21
Future Vol, veh/h	26	32	19	3	1	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	35	21	3	1	23
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	24	0	-	0	114	23
Stage 1	-	-	-	-	23	-
Stage 2	-	-	-	-	91	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1591	-	-	-	882	1054
Stage 1	-	-	-	-	1000	-
Stage 2	-	-	-	-	933	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1591	-	-	-	866	1054
Mov Cap-2 Maneuver	-	-	-	-	866	-
Stage 1	-	-	-	-	982	-
Stage 2	-	-	-	-	933	-
Approach	EB	WB		SB		
HCM Control Delay, s	3.3	0		8.5		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1591	-	-	-	1044	
HCM Lane V/C Ratio	0.018	-	-	-	0.023	
HCM Control Delay (s)	7.3	-	-	-	8.5	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	

Timings

1: S. Gun Club Road & E. Jewell Avenue

2023 Background

AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	200	120	125	260	60	230	1125	50	15	625	220
Future Volume (vph)	195	200	120	125	260	60	230	1125	50	15	625	220
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0		10.0	23.0		10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	13.0	33.0		15.0	35.0		12.0	60.0	60.0	12.0	60.0	60.0
Total Split (%)	10.8%	27.5%		12.5%	29.2%		10.0%	50.0%	50.0%	10.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	35.0	24.0	120.0	38.2	25.6	120.0	77.1	72.8	72.8	71.0	62.0	62.0
Actuated g/C Ratio	0.29	0.20	1.00	0.32	0.21	1.00	0.64	0.61	0.61	0.59	0.52	0.52
v/c Ratio	0.78	0.56	0.08	0.41	0.68	0.04	0.60	1.04	0.05	0.08	0.68	0.25
Control Delay	51.9	48.5	0.1	32.6	51.8	0.0	17.4	62.2	0.1	10.4	27.0	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.9	48.5	0.1	32.6	51.8	0.0	17.4	62.2	0.1	10.4	27.0	2.9
LOS	D	D	A	C	D	A	B	E	A	B	C	A
Approach Delay		38.5			39.4			52.7			20.6	
Approach LOS		D			D			D			C	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.04
Intersection Signal Delay: 40.0
Intersection Capacity Utilization 101.2%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service G

Splits and Phases: 1: S. Gun Club Road & E. Jewell Avenue







								
Ø1	Ø2 (R)		Ø3		Ø4			
12 s	60 s		15 s		33 s			
								
Ø5	Ø6 (R)		Ø7		Ø8			
12 s	60 s		13 s		35 s			

HCM 6th TWSC
2: E. Jewell Avenue & S. Old Tom Morris Road

2023 Background
AM Peak

Intersection

Int Delay, s/veh 7.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	180	70	180	4	2	280
Future Vol, veh/h	180	70	180	4	2	280
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	205	80	205	5	2	318

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	210	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	5.34	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	3.12	-	-
Pot Cap-1 Maneuver	924	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	924	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	7.2	0	12.8
HCM LOS			B






Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	924	-	-	-	781
HCM Lane V/C Ratio	0.221	-	-	-	0.41
HCM Control Delay (s)	10	-	-	-	12.8
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.8	-	-	-	2

HCM 6th TWSC
4: E. Jewell Avenue & S. Flat Rock Trail

2023 Background
AM Peak

Intersection

Int Delay, s/veh 4.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	45	80	1	1	100
Future Vol, veh/h	25	45	80	1	1	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	47	84	1	1	105





Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	85	0	0 184 85
Stage 1	-	-	- - 85 -
Stage 2	-	-	- - 99 -
Critical Hdwy	4.12	-	- - 6.42 6.22
Critical Hdwy Stg 1	-	-	- - 5.42 -
Critical Hdwy Stg 2	-	-	- - 5.42 -
Follow-up Hdwy	2.218	-	- - 3.518 3.318
Pot Cap-1 Maneuver	1512	-	- - 805 974
Stage 1	-	-	- - 938 -
Stage 2	-	-	- - 925 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1512	-	- - 791 974
Mov Cap-2 Maneuver	-	-	- - 791 -
Stage 1	-	-	- - 922 -
Stage 2	-	-	- - 925 -

Approach	EB	WB	SB
HCM Control Delay, s	2.7	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1512	-	-	-	791	974
HCM Lane V/C Ratio	0.017	-	-	-	0.001	0.108
HCM Control Delay (s)	7.4	-	-	-	9.6	9.1
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0	0.4

HCM 6th TWSC
5: E. Jewell Avenue & Harvest Road

2023 Background
AM Peak

























Intersection						
Int Delay, s/veh	4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	30	35	2	3	45
Future Vol, veh/h	15	30	35	2	3	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	32	37	2	3	47
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	39	0	-	0	102	38
Stage 1	-	-	-	-	38	-
Stage 2	-	-	-	-	64	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1571	-	-	-	896	1034
Stage 1	-	-	-	-	984	-
Stage 2	-	-	-	-	959	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1571	-	-	-	887	1034
Mov Cap-2 Maneuver	-	-	-	-	887	-
Stage 1	-	-	-	-	974	-
Stage 2	-	-	-	-	959	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.4	0		8.7		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1571	-	-	-	1023	
HCM Lane V/C Ratio	0.01	-	-	-	0.049	
HCM Control Delay (s)	7.3	-	-	-	8.7	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.2	

Timings

1: S. Gun Club Road & E. Jewell Avenue

2023 Background











PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	200	100	70	135	20	160	685	130	20	975	320
Future Volume (vph)	250	200	100	70	135	20	160	685	130	20	975	320
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0		10.0	23.0		10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	12.0	36.0		12.0	36.0		12.0	60.0	60.0	12.0	60.0	60.0
Total Split (%)	10.0%	30.0%		10.0%	30.0%		10.0%	50.0%	50.0%	10.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	31.0	23.0	120.0	30.4	20.6	120.0	83.4	78.8	78.8	76.4	67.4	67.4
Actuated g/C Ratio	0.26	0.19	1.00	0.25	0.17	1.00	0.70	0.66	0.66	0.64	0.56	0.56
v/c Ratio	0.84	0.56	0.06	0.26	0.42	0.01	0.60	0.56	0.12	0.04	0.93	0.32
Control Delay	63.2	50.3	0.1	33.8	47.1	0.0	32.1	15.7	2.4	7.6	42.2	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.2	50.3	0.1	33.8	47.1	0.0	32.1	15.7	2.4	7.6	42.2	5.1
LOS	E	D	A	C	D	A	C	B	A	A	D	A
Approach Delay		47.0			38.8			16.6			32.6	
Approach LOS		D			D			B			C	

Intersection Summary







Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 30.6
Intersection Capacity Utilization 94.5%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service F

Splits and Phases: 1: S. Gun Club Road & E. Jewell Avenue

				
Ø1	Ø2 (R)		Ø3	Ø4
12 s	60 s		12 s	36 s
				
Ø5	Ø6 (R)		Ø7	Ø8
12 s	60 s		12 s	36 s

HCM 6th TWSC
2: E. Jewell Avenue & S. Old Tom Morris Road

2023 Background
PM Peak






Intersection						
Int Delay, s/veh	4.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	150	175	100	2	2	115
Future Vol, veh/h	150	175	100	2	2	115
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	158	184	105	2	2	121
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	107	0	-	0	514	54
Stage 1	-	-	-	-	106	-
Stage 2	-	-	-	-	408	-
Critical Hdwy	5.34	-	-	-	6.29	7.14
Critical Hdwy Stg 1	-	-	-	-	6.64	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	3.12	-	-	-	3.67	3.92
Pot Cap-1 Maneuver	1031	-	-	-	513	850
Stage 1	-	-	-	-	851	-
Stage 2	-	-	-	-	619	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1031	-	-	-	435	850
Mov Cap-2 Maneuver	-	-	-	-	435	-
Stage 1	-	-	-	-	721	-
Stage 2	-	-	-	-	619	-
Approach	EB	WB		SB		
HCM Control Delay, s	4.2	0		10		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1031	-	-	-	836	
HCM Lane V/C Ratio	0.153	-	-	-	0.147	
HCM Control Delay (s)	9.1	-	-	-	10	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0.5	-	-	-	0.5	

HCM 6th TWSC
4: E. Jewell Avenue & S. Flat Rock Trail

2023 Background
PM Peak

Intersection

Int Delay, s/veh 4.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	95	80	50	1	1	50
Future Vol, veh/h	95	80	50	1	1	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	100	84	53	1	1	53





Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	54	0	0 338 54
Stage 1	-	-	- 54 -
Stage 2	-	-	- 284 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1551	-	- 658 1013
Stage 1	-	-	- 969 -
Stage 2	-	-	- 764 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1551	-	- 616 1013
Mov Cap-2 Maneuver	-	-	- 616 -
Stage 1	-	-	- 907 -
Stage 2	-	-	- 764 -

Approach	EB	WB	SB
HCM Control Delay, s	4.1	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1551	-	-	-	616	1013
HCM Lane V/C Ratio	0.064	-	-	-	0.002	0.052
HCM Control Delay (s)	7.5	-	-	-	10.9	8.7
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0	0.2

























HCM 6th TWSC
5: E. Jewell Avenue & Harvest Road

2023 Background
PM Peak

Intersection						
Int Delay, s/veh	3.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	30	50	25	4	2	25
Future Vol, veh/h	30	50	25	4	2	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	53	26	4	2	26
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	30	0	-	0	145	28
Stage 1	-	-	-	-	28	-
Stage 2	-	-	-	-	117	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1583	-	-	-	847	1047
Stage 1	-	-	-	-	995	-
Stage 2	-	-	-	-	908	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1583	-	-	-	830	1047
Mov Cap-2 Maneuver	-	-	-	-	830	-
Stage 1	-	-	-	-	975	-
Stage 2	-	-	-	-	908	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.7	0		8.6		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1583	-	-	-	1027	
HCM Lane V/C Ratio	0.02	-	-	-	0.028	
HCM Control Delay (s)	7.3	-	-	-	8.6	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	

Timings 1: S. Gun Club Road & E. Jewell Avenue

2023 Total
AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	250	120	325	413	118	230	1125	159	35	625	220
Future Volume (vph)	195	250	120	325	413	118	230	1125	159	35	625	220
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0		10.0	23.0		10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	13.0	33.0		15.0	35.0		12.0	60.0	60.0	12.0	60.0	60.0
Total Split (%)	10.8%	27.5%		12.5%	29.2%		10.0%	50.0%	50.0%	10.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	40.8	29.8	120.0	44.8	31.8	120.0	70.1	64.1	64.1	67.9	58.5	58.5
Actuated g/C Ratio	0.34	0.25	1.00	0.37	0.26	1.00	0.58	0.53	0.53	0.57	0.49	0.49
v/c Ratio	0.91	0.56	0.08	0.98	0.87	0.08	0.75	1.18	0.19	0.18	0.72	0.26
Control Delay	70.0	44.4	0.1	76.7	61.1	0.1	28.6	119.1	6.9	12.7	29.9	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.0	44.4	0.1	76.7	61.1	0.1	28.6	119.1	6.9	12.7	29.9	2.9
LOS	E	D	A	E	E	A	C	F	A	B	C	A
Approach Delay		43.8			58.6			93.5			22.5	
Approach LOS		D			E			F			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.18

Intersection Signal Delay: 62.0

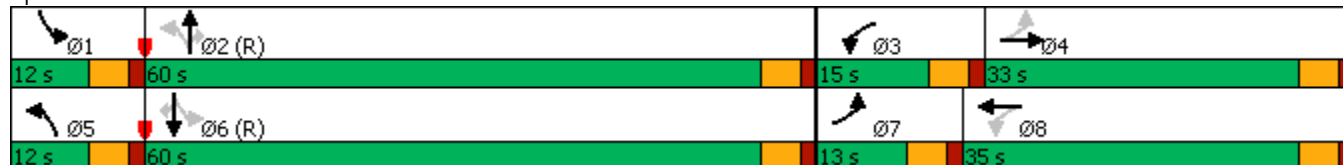
Intersection LOS: E

Intersection Capacity Utilization 109.3%

ICU Level of Service H





Analysis Period (min) 15

Splits and Phases: 1: S. Gun Club Road & E. Jewell Avenue



HCM 6th TWSC
2: E. Jewell Avenue & S. Old Tom Morris Road

2023 Total
AM Peak

Intersection						
Int Delay, s/veh	5.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	180	249	591	4	2	280
Future Vol, veh/h	180	249	591	4	2	280
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	189	262	622	4	2	295

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	626	0	-	0	1133
Stage 1	-	-	-	-	624
Stage 2	-	-	-	-	509
Critical Hdwy	5.34	-	-	-	6.29
Critical Hdwy Stg 1	-	-	-	-	6.64
Critical Hdwy Stg 2	-	-	-	-	5.84
Follow-up Hdwy	3.12	-	-	-	3.67
Pot Cap-1 Maneuver	591	-	-	-	228
Stage 1	-	-	-	-	419
Stage 2	-	-	-	-	551
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	591	-	-	-	155
Mov Cap-2 Maneuver	-	-	-	-	155
Stage 1	-	-	-	-	285
Stage 2	-	-	-	-	551

Approach	EB	WB	SB
HCM Control Delay, s	5.8	0	17.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	591	-	-	-	572
HCM Lane V/C Ratio	0.321	-	-	-	0.519
HCM Control Delay (s)	13.9	-	-	-	17.9
HCM Lane LOS	B	-	-	-	C
HCM 95th %tile Q(veh)	1.4	-	-	-	3








HCM 6th TWSC
4: S. Flat Rock Trail & E. Jewell Avenue

2023 Total
AM Peak

Intersection												
Int Delay, s/veh	13.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰ ↱ ↲ ↳	↰ ↱ ↲ ↳	↰ ↱ ↲ ↳	↰ ↱ ↲ ↳	↰ ↱ ↲ ↳	↰ ↱ ↲ ↳	↰ ↱ ↲ ↳	↰ ↱ ↲ ↳	↰ ↱ ↲ ↳	↰ ↱ ↲ ↳	↰ ↱ ↲ ↳	↰ ↱ ↲ ↳
Traffic Vol, veh/h	25	54	170	5	106	1	385	52	9	1	62	100
Future Vol, veh/h	25	54	170	5	106	1	385	52	9	1	62	100
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	300	-	300	300	-	-	0	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	57	179	5	112	1	405	55	9	1	65	105
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	113	0	0	236	0	0	196	232	29	225	411	57
Stage 1	-	-	-	-	-	-	109	109	-	123	123	-
Stage 2	-	-	-	-	-	-	87	123	-	102	288	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	1024	-	-	899	-	-	735	667	881	708	529	846
Stage 1	-	-	-	-	-	-	799	804	-	782	793	-
Stage 2	-	-	-	-	-	-	838	793	-	821	672	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1024	-	-	899	-	-	567	646	881	640	513	846
Mov Cap-2 Maneuver	-	-	-	-	-	-	567	646	-	640	513	-
Stage 1	-	-	-	-	-	-	779	784	-	762	788	-
Stage 2	-	-	-	-	-	-	669	788	-	736	655	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.9			0.4			23.7			12.1		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	567	672	1024	-	-	899	-	-	640	678		
HCM Lane V/C Ratio	0.715	0.096	0.026	-	-	0.006	-	-	0.002	0.252		
HCM Control Delay (s)	25.7	10.9	8.6	-	-	9	-	-	10.6	12.1		
HCM Lane LOS	D	B	A	-	-	A	-	-	B	B		
HCM 95th %tile Q(veh)	5.8	0.3	0.1	-	-	0	-	-	0	1		





HCM 6th TWSC
5: Harvest Road & E. Jewell Avenue

2023 Total
AM Peak

Intersection												
Int Delay, s/veh	5.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	32	9	2	35	2	28	20	5	3	6	48
Future Vol, veh/h	22	32	9	2	35	2	28	20	5	3	6	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	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	34	9	2	37	2	29	21	5	3	6	51
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	39	0	0	43	0	0	151	123	34	140	131	38
Stage 1	-	-	-	-	-	-	80	80	-	42	42	-
Stage 2	-	-	-	-	-	-	71	43	-	98	89	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1571	-	-	1566	-	-	816	767	1039	830	760	1034
Stage 1	-	-	-	-	-	-	929	828	-	972	860	-
Stage 2	-	-	-	-	-	-	939	859	-	908	821	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1571	-	-	1566	-	-	762	755	1039	798	748	1034
Mov Cap-2 Maneuver	-	-	-	-	-	-	762	755	-	798	748	-
Stage 1	-	-	-	-	-	-	915	816	-	957	859	-
Stage 2	-	-	-	-	-	-	886	858	-	867	809	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.6			0.4			9.8			8.9		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1 NBLn2		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)	762	799	1571	-	-	1566	-	-	979			
HCM Lane V/C Ratio	0.039	0.033	0.015	-	-	0.001	-	-	0.061			
HCM Control Delay (s)	9.9	9.7	7.3	-	-	7.3	0	-	8.9			
HCM Lane LOS	A	A	A	-	-	A	A	-	A			
HCM 95th %tile Q(veh)	0.1	0.1	0	-	-	0	-	-	0.2			





HCM 6th TWSC
7: S. Flat Rock Trail & East-West Internal Road

2023 Total
AM Peak

Intersection						
Int Delay, s/veh	2.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	77	369	5	25	212
Future Vol, veh/h	15	77	369	5	25	212
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	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	19	96	461	6	31	265
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	791	464	0	0	467	0
Stage 1	464	-	-	-	-	-
Stage 2	327	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	358	598	-	-	1094	-
Stage 1	633	-	-	-	-	-
Stage 2	731	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	348	598	-	-	1094	-
Mov Cap-2 Maneuver	348	-	-	-	-	-
Stage 1	615	-	-	-	-	-
Stage 2	731	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	13.6	0		0.9		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	535	1094	-	
HCM Lane V/C Ratio	-	-	0.215	0.029	-	
HCM Control Delay (s)	-	-	13.6	8.4	-	
HCM Lane LOS	-	-	B	A	-	
HCM 95th %tile Q(veh)	-	-	0.8	0.1	-	





HCM 6th TWSC
8: Harvest Road & East-West Internal Road

2023 Total
AM Peak

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	0	0	42	13	4
Future Vol, veh/h	11	0	0	42	13	4
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	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	0	0	48	15	5
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	66	18	20	0	-	0
Stage 1	18	-	-	-	-	-
Stage 2	48	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	939	1061	1596	-	-	-
Stage 1	1005	-	-	-	-	-
Stage 2	974	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	939	1061	1596	-	-	-
Mov Cap-2 Maneuver	939	-	-	-	-	-
Stage 1	1005	-	-	-	-	-
Stage 2	974	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	8.9	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1596	-	939	-	-	-
HCM Lane V/C Ratio	-	-	0.013	-	-	-
HCM Control Delay (s)	0	-	8.9	0	-	-
HCM Lane LOS	A	-	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-	-





HCM 6th TWSC
10: S. Flat Rock Trail & Warren Street

2023 Total
AM Peak

Intersection						
Int Delay, s/veh	1.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	34	200	2	11	175
Future Vol, veh/h	4	34	200	2	11	175
Conflicting Peds, #/hr	50	50	0	50	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	45	267	3	15	233
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	632	369	0	0	320	0
Stage 1	319	-	-	-	-	-
Stage 2	313	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	444	677	-	-	1240	-
Stage 1	737	-	-	-	-	-
Stage 2	741	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	397	614	-	-	1181	-
Mov Cap-2 Maneuver	397	-	-	-	-	-
Stage 1	693	-	-	-	-	-
Stage 2	705	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	11.8	0		0.5		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	581	1181	-	
HCM Lane V/C Ratio	-	-	0.087	0.012	-	
HCM Control Delay (s)	-	-	11.8	8.1	-	
HCM Lane LOS	-	-	B	A	-	
HCM 95th %tile Q(veh)	-	-	0.3	0	-	







