



LSC TRANSPORTATION CONSULTANTS, INC.

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January 12, 2024

Mr. James Spehalski  
Cottonwood Creek Investors  
c/o Marathon Land Company  
9750 W. Cambridge Place  
Littleton, CO 80217

Re: Cottonwood Creek  
Phase 1  
Aurora, CO  
LSC #230040

Dear Mr. Spehalski:

In response to your request, LSC Transportation Consultants, Inc. has prepared this updated traffic impact analysis for the proposed Phase 1 of the Cottonwood Creek development to address City comments. As shown on Figure 1, the site is located south of Jewell Avenue between Monaghan Road and Hayesmount Road in 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 projected 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.

## **RECENT TRAFFIC STUDIES**

LSC prepared an updated master traffic impact study (MTIS) for the entire Cottonwood Creek Master Plan, dated July 14, 2022.

## **LAND USE AND ACCESS**

Phase 1 of the Cottonwood Creek development is proposed to include about 835 single-family detached dwelling units and 266 townhomes. About 12.6 acres of park space, a 4.4-acre parcel for a community center and a fire station are anticipated to be developed in the short-term future. Phase 1 also includes an elementary school site and a mixed use parcel which was assumed to be developed with about 50,000 square feet of commercial space. The school parcel and mixed use parcel are not anticipated to be developed in the short-term. There are also three

existing oil & gas well sites within the Cottonwood Creek development. Access is proposed from several locations as shown in the conceptual site plan in Figure 2.

Figure 2 shows all of the proposed sidewalks and trails within the proposed Cottonwood Phase 1. As shown in Figure 2, the proposed pedestrian system provides for access between the residential land uses and the community center, the parks, the future school site, and the future retail parcel.

The currently proposed Phase 1 development was included in the Updated MTIS. Appendix Table 1 shows a comparison of the currently proposed land uses and the land uses assumed in the Updated MTIS. The currently proposed Phase 1 is planned to contain about 41 more single-family homes and seven more townhomes than were assumed for these same planning areas in the Updated MTIS. The non-residential land uses are consistent with the Updated MTIS. The following changes to the access from what was assumed in the Updated Master TIS are proposed:

- An additional right-in/right-out access to E. Jewell Avenue between S. Del Ray Street and Hayesmount Avenue.
- An additional right-in/right-out access to Monaghan Road just south of E. Jewell Avenue to serve the future mixed use parcel
- An additional full-movement site access to Monaghan Road just north of E. Iliff Avenue
- Three full-movement site access points to Hayesmount Road

### **SHORT-TERM ACCESS TO EXISTING YALE STREET**

Yale Street currently extends west from Watkins Road for about three miles and then turns and continues northwest to Jewell Avenue. The northwest diagonal section is planned to be used to provide secondary access for the initial phases of Cottonwood Creek, however, by 2040 it was assumed that Yale Street would be extended west along the straight east/west alignment to Gun Club Road. It was assumed once Yale Street is extended west, the “diagonal” section would be removed and alternate access would be provided to the parcels just west of Cottonwood Creek.

### **ROADWAY AND TRAFFIC CONDITIONS**

#### **Area Roadways**

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

- **E. Jewell Avenue** is an east-west, two-lane roadway passing through the site. The intersections with E. Powhaton Road and S. Watkins Road are stop-sign controlled. The posted speed limit in the vicinity of the site is 45 mph. The NEATS study shows a four-lane major arterial adjacent to the site by 2040 and a six-lane major arterial west of Monaghan Road. The south half of the final cross-section is planned to be constructed adjacent to the site with the currently proposed Cottonwood Creek Phase 1.
- **S. Powhaton Road** is a north-south, two-lane roadway west of the site. The intersection with E. Jewell Avenue is stop-sign controlled. The posted speed limit in the vicinity of the

site is 45 mph. The NEATS study shows a four-lane major arterial by 2040 in the vicinity of the site.

- **Monaghan Road** is a north-south roadway that will ultimately extend from south of Yale Avenue to E. 64<sup>th</sup> Avenue. In the vicinity of the site only a short section of gravel road has been constructed south of E. Jewell Avenue to serve an existing oil well operation. The NEATS study shows the section of Monaghan Road between E. Jewell Avenue and I-70 as a four-lane Major Arterial. The east half of the final cross-section is planned to be constructed adjacent to the site and north of E. Jewell Avenue to Exposition Avenue with the currently proposed Cottonwood Creek Phase 1.
- **E. Yale Avenue** is an east-west, two-lane roadway south of the site. The SEATS study shows a four-lane minor arterial by 2030.

### Existing Traffic Conditions

Figure 3 shows the existing traffic volumes, lane geometry and traffic control at the intersection of E. Jewell Avenue/Powhatan Road on a typical weekday. The traffic volumes are based on the attached traffic counts conducted by Counter Measures in August, 2019 with adjustments based on counts conducted at E. Jewell Avenue/Harvest Road in September 2021 and at E. Jewell Avenue/Watkins Road in August, 2019 and January, 2023.