HCM 6th TWSC
11: Harvest Road & Warren Street

2023 Total
AM Peak

Intersection						
Int Delay, s/veh	2.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	0	0	27	9	4
Future Vol, veh/h	15	0	0	27	9	4
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	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	0	0	31	10	5
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	44	13	15	0	-	0
Stage 1	13	-	-	-	-	-
Stage 2	31	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	967	1067	1603	-	-	-
Stage 1	1010	-	-	-	-	-
Stage 2	992	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	967	1067	1603	-	-	-
Mov Cap-2 Maneuver	967	-	-	-	-	-
Stage 1	1010	-	-	-	-	-
Stage 2	992	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	8.8	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1603	-	967	-	-	-
HCM Lane V/C Ratio	-	-	0.018	-	-	-
HCM Control Delay (s)	0	-	8.8	0	-	-
HCM Lane LOS	A	-	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-	-

HCM 6th TWSC
15: SW Site Access & E. Yale Avenue

2023 Total
AM Peak

Intersection												
Int Delay, s/veh	5.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	6	7	1	17	1	24	0	4	3	0	20
Future Vol, veh/h	7	6	7	1	17	1	24	0	4	3	0	20
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	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	7	8	1	18	1	26	0	4	3	0	22






Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	19	0	0	15	0	0	59	48	11	50	52	19
Stage 1	-	-	-	-	-	-	27	27	-	21	21	-
Stage 2	-	-	-	-	-	-	32	21	-	29	31	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1597	-	-	1603	-	-	937	844	1070	950	839	1059
Stage 1	-	-	-	-	-	-	990	873	-	998	878	-
Stage 2	-	-	-	-	-	-	984	878	-	988	869	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1597	-	-	1603	-	-	914	839	1070	942	834	1059
Mov Cap-2 Maneuver	-	-	-	-	-	-	914	839	-	942	834	-
Stage 1	-	-	-	-	-	-	985	869	-	993	877	-
Stage 2	-	-	-	-	-	-	963	877	-	979	865	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.5			0.4			9			8.5		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	933	1597	-	-	1603	-	-	1042
HCM Lane V/C Ratio	0.033	0.005	-	-	0.001	-	-	0.024
HCM Control Delay (s)	9	7.3	-	-	7.2	-	-	8.5
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1





HCM 6th TWSC
16: SE Site Access & E. Yale Avenue

2023 Total
AM Peak

Intersection						
Int Delay, s/veh	5.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	9	4	3	5	14	11
Future Vol, veh/h	9	4	3	5	14	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	4	3	5	15	12
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	14	0	23	12
Stage 1	-	-	-	-	12	-
Stage 2	-	-	-	-	11	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1604	-	993	1069
Stage 1	-	-	-	-	1011	-
Stage 2	-	-	-	-	1012	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1604	-	991	1069
Mov Cap-2 Maneuver	-	-	-	-	991	-
Stage 1	-	-	-	-	1009	-
Stage 2	-	-	-	-	1012	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		2.7		8.6	
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	1024	-	-	1604	-	
HCM Lane V/C Ratio	0.027	-	-	0.002	-	
HCM Control Delay (s)	8.6	-	-	7.2	-	
HCM Lane LOS	A	-	-	A	-	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	

HCM 6th TWSC
20: Harvest Road & Local Access

2023 Total
AM Peak

























Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	0	0	20	8	1
Future Vol, veh/h	7	0	0	20	8	1
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	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	0	0	22	9	1
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	32	10	10	0	-	0
Stage 1	10	-	-	-	-	-
Stage 2	22	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	982	1071	1610	-	-	-
Stage 1	1013	-	-	-	-	-
Stage 2	1001	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	982	1071	1610	-	-	-
Mov Cap-2 Maneuver	982	-	-	-	-	-
Stage 1	1013	-	-	-	-	-
Stage 2	1001	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	8.7	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1610	-	982	-	-	-
HCM Lane V/C Ratio	-	-	0.008	-	-	-
HCM Control Delay (s)	0	-	8.7	0	-	-
HCM Lane LOS	A	-	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-	-

Timings

2023 Total

1: S. Gun Club Road & E. Jewell Avenue





PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	368	100	179	234	56	160	685	302	85	975	320
Future Volume (vph)	250	368	100	179	234	56	160	685	302	85	975	320
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0		10.0	23.0		10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	12.0	36.0		12.0	36.0		12.0	60.0	60.0	12.0	60.0	60.0
Total Split (%)	10.0%	30.0%		10.0%	30.0%		10.0%	50.0%	50.0%	10.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	40.6	30.6	120.0	40.6	30.6	120.0	72.4	61.5	61.5	70.3	60.3	60.3
Actuated g/C Ratio	0.34	0.26	1.00	0.34	0.26	1.00	0.60	0.51	0.51	0.59	0.50	0.50
v/c Ratio	0.78	0.79	0.06	0.82	0.50	0.04	0.72	0.73	0.32	0.28	1.06	0.36
Control Delay	48.2	54.4	0.1	57.5	41.6	0.0	43.6	29.5	2.8	12.8	78.2	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.2	54.4	0.1	57.5	41.6	0.0	43.6	29.5	2.8	12.8	78.2	6.0
LOS	D	D	A	E	D	A	D	C	A	B	E	A
Approach Delay		44.7			42.8			24.5			57.4	
Approach LOS		D			D			C			E	

Intersection Summary





Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.06
Intersection Signal Delay: 42.9
Intersection Capacity Utilization 102.8%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service G

Splits and Phases: 1: S. Gun Club Road & E. Jewell Avenue

											
Ø1	Ø2 (R)		Ø3	Ø4		Ø5	Ø6 (R)		Ø7	Ø8	
12 s	60 s		12 s	36 s		12 s	60 s		12 s	36 s	

HCM 6th TWSC
2: E. Jewell Avenue & S. Old Tom Morris Road

2023 Total
PM Peak

Intersection						
Int Delay, s/veh	2.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	150	580	344	2	2	115
Future Vol, veh/h	150	580	344	2	2	115
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	158	611	362	2	2	121













Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	364	0	0	985	182
Stage 1	-	-	-	363	-
Stage 2	-	-	-	622	-
Critical Hdwy	5.34	-	-	6.29	7.14
Critical Hdwy Stg 1	-	-	-	6.64	-
Critical Hdwy Stg 2	-	-	-	5.84	-
Follow-up Hdwy	3.12	-	-	3.67	3.92
Pot Cap-1 Maneuver	784	-	-	278	706
Stage 1	-	-	-	601	-
Stage 2	-	-	-	483	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	784	-	-	222	706
Mov Cap-2 Maneuver	-	-	-	222	-
Stage 1	-	-	-	480	-
Stage 2	-	-	-	483	-

Approach	EB	WB	SB
HCM Control Delay, s	2.2	0	11.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	784	-	-	-	681
HCM Lane V/C Ratio	0.201	-	-	-	0.181
HCM Control Delay (s)	10.7	-	-	-	11.5
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.7	-	-	-	0.7








HCM 6th TWSC
4: S. Flat Rock Trail & E. Jewell Avenue

2023 Total
PM Peak

Intersection												
Int Delay, s/veh	7.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	95	110	375	18	59	1	235	15	6	1	15	50
Future Vol, veh/h	95	110	375	18	59	1	235	15	6	1	15	50
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	300	-	300	300	-	-	0	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	100	116	395	19	62	1	247	16	6	1	16	53
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	63	0	0	511	0	0	387	417	58	355	812	32
Stage 1	-	-	-	-	-	-	316	316	-	101	101	-
Stage 2	-	-	-	-	-	-	71	101	-	254	711	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	1080	-	-	669	-	-	575	525	845	599	312	877
Stage 1	-	-	-	-	-	-	582	654	-	809	811	-
Stage 2	-	-	-	-	-	-	857	811	-	668	434	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1080	-	-	669	-	-	470	463	845	527	275	877
Mov Cap-2 Maneuver	-	-	-	-	-	-	470	463	-	527	275	-
Stage 1	-	-	-	-	-	-	528	593	-	734	788	-
Stage 2	-	-	-	-	-	-	767	788	-	586	394	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.4			2.4			20.2			12		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	470	532	1080	-	-	669	-	-	527	583		
HCM Lane V/C Ratio	0.526	0.042	0.093	-	-	0.028	-	-	0.002	0.117		
HCM Control Delay (s)	20.9	12.1	8.7	-	-	10.5	-	-	11.8	12		
HCM Lane LOS	C	B	A	-	-	B	-	-	B	B		
HCM 95th %tile Q(veh)	3	0.1	0.3	-	-	0.1	-	-	0	0.4		

HCM 6th TWSC
5: Harvest Road & E. Jewell Avenue

2023 Total
PM Peak

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	35	51	30	5	27	4	17	13	3	2	22	33
Future Vol, veh/h	35	51	30	5	27	4	17	13	3	2	22	33
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	-	0	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	37	54	32	5	28	4	18	14	3	2	23	35





Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	32	0	0	86	0	0	197	170	54	193	200	30
Stage 1	-	-	-	-	-	-	128	128	-	40	40	-
Stage 2	-	-	-	-	-	-	69	42	-	153	160	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1580	-	-	1510	-	-	762	723	1013	767	696	1044
Stage 1	-	-	-	-	-	-	876	790	-	975	862	-
Stage 2	-	-	-	-	-	-	941	860	-	849	766	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1580	-	-	1510	-	-	703	704	1013	738	678	1044
Mov Cap-2 Maneuver	-	-	-	-	-	-	703	704	-	738	678	-
Stage 1	-	-	-	-	-	-	856	772	-	953	859	-
Stage 2	-	-	-	-	-	-	883	857	-	812	748	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.2	1	10.1	9.5
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	703	747	1580	-	-	1510	-	-	854
HCM Lane V/C Ratio	0.025	0.023	0.023	-	-	0.003	-	-	0.07
HCM Control Delay (s)	10.3	9.9	7.3	-	-	7.4	0	-	9.5
HCM Lane LOS	B	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0.1	0.1	-	-	0	-	-	0.2





HCM 6th TWSC
7: S. Flat Rock Trail & East-West Internal Road

2023 Total
PM Peak

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	50	206	17	85	324
Future Vol, veh/h	10	50	206	17	85	324
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	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	63	258	21	106	405
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	886	269	0	0	279	0
Stage 1	269	-	-	-	-	-
Stage 2	617	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	315	770	-	-	1284	-
Stage 1	776	-	-	-	-	-
Stage 2	538	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	289	770	-	-	1284	-
Mov Cap-2 Maneuver	289	-	-	-	-	-
Stage 1	712	-	-	-	-	-
Stage 2	538	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	11.8	0		1.7		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	603	1284	-	
HCM Lane V/C Ratio	-	-	0.124	0.083	-	
HCM Control Delay (s)	-	-	11.8	8.1	-	
HCM Lane LOS	-	-	B	A	-	
HCM 95th %tile Q(veh)	-	-	0.4	0.3	-	

HCM 6th TWSC
8: Harvest Road & East-West Internal Road

2023 Total
PM Peak

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	0	0	26	45	12
Future Vol, veh/h	7	0	0	26	45	12
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	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	0	0	30	51	14





Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	88	58	65	0	-	0
Stage 1	58	-	-	-	-	-
Stage 2	30	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	913	1008	1537	-	-	-
Stage 1	965	-	-	-	-	-
Stage 2	993	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	913	1008	1537	-	-	-
Mov Cap-2 Maneuver	913	-	-	-	-	-
Stage 1	965	-	-	-	-	-
Stage 2	993	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1537	-	913	-	-	-
HCM Lane V/C Ratio	-	-	0.009	-	-	-
HCM Control Delay (s)	0	-	9	0	-	-
HCM Lane LOS	A	-	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-	-





HCM 6th TWSC
10: S. Flat Rock Trail & Warren Street

2023 Total
PM Peak

Intersection						
Int Delay, s/veh	1.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	22	150	5	38	200
Future Vol, veh/h	3	22	150	5	38	200
Conflicting Peds, #/hr	15	15	0	15	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	28	188	6	48	250
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	567	221	0	0	209	0
Stage 1	206	-	-	-	-	-
Stage 2	361	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	485	819	-	-	1362	-
Stage 1	829	-	-	-	-	-
Stage 2	705	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	454	796	-	-	1343	-
Mov Cap-2 Maneuver	454	-	-	-	-	-
Stage 1	788	-	-	-	-	-
Stage 2	695	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10.2	0		1.2		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	730	1343	-	
HCM Lane V/C Ratio	-	-	0.043	0.035	-	
HCM Control Delay (s)	-	-	10.2	7.8	-	
HCM Lane LOS	-	-	B	A	-	
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-	







HCM 6th TWSC
11: Harvest Road & Warren Street

2023 Total
PM Peak

Intersection						
Int Delay, s/veh	1.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	0	0	24	31	14
Future Vol, veh/h	12	0	0	24	31	14
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	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	0	0	27	35	16
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	70	43	51	0	-	0
Stage 1	43	-	-	-	-	-
Stage 2	27	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	934	1027	1555	-	-	-
Stage 1	979	-	-	-	-	-
Stage 2	996	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	934	1027	1555	-	-	-
Mov Cap-2 Maneuver	934	-	-	-	-	-
Stage 1	979	-	-	-	-	-
Stage 2	996	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	8.9	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1555	-	934	-	-	-
HCM Lane V/C Ratio	-	-	0.015	-	-	-
HCM Control Delay (s)	0	-	8.9	0	-	-
HCM Lane LOS	A	-	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-	-






HCM 6th TWSC
15: SW Site Access & E. Yale Avenue

2023 Total
PM Peak

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	23	24	4	15	3	14	0	2	2	0	13
Future Vol, veh/h	23	23	24	4	15	3	14	0	2	2	0	13
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	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	25	25	26	4	16	3	15	0	2	2	0	14
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	19	0	0	51	0	0	121	115	38	115	127	18
Stage 1	-	-	-	-	-	-	88	88	-	26	26	-
Stage 2	-	-	-	-	-	-	33	27	-	89	101	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1597	-	-	1555	-	-	854	775	1034	862	764	1061
Stage 1	-	-	-	-	-	-	920	822	-	992	874	-
Stage 2	-	-	-	-	-	-	983	873	-	918	811	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1597	-	-	1555	-	-	831	760	1034	848	749	1061
Mov Cap-2 Maneuver	-	-	-	-	-	-	831	760	-	848	749	-
Stage 1	-	-	-	-	-	-	905	809	-	976	871	-
Stage 2	-	-	-	-	-	-	967	870	-	902	798	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.4			1.3			9.3			8.6		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	852	1597	-	-	1555	-	-	1027				
HCM Lane V/C Ratio	0.02	0.016	-	-	0.003	-	-	0.016				
HCM Control Delay (s)	9.3	7.3	-	-	7.3	-	-	8.6				
HCM Lane LOS	A	A	-	-	A	-	-	A				
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0				





HCM 6th TWSC
16: SE Site Access & E. Yale Avenue

2023 Total
PM Peak

Intersection						
Int Delay, s/veh	3.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	13	14	11	14	8	7
Future Vol, veh/h	13	14	11	14	8	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	15	12	15	9	8
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	29	0	61	22
Stage 1	-	-	-	-	22	-
Stage 2	-	-	-	-	39	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1584	-	945	1055
Stage 1	-	-	-	-	1001	-
Stage 2	-	-	-	-	983	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1584	-	937	1055
Mov Cap-2 Maneuver	-	-	-	-	937	-
Stage 1	-	-	-	-	993	-
Stage 2	-	-	-	-	983	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	3.2		8.7		
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	989	-	-	1584	-	
HCM Lane V/C Ratio	0.016	-	-	0.008	-	
HCM Control Delay (s)	8.7	-	-	7.3	-	
HCM Lane LOS	A	-	-	A	-	
HCM 95th %tile Q(veh)	0	-	-	0	-	

HCM 6th TWSC
20: Harvest Road & Local Access

2023 Total
PM Peak

























Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	0	0	20	25	6
Future Vol, veh/h	4	0	0	20	25	6
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	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	0	0	22	27	7
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	53	31	34	0	-	0
Stage 1	31	-	-	-	-	-
Stage 2	22	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	955	1043	1578	-	-	-
Stage 1	992	-	-	-	-	-
Stage 2	1001	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	955	1043	1578	-	-	-
Mov Cap-2 Maneuver	955	-	-	-	-	-
Stage 1	992	-	-	-	-	-
Stage 2	1001	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	8.8	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1578	-	955	-	-	-
HCM Lane V/C Ratio	-	-	0.005	-	-	-
HCM Control Delay (s)	0	-	8.8	0	-	-
HCM Lane LOS	A	-	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-	-

Timings

1: S. Gun Club Road & E. Jewell Avenue

2023 Total - Mitigated

AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	250	120	325	413	118	230	1125	159	35	625	220
Future Volume (vph)	195	250	120	325	413	118	230	1125	159	35	625	220
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0		10.0	23.0		10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	14.0	36.0		17.0	39.0		12.0	55.0	55.0	12.0	55.0	55.0
Total Split (%)	11.7%	30.0%		14.2%	32.5%		10.0%	45.8%	45.8%	10.0%	45.8%	45.8%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	42.7	30.7	120.0	47.7	33.7	120.0	67.5	61.2	61.2	64.1	54.7	54.7
Actuated g/C Ratio	0.36	0.26	1.00	0.40	0.28	1.00	0.56	0.51	0.51	0.53	0.46	0.46
v/c Ratio	0.83	0.55	0.08	0.88	0.82	0.08	0.56	0.65	0.19	0.14	0.40	0.27
Control Delay	53.8	42.7	0.1	52.7	54.0	0.1	19.7	25.5	3.5	13.9	23.1	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	42.7	0.1	52.7	54.0	0.1	19.7	25.5	3.5	13.9	23.1	3.4
LOS	D	D	A	D	D	A	B	C	A	B	C	A
Approach Delay		37.5			46.0			22.3			17.8	
Approach LOS		D			D			C			B	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 28.8

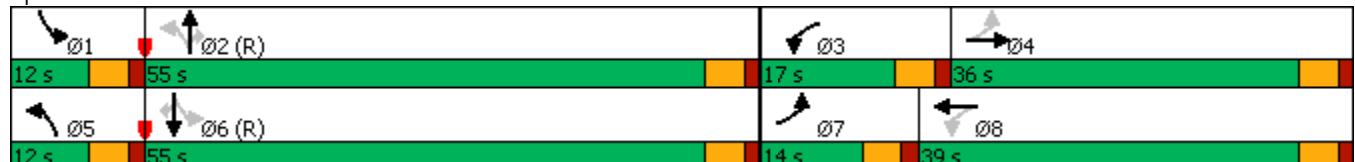
Intersection LOS: C

Intersection Capacity Utilization 81.1%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: S. Gun Club Road & E. Jewell Avenue



























Timings

1: S. Gun Club Road & E. Jewell Avenue

2023 Total - Mitigated

PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	368	100	179	234	56	160	685	302	85	975	320
Future Volume (vph)	250	368	100	179	234	56	160	685	302	85	975	320
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0		10.0	23.0		10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	12.0	37.0		12.0	37.0		12.0	59.0	59.0	12.0	59.0	59.0
Total Split (%)	10.0%	30.8%		10.0%	30.8%		10.0%	49.2%	49.2%	10.0%	49.2%	49.2%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	41.0	31.0	120.0	41.0	31.0	120.0	72.0	61.0	61.0	70.0	60.1	60.1
Actuated g/C Ratio	0.34	0.26	1.00	0.34	0.26	1.00	0.60	0.51	0.51	0.58	0.50	0.50
v/c Ratio	0.77	0.78	0.06	0.81	0.50	0.04	0.50	0.39	0.32	0.20	0.56	0.34
Control Delay	46.6	53.1	0.1	54.5	41.0	0.0	16.3	19.5	2.9	11.8	23.0	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.6	53.1	0.1	54.5	41.0	0.0	16.3	19.5	2.9	11.8	23.0	3.0
LOS	D	D	A	D	D	A	B	B	A	B	C	A
Approach Delay		43.5			41.3			14.7			17.7	
Approach LOS		D			D			B			B	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 24.7













Intersection LOS: C

Intersection Capacity Utilization 78.4%

ICU Level of Service D

Analysis Period (min) 15





































Splits and Phases: 1: S. Gun Club Road & E. Jewell Avenue

											
Ø1	Ø2 (R)		Ø3	Ø4		Ø5	Ø6 (R)		Ø7	Ø8	
12 s	59 s		12 s	37 s		12 s	59 s		12 s	37 s	

Timings

1: S. Gun Club Road & E. Jewell Avenue

2040 Background
AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	  		 	  	
Traffic Volume (vph)	350	1000	392	640	1247	243	576	1494	450	190	998	375
Future Volume (vph)	350	1000	392	640	1247	243	576	1494	450	190	998	375
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	23.0		10.0	23.0		10.0	23.0		10.0	23.0	
Total Split (s)	22.0	45.0		32.0	55.0		32.0	58.0		15.0	41.0	
Total Split (%)	14.7%	30.0%		21.3%	36.7%		21.3%	38.7%		10.0%	27.3%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effect Green (s)	19.9	40.1	150.0	30.0	50.3	150.0	30.5	58.0	150.0	13.9	41.4	150.0
Actuated g/C Ratio	0.13	0.27	1.00	0.20	0.34	1.00	0.20	0.39	1.00	0.09	0.28	1.00
v/c Ratio	0.80	0.77	0.26	0.97	0.76	0.16	0.86	0.79	0.30	0.62	0.74	0.25
Control Delay	77.3	54.6	0.4	81.9	40.6	0.2	73.2	68.2	0.4	74.9	53.8	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.3	54.6	0.4	81.9	40.6	0.2	73.2	68.2	0.4	74.9	53.8	0.4
LOS	E	D	A	F	D	A	E	E	A	E	D	A
Approach Delay		47.0			48.4			57.2			43.5	
Approach LOS		D			D			E			D	

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

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: 0.97

Intersection Signal Delay: 49.9

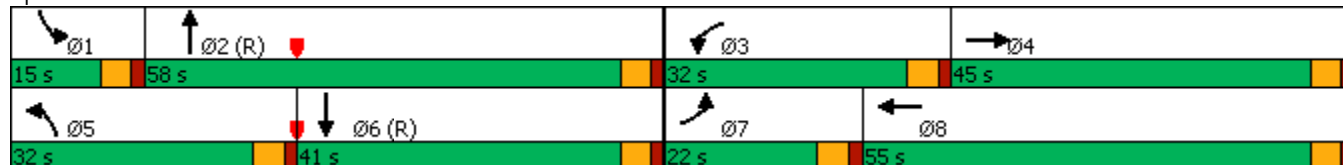
Intersection LOS: D

Intersection Capacity Utilization 86.6%

ICU Level of Service E























Analysis Period (min) 15

Splits and Phases: 1: S. Gun Club Road & E. Jewell Avenue



Timings 2: S. Old Tom Morris Road & E. Jewell Avenue

2040 Background
AM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		  			  				
Traffic Volume (vph)	225	1349	65	90	1741	75	25	75	25
Future Volume (vph)	225	1349	65	90	1741	75	25	75	25
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	10.0	23.0
Total Split (s)	22.0	93.0	93.0	12.0	83.0	15.0	33.0	12.0	30.0
Total Split (%)	14.7%	62.0%	62.0%	8.0%	55.3%	10.0%	22.0%	8.0%	20.0%
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)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	105.2	93.4	93.4	92.8	83.9	38.1	26.8	33.4	24.4
Actuated g/C Ratio	0.70	0.62	0.62	0.62	0.56	0.25	0.18	0.22	0.16
v/c Ratio	0.85	0.45	0.07	0.36	0.65	0.43	0.23	0.25	0.91
Control Delay	48.9	41.9	16.7	17.0	24.0	46.3	22.1	44.1	58.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.9	41.9	16.7	17.0	24.0	46.3	22.1	44.1	58.1
LOS	D	D	B	B	C	D	C	D	E
Approach Delay		41.9			23.7		34.2		55.7
Approach LOS		D			C		C		E

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 34.7

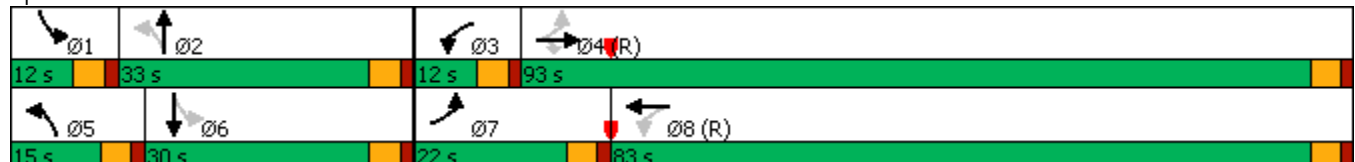
Intersection LOS: C

Intersection Capacity Utilization 85.6%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 2: S. Old Tom Morris Road & E. Jewell Avenue



HCM 6th TWSC



















3: Full Movement Access & E. Jewell Avenue

2040 Background
AM Peak

Intersection												
Int Delay, s/veh	4.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↱ ↱ ↱ ↱			↱ ↱ ↱ ↱			↕			↕		
Traffic Vol, veh/h	5	1464	5	2	1816	2	20	1	10	10	1	20
Future Vol, veh/h	5	1464	5	2	1816	2	20	1	10	10	1	20
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	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1541	5	2	1912	2	21	1	11	11	1	21
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1914	0	0	1546	0	0	2323	3472	773	2544	3473	957
Stage 1	-	-	-	-	-	-	1554	1554	-	1917	1917	-
Stage 2	-	-	-	-	-	-	769	1918	-	627	1556	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	138	-	-	211	-	-	40	6	293	29	6	222
Stage 1	-	-	-	-	-	-	81	173	-	44	114	-
Stage 2	-	-	-	-	-	-	327	114	-	399	172	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	138	-	-	211	-	-	30	6	293	23	6	222
Mov Cap-2 Maneuver	-	-	-	-	-	-	30	6	-	23	6	-
Stage 1	-	-	-	-	-	-	78	167	-	42	113	-
Stage 2	-	-	-	-	-	-	290	113	-	368	166	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0			287			196.2		
HCM LOS							F			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	36	138	-	-	211	-	-	45				
HCM Lane V/C Ratio	0.906	0.038	-	-	0.01	-	-	0.725				
HCM Control Delay (s)	287	32.1	-	-	22.2	-	-	196.2				
HCM Lane LOS	F	D	-	-	C	-	-	F				
HCM 95th %tile Q(veh)	3.3	0.1	-	-	0	-	-	2.8				

Timings 4: S. Flat Rock Trail & E. Jewell Avenue

2040 Background
AM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	85	1372	22	5	1572	59	8	10	8
Future Volume (vph)	85	1372	22	5	1572	59	8	10	8
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	10.0	25.0
Total Split (s)	12.0	77.0	77.0	12.0	77.0	25.0	49.0	12.0	36.0
Total Split (%)	8.0%	51.3%	51.3%	8.0%	51.3%	16.7%	32.7%	8.0%	24.0%
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)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	108.9	106.7	106.7	103.6	95.9	35.1	30.3	28.7	22.0
Actuated g/C Ratio	0.73	0.71	0.71	0.69	0.64	0.23	0.20	0.19	0.15
v/c Ratio	0.38	0.40	0.02	0.02	0.51	0.29	0.05	0.04	0.51
Control Delay	28.3	2.8	0.0	5.8	10.8	47.0	32.1	41.7	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	2.8	0.0	5.8	10.8	47.0	32.1	41.7	13.1
LOS	C	A	A	A	B	D	C	D	B
Approach Delay		4.3			10.8		43.8		14.5
Approach LOS		A			B		D		B

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.51

Intersection Signal Delay: 8.9

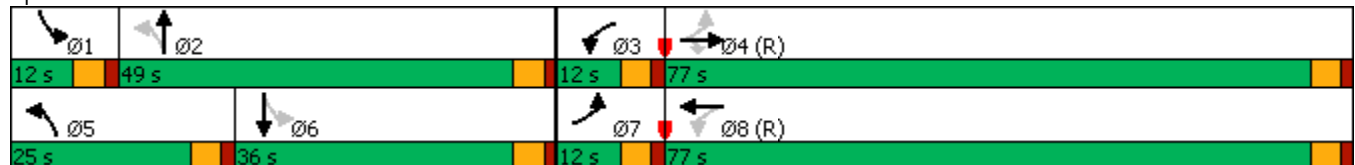
Intersection LOS: A

Intersection Capacity Utilization 69.4%

ICU Level of Service C




























Analysis Period (min) 15

Splits and Phases: 4: S. Flat Rock Trail & E. Jewell Avenue



Timings 5: Harvest Road & E. Jewell Avenue

2040 Background
AM Peak

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	 	  		  			 		 	
Traffic Volume (vph)	414	930	75	1098	350	82	250	200	140	396
Future Volume (vph)	414	930	75	1098	350	82	250	200	140	396
Turn Type	Prot	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2	1	6	
Permitted Phases			8		8	2		6		6
Detector Phase	7	4	3	8	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	30.0	5.0	30.0	30.0
Minimum Split (s)	10.0	23.0	10.0	23.0	23.0	10.0	35.0	10.0	35.0	35.0
Total Split (s)	30.0	83.0	12.0	65.0	65.0	12.0	38.0	17.0	43.0	43.0
Total Split (%)	20.0%	55.3%	8.0%	43.3%	43.3%	8.0%	25.3%	11.3%	28.7%	28.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	C-Max	None	None	None	None	None
Act Effect Green (s)	25.8	82.0	76.2	66.2	66.2	41.0	32.0	49.0	37.0	37.0
Actuated g/C Ratio	0.17	0.55	0.51	0.44	0.44	0.27	0.21	0.33	0.25	0.25
v/c Ratio	0.74	0.37	0.23	0.52	0.43	0.23	0.46	0.67	0.17	0.66
Control Delay	72.5	39.0	13.9	31.8	8.9	37.8	49.8	51.0	45.0	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.5	39.0	13.9	31.8	8.9	37.8	49.8	51.0	45.0	17.4
LOS	E	D	B	C	A	D	D	D	D	B
Approach Delay		49.0		25.6			47.4		31.8	
Approach LOS		D		C			D		C	

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 36.9

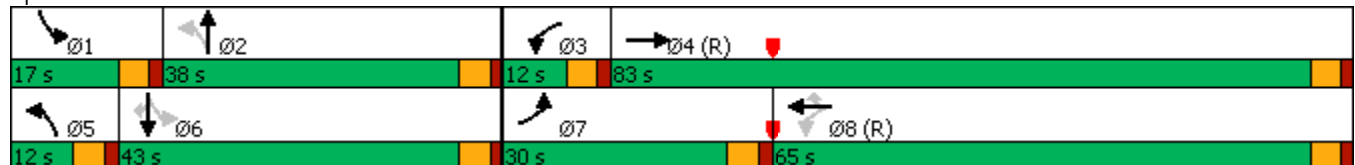
Intersection LOS: D

Intersection Capacity Utilization 82.4%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 5: Harvest Road & E. Jewell Avenue



Timings 6: S. Gun Club Road & Commercial Access

2040 Background
AM Peak

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	25	50	2470	50	80	1960
Future Volume (vph)	25	50	2470	50	80	1960
Turn Type	Prot	Free	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		Free		2	6	
Detector Phase	8		2	2	1	6
Switch Phase						
Minimum Initial (s)	30.0		5.0	5.0	5.0	5.0
Minimum Split (s)	35.0		23.0	23.0	10.0	23.0
Total Split (s)	35.0		97.0	97.0	18.0	115.0
Total Split (%)	23.3%		64.7%	64.7%	12.0%	76.7%
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.5		1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0		3.0	3.0	3.0	3.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effect Green (s)	32.0	150.0	112.7	112.7	126.0	127.2
Actuated g/C Ratio	0.21	1.00	0.75	0.75	0.84	0.85
v/c Ratio	0.07	0.03	0.68	0.04	0.49	0.48
Control Delay	55.5	0.0	6.9	2.0	55.2	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.5	0.0	6.9	2.0	55.2	1.2
LOS	E	A	A	A	E	A
Approach Delay	18.3		6.8			3.3
Approach LOS	B		A			A

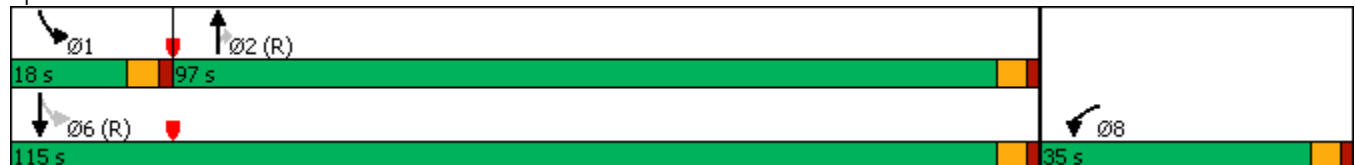
Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
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: 0.68
Intersection Signal Delay: 5.5
Intersection Capacity Utilization 87.2%
Analysis Period (min) 15

Intersection LOS: A

ICU Level of Service E

Splits and Phases: 6: S. Gun Club Road & Commercial Access











HCM 6th TWSC
7: S. Flat Rock Trail & East-West Internal Road

2040 Background
AM Peak

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↵	↵		↵	↵	
Traffic Vol, veh/h	8	3	1	0	2	0	5	53	0	0	40	3
Future Vol, veh/h	8	3	1	0	2	0	5	53	0	0	40	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	4	1	0	3	0	6	66	0	0	50	4
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	132	130	52	133	132	66	54	0	0	66	0	0
Stage 1	52	52	-	78	78	-	-	-	-	-	-	-
Stage 2	80	78	-	55	54	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	840	761	1016	839	759	998	1551	-	-	1536	-	-
Stage 1	961	852	-	931	830	-	-	-	-	-	-	-
Stage 2	929	830	-	957	850	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	836	758	1016	832	756	998	1551	-	-	1536	-	-
Mov Cap-2 Maneuver	836	758	-	832	756	-	-	-	-	-	-	-
Stage 1	957	852	-	927	827	-	-	-	-	-	-	-
Stage 2	923	827	-	952	850	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	9.4		9.8			0.6			0			
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1551	-	-	827	756	1536	-	-				
HCM Lane V/C Ratio	0.004	-	-	0.018	0.003	-	-	-				
HCM Control Delay (s)	7.3	-	-	9.4	9.8	0	-	-				
HCM Lane LOS	A	-	-	A	A	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-				

HCM 6th TWSC
8: Harvest Road & East-West Internal Road

2040 Background
AM Peak

Intersection												
Int Delay, s/veh	1.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	2	0	20	2	50	0	358	10	20	242	0
Future Vol, veh/h	0	2	0	20	2	50	0	358	10	20	242	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	2	0	23	2	57	0	407	11	23	275	0
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	763	739	275	735	734	413	275	0	0	418	0	0
Stage 1	321	321	-	413	413	-	-	-	-	-	-	-
Stage 2	442	418	-	322	321	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	321	345	764	335	347	639	1288	-	-	1141	-	-
Stage 1	691	652	-	616	594	-	-	-	-	-	-	-
Stage 2	594	591	-	690	652	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	287	338	764	328	340	639	1288	-	-	1141	-	-
Mov Cap-2 Maneuver	287	338	-	328	340	-	-	-	-	-	-	-
Stage 1	691	639	-	616	594	-	-	-	-	-	-	-
Stage 2	539	591	-	674	639	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	15.7			12.9			0			0.6		
HCM LOS	C			B								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1288	-	-	-	338	328	618	1141	-	-		
HCM Lane V/C Ratio	-	-	-	-	0.007	0.069	0.096	0.02	-	-		
HCM Control Delay (s)	0	-	-	0	15.7	16.8	11.4	8.2	-	-		
HCM Lane LOS	A	-	-	A	C	C	B	A	-	-		
HCM 95th %tile Q(veh)	0	-	-	-	0	0.2	0.3	0.1	-	-		

Timings 9: S. Gun Club Road & E. Yale Avenue

2040 Background
AM Peak

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	182	220	2300	111	290	1690
Future Volume (vph)	182	220	2300	111	290	1690
Turn Type	Prot	Free	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		Free		2		
Detector Phase	8		2	2	1	6
Switch Phase						
Minimum Initial (s)	30.0		5.0	5.0	5.0	5.0
Minimum Split (s)	35.0		23.0	23.0	10.0	23.0
Total Split (s)	35.0		90.0	90.0	25.0	115.0
Total Split (%)	23.3%		60.0%	60.0%	16.7%	76.7%
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.5		1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0		3.0	3.0	3.0	3.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effect Green (s)	32.0	150.0	89.2	89.2	19.8	112.0
Actuated g/C Ratio	0.21	1.00	0.59	0.59	0.13	0.75
v/c Ratio	0.51	0.15	0.80	0.12	0.67	0.47
Control Delay	57.6	0.2	26.4	5.1	71.2	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	0.2	26.4	5.1	71.2	10.1
LOS	E	A	C	A	E	B
Approach Delay	26.2		25.5			19.0
Approach LOS	C		C			B

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

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: 0.80

Intersection Signal Delay: 22.9

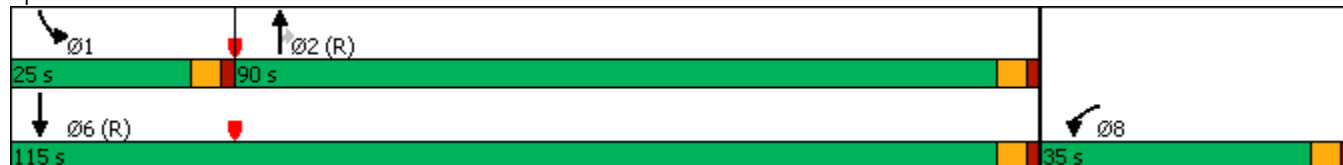
Intersection LOS: C

Intersection Capacity Utilization 87.7%

ICU Level of Service E







Analysis Period (min) 15

Splits and Phases: 9: S. Gun Club Road & E. Yale Avenue











HCM 6th TWSC
10: S. Flat Rock Trail & Warren Street

2040 Background
AM Peak

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	1	4	1	1	0	1	18	2	1	14	4
Future Vol, veh/h	11	1	4	1	1	0	1	18	2	1	14	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	1	5	1	1	0	1	23	3	1	18	5
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	50	51	21	53	52	25	23	0	0	26	0	0
Stage 1	23	23	-	27	27	-	-	-	-	-	-	-
Stage 2	27	28	-	26	25	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	950	840	1056	946	839	1051	1592	-	-	1588	-	-
Stage 1	995	876	-	990	873	-	-	-	-	-	-	-
Stage 2	990	872	-	992	874	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	948	838	1056	939	837	1051	1592	-	-	1588	-	-
Mov Cap-2 Maneuver	948	838	-	939	837	-	-	-	-	-	-	-
Stage 1	994	875	-	989	872	-	-	-	-	-	-	-
Stage 2	988	871	-	985	873	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	8.8		9.1			0.3			0.4			
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1592	-	-	965	885	1588	-	-				
HCM Lane V/C Ratio	0.001	-	-	0.021	0.003	0.001	-	-				
HCM Control Delay (s)	7.3	-	-	8.8	9.1	7.3	-	-				
HCM Lane LOS	A	-	-	A	A	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-				

HCM 6th TWSC
11: Harvest Road & Warren Street

2040 Background
AM Peak

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	4	10	0	20	10	75	0	289	5	30	229	1
Future Vol, veh/h	4	10	0	20	10	75	0	289	5	30	229	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	11	0	23	11	85	0	328	6	34	260	1

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	708	663	261	665	660	331	261	0	0	334	0	0
Stage 1	329	329	-	331	331	-	-	-	-	-	-	-
Stage 2	379	334	-	334	329	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	350	382	778	374	383	711	1303	-	-	1225	-	-
Stage 1	684	646	-	682	645	-	-	-	-	-	-	-
Stage 2	643	643	-	680	646	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	294	371	778	358	372	711	1303	-	-	1225	-	-
Mov Cap-2 Maneuver	294	371	-	358	372	-	-	-	-	-	-	-
Stage 1	684	628	-	682	645	-	-	-	-	-	-	-
Stage 2	556	643	-	649	628	-	-	-	-	-	-	-