### 2028 and 2040 Background Traffic

Figure 4a shows the estimated 2028 background traffic volumes at the study area intersections. The 2028 background traffic assume the areas north of E. Jewell Avenue in the vicinity of the site remain undeveloped by 2028. The 2028 background volumes are estimates by LSC based on a straight line growth of the 2040 background volumes unrelated to the traffic projected to be generated by future development of the parcels north of E. Jewell Avenue and future phases of the Cottonwood Creek Master Plan. The 2028 background volumes assume Monaghan Road has been constructed as a two-lane roadway between E. Jewell Avenue and Exposition Avenue. The 2028 background traffic volumes also assume the existing alignment of E. Yale Avenue and S. Powhatan Road and that S. Powhatan Road has not been extended south of E. Jewell Avenue and that Hayesmount Road has not been improved and/or extended north of E. Jewell Avenue.

Figure 4b shows the estimated lane geometry and traffic control for the study area intersections.

Figure 5a shows the estimated 2040 background traffic for the study area intersections. The background traffic is based on Updated Cottonwood Creek Master TIS and other work completed by LSC in the area including the *Foundry Traffic Impact Analysis* dated October 21, 2022. The 2040 background traffic volumes assume buildout of the surrounding roadway network and full buildout of the surrounding area.

Figure 5b shows the estimated lane geometry and traffic control for the study area intersections.

**Existing, 2028 Background, 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 through 5b were analyzed to determine the existing, 2028 background, and 2040 background levels of service using Synchro. Table 1 shows the level of service analysis results. The level of service reports are attached.

- 6. E. Jewell Avenue/S. Powhatan Road:** All movements at this stop-sign controlled intersection currently operate at LOS "A" during both morning and afternoon peak-hours and are expected to continue to do so through 2028. By 2040, this intersection is expected to be realigned to the east and signalized. As a signal controlled intersection it is expected to operate at an overall LOS "C" during both peak-hours.
- 7. E. Jewell Avenue/Monaghan Road:** This future signalized intersection is expected to operate at an overall LOS "C" during the morning peak-hour and LOS "D" during the afternoon peak-hour through 2040. Some of the minor movements are projected to operate at LOS "E" during the peak-hours. It is common for left-turn and side-street through movements to have projected delays in the LOS "E" range, as signal coordination timing plans generally give priority to moving through traffic. This often results in higher delay for left-turn and side-street movements and can result in movement/approach delays in the "E" or "F" range even though they are projected to have sufficient capacity for the projected traffic volumes.
- 8. E. Jewell Avenue/S. Del Ray Street:** All movements at this future signalized intersection are expected to operate at LOS "B" or better during both morning and afternoon peak-hours through 2040.
- 9. E. Jewell Avenue/N. Hayesmount Road:** All movements at this existing stop-sign controlled intersection are expected to operate at LOS "A" during the peak-hours through 2028. By 2040 N. Hayesmount Road is planned to be extended north and south of E. Jewell Avenue and this intersection is expected to be converted to signal control. As a signalized intersection it is expected to operate at LOS "B" during both morning and afternoon peak-hours through 2040.
- 14. Monaghan Road/Phase 1 North Access:** This intersection was analyzed only in the total traffic scenarios.
- 15. Monaghan Road/E. Iliff Avenue:** All movements at this future stop-sign controlled intersection are expected to operate at LOS "B" or better through 2040.
- 16. E. Iliff Avenue/S. Del Ray Street:** All approaches at this future one-lane modern roundabout are expected to operate at LOS "A" during the peak-hours through 2040.
- 17. E. Iliff Avenue/Hayesmount Road:** All movements at this future stop-sign controlled intersection are expected to operate at LOS "B" or better through 2040.

- 21. S. Powhaton Road/E. Yale Avenue:** This intersection is not anticipated to be constructed in the short-term. By 2040 it is expected to be constructed as a stop-sign controlled intersection and all movements are projected to operate at LOS “B” or better during the peak-hours.
- 22. E. Monaghan Road/E. Yale Avenue:** This intersection is not anticipated to be constructed in the short-term. By 2040 it is expected to be constructed as a two-lane modern roundabout and all approaches are projected to operate at LOS “A” during the peak-hours.
- 23. E. Yale Avenue/S. Del Ray Street:** This intersection is not anticipated to be constructed in the short-term. By 2040 it is expected to be constructed as a stop-sign controlled intersection and all movements are projected to operate at LOS “B” or better during the peak-hours.
- 24. E. Yale Avenue/Hayesmount Road:** All movements at this future stop-sign controlled intersection are expected to operate at This intersection is not anticipated to be constructed in the short-term. By 2040 it is expected to be constructed as a stop-sign controlled intersection and all movements are projected to operate at LOS “B” or better during the peak-hours.
- 27. E. Jewell Avenue/Phase 1 Full-Movement Access:** This intersection was analyzed only in the total traffic scenarios.
- 28. E. Jewell Avenue/Phase 1 Right-in/Right-out Access:** This intersection was analyzed only in the total traffic scenarios.
- 29. Monaghan Road/Retail Right-in/Right-out Access:** This intersection was analyzed only in the total traffic scenarios.
- 30. Monaghan Road/Phase 1 South Access:** This intersection was analyzed only in the total traffic scenarios.