Approach	EB		WB		NB		SB	
HCM Control Delay, s	15.7		12.4		0		0.9	
HCM LOS	C		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1303	-	-	294	371	358	642	1225	-	-
HCM Lane V/C Ratio	-	-	-	0.015	0.031	0.063	0.15	0.028	-	-
HCM Control Delay (s)	0	-	-	17.4	15	15.7	11.6	8	-	-
HCM Lane LOS	A	-	-	C	C	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0.2	0.5	0.1	-	-

Intersection				
Intersection Delay, s/veh	6.8			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	429	266	65	140
Demand Flow Rate, veh/h	437	271	66	143
Vehicles Circulating, veh/h	26	116	276	327
Vehicles Exiting, veh/h	444	226	187	60
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.5	6.3	5.0	6.4
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	437	271	66	143
Cap Entry Lane, veh/h	1101	1006	857	815
Entry HV Adj Factor	0.981	0.982	0.983	0.978
Flow Entry, veh/h	429	266	65	140
Cap Entry, veh/h	1080	988	843	797
V/C Ratio	0.397	0.269	0.077	0.176
Control Delay, s/veh	7.5	6.3	5.0	6.4
LOS	A	A	A	A
95th %tile Queue, veh	2	1	0	1

HCM 6th TWSC
13: Full Movement & E. Yale Avenue

2040 Background
AM Peak

Intersection												
Int Delay, s/veh	5.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	120	10	15	165	20	25	5	55	75	5	55
Future Vol, veh/h	15	120	10	15	165	20	25	5	55	75	5	55
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	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	130	11	16	179	22	27	5	60	82	5	60
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	201	0	0	141	0	0	423	401	136	422	395	190
Stage 1	-	-	-	-	-	-	168	168	-	222	222	-
Stage 2	-	-	-	-	-	-	255	233	-	200	173	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1371	-	-	1442	-	-	541	538	913	542	542	852
Stage 1	-	-	-	-	-	-	834	759	-	780	720	-
Stage 2	-	-	-	-	-	-	749	712	-	802	756	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1371	-	-	1442	-	-	491	526	913	494	530	852
Mov Cap-2 Maneuver	-	-	-	-	-	-	491	526	-	494	530	-
Stage 1	-	-	-	-	-	-	824	750	-	771	712	-
Stage 2	-	-	-	-	-	-	683	704	-	735	747	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.8			0.6			10.9			13		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	704	1371	-	-	1442	-	-	598				
HCM Lane V/C Ratio	0.131	0.012	-	-	0.011	-	-	0.245				
HCM Control Delay (s)	10.9	7.7	-	-	7.5	-	-	13				
HCM Lane LOS	B	A	-	-	A	-	-	B				
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	1				

Intersection			
Intersection Delay, s/veh	4.9		
Intersection LOS	A		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	239	173	66
Demand Flow Rate, veh/h	244	177	67
Vehicles Circulating, veh/h	9	12	146
Vehicles Exiting, veh/h	204	241	43
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	5.3	4.7	4.4
Approach LOS	A	A	A
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	244	177	67
Cap Entry Lane, veh/h	1120	1116	976
Entry HV Adj Factor	0.981	0.978	0.985
Flow Entry, veh/h	239	173	66
Cap Entry, veh/h	1099	1092	962
V/C Ratio	0.218	0.159	0.069
Control Delay, s/veh	5.3	4.7	4.4
LOS	A	A	A
95th %tile Queue, veh	1	1	0

Intersection			
Intersection Delay, s/veh	7.1		
Intersection LOS	A		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	234	341	292
Demand Flow Rate, veh/h	238	348	298
Vehicles Circulating, veh/h	244	117	134
Vehicles Exiting, veh/h	188	365	331
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	7.0	7.3	6.8
Approach LOS	A	A	A
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	238	348	298
Cap Entry Lane, veh/h	885	1005	988
Entry HV Adj Factor	0.982	0.981	0.980
Flow Entry, veh/h	234	341	292
Cap Entry, veh/h	869	986	968
V/C Ratio	0.269	0.346	0.302
Control Delay, s/veh	7.0	7.3	6.8
LOS	A	A	A
95th %tile Queue, veh	1	2	1

Intersection

Int Delay, s/veh 0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗ ↘ ↘	↗ ↘ ↘			↗ ↘ ↘
Traffic Vol, veh/h	0	25	2386	50	0	1872
Future Vol, veh/h	0	25	2386	50	0	1872
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	26	2512	53	0	1971









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

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	0 -
HCM Lane LOS	-	-	A -
HCM 95th %tile Q(veh)	-	-	- -

HCM 6th TWSC
19: S. Gun Club Road & Three-Quarter

2040 Background
AM Peak






Intersection						
Int Delay, s/veh	0.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		 	 		 	 
Traffic Vol, veh/h	0	25	2411	50	30	1842
Future Vol, veh/h	0	25	2411	50	30	1842
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	-	0	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	26	2538	53	32	1939
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	-	0	0	2591	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	5.34	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	3.12	-
Pot Cap-1 Maneuver	0	0	-	-	62	-
Stage 1	0	0	-	-	-	-
Stage 2	0	0	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	-	-	-	62	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	0	0		1.8		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	-	62	-	
HCM Lane V/C Ratio	-	-	-	0.509	-	
HCM Control Delay (s)	-	-	0	112.3	-	
HCM Lane LOS	-	-	A	F	-	
HCM 95th %tile Q(veh)	-	-	-	2	-	

HCM 6th TWSC
20: Harvest Road & Local Access

2040 Background
AM Peak

Intersection

Int Delay, s/veh 1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	40	254	30	20	229
Future Vol, veh/h	30	40	254	30	20	229
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	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	43	276	33	22	249

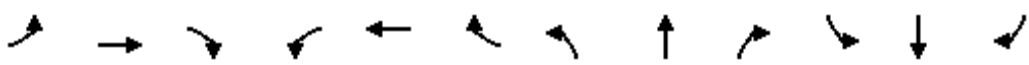
Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	586	293	0
Stage 1	293	-	-
Stage 2	293	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	473	746	-
Stage 1	757	-	-
Stage 2	757	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	464	746	-
Mov Cap-2 Maneuver	464	-	-
Stage 1	743	-	-
Stage 2	757	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.5	0	0.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	-	464	746
HCM Lane V/C Ratio	-	-	0.07	0.058
HCM Control Delay (s)	-	-	13.3	10.1
HCM Lane LOS	-	-	B	B
HCM 95th %tile Q(veh)	-	-	0.2	0.2

Timings 1: S. Gun Club Road & E. Jewell Avenue

2040 Background
PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	385	1232	624	645	1051	230	655	1196	750	240	1494	490
Future Volume (vph)	385	1232	624	645	1051	230	655	1196	750	240	1494	490
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	23.0		10.0	23.0		10.0	23.0		10.0	23.0	
Total Split (s)	25.0	43.0		28.0	46.0		30.0	60.0		19.0	49.0	
Total Split (%)	16.7%	28.7%		18.7%	30.7%		20.0%	40.0%		12.7%	32.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effect Green (s)	22.3	40.9	150.0	26.0	44.6	150.0	28.1	58.6	150.0	16.5	47.0	150.0
Actuated g/C Ratio	0.15	0.27	1.00	0.17	0.30	1.00	0.19	0.39	1.00	0.11	0.31	1.00
v/c Ratio	0.75	0.89	0.39	1.08	0.70	0.15	1.02	0.60	0.47	0.63	0.94	0.31
Control Delay	71.4	61.3	0.7	122.0	33.2	0.2	105.0	49.8	0.7	71.9	62.0	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.4	61.3	0.7	122.0	33.2	0.2	105.0	49.8	0.7	71.9	62.0	0.5
LOS	E	E	A	F	C	A	F	D	A	E	E	A
Approach Delay		46.2			59.0			49.6			49.5	
Approach LOS		D			E			D			D	

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

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: 1.08

Intersection Signal Delay: 50.7

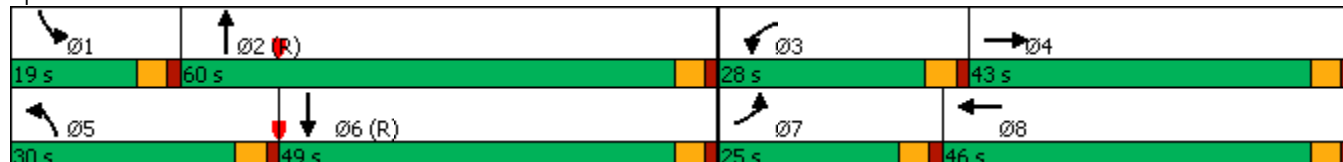
Intersection LOS: D

Intersection Capacity Utilization 103.1%

ICU Level of Service G

Analysis Period (min) 15























Splits and Phases: 1: S. Gun Club Road & E. Jewell Avenue



Timings

2: S. Old Tom Morris Road & E. Jewell Avenue

2040 Background
PM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		  			  				
Traffic Volume (vph)	250	1842	130	145	1616	140	25	50	25
Future Volume (vph)	250	1842	130	145	1616	140	25	50	25
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	10.0	23.0
Total Split (s)	15.0	92.0	92.0	16.0	93.0	17.0	30.0	12.0	25.0
Total Split (%)	10.0%	61.3%	61.3%	10.7%	62.0%	11.3%	20.0%	8.0%	16.7%
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)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	111.0	96.4	96.4	103.2	90.0	31.4	21.8	23.3	14.5
Actuated g/C Ratio	0.74	0.64	0.64	0.69	0.60	0.21	0.15	0.16	0.10
v/c Ratio	0.82	0.59	0.13	0.65	0.58	0.70	0.50	0.30	0.74
Control Delay	40.2	40.3	16.3	48.0	12.7	67.6	23.4	50.7	38.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.2	40.3	16.3	48.0	12.7	67.6	23.4	50.7	38.0
LOS	D	D	B	D	B	E	C	D	D
Approach Delay		38.8			15.5		43.0		40.5
Approach LOS		D			B		D		D

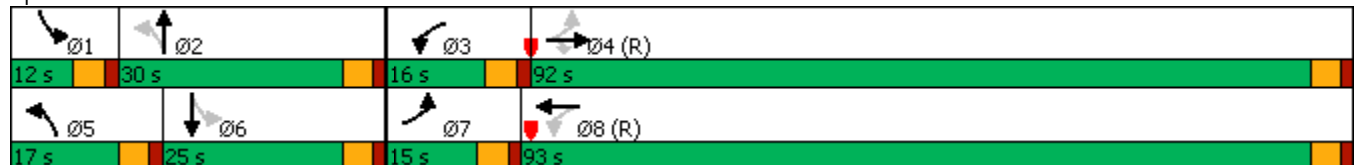
Intersection Summary

Cycle Length: 150
 Actuated Cycle Length: 150
 Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 30.0
 Intersection Capacity Utilization 79.4%
 Analysis Period (min) 15

Intersection LOS: C

ICU Level of Service D

Splits and Phases: 2: S. Old Tom Morris Road & E. Jewell Avenue



HCM 6th TWSC























3: Full Movement Access & E. Jewell Avenue

2040 Background
PM Peak

Intersection												
Int Delay, s/veh	7.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵ ↑↑↑			↵ ↑↑↑			↕			↕		
Traffic Vol, veh/h	20	1997	20	5	1791	5	10	1	5	5	1	10
Future Vol, veh/h	20	1997	20	5	1791	5	10	1	5	5	1	10
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	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	2102	21	5	1885	5	11	1	5	5	1	11
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1890	0	0	2123	0	0	2920	4055	1062	2781	4063	945
Stage 1	-	-	-	-	-	-	2155	2155	-	1898	1898	-
Stage 2	-	-	-	-	-	-	765	1900	-	883	2165	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	142	-	-	108	-	-	16	3	189	20	3	226
Stage 1	-	-	-	-	-	-	30	86	-	46	116	-
Stage 2	-	-	-	-	-	-	329	116	-	278	85	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	142	-	-	108	-	-	~ 8	2	189	10	2	226
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 8	2	-	10	2	-
Stage 1	-	-	-	-	-	-	26	73	-	39	111	-
Stage 2	-	-	-	-	-	-	296	111	-	227	72	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			0.1			\$ 1213.7			\$ 622		
HCM LOS							F			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	9	142	-	-	108	-	-	15				
HCM Lane V/C Ratio	1.871	0.148	-	-	0.049	-	-	1.123				
HCM Control Delay (s)	\$ 1213.7	34.7	-	-	40	-	-	\$ 622				
HCM Lane LOS	F	D	-	-	E	-	-	F				
HCM 95th %tile Q(veh)	3.1	0.5	-	-	0.2	-	-	2.6				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			

Timings 4: S. Flat Rock Trail & E. Jewell Avenue

2040 Background
PM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		  			  				
Traffic Volume (vph)	260	1682	66	12	1565	36	5	5	5
Future Volume (vph)	260	1682	66	12	1565	36	5	5	5
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	10.0	25.0
Total Split (s)	25.0	88.0	88.0	12.0	75.0	20.0	38.0	12.0	30.0
Total Split (%)	16.7%	58.7%	58.7%	8.0%	50.0%	13.3%	25.3%	8.0%	20.0%
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)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	110.6	106.1	106.1	90.7	82.9	33.4	31.1	28.4	22.0
Actuated g/C Ratio	0.74	0.71	0.71	0.60	0.55	0.22	0.21	0.19	0.15
v/c Ratio	0.74	0.49	0.06	0.06	0.59	0.20	0.04	0.02	0.52
Control Delay	54.4	11.8	2.2	6.0	14.0	46.3	29.4	42.8	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.4	11.8	2.2	6.0	14.0	46.3	29.4	42.8	12.4
LOS	D	B	A	A	B	D	C	D	B
Approach Delay		17.0			13.9		41.7		13.1
Approach LOS		B			B		D		B

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 15.8

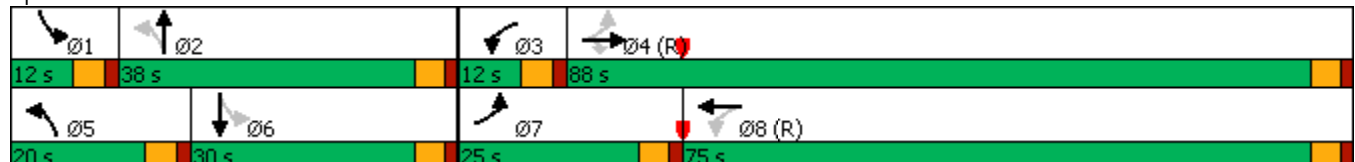
Intersection LOS: B

Intersection Capacity Utilization 79.0%

ICU Level of Service D




























Analysis Period (min) 15

Splits and Phases: 4: S. Flat Rock Trail & E. Jewell Avenue



Timings 5: Harvest Road & E. Jewell Avenue

2040 Background
PM Peak

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	 	  		  				 	 	
Traffic Volume (vph)	368	1237	104	1090	250	70	251	350	287	413
Future Volume (vph)	368	1237	104	1090	250	70	251	350	287	413
Turn Type	Prot	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2	1	6	
Permitted Phases			8		8	2		6		6
Detector Phase	7	4	3	8	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	30.0	5.0	30.0	30.0
Minimum Split (s)	10.0	23.0	10.0	23.0	23.0	10.0	35.0	10.0	35.0	35.0
Total Split (s)	30.0	77.0	12.0	59.0	59.0	12.0	35.0	26.0	49.0	49.0
Total Split (%)	20.0%	51.3%	8.0%	39.3%	39.3%	8.0%	23.3%	17.3%	32.7%	32.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	C-Max	None	None	None	None	None
Act Effect Green (s)	23.6	74.0	68.4	59.4	59.4	40.9	32.0	58.0	46.1	46.1
Actuated g/C Ratio	0.16	0.49	0.46	0.40	0.40	0.27	0.21	0.39	0.31	0.31
v/c Ratio	0.72	0.56	0.52	0.57	0.34	0.22	0.47	0.88	0.28	0.60
Control Delay	78.1	41.3	26.2	37.1	4.6	32.4	49.9	60.0	40.2	13.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.1	41.3	26.2	37.1	4.6	32.4	49.9	60.0	40.2	13.8
LOS	E	D	C	D	A	C	D	E	D	B
Approach Delay		49.3		30.7			46.8		36.4	
Approach LOS		D		C			D		D	

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 40.3

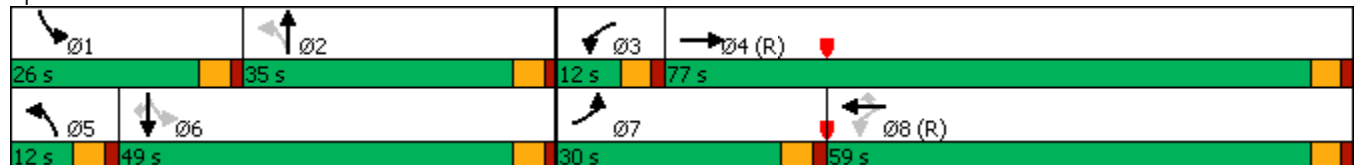
Intersection LOS: D

Intersection Capacity Utilization 89.4%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 5: Harvest Road & E. Jewell Avenue



Timings 6: S. Gun Club Road & Commercial Access

2040 Background
PM Peak

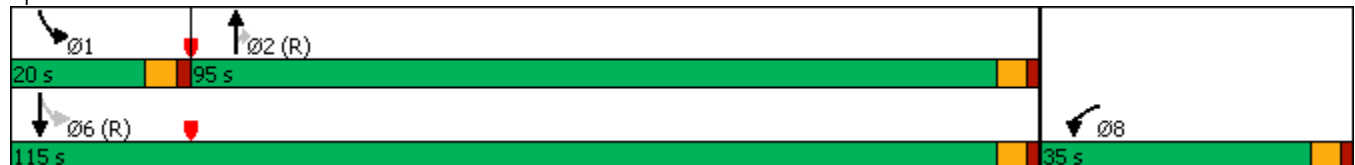
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	90	105	2501	50	130	2638
Future Volume (vph)	90	105	2501	50	130	2638
Turn Type	Prot	Free	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		Free		2	6	
Detector Phase	8		2	2	1	6
Switch Phase						
Minimum Initial (s)	30.0		5.0	5.0	5.0	5.0
Minimum Split (s)	35.0		23.0	23.0	10.0	23.0
Total Split (s)	35.0		95.0	95.0	20.0	115.0
Total Split (%)	23.3%		63.3%	63.3%	13.3%	76.7%
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.5		1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0		3.0	3.0	3.0	3.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effect Green (s)	32.0	150.0	95.2	95.2	112.0	112.0
Actuated g/C Ratio	0.21	1.00	0.63	0.63	0.75	0.75
v/c Ratio	0.25	0.07	0.82	0.05	0.65	0.73
Control Delay	58.1	0.1	9.8	0.8	62.2	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	58.1	0.1	9.8	0.8	62.2	4.4
LOS	E	A	A	A	E	A
Approach Delay	26.8		9.6			7.1
Approach LOS	C		A			A

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
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: 0.82
Intersection Signal Delay: 9.0
Intersection Capacity Utilization 90.5%
Analysis Period (min) 15

Intersection LOS: A
ICU Level of Service E

Splits and Phases: 6: S. Gun Club Road & Commercial Access











HCM 6th TWSC
7: S. Flat Rock Trail & East-West Internal Road

2040 Background
PM Peak

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	5	2	1	0	3	0	2	35	0	0	72	9
Future Vol, veh/h	5	2	1	0	3	0	2	35	0	0	72	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	3	1	0	4	0	3	44	0	0	90	11
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	148	146	96	148	151	44	101	0	0	44	0	0
Stage 1	96	96	-	50	50	-	-	-	-	-	-	-
Stage 2	52	50	-	98	101	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	820	745	960	820	741	1026	1491	-	-	1564	-	-
Stage 1	911	815	-	963	853	-	-	-	-	-	-	-
Stage 2	961	853	-	908	811	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	816	744	960	816	740	1026	1491	-	-	1564	-	-
Mov Cap-2 Maneuver	816	744	-	816	740	-	-	-	-	-	-	-
Stage 1	909	815	-	961	851	-	-	-	-	-	-	-
Stage 2	955	851	-	904	811	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	9.5		9.9			0.4			0			
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1491	-	-	812	740	1564	-	-				
HCM Lane V/C Ratio	0.002	-	-	0.012	0.005	-	-	-				
HCM Control Delay (s)	7.4	-	-	9.5	9.9	0	-	-				
HCM Lane LOS	A	-	-	A	A	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-				

HCM 6th TWSC
8: Harvest Road & East-West Internal Road

2040 Background
PM Peak

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	2	0	10	2	35	0	364	20	50	430	0
Future Vol, veh/h	0	2	0	10	2	35	0	364	20	50	430	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	2	0	11	2	40	0	414	23	57	489	0













Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1050	1040	489	1030	1029	426	489	0	0	437	0	0
Stage 1	603	603	-	426	426	-	-	-	-	-	-	-
Stage 2	447	437	-	604	603	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	205	230	579	212	234	628	1074	-	-	1123	-	-
Stage 1	486	488	-	606	586	-	-	-	-	-	-	-
Stage 2	591	579	-	485	488	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	183	218	579	202	222	628	1074	-	-	1123	-	-
Mov Cap-2 Maneuver	183	218	-	202	222	-	-	-	-	-	-	-
Stage 1	486	463	-	606	586	-	-	-	-	-	-	-
Stage 2	551	579	-	458	463	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	21.7			14.4			0			0.9		
HCM LOS	C			B								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1074	-	-	-	218	202	572	1123	-	-
HCM Lane V/C Ratio	-	-	-	-	0.01	0.056	0.074	0.051	-	-
HCM Control Delay (s)	0	-	-	0	21.7	23.9	11.8	8.4	-	-
HCM Lane LOS	A	-	-	A	C	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0	0.2	0.2	0.2	-	-

Timings 9: S. Gun Club Road & E. Yale Avenue

2040 Background
PM Peak

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			  		 	  
Traffic Volume (vph)	299	382	2170	196	418	2300
Future Volume (vph)	299	382	2170	196	418	2300
Turn Type	Prot	Free	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		Free		2		
Detector Phase	8		2	2	1	6
Switch Phase						
Minimum Initial (s)	30.0		5.0	5.0	5.0	5.0
Minimum Split (s)	35.0		23.0	23.0	10.0	23.0
Total Split (s)	45.0		75.0	75.0	30.0	105.0
Total Split (%)	30.0%		50.0%	50.0%	20.0%	70.0%
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.5		1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0		3.0	3.0	3.0	3.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effect Green (s)	35.5	150.0	80.1	80.1	25.3	108.5
Actuated g/C Ratio	0.24	1.00	0.53	0.53	0.17	0.72
v/c Ratio	0.75	0.25	0.84	0.23	0.76	0.66
Control Delay	64.8	0.4	34.0	8.7	60.2	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.8	0.4	34.0	8.7	60.2	18.7
LOS	E	A	C	A	E	B
Approach Delay	28.7		32.0			25.1
Approach LOS	C		C			C

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
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: 0.84
Intersection Signal Delay: 28.3
Intersection Capacity Utilization 88.9%
Analysis Period (min) 15

Intersection LOS: C







ICU Level of Service E

Splits and Phases: 9: S. Gun Club Road & E. Yale Avenue











HCM 6th TWSC
10: S. Flat Rock Trail & Warren Street

2040 Background
PM Peak

Intersection												
Int Delay, s/veh	2.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	1	3	2	2	1	5	18	1	0	20	13
Future Vol, veh/h	8	1	3	2	2	1	5	18	1	0	20	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	1	4	3	3	1	6	23	1	0	25	16
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	71	69	33	72	77	24	41	0	0	24	0	0
Stage 1	33	33	-	36	36	-	-	-	-	-	-	-
Stage 2	38	36	-	36	41	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	920	822	1041	919	813	1052	1568	-	-	1591	-	-
Stage 1	983	868	-	980	865	-	-	-	-	-	-	-
Stage 2	977	865	-	980	861	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	914	819	1041	912	810	1052	1568	-	-	1591	-	-
Mov Cap-2 Maneuver	914	819	-	912	810	-	-	-	-	-	-	-
Stage 1	979	868	-	976	862	-	-	-	-	-	-	-
Stage 2	969	862	-	975	861	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	8.9		9.1			1.5			0			
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1568	-	-	933	891	1591	-	-				
HCM Lane V/C Ratio	0.004	-	-	0.016	0.007	-	-	-				
HCM Control Delay (s)	7.3	-	-	8.9	9.1	0	-	-				
HCM Lane LOS	A	-	-	A	A	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-				

HCM 6th TWSC
11: Harvest Road & Warren Street

2040 Background
PM Peak

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	5	0	10	5	50	0	329	10	70	365	5
Future Vol, veh/h	3	5	0	10	5	50	0	329	10	70	365	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	6	0	11	6	57	0	374	11	80	415	6

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	989	963	418	961	961	380	421	0	0	385	0	0
Stage 1	578	578	-	380	380	-	-	-	-	-	-	-
Stage 2	411	385	-	581	581	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	226	256	635	236	256	667	1138	-	-	1173	-	-
Stage 1	501	501	-	642	614	-	-	-	-	-	-	-
Stage 2	618	611	-	499	500	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	193	239	635	220	239	667	1138	-	-	1173	-	-
Mov Cap-2 Maneuver	193	239	-	220	239	-	-	-	-	-	-	-
Stage 1	501	467	-	642	614	-	-	-	-	-	-	-
Stage 2	560	611	-	459	466	-	-	-	-	-	-	-







Approach	EB		WB		NB		SB	
HCM Control Delay, s	21.8		13.6		0		1.3	
HCM LOS	C		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1138	-	-	193	239	220	574	1173	-	-
HCM Lane V/C Ratio	-	-	-	0.018	0.024	0.052	0.109	0.068	-	-
HCM Control Delay (s)	0	-	-	24	20.4	22.3	12	8.3	-	-
HCM Lane LOS	A	-	-	C	C	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0.2	0.4	0.2	-	-

Intersection				
Intersection Delay, s/veh	12.8			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	673	375	353	119
Demand Flow Rate, veh/h	686	383	360	121
Vehicles Circulating, veh/h	55	465	487	683
Vehicles Exiting, veh/h	749	382	254	165
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	12.6	13.8	13.4	9.2
Approach LOS	B	B	B	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	686	383	360	121
Cap Entry Lane, veh/h	1069	710	694	571
Entry HV Adj Factor	0.981	0.980	0.980	0.983
Flow Entry, veh/h	673	375	353	119
Cap Entry, veh/h	1049	696	681	561
V/C Ratio	0.641	0.540	0.518	0.212
Control Delay, s/veh	12.6	13.8	13.4	9.2
LOS	B	B	B	A
95th %tile Queue, veh	5	3	3	1

HCM 6th TWSC
13: Full Movement & E. Yale Avenue

2040 Background
PM Peak

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	55	255	25	50	210	60	15	5	30	35	5	30
Future Vol, veh/h	55	255	25	50	210	60	15	5	30	35	5	30
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	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	60	277	27	54	228	65	16	5	33	38	5	33




Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	293	0	0	304	0	0	799	812	291	799	793	261
Stage 1	-	-	-	-	-	-	411	411	-	369	369	-
Stage 2	-	-	-	-	-	-	388	401	-	430	424	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1269	-	-	1257	-	-	304	313	748	304	321	778
Stage 1	-	-	-	-	-	-	618	595	-	651	621	-
Stage 2	-	-	-	-	-	-	636	601	-	603	587	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1269	-	-	1257	-	-	268	285	748	267	293	778
Mov Cap-2 Maneuver	-	-	-	-	-	-	268	285	-	267	293	-
Stage 1	-	-	-	-	-	-	589	567	-	620	594	-
Stage 2	-	-	-	-	-	-	578	575	-	544	559	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	1.2	14.3	17
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	440	1269	-	-	1257	-	-	375
HCM Lane V/C Ratio	0.124	0.047	-	-	0.043	-	-	0.203
HCM Control Delay (s)	14.3	8	-	-	8	-	-	17
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0.1	-	-	0.7

Intersection			
Intersection Delay, s/veh	6.2		
Intersection LOS	A		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	348	313	48
Demand Flow Rate, veh/h	355	319	49
Vehicles Circulating, veh/h	8	46	314
Vehicles Exiting, veh/h	355	317	51
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	6.4	6.3	5.0
Approach LOS	A	A	A
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	355	319	49
Cap Entry Lane, veh/h	1121	1079	825
Entry HV Adj Factor	0.980	0.981	0.980
Flow Entry, veh/h	348	313	48
Cap Entry, veh/h	1099	1058	809
V/C Ratio	0.317	0.296	0.059
Control Delay, s/veh	6.4	6.3	5.0
LOS	A	A	A
95th %tile Queue, veh	1	1	0

Intersection			
Intersection Delay, s/veh	8.6		
Intersection LOS	A		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	318	403	397
Demand Flow Rate, veh/h	324	411	405
Vehicles Circulating, veh/h	249	151	173
Vehicles Exiting, veh/h	329	422	389
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	8.4	8.6	8.8
Approach LOS	A	A	A
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	324	411	405
Cap Entry Lane, veh/h	881	972	950
Entry HV Adj Factor	0.980	0.980	0.980
Flow Entry, veh/h	318	403	397
Cap Entry, veh/h	864	952	932
V/C Ratio	0.368	0.423	0.426
Control Delay, s/veh	8.4	8.6	8.8
LOS	A	A	A
95th %tile Queue, veh	2	2	2

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	75	2391	75	0	2599
Future Vol, veh/h	0	75	2391	75	0	2599
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	79	2517	79	0	2736

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

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	0	-
HCM Lane LOS	-	A	-
HCM 95th %tile Q(veh)	-	-	-






HCM 6th TWSC
19: S. Gun Club Road & Three-Quarter

2040 Background
PM Peak

Intersection						
Int Delay, s/veh	9.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↑↑↑↘		↘	↑↑↑↑
Traffic Vol, veh/h	0	75	2291	75	110	2489
Future Vol, veh/h	0	75	2291	75	110	2489
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	-	0	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	79	2412	79	116	2620
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	-	0	0	2491	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	5.34	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	3.12	-
Pot Cap-1 Maneuver	0	0	-	-	~ 70	-
Stage 1	0	0	-	-	-	-
Stage 2	0	0	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	-	-	-	~ 70	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	0		0		19	
HCM LOS	A					
Minor Lane/Major Mvmt	NBT		NBRWBLn1		SBL	SBT
Capacity (veh/h)	-		-		~ 70	-
HCM Lane V/C Ratio	-		-		1.654	-
HCM Control Delay (s)	-		-		0\$ 448.4	-
HCM Lane LOS	-		-		A F	-
HCM 95th %tile Q(veh)	-		-		10	-
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

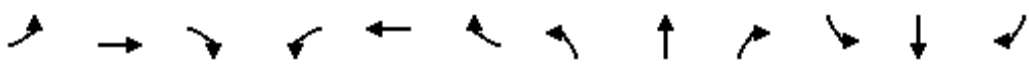












HCM 6th TWSC
20: Harvest Road & Local Access

2040 Background
PM Peak

Intersection						
Int Delay, s/veh	1.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	30	309	30	40	335
Future Vol, veh/h	15	30	309	30	40	335
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	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	33	336	33	43	364
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	803	353	0	0	369	0
Stage 1	353	-	-	-	-	-
Stage 2	450	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	353	691	-	-	1190	-
Stage 1	711	-	-	-	-	-
Stage 2	642	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	340	691	-	-	1190	-
Mov Cap-2 Maneuver	340	-	-	-	-	-
Stage 1	685	-	-	-	-	-
Stage 2	642	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	12.4	0		0.9		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	340	691	1190	-
HCM Lane V/C Ratio	-	-	0.048	0.047	0.037	-
HCM Control Delay (s)	-	-	16.1	10.5	8.1	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0.1	-

Timings 1: S. Gun Club Road & E. Jewell Avenue

2040 Total
AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	350	1050	400	640	1400	275	600	1500	450	200	1000	375
Future Volume (vph)	350	1050	400	640	1400	275	600	1500	450	200	1000	375
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	23.0		10.0	23.0		10.0	23.0		10.0	23.0	
Total Split (s)	24.0	45.0		32.0	53.0		32.0	58.0		15.0	41.0	
Total Split (%)	16.0%	30.0%		21.3%	35.3%		21.3%	38.7%		10.0%	27.3%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effect Green (s)	21.4	41.8	150.0	30.0	50.4	150.0	30.0	57.1	150.0	13.1	40.3	150.0
Actuated g/C Ratio	0.14	0.28	1.00	0.20	0.34	1.00	0.20	0.38	1.00	0.09	0.27	1.00
v/c Ratio	0.75	0.77	0.26	0.97	0.85	0.18	0.91	0.79	0.30	0.70	0.75	0.25
Control Delay	71.8	53.9	0.4	74.7	44.0	0.2	79.1	68.1	0.3	79.5	54.6	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.8	53.9	0.4	74.7	44.0	0.2	79.1	68.1	0.3	79.5	54.6	0.4
LOS	E	D	A	E	D	A	E	E	A	E	D	A
Approach Delay		45.5			47.3			58.6			44.7	
Approach LOS		D			D			E			D	

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

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: 0.97

Intersection Signal Delay: 49.9

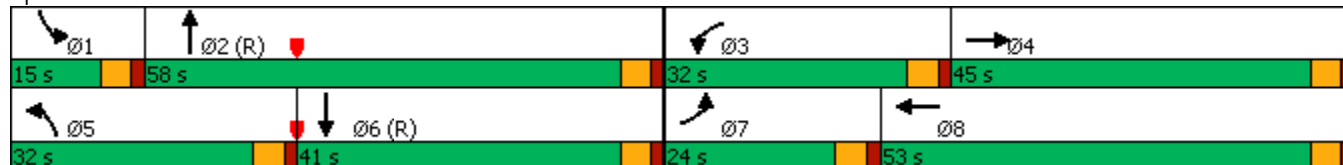
Intersection LOS: D

Intersection Capacity Utilization 88.3%

ICU Level of Service E























Analysis Period (min) 15

Splits and Phases: 1: S. Gun Club Road & E. Jewell Avenue



Timings 2: S. Old Tom Morris Road & E. Jewell Avenue

2040 Total
AM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		  			  				
Traffic Volume (vph)	225	1410	65	90	1925	75	25	75	25
Future Volume (vph)	225	1410	65	90	1925	75	25	75	25
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	10.0	23.0
Total Split (s)	22.0	93.0	93.0	12.0	83.0	15.0	33.0	12.0	30.0
Total Split (%)	14.7%	62.0%	62.0%	8.0%	55.3%	10.0%	22.0%	8.0%	20.0%
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)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	105.1	93.2	93.2	92.2	83.3	38.3	26.9	33.5	24.5
Actuated g/C Ratio	0.70	0.62	0.62	0.61	0.56	0.26	0.18	0.22	0.16
v/c Ratio	0.88	0.47	0.07	0.38	0.73	0.43	0.23	0.25	0.91
Control Delay	53.2	42.4	16.2	15.9	24.9	46.3	22.1	44.0	59.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.2	42.4	16.2	15.9	24.9	46.3	22.1	44.0	59.1
LOS	D	D	B	B	C	D	C	D	E
Approach Delay		42.8			24.5		34.2		56.4
Approach LOS		D			C		C		E

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 35.2










Intersection LOS: D

Intersection Capacity Utilization 89.1%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 2: S. Old Tom Morris Road & E. Jewell Avenue

								
Ø1	Ø2		Ø3	Ø4(R)		Ø5	Ø6	Ø7
12 s	33 s		12 s	93 s		15 s	30 s	22 s
								Ø8(R)
								83 s

HCM 6th TWSC























3: Full Movement Access & E. Jewell Avenue

2040 Total
AM Peak

Intersection												
Int Delay, s/veh	7.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵ ↑↑↑			↵ ↑↑↑			↕			↕		
Traffic Vol, veh/h	5	1525	5	2	2000	2	20	1	10	10	1	20
Future Vol, veh/h	5	1525	5	2	2000	2	20	1	10	10	1	20
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	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1605	5	2	2105	2	21	1	11	11	1	21
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	2107	0	0	1610	0	0	2465	3729	805	2763	3730	1054
Stage 1	-	-	-	-	-	-	1618	1618	-	2110	2110	-
Stage 2	-	-	-	-	-	-	847	2111	-	653	1620	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	110	-	-	196	-	-	32	4	279	21	4	191
Stage 1	-	-	-	-	-	-	73	161	-	32	91	-
Stage 2	-	-	-	-	-	-	293	91	-	385	160	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	110	-	-	196	-	-	22	4	279	15	4	191
Mov Cap-2 Maneuver	-	-	-	-	-	-	22	4	-	15	4	-
Stage 1	-	-	-	-	-	-	70	154	-	31	90	-
Stage 2	-	-	-	-	-	-	255	90	-	351	153	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0			\$ 486.3			\$ 387.9		
HCM LOS							F			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	26	110	-	-	196	-	-	30				
HCM Lane V/C Ratio	1.255	0.048	-	-	0.011	-	-	1.088				
HCM Control Delay (s)	\$ 486.3	39.4	-	-	23.6	-	-	\$ 387.9				
HCM Lane LOS	F	E	-	-	C	-	-	F				
HCM 95th %tile Q(veh)	3.9	0.1	-	-	0	-	-	3.7				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			

Timings 4: S. Flat Rock Trail & E. Jewell Avenue

2040 Total
AM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		  			  				
Traffic Volume (vph)	85	1375	80	10	1580	235	60	10	70
Future Volume (vph)	85	1375	80	10	1580	235	60	10	70
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	10.0	25.0
Total Split (s)	12.0	77.0	77.0	12.0	77.0	25.0	49.0	12.0	36.0
Total Split (%)	8.0%	51.3%	51.3%	8.0%	51.3%	16.7%	32.7%	8.0%	24.0%
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)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	92.5	88.5	88.5	88.2	80.3	51.0	46.3	34.5	26.4
Actuated g/C Ratio	0.62	0.59	0.59	0.59	0.54	0.34	0.31	0.23	0.18
v/c Ratio	0.47	0.48	0.09	0.05	0.61	0.76	0.16	0.03	0.76
Control Delay	47.9	5.7	0.2	10.3	15.8	52.6	32.7	31.4	54.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.9	5.7	0.2	10.3	15.8	52.6	32.7	31.4	54.3
LOS	D	A	A	B	B	D	C	C	D
Approach Delay		7.8			15.8		47.3		53.4
Approach LOS		A			B		D		D

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 17.9

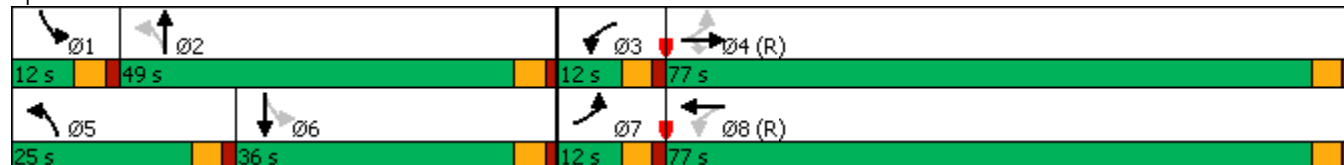
Intersection LOS: B

Intersection Capacity Utilization 78.4%

ICU Level of Service D




























Analysis Period (min) 15

Splits and Phases: 4: S. Flat Rock Trail & E. Jewell Avenue



Timings 5: Harvest Road & E. Jewell Avenue

2040 Total
AM Peak

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	 	  		  			 		 	
Traffic Volume (vph)	425	935	80	1100	350	90	280	200	150	400
Future Volume (vph)	425	935	80	1100	350	90	280	200	150	400
Turn Type	Prot	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2	1	6	
Permitted Phases			8		8	2		6		6
Detector Phase	7	4	3	8	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	30.0	5.0	30.0	30.0
Minimum Split (s)	10.0	23.0	10.0	23.0	23.0	10.0	35.0	10.0	35.0	35.0
Total Split (s)	30.0	83.0	12.0	65.0	65.0	12.0	38.0	17.0	43.0	43.0
Total Split (%)	20.0%	55.3%	8.0%	43.3%	43.3%	8.0%	25.3%	11.3%	28.7%	28.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	C-Max	None	None	None	None	None
Act Effect Green (s)	26.2	81.8	76.0	65.8	65.8	41.0	32.0	49.0	37.0	37.0
Actuated g/C Ratio	0.17	0.55	0.51	0.44	0.44	0.27	0.21	0.33	0.25	0.25
v/c Ratio	0.75	0.38	0.25	0.52	0.44	0.26	0.52	0.72	0.18	0.67
Control Delay	69.2	39.5	14.2	32.0	10.6	38.5	51.3	54.3	45.2	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.2	39.5	14.2	32.0	10.6	38.5	51.3	54.3	45.2	18.2
LOS	E	D	B	C	B	D	D	D	D	B
Approach Delay		48.4		26.2			48.8		33.3	
Approach LOS		D		C			D		C	