## 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, 11<sup>th</sup> Edition, 2021 by the Institute of Transportation Engineers (ITE).

The residential portion of the site is expected to generate about 9,789 vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. As shown in Appendix Table 1, this is about 437 more vehicle-trips than was estimated for the same area in the MTIS. During the morning peak-hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 192 residential related vehicles would enter and about 521 residential related vehicles would exit the site. As shown in Appendix Table 1, this is about 9 more entering vehicles and 24 more exiting vehicles than was estimated for the same area in the MTIS. During the afternoon peak-hour, which generally occurs for one hour between 4:00 and 6:00 p.m., about 580 residential related vehicles would enter and about 355 residential related vehicles would exit. As shown in Appendix Table 1, this is about 26 more entering vehicles and 16 more

exiting vehicles than was estimated for the same area in the MTIS. These estimates are expected to be reduced due to internal trips as shown in Appendix Table 2.

Neighborhood parks, a community center, and a fire station are all anticipated to be developed within the Phase 1 area in the short-term. There are also three existing oil and gas sites within the Cottonwood Creek Master Plan Area. These developments are expected to generate about 1,553 vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. During the morning peak-hour, about 74 non-residential related vehicles would enter and about 41 non-residential related vehicles would exit the site. During the afternoon peak-hour, about 86 non-residential related vehicles would enter and about 98 non-residential related vehicles would exit. As shown in Appendix Table 1 this is consistent with the trip generation estimate for the same area assumed in the MTIS. These estimates are expected to be reduced due to internal trips as shown in Appendix Table 2.

By 2040 an elementary school and a mixed use parcel are anticipated to be developed within the Phase 1 area. These developments are expected to generate about 4,511 vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. During the morning peak-hour, about 254 school and retail related vehicles would enter and about 203 school and retail related vehicles would exit the site. During the afternoon peak-hour, about 164 school and retail related vehicles would enter and about 175 school and retail related vehicles would exit. As shown in Appendix Table 1 this is consistent with the trip generation estimate for the same area assumed in the MTIS. These estimates are expected to be reduced due to internal and pass-by trips as shown in Appendix Table 2.

## **DIRECTIONAL DISTRIBUTION**

Figure 6 shows the estimated short-term and long-term 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. The short-term directional distribution estimates assume the existing alignment of E. Yale Avenue and S. Powhatan Road and assume that S. Powhatan Road has not been extended south of E. Jewell Avenue and that Monaghan Road and Hayesmount Road have not been improved and/or extended north of E. Jewell Avenue. The long-term directional distribution estimate assumes buildout of the area street network.

## **TRIP ASSIGNMENT**

Figures 7a and 7b show the estimated assignment of residential and non-residential site-generated traffic volumes for the study area intersections based on the trip generation estimate (from Table 2) and the directional distribution shown in Figure 6.

Figures 8a and 8b show the estimated assignment of residential and non-residential site-generated traffic volumes for the study area intersections based on the trip generation estimate (from Table 2) and the directional distribution shown in Figure 6.

## **2028 AND 2040 TOTAL TRAFFIC**

Figure 9a shows the estimated 2028 total traffic for the study area intersections planned to be constructed in the short-term. The 2028 total traffic volumes are the sum of the 2028 back-

ground traffic volumes traffic volumes in Figure 4a and the short-term site-generated traffic volumes shown in Figures 7a and 7b.

Figure 9b shows the estimated 2028 total traffic lane geometry and traffic control for the study area intersections planned to be constructed in the short-term.

Figure 10a shows the estimated 2040 total traffic for the study area intersections. The 2040 total traffic volumes are the sum of the 2040 background traffic volumes from Figure 5a and the long-term site-generated traffic volumes from Figures 8a and 8b.

Figure 10b shows the estimated 2040 total traffic lane geometry and traffic control for the study area intersections.

### **TRAFFIC SIGNAL WARRANT ANALYSIS**

Tables 3 through 6 show the projected traffic volumes compared to the traffic volume thresholds for Traffic Signal Warrant 1 (Eight-Hour), Warrant 2 (Four-Hour), and Warrant 3 (Peak-Hour) at the following intersections:

- Table 3: E. Jewell Avenue/S. Powhatan Road (#6)
- Table 4: E. Jewell Avenue/ Monaghan Road (#7)
- Table 5: E. Jewell Avenue/S. Del Ray Street (#8)
- Table 6: E. Jewell Avenue/Hayesmount Road (#9)

The findings of Tables 3 through 6 are summarized in Table 7.

The intersection of E. Jewell Avenue/S. Powhatan Road (#6) is projected to meet multiple traffic signal warrants by 2028 based on the projected total traffic volumes.

The intersections of E. Jewell Avenue/Monaghan Road (#7) and E. Jewell Avenue/Hayesmount Road (#9) are projected to meet multiple traffic signal warrants by 2040 based on the projected background traffic volumes and the intersection of E. Jewell Avenue/ Street “A” (#8) is projected to meet multiple traffic signal warrants by 2040 based on the projected total traffic volumes.