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 37.5

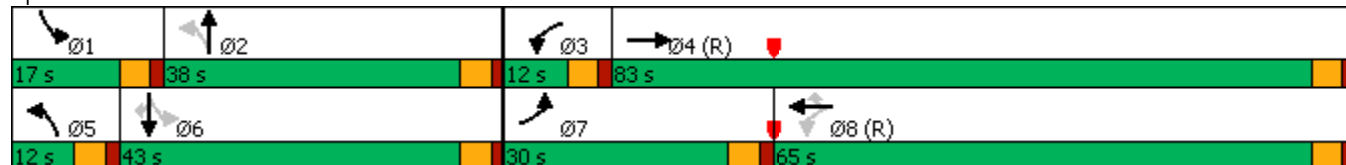
Intersection LOS: D

Intersection Capacity Utilization 82.8%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 5: Harvest Road & E. Jewell Avenue



Timings 6: S. Gun Club Road & Commercial Access

2040 Total
AM Peak

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	25	50	2500	50	80	1970
Future Volume (vph)	25	50	2500	50	80	1970
Turn Type	Prot	Free	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		Free		2	6	
Detector Phase	8		2	2	1	6
Switch Phase						
Minimum Initial (s)	30.0		5.0	5.0	5.0	5.0
Minimum Split (s)	35.0		23.0	23.0	10.0	23.0
Total Split (s)	35.0		97.0	97.0	18.0	115.0
Total Split (%)	23.3%		64.7%	64.7%	12.0%	76.7%
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.5		1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0		3.0	3.0	3.0	3.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effect Green (s)	32.0	150.0	112.7	112.7	126.0	127.2
Actuated g/C Ratio	0.21	1.00	0.75	0.75	0.84	0.85
v/c Ratio	0.07	0.03	0.69	0.04	0.49	0.48
Control Delay	54.6	0.0	7.2	2.0	54.5	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.6	0.0	7.2	2.0	54.5	1.3
LOS	D	A	A	A	D	A
Approach Delay	18.0		7.1			3.4
Approach LOS	B		A			A

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

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: 0.69

Intersection Signal Delay: 5.7

Intersection LOS: A

Intersection Capacity Utilization 87.7%

ICU Level of Service E







Analysis Period (min) 15

Splits and Phases: 6: S. Gun Club Road & Commercial Access











HCM 6th TWSC
7: S. Flat Rock Trail & East-West Internal Road

2040 Total
AM Peak

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	3	13	15	2	77	5	220	5	25	140	3
Future Vol, veh/h	8	3	13	15	2	77	5	220	5	25	140	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	4	16	19	3	96	6	275	6	31	175	4
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	579	532	177	539	531	278	179	0	0	281	0	0
Stage 1	239	239	-	290	290	-	-	-	-	-	-	-
Stage 2	340	293	-	249	241	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	426	453	866	453	454	761	1397	-	-	1282	-	-
Stage 1	764	708	-	718	672	-	-	-	-	-	-	-
Stage 2	675	670	-	755	706	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	363	440	866	432	441	761	1397	-	-	1282	-	-
Mov Cap-2 Maneuver	363	440	-	432	441	-	-	-	-	-	-	-
Stage 1	761	691	-	715	669	-	-	-	-	-	-	-
Stage 2	585	667	-	719	689	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	12		11.5		0.2		1.2					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1397	-	-	547	669	1282	-	-				
HCM Lane V/C Ratio	0.004	-	-	0.055	0.176	0.024	-	-				
HCM Control Delay (s)	7.6	-	-	12	11.5	7.9	-	-				
HCM Lane LOS	A	-	-	B	B	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.2	0.6	0.1	-	-				

HCM 6th TWSC
8: Harvest Road & East-West Internal Road

2040 Total
AM Peak

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	11	2	10	20	2	50	3	400	10	20	255	4
Future Vol, veh/h	11	2	10	20	2	50	3	400	10	20	255	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	2	11	23	2	57	3	455	11	23	290	5
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	835	811	293	812	808	461	295	0	0	466	0	0
Stage 1	339	339	-	467	467	-	-	-	-	-	-	-
Stage 2	496	472	-	345	341	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	287	313	746	298	315	600	1266	-	-	1095	-	-
Stage 1	676	640	-	576	562	-	-	-	-	-	-	-
Stage 2	556	559	-	671	639	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	254	306	746	287	308	600	1266	-	-	1095	-	-
Mov Cap-2 Maneuver	254	306	-	287	308	-	-	-	-	-	-	-
Stage 1	675	627	-	575	561	-	-	-	-	-	-	-
Stage 2	500	558	-	645	626	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	15.3			13.8			0.1			0.6		
HCM LOS	C			B								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1266	-	-	254	602	287	579	1095	-	-		
HCM Lane V/C Ratio	0.003	-	-	0.049	0.023	0.079	0.102	0.021	-	-		
HCM Control Delay (s)	7.9	-	-	19.9	11.1	18.6	11.9	8.4	-	-		
HCM Lane LOS	A	-	-	C	B	C	B	A	-	-		
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0.3	0.3	0.1	-	-		

Timings 9: S. Gun Club Road & E. Yale Avenue

2040 Total
AM Peak

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	300	250	2300	150	300	1690
Future Volume (vph)	300	250	2300	150	300	1690
Turn Type	Prot	Free	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		Free		2		
Detector Phase	8		2	2	1	6
Switch Phase						
Minimum Initial (s)	30.0		5.0	5.0	5.0	5.0
Minimum Split (s)	35.0		23.0	23.0	10.0	23.0
Total Split (s)	35.0		90.0	90.0	25.0	115.0
Total Split (%)	23.3%		60.0%	60.0%	16.7%	76.7%
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.5		1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0		3.0	3.0	3.0	3.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effect Green (s)	32.0	150.0	89.0	89.0	20.0	112.0
Actuated g/C Ratio	0.21	1.00	0.59	0.59	0.13	0.75
v/c Ratio	0.84	0.17	0.80	0.16	0.69	0.47
Control Delay	76.3	0.2	26.7	5.0	71.6	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.3	0.2	26.7	5.0	71.6	10.1
LOS	E	A	C	A	E	B
Approach Delay	41.7		25.3			19.4
Approach LOS	D		C			B

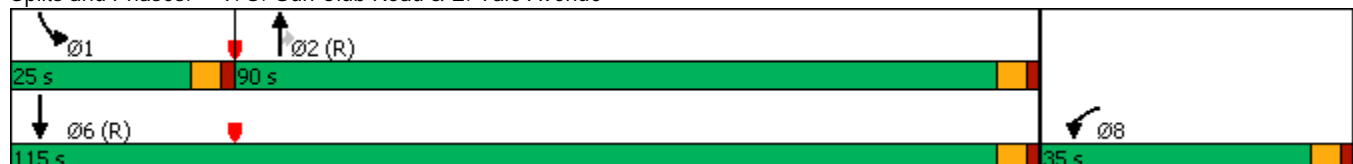
Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
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: 0.84
Intersection Signal Delay: 24.8
Intersection Capacity Utilization 88.0%
Analysis Period (min) 15

Intersection LOS: C

ICU Level of Service E

Splits and Phases: 9: S. Gun Club Road & E. Yale Avenue



HCM 6th TWSC
10: S. Flat Rock Trail & Warren Street

2040 Total
AM Peak

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	11	1	4	17	1	22	1	175	8	8	175	4
Future Vol, veh/h	11	1	4	17	1	22	1	175	8	8	175	4
Conflicting Peds, #/hr	25	0	25	40	0	40	40	0	40	25	0	25
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	75	75	75	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	1	5	23	1	29	1	233	11	11	233	5









Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	594	584	316	582	581	319	278	0	0	284	0	0
Stage 1	298	298	-	281	281	-	-	-	-	-	-	-
Stage 2	296	286	-	301	300	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	417	423	724	424	425	722	1285	-	-	1278	-	-
Stage 1	711	667	-	726	678	-	-	-	-	-	-	-
Stage 2	712	675	-	708	666	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	365	387	670	385	389	668	1236	-	-	1229	-	-
Mov Cap-2 Maneuver	365	387	-	385	389	-	-	-	-	-	-	-
Stage 1	683	636	-	698	652	-	-	-	-	-	-	-
Stage 2	653	649	-	668	635	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	14.2		13		0		0.3	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1236	-	-	414 502	1229	-	-
HCM Lane V/C Ratio	0.001	-	-	0.052 0.106	0.009	-	-
HCM Control Delay (s)	7.9	-	-	14.2 13	8	-	-
HCM Lane LOS	A	-	-	B B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2 0.4	0	-	-

HCM 6th TWSC
11: Harvest Road & Warren Street

2040 Total
AM Peak

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	10	7	20	10	75	2	310	5	30	245	9
Future Vol, veh/h	28	10	7	20	10	75	2	310	5	30	245	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	32	11	8	23	11	85	2	352	6	34	278	10

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	758	713	283	720	715	355	288	0	0	358	0	0
Stage 1	351	351	-	359	359	-	-	-	-	-	-	-
Stage 2	407	362	-	361	356	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	324	357	756	343	356	689	1274	-	-	1201	-	-
Stage 1	666	632	-	659	627	-	-	-	-	-	-	-
Stage 2	621	625	-	657	629	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	271	346	756	323	345	689	1274	-	-	1201	-	-
Mov Cap-2 Maneuver	271	346	-	323	345	-	-	-	-	-	-	-
Stage 1	665	614	-	658	626	-	-	-	-	-	-	-
Stage 2	533	624	-	620	611	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	17.5		12.9		0		0.9	
HCM LOS	C		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1274	-	-	271	445	323	617	1201	-	-
HCM Lane V/C Ratio	0.002	-	-	0.117	0.043	0.07	0.157	0.028	-	-
HCM Control Delay (s)	7.8	-	-	20	13.5	17	11.9	8.1	-	-
HCM Lane LOS	A	-	-	C	B	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.1	0.2	0.6	0.1	-	-







HCM 2010 Roundabout
12: Roundabout Access & E. Yale Avenue

2040 Total
AM Peak

Intersection				
Intersection Delay, s/veh	8.6			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	484	457	81	157
Demand Flow Rate, veh/h	493	466	82	160
Vehicles Circulating, veh/h	61	116	349	511
Vehicles Exiting, veh/h	610	315	205	71
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.7	9.1	5.6	8.3
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	493	466	82	160
Cap Entry Lane, veh/h	1063	1006	797	678
Entry HV Adj Factor	0.981	0.980	0.987	0.981
Flow Entry, veh/h	484	457	81	157
Cap Entry, veh/h	1043	986	786	665
V/C Ratio	0.464	0.463	0.103	0.236
Control Delay, s/veh	8.7	9.1	5.6	8.3
LOS	A	A	A	A
95th %tile Queue, veh	3	2	0	1

HCM 6th TWSC
13: Full Movement & E. Yale Avenue

2040 Total
AM Peak

Intersection												
Int Delay, s/veh	4.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	200	10	15	340	20	25	5	55	75	5	55
Future Vol, veh/h	15	200	10	15	340	20	25	5	55	75	5	55
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	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	217	11	16	370	22	27	5	60	82	5	60
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	392	0	0	228	0	0	701	679	223	700	673	381
Stage 1	-	-	-	-	-	-	255	255	-	413	413	-
Stage 2	-	-	-	-	-	-	446	424	-	287	260	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1167	-	-	1340	-	-	353	374	817	354	377	666
Stage 1	-	-	-	-	-	-	749	696	-	616	594	-
Stage 2	-	-	-	-	-	-	591	587	-	720	693	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1167	-	-	1340	-	-	311	364	817	318	367	666
Mov Cap-2 Maneuver	-	-	-	-	-	-	311	364	-	318	367	-
Stage 1	-	-	-	-	-	-	739	686	-	607	587	-
Stage 2	-	-	-	-	-	-	527	580	-	653	683	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.5			0.3			13.3			18.7		
HCM LOS							B			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	527	1167	-	-	1340	-	-	407				
HCM Lane V/C Ratio	0.175	0.014	-	-	0.012	-	-	0.361				
HCM Control Delay (s)	13.3	8.1	-	-	7.7	-	-	18.7				
HCM Lane LOS	B	A	-	-	A	-	-	C				
HCM 95th %tile Q(veh)	0.6	0	-	-	0	-	-	1.6				







HCM 2010 Roundabout
14: E. Yale Avenue & S. Flat Rock Trail

2040 Total
AM Peak

Intersection			
Intersection Delay, s/veh	6.4		
Intersection LOS	A		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	359	256	212
Demand Flow Rate, veh/h	366	261	216
Vehicles Circulating, veh/h	11	111	221
Vehicles Exiting, veh/h	426	266	151
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	6.5	6.2	6.5
Approach LOS	A	A	A
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	366	261	216
Cap Entry Lane, veh/h	1118	1011	906
Entry HV Adj Factor	0.981	0.980	0.981
Flow Entry, veh/h	359	256	212
Cap Entry, veh/h	1096	991	889
V/C Ratio	0.327	0.258	0.238
Control Delay, s/veh	6.5	6.2	6.5
LOS	A	A	A
95th %tile Queue, veh	1	1	1






HCM 6th TWSC
15: SW Site Access & E. Yale Avenue

2040 Total
AM Peak

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	7	220	7	1	192	1	24	1	4	3	1	20
Future Vol, veh/h	7	220	7	1	192	1	24	1	4	3	1	20
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	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	239	8	1	209	1	26	1	4	3	1	22
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	210	0	0	247	0	0	482	471	243	474	475	210
Stage 1	-	-	-	-	-	-	259	259	-	212	212	-
Stage 2	-	-	-	-	-	-	223	212	-	262	263	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1361	-	-	1319	-	-	495	491	796	501	488	830
Stage 1	-	-	-	-	-	-	746	694	-	790	727	-
Stage 2	-	-	-	-	-	-	780	727	-	743	691	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1361	-	-	1319	-	-	479	488	796	495	485	830
Mov Cap-2 Maneuver	-	-	-	-	-	-	479	488	-	495	485	-
Stage 1	-	-	-	-	-	-	742	690	-	785	726	-
Stage 2	-	-	-	-	-	-	758	726	-	733	687	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0			12.6			10		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	507	1361	-	-	1319	-	-	745				
HCM Lane V/C Ratio	0.062	0.006	-	-	0.001	-	-	0.035				
HCM Control Delay (s)	12.6	7.7	-	-	7.7	-	-	10				
HCM Lane LOS	B	A	-	-	A	-	-	B				
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1				

HCM 6th TWSC
16: SE Site Access & E. Yale Avenue

2040 Total
AM Peak

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	220	4	3	180	14	11
Future Vol, veh/h	220	4	3	180	14	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	239	4	3	196	15	12
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	243	0	443	241
Stage 1	-	-	-	-	241	-
Stage 2	-	-	-	-	202	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1323	-	572	798
Stage 1	-	-	-	-	799	-
Stage 2	-	-	-	-	832	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1323	-	571	798
Mov Cap-2 Maneuver	-	-	-	-	571	-
Stage 1	-	-	-	-	797	-
Stage 2	-	-	-	-	832	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.1		10.8	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	653	-	-	1323	-	
HCM Lane V/C Ratio	0.042	-	-	0.002	-	
HCM Control Delay (s)	10.8	-	-	7.7	-	
HCM Lane LOS	B	-	-	A	-	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	

HCM 2010 Roundabout
17: E. Yale Avenue & Harvest Road

2040 Total
AM Peak

Intersection			
Intersection Delay, s/veh	7.4		
Intersection LOS	A		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	261	341	319
Demand Flow Rate, veh/h	266	348	326
Vehicles Circulating, veh/h	244	145	134
Vehicles Exiting, veh/h	216	365	359
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	7.4	7.6	7.2
Approach LOS	A	A	A
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	266	348	326
Cap Entry Lane, veh/h	885	977	988
Entry HV Adj Factor	0.980	0.981	0.979
Flow Entry, veh/h	261	341	319
Cap Entry, veh/h	867	959	967
V/C Ratio	0.300	0.356	0.330
Control Delay, s/veh	7.4	7.6	7.2
LOS	A	A	A
95th %tile Queue, veh	1	2	1

HCM 6th TWSC
18: S. Gun Club Road & RIRO

2040 Total
AM Peak

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗ ↘ ↘ ↘	↗ ↘ ↘ ↘			↗ ↘ ↘ ↘
Traffic Vol, veh/h	0	25	2425	50	0	1990
Future Vol, veh/h	0	25	2425	50	0	1990
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	26	2553	53	0	2095

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

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	0 -
HCM Lane LOS	-	-	A -
HCM 95th %tile Q(veh)	-	-	-

HCM 6th TWSC
19: S. Gun Club Road & Three-Quarter

2040 Total
AM Peak

Intersection

Int Delay, s/veh 0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗ ↘ ↘ ↘			↗ ↘ ↘ ↘	
Traffic Vol, veh/h	0	25	2450	50	30	1960
Future Vol, veh/h	0	25	2450	50	30	1960
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	-	0	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	26	2579	53	32	2063









Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	-	0 0 2632 0
Stage 1	-	-	- - - -
Stage 2	-	-	- - - -
Critical Hdwy	-	-	- - 5.34 -
Critical Hdwy Stg 1	-	-	- - - -
Critical Hdwy Stg 2	-	-	- - - -
Follow-up Hdwy	-	-	- - 3.12 -
Pot Cap-1 Maneuver	0	0	- - 59 -
Stage 1	0	0	- - - -
Stage 2	0	0	- - - -
Platoon blocked, %		-	- - -
Mov Cap-1 Maneuver	-	-	- - 59 -
Mov Cap-2 Maneuver	-	-	- - - -
Stage 1	-	-	- - - -
Stage 2	-	-	- - - -

Approach	WB	NB	SB
HCM Control Delay, s	0	0	1.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	- 59	-
HCM Lane V/C Ratio	-	-	- 0.535	-
HCM Control Delay (s)	-	-	0 121.5	-
HCM Lane LOS	-	-	A F	-
HCM 95th %tile Q(veh)	-	-	- 2.1	-

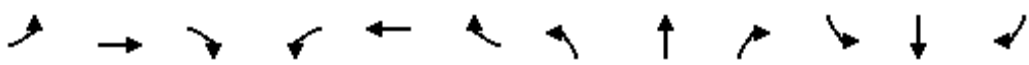












HCM 6th TWSC
20: Harvest Road & Local Access

2040 Total
AM Peak

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	2	30	0	40	0	277	30	28	250	2
Future Vol, veh/h	7	0	2	30	0	40	0	277	30	28	250	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	0	2	33	0	43	0	301	33	30	272	2
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	672	667	273	652	652	318	274	0	0	334	0	0
Stage 1	333	333	-	318	318	-	-	-	-	-	-	-
Stage 2	339	334	-	334	334	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	370	380	766	381	387	723	1289	-	-	1225	-	-
Stage 1	681	644	-	693	654	-	-	-	-	-	-	-
Stage 2	676	643	-	680	643	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	341	371	766	373	378	723	1289	-	-	1225	-	-
Mov Cap-2 Maneuver	341	371	-	373	378	-	-	-	-	-	-	-
Stage 1	681	629	-	693	654	-	-	-	-	-	-	-
Stage 2	635	643	-	661	628	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	14.4			12.6			0			0.8		
HCM LOS	B			B								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1289	-	-	341	766	373	723	1225	-	-		
HCM Lane V/C Ratio	-	-	-	0.022	0.003	0.087	0.06	0.025	-	-		
HCM Control Delay (s)	0	-	-	15.8	9.7	15.6	10.3	8	-	-		
HCM Lane LOS	A	-	-	C	A	C	B	A	-	-		
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0.3	0.2	0.1	-	-		