### **PROJECTED LEVELS OF SERVICE**

The intersections in Figures 9a through 10b were analyzed to determine the 2028 total and 2040 total levels of service. Table 1 shows the level of service analysis results. The level of service reports are attached.

- 6. E. Jewell Avenue/S. Powhatan Road:** All movements at this stop-sign controlled intersection are expected to operate at LOS “D” or better during both morning and afternoon peak-hours with the following exception: The southbound left-turn movement is expected to operate at LOS “E” in the 2028 afternoon peak-hour. This intersection is expected to meet multiple traffic signal warrants by buildout of Phase 1 of the Cottonwood Creek development. As a signal controlled intersection it is expected to operate at an overall LOS “C” during both peak-hours through 2040.

- 7. E. Jewell Avenue/Monaghan Road:** This intersection is expected to operate at LOS “D” or better for all movements during the peak-hours through 2028 as a stop-sign controlled intersection. By 2040 it was assumed that Monaghan Road would be extended north to Interstate 70 and south to E. Yale Avenue and that the intersection with E. Jewell Avenue would be converted to signal control. As a signalized intersection it is expected to operate at an overall LOS “C” during the morning peak-hour and LOS “D” during the afternoon peak-hour through 2040. Some of the minor movements are projected to operate at LOS “E” during the peak-hours. It is common for left-turn and side-street through movements to have projected delays in the LOS “E” range, as signal coordination timing plans generally give priority to moving through traffic. This often results in higher delay for left-turn and side-street movements and can result in movement/approach delays in the “E” or “F” range even though they are projected to have sufficient capacity for the projected traffic volumes.
- 8. E. Jewell Avenue/S. Del Ray Street:** This intersection is expected to operate at LOS “B” or better for all movements during the peak-hours through 2028 as a stop-sign controlled intersection. By 2040 it was assumed that S. Del Ray Street would be extended north of E. Jewell Avenue and south to E. Yale Avenue and that the intersection with E. Jewell Avenue would be converted to signal control. As a signalized intersection it is expected to operate at LOS “B” during both morning and afternoon peak-hours through 2040.
- 9. E. Jewell Avenue/N. Hayesmount Road:** All movements at this existing stop-sign controlled intersection are expected to operate at LOS “B” or better during the peak-hours through 2028. By 2040 N. Hayesmount Road is planned to be extended north and south of E. Jewell Avenue and this intersection is expected to be converted to signal control. As a signalized intersection it is expected to operate at LOS “B” during both morning and afternoon peak-hours through 2040.
- 14. Monaghan Road/Phase 1 North Access:** All movements at this stop-sign controlled intersection are expected to operate at LOS “B” or better during both morning and afternoon peak-hours through 2040.
- 15. Monaghan Road/E. Iliff Avenue:** All movements at this future stop-sign controlled intersection are expected to operate at LOS “C” or better during both morning and afternoon peak-hours through 2040.
- 16. E. Iliff Avenue/S. Del Ray Street:** All approaches at this future one-lane modern roundabout are expected to operate at LOS “A” during both morning and afternoon peak-hours through 2040.
- 17. E. Iliff Avenue/Hayesmount Road:** All movements at this future stop-sign controlled intersection are expected to operate at LOS “B” or better during both morning and afternoon peak-hours through 2040.
- 21. S. Powhaton Road/E. Yale Avenue:** This intersection is not anticipated to be constructed in the short-term. By 2040 it is expected to be constructed as a stop-sign controlled intersection and all movements are projected to operate at LOS “B” or better during the peak-hours.



- 22. E. Monaghan Road/E. Yale Avenue:** This intersection is not anticipated to be constructed in the short-term. By 2040 it is expected to be constructed as a two-lane modern roundabout and all approaches are projected to operate at LOS “A” during the peak-hours.
- 23. E. Yale Avenue/S. Del Ray Street:** This intersection is not anticipated to be constructed in the short-term. By 2040 it is expected to be constructed as a stop-sign controlled intersection and all movements are projected to operate at LOS “B” or better during the peak-hours.
- 24. E. Yale Avenue/Hayesmount Road:** This intersection is not anticipated to be constructed in the short-term. By 2040 it is expected to be constructed as a stop-sign controlled intersection and all movements are projected to operate at LOS “B” or better during the peak-hours.
- 27. E. Jewell Avenue/Phase 1 Full-Movement Access:** All movements at this future stop-sign controlled intersection are expected to operate at LOS “C” or better through 2040.
- 28. E. Jewell Avenue/Phase 1 Right-in/Right-out Access:** All movements at this future stop-sign controlled intersection are expected to operate at LOS “B” or better through 2040.
- 29. Monaghan Road/Retail Right-in/Right-out Access:** All movements at this future stop-sign controlled intersection are expected to operate at LOS “A” through 2040.
- 29. Monaghan Road/Phase 1 South Access:** All movements at this future stop-sign controlled intersection are expected to operate at LOS “A” through 2040.

## 95TH PERCENTILE QUEUE LENGTHS

The estimated 2040 95<sup>th</sup> percentile queue lengths for the intersections in the study area are shown in Table 8 along with the recommended turn lane lengths based on the NR-B classification criteria in the CDOT *State Highway Access Code* and the projected 95<sup>th</sup> percentile queue lengths.

## RECOMMENDED ROADWAY CLASSIFICATIONS

Figure 11 shows the recommended roadway classifications for the internal roadways based on the projected average weekday traffic volumes shown on Figures 9a and 10a. Figure 11 also shows the classifications for the adjacent roadways based on the NEATS study.

## RECOMMENDED IMPROVEMENTS

Table 9 shows the recommended improvements by 2028 and 2040. The recommended turn lane lengths are based on the criteria contained in the CDOT *State Highway Access Code* for the NR-B classification, the projected total traffic volumes shown in Figures 9a and 10a, and the projected 95<sup>th</sup> percentile queue lengths shown in Table 8. A design speed of 45 mph was assumed for all Major and Minor Arterial roadways, a design speed of 35 mph was assumed for Collector roadways, and a design speed of 25 mph was assumed for all Local roadways.

**CONCLUSIONS AND RECOMMENDATIONS****Trip Generation**

1. The residential portion of the site is expected to generate about 9,789 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 192 residential related vehicles would enter and about 521 residential related 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 580 residential related vehicles would enter and about 355 residential related vehicles would exit. These estimates are expected to be reduced due to internal trips as shown in Appendix Table 2.
2. Neighborhood parks, a community center, and a fire station are all anticipated to be developed within the Phase 1 area in the short-term. There are also three existing oil and gas sites within the Cottonwood Creek Master Plan Area. These developments are expected to generate about 1,553 vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. During the morning peak-hour about 74 non-residential related vehicles would enter and about 41 non-residential related vehicles would exit the site. During the afternoon peak-hour about 86 non-residential related vehicles would enter and about 98 non-residential related vehicles would exit. These estimates are expected to be reduced due to internal trips as shown in Appendix Table 2.
3. By 2040 an elementary school and a mixed use parcel are anticipated to be developed within the Phase 1 area. These developments are expected to generate about 4,511 vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. During the morning peak-hour about 254 school and retail related vehicles would enter and about 203 school and retail related vehicles would exit the site. During the afternoon peak-hour about 164 school and retail related vehicles would enter and about 175 school and retail related vehicles would exit. These estimates are expected to be reduced due to internal and pass-by trips as shown in Appendix Table 2.

**Projected Levels of Service**

4. The intersection of E. Jewell Avenue/Powhaton Road (#6) is projected to meet multiple traffic signal warrants by 2028 based on the projected total traffic volumes. If signalized this intersection is expected to operate at LOS "C" or better during both morning and afternoon peak-hours through 2040 with the recommended improvements.
5. The intersections of E. Jewell Avenue/Monaghan Road (#7), E. Jewell Avenue/Street "A" (#8), and E. Jewell Avenue/Hayesmount Road (#9) are projected to meet multiple traffic signal warrants by 2040 based on the projected background or total traffic volumes. If signalized these intersections are projected to operate at an overall LOS "D" or better during the peak-hours through 2040.
6. LSC recommends that the intersection of E. Yale Avenue/Monaghan Road (#22) be constructed as a modern two-lane roundabout. As a roundabout controlled intersection all approaches are expected to operate at LOS "A" through 2040.

7. LSC recommends that the intersection of E. Iliff Avenue/S. Del Ray Street (#16) be constructed as a modern one-lane roundabout. As a roundabout controlled intersection all approaches are expected to operate at LOS "A" through 2040.
8. All movements at the other intersections in the study area are expected to operate at LOS "D" or better during both morning and afternoon peak-hours through 2040 as stop-sign controlled intersections with the recommended improvements.

### Conclusions

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

### Recommendations

10. The recommended improvements are shown in Figures 9b and 10b and detailed in Tables 8 and 9.

\* \* \* \* \*

We trust our findings will assist you in gaining approval of the proposed Cottonwood Creek Phase 1 development. Please contact me if you have any questions or need further assistance.

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.

By   
Christopher S. McGranahan, P.E.  
Principal/President



CSM/wc

1-12-24

Enclosures: Tables 1 - 9  
Figures 1 - 11  
Appendix Tables 1 & 2  
Traffic Counts  
Level of Service Definitions  
Level of Service Reports  
Queuing Reports

Table 1 (Page 1 of 4)  
Intersection Levels of Service Analysis  
Cottonwood Creek Phase 1  
Aurora, Colorado  
LSC #230040; January, 2024