Timings 1: S. Gun Club Road & E. Jewell Avenue

2040 Total
PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	385	1400	650	645	1150	250	670	1200	750	275	1500	490
Future Volume (vph)	385	1400	650	645	1150	250	670	1200	750	275	1500	490
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	23.0		10.0	23.0		10.0	23.0		10.0	23.0	
Total Split (s)	25.0	43.0		28.0	46.0		30.0	60.0		19.0	49.0	
Total Split (%)	16.7%	28.7%		18.7%	30.7%		20.0%	40.0%		12.7%	32.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effect Green (s)	22.3	41.0	150.0	26.0	44.7	150.0	28.0	58.2	150.0	16.8	47.0	150.0
Actuated g/C Ratio	0.15	0.27	1.00	0.17	0.30	1.00	0.19	0.39	1.00	0.11	0.31	1.00
v/c Ratio	0.75	1.01	0.41	1.08	0.76	0.16	1.05	0.61	0.47	0.72	0.94	0.31
Control Delay	71.4	79.7	0.8	118.7	35.8	0.2	109.6	51.8	0.7	75.6	62.5	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.4	79.7	0.8	118.7	35.8	0.2	109.6	51.8	0.7	75.6	62.5	0.5
LOS	E	E	A	F	D	A	F	D	A	E	E	A
Approach Delay		57.3			57.6			52.0			50.7	
Approach LOS		E			E			D			D	

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

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: 1.08

Intersection Signal Delay: 54.3

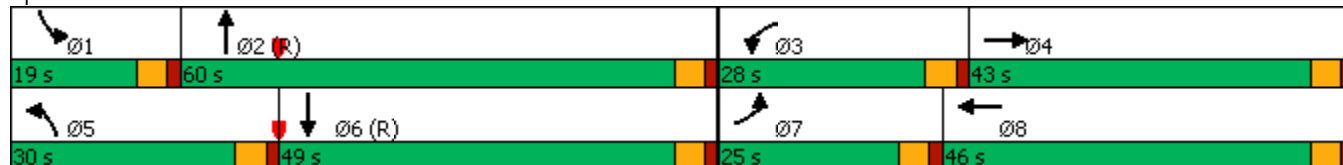
Intersection LOS: D

Intersection Capacity Utilization 106.9%

ICU Level of Service G























Analysis Period (min) 15

Splits and Phases: 1: S. Gun Club Road & E. Jewell Avenue



Timings 2: S. Old Tom Morris Road & E. Jewell Avenue

2040 Total
PM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		  			  				
Traffic Volume (vph)	250	2045	130	145	1735	140	25	50	25
Future Volume (vph)	250	2045	130	145	1735	140	25	50	25
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	10.0	23.0
Total Split (s)	15.0	92.0	92.0	16.0	93.0	17.0	30.0	12.0	25.0
Total Split (%)	10.0%	61.3%	61.3%	10.7%	62.0%	11.3%	20.0%	8.0%	16.7%
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)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	110.7	95.3	95.3	104.0	90.0	31.7	22.1	23.6	14.8
Actuated g/C Ratio	0.74	0.64	0.64	0.69	0.60	0.21	0.15	0.16	0.10
v/c Ratio	0.88	0.67	0.13	0.70	0.62	0.70	0.50	0.29	0.74
Control Delay	44.5	44.5	17.0	54.9	14.6	67.4	23.5	50.3	39.5
Queue Delay	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.5	45.0	17.0	54.9	14.6	67.4	23.5	50.3	39.5
LOS	D	D	B	D	B	E	C	D	D
Approach Delay		43.5			17.6		43.0		41.7
Approach LOS		D			B		D		D

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 33.2

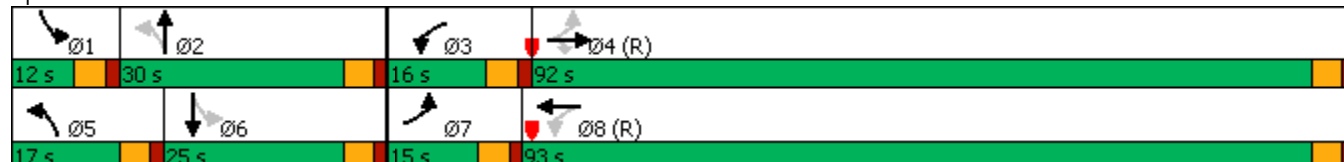
Intersection LOS: C

Intersection Capacity Utilization 81.7%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: S. Old Tom Morris Road & E. Jewell Avenue



HCM 6th TWSC























3: Full Movement Access & E. Jewell Avenue

2040 Total
PM Peak

Intersection												
Int Delay, s/veh	4.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵ ↑↑↑			↵ ↑↑↑			↕			↕		
Traffic Vol, veh/h	20	2200	20	5	1910	5	10	1	5	5	1	10
Future Vol, veh/h	20	2200	20	5	1910	5	10	1	5	5	1	10
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	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	2316	21	5	2011	5	11	1	5	5	1	11
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	2016	0	0	2337	0	0	3184	4395	1169	2993	4403	1008
Stage 1	-	-	-	-	-	-	2369	2369	-	2024	2024	-
Stage 2	-	-	-	-	-	-	815	2026	-	969	2379	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	123	-	-	84	-	-	11	2	160	15	~ 1	205
Stage 1	-	-	-	-	-	-	21	67	-	37	100	-
Stage 2	-	-	-	-	-	-	306	100	-	246	66	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	123	-	-	84	-	-	-	2	160	7	~ 1	205
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	2	-	7	~ 1	-
Stage 1	-	-	-	-	-	-	17	56	-	31	94	-
Stage 2	-	-	-	-	-	-	270	94	-	194	55	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.4			0.1						\$ 1213.7		
HCM LOS							-			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	-	123	-	-	84	-	-	9				
HCM Lane V/C Ratio	-	0.171	-	-	0.063	-	-	1.871				
HCM Control Delay (s)	-	40.2	-	-	50.7	-	-	\$ 1213.7				
HCM Lane LOS	-	E	-	-	F	-	-	F				
HCM 95th %tile Q(veh)	-	0.6	-	-	0.2	-	-	3.1				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			

Timings 4: S. Flat Rock Trail & E. Jewell Avenue

2040 Total
PM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		  			  				
Traffic Volume (vph)	260	1690	260	30	1570	150	15	5	20
Future Volume (vph)	260	1690	260	30	1570	150	15	5	20
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	10.0	25.0
Total Split (s)	25.0	88.0	88.0	12.0	75.0	20.0	38.0	12.0	30.0
Total Split (%)	16.7%	58.7%	58.7%	8.0%	50.0%	13.3%	25.3%	8.0%	20.0%
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)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	102.6	95.5	95.5	84.0	75.6	41.4	39.1	29.9	22.0
Actuated g/C Ratio	0.68	0.64	0.64	0.56	0.50	0.28	0.26	0.20	0.15
v/c Ratio	0.80	0.55	0.25	0.17	0.65	0.60	0.08	0.02	0.56
Control Delay	64.1	17.8	5.9	7.9	16.2	53.2	24.8	39.8	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.1	17.8	5.9	7.9	16.2	53.2	24.8	39.8	15.3
LOS	E	B	A	A	B	D	C	D	B
Approach Delay		21.9			16.0		47.8		15.8
Approach LOS		C			B		D		B

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 20.5

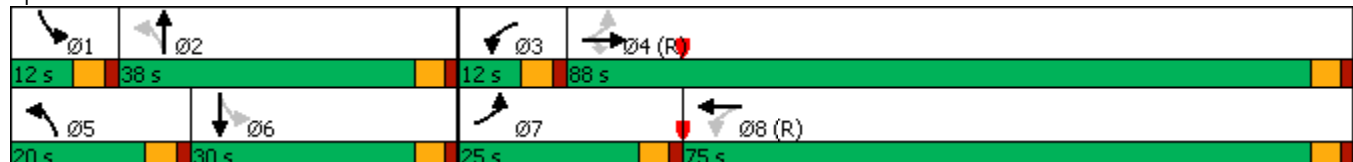
Intersection LOS: C

Intersection Capacity Utilization 83.3%

ICU Level of Service E




























Analysis Period (min) 15

Splits and Phases: 4: S. Flat Rock Trail & E. Jewell Avenue



Timings 5: Harvest Road & E. Jewell Avenue

2040 Total
PM Peak

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	 	  		  			 		 	
Traffic Volume (vph)	375	1240	120	1100	250	75	270	350	320	425
Future Volume (vph)	375	1240	120	1100	250	75	270	350	320	425
Turn Type	Prot	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2	1	6	
Permitted Phases			8		8	2		6		6
Detector Phase	7	4	3	8	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	30.0	5.0	30.0	30.0
Minimum Split (s)	10.0	23.0	10.0	23.0	23.0	10.0	35.0	10.0	35.0	35.0
Total Split (s)	30.0	72.0	17.0	59.0	59.0	12.0	35.0	26.0	49.0	49.0
Total Split (%)	20.0%	48.0%	11.3%	39.3%	39.3%	8.0%	23.3%	17.3%	32.7%	32.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	C-Max	None	None	None	None	None
Act Effect Green (s)	23.9	70.9	71.3	59.1	59.1	40.9	32.0	58.0	46.1	46.1
Actuated g/C Ratio	0.16	0.47	0.48	0.39	0.39	0.27	0.21	0.39	0.31	0.31
v/c Ratio	0.72	0.59	0.53	0.58	0.34	0.24	0.51	0.91	0.31	0.62
Control Delay	79.0	39.0	26.5	37.5	4.7	32.7	50.7	64.5	40.8	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.0	39.0	26.5	37.5	4.7	32.7	50.7	64.5	40.8	15.1
LOS	E	D	C	D	A	C	D	E	D	B
Approach Delay		47.8		31.0			47.6		38.4	
Approach LOS		D		C			D		D	

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 40.4

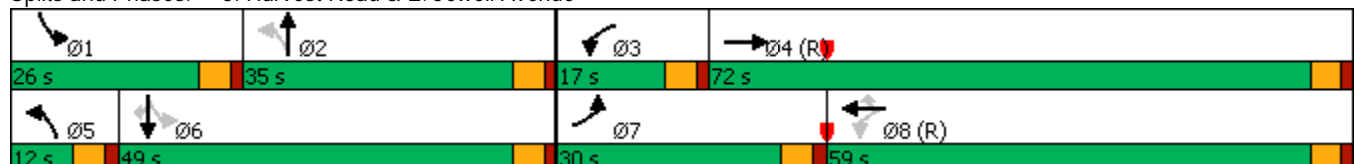
Intersection LOS: D

Intersection Capacity Utilization 90.6%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 5: Harvest Road & E. Jewell Avenue



Timings

2040 Total

6: S. Gun Club Road & Commercial Access

PM Peak

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	90	105	2520	50	130	2670
Future Volume (vph)	90	105	2520	50	130	2670
Turn Type	Prot	Free	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		Free		2	6	
Detector Phase	8		2	2	1	6
Switch Phase						
Minimum Initial (s)	30.0		5.0	5.0	5.0	5.0
Minimum Split (s)	35.0		23.0	23.0	10.0	23.0
Total Split (s)	35.0		95.0	95.0	20.0	115.0
Total Split (%)	23.3%		63.3%	63.3%	13.3%	76.7%
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.5		1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0		3.0	3.0	3.0	3.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effect Green (s)	32.0	150.0	95.2	95.2	112.0	112.0
Actuated g/C Ratio	0.21	1.00	0.63	0.63	0.75	0.75
v/c Ratio	0.25	0.07	0.82	0.05	0.65	0.74
Control Delay	60.9	0.1	10.9	1.0	62.1	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	60.9	0.1	10.9	1.0	62.1	4.7
LOS	E	A	B	A	E	A
Approach Delay	28.1		10.8			7.4
Approach LOS	C		B			A

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

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: 0.82

Intersection Signal Delay: 9.7

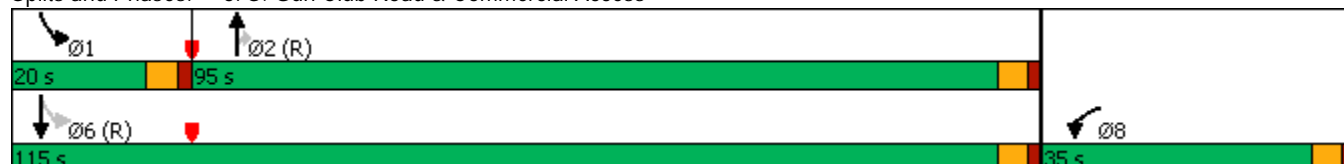
Intersection LOS: A

Intersection Capacity Utilization 90.9%

ICU Level of Service E







Analysis Period (min) 15

Splits and Phases: 6: S. Gun Club Road & Commercial Access











HCM 6th TWSC
7: S. Flat Rock Trail & East-West Internal Road

2040 Total
PM Peak

Intersection												
Int Delay, s/veh	2.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	2	4	10	3	50	1	125	17	85	215	9
Future Vol, veh/h	5	2	4	10	3	50	1	125	17	85	215	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	3	5	13	4	63	1	156	21	106	269	11
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	689	666	275	660	661	167	280	0	0	177	0	0
Stage 1	487	487	-	169	169	-	-	-	-	-	-	-
Stage 2	202	179	-	491	492	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	360	380	764	376	383	877	1283	-	-	1399	-	-
Stage 1	562	550	-	833	759	-	-	-	-	-	-	-
Stage 2	800	751	-	559	548	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	312	351	764	350	354	877	1283	-	-	1399	-	-
Mov Cap-2 Maneuver	312	351	-	350	354	-	-	-	-	-	-	-
Stage 1	561	508	-	832	758	-	-	-	-	-	-	-
Stage 2	739	750	-	511	506	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	14.1		11.1			0.1			2.1			
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1283	-	-	408	670	1399	-	-				
HCM Lane V/C Ratio	0.001	-	-	0.034	0.118	0.076	-	-				
HCM Control Delay (s)	7.8	-	-	14.1	11.1	7.8	-	-				
HCM Lane LOS	A	-	-	B	B	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.4	0.2	-	-				

HCM 6th TWSC
8: Harvest Road & East-West Internal Road

2040 Total
PM Peak

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	2	6	10	2	35	10	390	20	50	475	12
Future Vol, veh/h	7	2	6	10	2	35	10	390	20	50	475	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	2	7	11	2	40	11	443	23	57	540	14
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1159	1149	547	1143	1145	455	554	0	0	466	0	0
Stage 1	661	661	-	477	477	-	-	-	-	-	-	-
Stage 2	498	488	-	666	668	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	173	198	537	177	200	605	1016	-	-	1095	-	-
Stage 1	452	460	-	569	556	-	-	-	-	-	-	-
Stage 2	554	550	-	449	456	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	153	186	537	165	188	605	1016	-	-	1095	-	-
Mov Cap-2 Maneuver	153	186	-	165	188	-	-	-	-	-	-	-
Stage 1	447	436	-	563	550	-	-	-	-	-	-	-
Stage 2	510	544	-	418	432	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	22			15.6			0.2			0.8		
HCM LOS	C			C								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1016	-	-	153	365	165	540	1095	-	-		
HCM Lane V/C Ratio	0.011	-	-	0.052	0.025	0.069	0.078	0.052	-	-		
HCM Control Delay (s)	8.6	-	-	29.8	15.1	28.4	12.2	8.5	-	-		
HCM Lane LOS	A	-	-	D	C	D	B	A	-	-		
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0.2	0.3	0.2	-	-		

Timings 9: S. Gun Club Road & E. Yale Avenue

2040 Total
PM Peak

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	375	400	2170	325	450	2300
Future Volume (vph)	375	400	2170	325	450	2300
Turn Type	Prot	Free	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		Free		2		
Detector Phase	8		2	2	1	6
Switch Phase						
Minimum Initial (s)	30.0		5.0	5.0	5.0	5.0
Minimum Split (s)	35.0		23.0	23.0	10.0	23.0
Total Split (s)	45.0		75.0	75.0	30.0	105.0
Total Split (%)	30.0%		50.0%	50.0%	20.0%	70.0%
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.5		1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0		3.0	3.0	3.0	3.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effect Green (s)	38.8	150.0	76.4	76.4	25.8	105.2
Actuated g/C Ratio	0.26	1.00	0.51	0.51	0.17	0.70
v/c Ratio	0.86	0.27	0.88	0.38	0.80	0.68
Control Delay	72.1	0.4	38.6	10.2	65.6	20.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.1	0.4	38.6	10.2	65.6	20.3
LOS	E	A	D	B	E	C
Approach Delay	35.1		34.9			27.8
Approach LOS	D		C			C

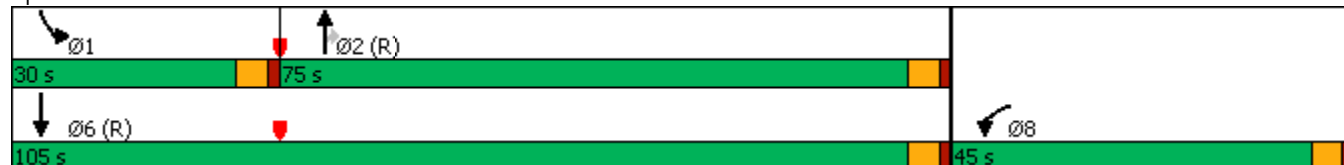
Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
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: 0.88
Intersection Signal Delay: 31.6
Intersection Capacity Utilization 89.8%
Analysis Period (min) 15

Intersection LOS: C

ICU Level of Service E

Splits and Phases: 9: S. Gun Club Road & E. Yale Avenue











HCM 6th TWSC
10: S. Flat Rock Trail & Warren Street

2040 Total
PM Peak

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	8	1	3	13	2	15	5	115	19	25	125	13
Future Vol, veh/h	8	1	3	13	2	15	5	115	19	25	125	13
Conflicting Peds, #/hr	5	0	5	10	0	10	10	0	10	5	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	1	4	16	3	19	6	144	24	31	156	16
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	425	426	184	417	422	176	182	0	0	178	0	0
Stage 1	236	236	-	178	178	-	-	-	-	-	-	-
Stage 2	189	190	-	239	244	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	540	520	858	546	523	867	1393	-	-	1398	-	-
Stage 1	767	710	-	824	752	-	-	-	-	-	-	-
Stage 2	813	743	-	764	704	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	505	497	842	521	499	851	1380	-	-	1385	-	-
Mov Cap-2 Maneuver	505	497	-	521	499	-	-	-	-	-	-	-
Stage 1	756	687	-	812	741	-	-	-	-	-	-	-
Stage 2	781	733	-	735	681	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	11.6		10.9		0.3		1.2					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1380	-	-	560	644	1385	-	-				
HCM Lane V/C Ratio	0.005	-	-	0.027	0.058	0.023	-	-				
HCM Control Delay (s)	7.6	-	-	11.6	10.9	7.7	-	-				
HCM Lane LOS	A	-	-	B	B	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0.1	-	-				

HCM 6th TWSC
11: Harvest Road & Warren Street

2040 Total
PM Peak

Intersection												
Int Delay, s/veh	2.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	5	5	10	5	50	8	350	10	70	390	32
Future Vol, veh/h	19	5	5	10	5	50	8	350	10	70	390	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	6	6	11	6	57	9	398	11	80	443	36

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1074	1048	461	1049	1061	404	479	0	0	409	0	0
Stage 1	621	621	-	422	422	-	-	-	-	-	-	-
Stage 2	453	427	-	627	639	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	198	228	600	205	224	647	1083	-	-	1150	-	-
Stage 1	475	479	-	609	588	-	-	-	-	-	-	-
Stage 2	586	585	-	471	470	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	167	210	600	187	207	647	1083	-	-	1150	-	-
Mov Cap-2 Maneuver	167	210	-	187	207	-	-	-	-	-	-	-
Stage 1	471	445	-	604	583	-	-	-	-	-	-	-
Stage 2	525	580	-	429	437	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	25.3		14.5		0.2		1.2	
HCM LOS	D		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1083	-	-	167	311	187	542	1150	-	-
HCM Lane V/C Ratio	0.008	-	-	0.129	0.037	0.061	0.115	0.069	-	-
HCM Control Delay (s)	8.4	-	-	29.7	17	25.5	12.5	8.4	-	-
HCM Lane LOS	A	-	-	D	C	D	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.1	0.2	0.4	0.2	-	-