Intersection Location	Traffic Control	Existing Traffic				2028 Background Traffic				2028 Total Traffic				2040 Background Traffic				2040 Total Traffic			
		Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay	Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay	Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay	Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay	Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay
6) E. Jewell Avenue/S. Powhaton Road	TWSC																				
EB Left/Through or Left		A	7.5	A	7.5	A	7.7	A	7.5	A	9.6	A	8.7	--	--	--	--	--	--	--	--
SB Approach		A	9.1	A	8.9	A	9.8	A	9.6	--	--	--	--	--	--	--	--	--	--	--	--
SB Left		--	--	--	--	--	--	--	--	D	27.4	E	45.4	--	--	--	--	--	--	--	--
SB Right		--	--	--	--	--	--	--	--	C	17.0	B	12.4	--	--	--	--	--	--	--	--
	Signalized																				
EB Left		--	--	--	--	--	--	--	--	B	10.6	A	5.6	C	23.3	B	19.9	D	45.9	C	32.0
EB Through		--	--	--	--	--	--	--	--	A	4.2	A	5.0	B	10.2	B	19.5	B	11.7	C	24.1
EB Right		--	--	--	--	--	--	--	--	--	--	--	--	A	9.0	B	12.1	A	9.9	B	13.0
EB Approach & Delay		--	--	--	--	--	--	--	--	A	7.0	A	5.1	B	15.3	B	19.4	C	23.3	C	25.3
WB Left		--	--	--	--	--	--	--	--	--	--	--	--	B	11.3	B	16.0	B	12.4	B	19.4
WB Through		--	--	--	--	--	--	--	--	A	5.9	A	3.9	B	19.2	B	19.6	C	23.6	C	22.4
WB Right		--	--	--	--	--	--	--	--	A	3.7	A	2.8	A	0.0	A	0.0	A	0.0	A	0.0
WB Approach & Delay		--	--	--	--	--	--	--	--	A	5.7	A	3.7	B	19.1	B	19.5	C	23.5	C	22.3
NB Left		--	--	--	--	--	--	--	--	--	--	--	--	D	39.9	D	40.1	D	39.8	D	40.1
NB Through		--	--	--	--	--	--	--	--	--	--	--	--	D	42.6	D	42.6	D	42.6	D	42.6
NB Right		--	--	--	--	--	--	--	--	--	--	--	--	A	0.0	A	0.0	A	0.0	A	0.0
NB Approach & Delay		--	--	--	--	--	--	--	--	--	--	--	--	D	41.6	D	41.9	D	41.6	D	41.9
SB Left		--	--	--	--	--	--	--	--	C	29.5	C	32.3	D	39.7	D	35.9	D	38.7	D	36.2
SB Through		--	--	--	--	--	--	--	--	--	--	--	--	D	41.8	D	36.7	D	39.9	D	35.2
SB Right		--	--	--	--	--	--	--	--	D	47.2	D	40.7	A	0.0	A	0.0	A	0.0	A	0.0
SB Approach & Delay		--	--	--	--	--	--	--	--	D	45.6	D	38.3	D	40.7	D	36.2	D	39.2	D	36.0
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--	--	--	14.1		10.0		20.0		21.6		25.1		25.9	
Entire Intersection LOS		--	--	--	--	--	--	--	--	B		B		C		C		C		C	
7) E. Jewell Avenue/Monaghan Road	TWSC																				
NB Left/Through		--	--	--	--	--	--	--	--	C	22.3	D	25.3	--	--	--	--	--	--	--	--
NB Right		--	--	--	--	--	--	--	--	A	9.1	B	10.7	--	--	--	--	--	--	--	--
Eastbound Left/Through		--	--	--	--	A	0.0	A	0.0	A	0.0	A	0.0	--	--	--	--	--	--	--	--
WB Left/Through		--	--	--	--	--	--	--	--	A	7.7	A	9.0	--	--	--	--	--	--	--	--
SB Approach		--	--	--	--	A	9.0	A	9.2	B	14.1	C	19.5	--	--	--	--	--	--	--	--
	Signalized																				
EB Left		--	--	--	--	--	--	--	--	--	--	--	--	E	62.3	E	70.0	E	62.3	E	70.0
EB Through		--	--	--	--	--	--	--	--	--	--	--	--	A	6.6	A	7.5	A	9.0	B	10.2
EB Right		--	--	--	--	--	--	--	--	--	--	--	--	A	0.0	A	0.0	A	0.0	A	0.0
EB Approach & Delay		--	--	--	--	--	--	--	--	--	--	--	--	C	29.1	D	35.8	C	26.0	C	33.7
WB Left		--	--	--	--	--	--	--	--	--	--	--	--	A	6.9	B	11.5	A	8.8	B	13.6
WB Through		--	--	--	--	--	--	--	--	--	--	--	--	A	9.1	B	13.8	B	12.3	B	16.9
WB Right		--	--	--	--	--	--	--	--	--	--	--	--	A	0.0	A	0.0	A	0.0	A	0.0
WB Approach & Delay		--	--	--	--	--	--	--	--	--	--	--	--	A	8.9	B	13.6	B	12.1	B	16.5
NB Left		--	--	--	--	--	--	--	--	--	--	--	--	D	48.8	D	49.9	D	50.3	E	60.5
NB Through		--	--	--	--	--	--	--	--	--	--	--	--	D	49.2	D	52.5	D	47.5	D	53.1
NB Right		--	--	--	--	--	--	--	--	--	--	--	--	A	0.0	A	0.0	A	0.0	A	0.0
NB Approach & Delay		--	--	--	--	--	--	--	--	--	--	--	--	D	49.0	D	51.1	D	49.1	E	57.2
SB Left		--	--	--	--	--	--	--	--	--	--	--	--	E	61.0	E	59.5	E	59.7	E	64.3
SB Through		--	--	--	--	--	--	--	--	--	--	--	--	D	54.4	D	54.5	E	55.0	D	53.3
SB Right		--	--	--	--	--	--	--	--	--	--	--	--	A	0.0	A	0.0	A	0.0	A	0.0
SB Approach & Delay		--	--	--	--	--	--	--	--	--	--	--	--	E	58.6	E	57.1	E	58.3	E	59.4
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--	--	--	--	--	--	--	26.5		35.6		28.6		37.4	
Entire Intersection LOS		--	--	--	--	--	--	--	--	--	--	--	--	C		D		C		D	

Table 1 (Page 2 of 4)  
Intersection Levels of Service Analysis  
Cottonwood Creek Phase 1  
Aurora, Colorado  
LSC #230040; January, 2024

Intersection Location	Traffic Control	Existing Traffic				2028 Background Traffic				2028 Total Traffic				2040 Background Traffic				2040 Total Traffic			
		Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay	Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay	Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay	Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay	Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay
8) <u>E. Jewell Avenue/S. Del Ray Street</u>	TWSC	--	--	--	--	--	--	--	--	B	11.5	B	12.3	--	--	--	--	--	--	--	--
NB Left		--	--	--	--	--	--	--	--	A	8.7	A	9.3	--	--	--	--	--	--	--	--
NB Right		--	--	--	--	--	--	--	--	A	7.5	A	8.1	--	--	--	--	--	--	--	--
WB Left/Through		--	--	--	--	--	--	--	--	A		A		--	--	--	--	--	--	--	--
	Signalized																				
EB Left		--	--	--	--	--	--	--	--	--	--	--	--	A	5.7	A	7.9	B	12.0	B	11.8
EB Through		--	--	--	--	--	--	--	--	--	--	--	--	A	6.2	B	10.6	B	14.2	B	17.0
EB Right		--	--	--	--	--	--	--	--	--	--	--	--	A	5.8	A	9.1	B	14.4	B	15.9
EB Approach & Delay		--	--	--	--	--	--	--	--	--	--	--	--	A	6.1	B	10.2	B	14.1	B	16.4
WB Left		--	--	--	--	--	--	--	--	--	--	--	--	A	5.9	A	8.4	B	11.4	B	12.8
WB Through/Right		--	--	--	--	--	--	--	--	--	--	--	--	A	8.1	B	10.7	B	15.5	B	15.6
WB Approach & Delay		--	--	--	--	--	--	--	--	--	--	--	--	A	8.0	B	10.6	B	15.0	B	15.2
NB Left		--	--	--	--	--	--	--	--	--	--	--	--	D	46.4	D	40.3	D	39.8	D	36.0
NB Through		--	--	--	--	--	--	--	--	--	--	--	--	D	46.8	D	40.9	C	34.9	C	34.0
NB Right		--	--	--	--	--	--	--	--	--	--	--	--	A	0.0	A	0.0	A	0.0	A	0.0
NB Approach & Delay		--	--	--	--	--	--	--	--	--	--	--	--	D	46.4	D	40.3	D	39.5	D	35.9
SB Left		--	--	--	--	--	--	--	--	--	--	--	--	D	50.4	E	55.4	D	49.4	D	49.2
SB Through		--	--	--	--	--	--	--	--	--	--	--	--	D	51.4	E	56.2	D	50.6	D	50.6
SB Right		--	--	--	--	--	--	--	--	--	--	--	--	A	0.0	A	0.0	A	0.0	A	0.0
SB Approach & Delay		--	--	--	--	--	--	--	--	--	--	--	--	D	50.5	E	55.7	D	49.8	D	50.3
Entire Intersection LOS		--	--	--	--	--	--	--	--	--	--	--	--	10.9			11.9	19.9		18.4	
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--	--	--	--	--	--	--	B			B	B		B	
9) <u>E. Jewell Avenue/N. Hayesmount Road</u>	TWSC	--	--	--	--	--	--	--	--	A	9.6	B	10.0	--	--	--	--	--	--	--	--
NB Left/Through		--	--	--	--	--	--	--	--	A	8.5	A	8.7	--	--	--	--	--	--	--	--
NB Right		--	--	--	--	--	--	--	--	A		A		--	--	--	--	--	--	--	--
EB Left/Through		--	--	--	--	A	7.4	A	7.3	A	7.4	A	7.4	--	--	--	--	--	--	--	--
WB Left/Through/Right		--	--	--	--	--	--	--	--	A	7.3	A	7.5	--	--	--	--	--	--	--	--
SB Approach		--	--	--	--	A	8.7	A	8.8	A	8.8	A	9.1	--	--	--	--	--	--	--	--
	Signalized																				
EB Left		--	--	--	--	--	--	--	--	--	--	--	--	B	11.4	B	11.4	B	12.4	B	11.8
EB Through		--	--	--	--	--	--	--	--	--	--	--	--	B	12.6	B	14.3	B	13.8	B	15.4
EB Right		--	--	--	--	--	--	--	--	--	--	--	--	B	11.9	B	12.8	B	12.8	B	13.8
EB Approach & Delay		--	--	--	--	--	--	--	--	--	--	--	--	B	12.3	B	13.7	B	13.5	B	14.7
WB Left		--	--	--	--	--	--	--	--	--	--	--	--	B	11.6	B	11.7	B	12.3	B	12.0
WB Through		--	--	--	--	--	--	--	--	--	--	--	--	B	14.7	B	14.2	B	16.2	B	15.0
WB Right		--	--	--	--	--	--	--	--	--	--	--	--	B	13.1	B	13.0	B	14.1	B	13.4
WB Approach & Delay		--	--	--	--	--	--	--	--	--	--	--	--	B	14.4	B	14.0	B	15.8	B	14.6
NB Left		--	--	--	--	--	--	--	--	--	--	--	--	D	35.0	D	35.6	C	34.0	D	35.4
NB Through		--	--	--	--	--	--	--	--	--	--	--	--	D	38.2	D	39.4	D	37.8	D	39.7
NB Right		--	--	--	--	--	--	--	--	--	--	--	--	A	0.0	A	0.0	A	0.0	A	0.0
NB Approach & Delay		--	--	--	--	--	--	--	--	--	--	--	--	D	36.6	D	37.4	D	35.9	D	37.4
SB Left		--	--	--	--	--	--	--	--	--	--	--	--	D	35.9	D	35.2	D	35.9	D	35.3
SB Through		--	--	--	--	--	--	--	--	--	--	--	--	D	38.5	D	40.3	D	38.8	D	42.4
SB Right		--	--	--	--	--	--	--	--	--	--	--	--	A	0.0	A	0.0	A	0.0	A	0.0
SB Approach & Delay		--	--	--	--	--	--	--	--	--	--	--	--	D	37.1	D	38.1	D	37.5	D	39.8
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--	--	--	--	--	--	--	18.0			18.5	19.1		19.5	
Entire Intersection LOS		--	--	--	--	--	--	--	--	--	--	--	--	B			B	B		B	