HCM 2010 Roundabout
12: Roundabout Access & E. Yale Avenue

2040 Total
PM Peak

Intersection				
Intersection Delay, s/veh	20.1			
Intersection LOS	C			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	847	495	358	124
Demand Flow Rate, veh/h	864	505	365	127
Vehicles Circulating, veh/h	72	465	671	799
Vehicles Exiting, veh/h	854	571	265	171
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	21.3	20.4	19.8	10.9
Approach LOS	C	C	C	B
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	864	505	365	127
Cap Entry Lane, veh/h	1051	710	578	508
Entry HV Adj Factor	0.981	0.981	0.981	0.976
Flow Entry, veh/h	847	495	358	124
Cap Entry, veh/h	1031	696	566	496
V/C Ratio	0.822	0.712	0.632	0.250
Control Delay, s/veh	21.3	20.4	19.8	10.9
LOS	C	C	C	B
95th %tile Queue, veh	10	6	4	1

HCM 6th TWSC
13: Full Movement & E. Yale Avenue

2040 Total
PM Peak

Intersection												
Int Delay, s/veh	3.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	55	425	25	50	320	60	15	5	30	35	5	30
Future Vol, veh/h	55	425	25	50	320	60	15	5	30	35	5	30
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	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	60	462	27	54	348	65	16	5	33	38	5	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	413	0	0	489	0	0	1104	1117	476	1104	1098	381
Stage 1	-	-	-	-	-	-	596	596	-	489	489	-
Stage 2	-	-	-	-	-	-	508	521	-	615	609	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1146	-	-	1074	-	-	188	207	589	188	213	666
Stage 1	-	-	-	-	-	-	490	492	-	561	549	-
Stage 2	-	-	-	-	-	-	547	532	-	479	485	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1146	-	-	1074	-	-	162	187	589	160	192	666
Mov Cap-2 Maneuver	-	-	-	-	-	-	162	187	-	160	192	-
Stage 1	-	-	-	-	-	-	465	466	-	532	522	-
Stage 2	-	-	-	-	-	-	489	505	-	424	460	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	1	20	26.6
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	294	1146	-	-	1074	-	-	242
HCM Lane V/C Ratio	0.185	0.052	-	-	0.051	-	-	0.314
HCM Control Delay (s)	20	8.3	-	-	8.5	-	-	26.6
HCM Lane LOS	C	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.7	0.2	-	-	0.2	-	-	1.3







HCM 2010 Roundabout
14: E. Yale Avenue & S. Flat Rock Trail

2040 Total
PM Peak

Intersection			
Intersection Delay, s/veh	8.3		
Intersection LOS	A		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	538	364	130
Demand Flow Rate, veh/h	549	371	132
Vehicles Circulating, veh/h	16	161	360
Vehicles Exiting, veh/h	476	404	172
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	8.9	8.1	6.4
Approach LOS	A	A	A
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	549	371	132
Cap Entry Lane, veh/h	1112	962	788
Entry HV Adj Factor	0.981	0.981	0.985
Flow Entry, veh/h	538	364	130
Cap Entry, veh/h	1091	944	776
V/C Ratio	0.494	0.386	0.167
Control Delay, s/veh	8.9	8.1	6.4
LOS	A	A	A
95th %tile Queue, veh	3	2	1

HCM 6th TWSC
15: SW Site Access & E. Yale Avenue

2040 Total
PM Peak

Intersection												
Int Delay, s/veh	1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	315	24	4	305	3	14	1	2	2	1	13
Future Vol, veh/h	23	315	24	4	305	3	14	1	2	2	1	13
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	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	25	342	26	4	332	3	15	1	2	2	1	14






Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	335	0	0	368	0	0	754	748	355	749	760	334
Stage 1	-	-	-	-	-	-	405	405	-	342	342	-
Stage 2	-	-	-	-	-	-	349	343	-	407	418	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1224	-	-	1191	-	-	326	341	689	328	336	708
Stage 1	-	-	-	-	-	-	622	598	-	673	638	-
Stage 2	-	-	-	-	-	-	667	637	-	621	591	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1224	-	-	1191	-	-	313	333	689	320	328	708
Mov Cap-2 Maneuver	-	-	-	-	-	-	313	333	-	320	328	-
Stage 1	-	-	-	-	-	-	610	586	-	660	636	-
Stage 2	-	-	-	-	-	-	650	635	-	605	579	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.5			0.1			16.3			11.4		
HCM LOS							C			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	336	1224	-	-	1191	-	-	578
HCM Lane V/C Ratio	0.055	0.02	-	-	0.004	-	-	0.03
HCM Control Delay (s)	16.3	8	-	-	8	-	-	11.4
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.1

HCM 6th TWSC
16: SE Site Access & E. Yale Avenue

2040 Total
PM Peak

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	305	14	11	305	8	7
Future Vol, veh/h	305	14	11	305	8	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	332	15	12	332	9	8
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	347	0	696	340
Stage 1	-	-	-	-	340	-
Stage 2	-	-	-	-	356	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1212	-	408	702
Stage 1	-	-	-	-	721	-
Stage 2	-	-	-	-	709	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1212	-	404	702
Mov Cap-2 Maneuver	-	-	-	-	404	-
Stage 1	-	-	-	-	714	-
Stage 2	-	-	-	-	709	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.3		12.4	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	504	-	-	1212	-	
HCM Lane V/C Ratio	0.032	-	-	0.01	-	
HCM Control Delay (s)	12.4	-	-	8	-	
HCM Lane LOS	B	-	-	A	-	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	




HCM 2010 Roundabout
17: E. Yale Avenue & Harvest Road

2040 Total
PM Peak

Intersection			
Intersection Delay, s/veh	9.2		
Intersection LOS	A		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	352	403	432
Demand Flow Rate, veh/h	359	411	441
Vehicles Circulating, veh/h	249	186	173
Vehicles Exiting, veh/h	365	422	424
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	9.1	9.1	9.5
Approach LOS	A	A	A
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	359	411	441
Cap Entry Lane, veh/h	881	938	950
Entry HV Adj Factor	0.979	0.980	0.980
Flow Entry, veh/h	352	403	432
Cap Entry, veh/h	863	919	931
V/C Ratio	0.408	0.438	0.464
Control Delay, s/veh	9.1	9.1	9.5
LOS	A	A	A
95th %tile Queue, veh	2	2	2

HCM 6th TWSC
18: S. Gun Club Road & RIRO

2040 Total
PM Peak

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	75	2420	75	0	2675
Future Vol, veh/h	0	75	2420	75	0	2675
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	79	2547	79	0	2816

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

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	0	-
HCM Lane LOS	-	A	-
HCM 95th %tile Q(veh)	-	-	-









HCM 6th TWSC
19: S. Gun Club Road & Three-Quarter

2040 Total
PM Peak

Intersection						
Int Delay, s/veh	12.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↑↑↑↘		↘	↑↑↑↑
Traffic Vol, veh/h	0	75	2420	75	110	2565
Future Vol, veh/h	0	75	2420	75	110	2565
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	-	0	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	79	2547	79	116	2700
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	-	0	0	2626	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	5.34	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	3.12	-
Pot Cap-1 Maneuver	0	0	-	-	~ 60	-
Stage 1	0	0	-	-	-	-
Stage 2	0	0	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	-	-	-	~ 60	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	0		0		24	
HCM LOS	A					
Minor Lane/Major Mvmt	NBT		NBRWBLn1		SBL	SBT
Capacity (veh/h)	-		-		~ 60	-
HCM Lane V/C Ratio	-		-		1.93	-
HCM Control Delay (s)	-		-		583.8	-
HCM Lane LOS	-		A		F	-
HCM 95th %tile Q(veh)	-		-		10.9	-
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

HCM 6th TWSC
20: Harvest Road & Local Access

2040 Total
PM Peak

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	0	1	15	0	30	2	336	30	40	363	8
Future Vol, veh/h	4	0	1	15	0	30	2	336	30	40	363	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	0	1	16	0	33	2	365	33	43	395	9

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	888	888	400	872	876	382	404	0	0	398	0	0
Stage 1	486	486	-	386	386	-	-	-	-	-	-	-
Stage 2	402	402	-	486	490	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	264	283	650	271	287	665	1155	-	-	1161	-	-
Stage 1	563	551	-	637	610	-	-	-	-	-	-	-
Stage 2	625	600	-	563	549	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	244	272	650	263	276	665	1155	-	-	1161	-	-
Mov Cap-2 Maneuver	244	272	-	263	276	-	-	-	-	-	-	-
Stage 1	562	531	-	636	609	-	-	-	-	-	-	-
Stage 2	593	599	-	541	529	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	18.1		13.7		0		0.8	
HCM LOS	C		B					













Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1155	-	-	244	650	263	665	1161	-	-
HCM Lane V/C Ratio	0.002	-	-	0.018	0.002	0.062	0.049	0.037	-	-
HCM Control Delay (s)	8.1	-	-	20	10.5	19.6	10.7	8.2	-	-
HCM Lane LOS	A	-	-	C	B	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0.2	0.2	0.1	-	-

Queues

2040 Total

1: S. Gun Club Road & E. Jewell Avenue

AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	365	1094	417	667	1458	286	625	1531	469	208	1020	391
v/c Ratio	0.75	0.77	0.26	0.97	0.85	0.18	0.91	0.79	0.30	0.70	0.75	0.25
Control Delay	71.8	53.9	0.4	74.7	44.0	0.2	79.1	68.1	0.3	79.5	54.6	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.8	53.9	0.4	74.7	44.0	0.2	79.1	68.1	0.3	79.5	54.6	0.4
Queue Length 50th (ft)	178	358	0	354	540	0	335	571	0	103	340	0
Queue Length 95th (ft)	236	414	0	m#464	593	m0	#429	523	0	149	396	0
Internal Link Dist (ft)	1000				823				948			
Turn Bay Length (ft)	300		300	300		300	300		300	300		300
Base Capacity (vph)	503	1457	1583	686	1728	1583	686	1937	1583	299	1365	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.75	0.26	0.97	0.84	0.18	0.91	0.79	0.30	0.70	0.75	0.25

Intersection Summary

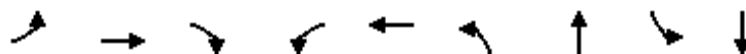
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Queues
2: S. Old Tom Morris Road & E. Jewell Avenue

2040 Total
AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	237	1484	68	95	2052	79	79	79	368
v/c Ratio	0.88	0.47	0.07	0.38	0.73	0.43	0.23	0.25	0.91
Control Delay	53.2	42.4	16.2	15.9	24.9	46.3	22.1	44.0	59.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.2	42.4	16.2	15.9	24.9	46.3	22.1	44.0	59.1
Queue Length 50th (ft)	213	486	25	33	358	54	21	59	199
Queue Length 95th (ft)	m#326	527	m47	m66	441	105	70	104	#375
Internal Link Dist (ft)		823			737		1054		588
Turn Bay Length (ft)	300		300	300		100		100	
Base Capacity (vph)	278	3159	1016	254	2819	191	377	319	428
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.47	0.07	0.37	0.73	0.41	0.21	0.25	0.86

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

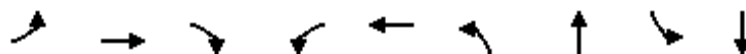
m Volume for 95th percentile queue is metered by upstream signal.

Queues

2040 Total

4: S. Flat Rock Trail & E. Jewell Avenue

AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	89	1447	84	11	1668	247	89	11	274
v/c Ratio	0.47	0.48	0.09	0.05	0.61	0.76	0.16	0.03	0.76
Control Delay	47.9	5.7	0.2	10.3	15.8	52.6	32.7	31.4	54.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.9	5.7	0.2	10.3	15.8	52.6	32.7	31.4	54.3
Queue Length 50th (ft)	44	78	0	3	194	187	51	7	184
Queue Length 95th (ft)	108	105	0	m6	229	249	100	21	275
Internal Link Dist (ft)		1471			1945		889		531
Turn Bay Length (ft)	300		300	300				100	
Base Capacity (vph)	190	2999	984	232	2720	330	568	335	429
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.48	0.09	0.05	0.61	0.75	0.16	0.03	0.64

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues
5: Harvest Road & E. Jewell Avenue

2040 Total
AM Peak



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	447	1037	84	1158	368	95	390	211	158	421
v/c Ratio	0.75	0.38	0.25	0.52	0.44	0.26	0.52	0.72	0.18	0.67
Control Delay	69.2	39.5	14.2	32.0	10.6	38.5	51.3	54.3	45.2	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.2	39.5	14.2	32.0	10.6	38.5	51.3	54.3	45.2	18.2
Queue Length 50th (ft)	239	268	30	300	67	66	166	158	64	87
Queue Length 95th (ft)	297	312	53	360	160	114	223	#235	97	213
Internal Link Dist (ft)		1945		744			884		627	
Turn Bay Length (ft)										
Base Capacity (vph)	640	2755	337	2232	837	365	815	293	943	655
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.38	0.25	0.52	0.44	0.26	0.48	0.72	0.17	0.64

Intersection Summary







95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues

2040 Total

6: S. Gun Club Road & Commercial Access

AM Peak

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	26	53	2632	53	84	2074
v/c Ratio	0.07	0.03	0.69	0.04	0.49	0.48
Control Delay	54.6	0.0	7.2	2.0	54.5	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.6	0.0	7.2	2.0	54.5	1.3
Queue Length 50th (ft)	22	0	157	1	41	40
Queue Length 95th (ft)	m49	m0	200	m5	m70	m42
Internal Link Dist (ft)	764		2085			948
Turn Bay Length (ft)	150				150	
Base Capacity (vph)	377	1583	3818	1198	225	4312
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.03	0.69	0.04	0.37	0.48

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues

2040 Total

9: S. Gun Club Road & E. Yale Avenue

AM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	316	263	2421	158	316	1779
v/c Ratio	0.84	0.17	0.80	0.16	0.69	0.47
Control Delay	76.3	0.2	26.7	5.0	71.6	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.3	0.2	26.7	5.0	71.6	10.1
Queue Length 50th (ft)	299	0	658	18	169	201
Queue Length 95th (ft)	#455	0	733	52	221	218
Internal Link Dist (ft)	1129		801			2085
Turn Bay Length (ft)						
Base Capacity (vph)	377	1583	3015	984	503	3796
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.17	0.80	0.16	0.63	0.47

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.













Queue shown is maximum after two cycles.

Queues

2040 Total

1: S. Gun Club Road & E. Jewell Avenue

PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	385	1400	650	645	1150	250	670	1200	750	275	1500	490
v/c Ratio	0.75	1.01	0.41	1.08	0.76	0.16	1.05	0.61	0.47	0.72	0.94	0.31
Control Delay	71.4	79.7	0.8	118.7	35.8	0.2	109.6	51.8	0.7	75.6	62.5	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.4	79.7	0.8	118.7	35.8	0.2	109.6	51.8	0.7	75.6	62.5	0.5
Queue Length 50th (ft)	188	~511	0	~371	372	0	~375	333	0	136	524	0
Queue Length 95th (ft)	246	#621	0	#500	464	0	#505	334	0	187	#619	0
Internal Link Dist (ft)		1000			823			948			606	
Turn Bay Length (ft)	300		300	300		300	300		300	300		300
Base Capacity (vph)	526	1389	1583	595	1515	1583	640	1974	1583	389	1593	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	1.01	0.41	1.08	0.76	0.16	1.05	0.61	0.47	0.71	0.94	0.31

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

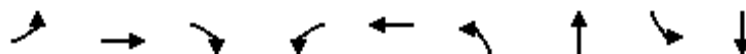
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues
2: S. Old Tom Morris Road & E. Jewell Avenue

2040 Total
PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	263	2153	137	153	1879	147	184	53	210
v/c Ratio	0.88	0.67	0.13	0.70	0.62	0.70	0.50	0.29	0.74
Control Delay	44.5	44.5	17.0	54.9	14.6	67.4	23.5	50.3	39.5
Queue Delay	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.5	45.0	17.0	54.9	14.6	67.4	23.5	50.3	39.5
Queue Length 50th (ft)	204	693	56	116	192	126	42	43	70
Queue Length 95th (ft)	m#327	m727	m79	#199	279	190	111	78	157
Internal Link Dist (ft)		823			737		1054		588
Turn Bay Length (ft)	300		300	300		100		100	
Base Capacity (vph)	300	3231	1054	227	3041	212	418	184	353
Starvation Cap Reductn	0	582	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.81	0.13	0.67	0.62	0.69	0.44	0.29	0.59

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

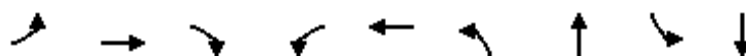
m Volume for 95th percentile queue is metered by upstream signal.

Queues

2040 Total

4: S. Flat Rock Trail & E. Jewell Avenue

PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	274	1779	274	32	1664	158	37	5	232
v/c Ratio	0.80	0.55	0.25	0.17	0.65	0.60	0.08	0.02	0.56
Control Delay	64.1	17.8	5.9	7.9	16.2	53.2	24.8	39.8	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.1	17.8	5.9	7.9	16.2	53.2	24.8	39.8	15.3
Queue Length 50th (ft)	242	275	24	7	189	123	11	4	18
Queue Length 95th (ft)	336	382	93	m11	219	190	46	15	104
Internal Link Dist (ft)		1471			1945		889		531
Turn Bay Length (ft)	300		300	300				100	
Base Capacity (vph)	355	3236	1107	199	2559	268	470	306	462
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.55	0.25	0.16	0.65	0.59	0.08	0.02	0.50

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues

2040 Total

5: Harvest Road & E. Jewell Avenue

PM Peak



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	395	1410	126	1158	263	79	379	368	337	447
v/c Ratio	0.72	0.59	0.53	0.58	0.34	0.24	0.51	0.91	0.31	0.62
Control Delay	79.0	39.0	26.5	37.5	4.7	32.7	50.7	64.5	40.8	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.0	39.0	26.5	37.5	4.7	32.7	50.7	64.5	40.8	15.1
Queue Length 50th (ft)	211	313	55	326	1	49	161	278	133	88
Queue Length 95th (ft)	268	276	93	386	61	88	215	#407	178	210
Internal Link Dist (ft)		1945		744			884		627	
Turn Bay Length (ft)										
Base Capacity (vph)	617	2381	258	2004	782	324	748	404	1086	717
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.59	0.49	0.58	0.34	0.24	0.51	0.91	0.31	0.62

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.







Queue shown is maximum after two cycles.

Queues

2040 Total

6: S. Gun Club Road & Commercial Access

PM Peak

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	95	111	2653	53	137	2811
v/c Ratio	0.25	0.07	0.82	0.05	0.65	0.74
Control Delay	60.9	0.1	10.9	1.0	62.1	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	60.9	0.1	10.9	1.0	62.1	4.7
Queue Length 50th (ft)	87	0	138	1	84	73
Queue Length 95th (ft)	m143	m0	190	m1	m104	m74
Internal Link Dist (ft)	764		2085			948
Turn Bay Length (ft)	150				150	
Base Capacity (vph)	377	1583	3228	1018	248	3796
Starvation Cap Reductn	0	0	0	0	0	256
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.07	0.82	0.05	0.55	0.79

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues

2040 Total

9: S. Gun Club Road & E. Yale Avenue

PM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	395	421	2284	342	474	2421
v/c Ratio	0.86	0.27	0.88	0.38	0.80	0.68
Control Delay	72.1	0.4	38.6	10.2	65.6	20.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.1	0.4	38.6	10.2	65.6	20.3
Queue Length 50th (ft)	364	0	755	75	254	458
Queue Length 95th (ft)	#500	0	834	151	313	504
Internal Link Dist (ft)	1129		801			2085
Turn Bay Length (ft)						
Base Capacity (vph)	495	1583	2591	908	620	3567
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.27	0.88	0.38	0.76	0.68

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.