Table 1 (Page 3 of 4)  
Intersection Levels of Service Analysis  
Cottonwood Creek Phase 1  
Aurora, Colorado  
LSC #230040; January, 2024

Intersection Location	Traffic Control	Existing Traffic				2028 Background Traffic				2028 Total Traffic				2040 Background Traffic				2040 Total Traffic			
		Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay	Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay	Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay	Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay	Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay
14) <u>Monaghan Road/Phase 1 North Access</u>	TWSC																				
WB Approach		--	--	--	--	--	--	--	--	A	9.5	A	9.1	--	--	--	--	B	11.9	B	11.5
SB Left/Through or Left		--	--	--	--	--	--	--	--	A	7.6	A	7.6	--	--	--	--	A	8.2	A	8.1
15) <u>Monaghan Road/E. Iliff Avenue</u>																					
NB Left		--	--	--	--	--	--	--	--	--	--	--	--	A	7.5	A	7.8	A	7.5	A	7.8
EB Left		--	--	--	--	--	--	--	--	--	--	--	--	B	11.3	B	14.9	B	12.4	C	19.0
EB Through/Right		--	--	--	--	--	--	--	--	--	--	--	--	B	10.3	B	10.8	B	11.3	B	14.9
WB Left		--	--	--	--	--	--	--	--	A	0.0	A	0.0	B	10.9	B	13.4	B	11.8	C	16.8
WB Right or Through/Right		--	--	--	--	--	--	--	--	A	8.6	A	8.5	A	9.2	A	9.1	A	9.6	A	9.8
SB Left or Left/Through		--	--	--	--	--	--	--	--	A	7.3	A	7.3	A	7.6	A	7.8	A	7.7	A	8.1
16) <u>E. Iliff Avenue/S. Del Ray Street</u>	Roundabout																				
EB Approach		--	--	--	--	--	--	--	--	A	2.7	A	2.9	A	3.0	A	3.5	A	3.7	A	4.2
WB Approach		--	--	--	--	--	--	--	--	A	2.9	A	2.8	A	3.5	A	3.3	A	4.6	A	3.9
NB Approach		--	--	--	--	--	--	--	--	--	--	--	--	A	3.2	A	3.3	A	3.8	A	4.1
SB Approach		--	--	--	--	--	--	--	--	A	2.7	A	2.7	A	3.0	A	3.6	A	3.8	A	4.3
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--	--	--	2.8		2.9		3.3		3.4		4.1		4.1	
Entire Intersection LOS		--	--	--	--	--	--	--	--	A		A		A		A		A		A	
17) <u>E. Iliff Avenue/Hayesmount Road</u>	TWSC																				
NB Left		--	--	--	--	--	--	--	--	A	0.0	A	0.0	A	7.3	A	7.5	A	7.3	A	7.5
EB Left		--	--	--	--	--	--	--	--	A	8.5	A	8.5	B	10.7	B	12.2	B	11.6	B	13.0
EB Through/Right		--	--	--	--	--	--	--	--	--	--	--	--	B	10.3	B	11.8	B	11.0	B	12.4
WB Left		--	--	--	--	--	--	--	--	--	--	--	--	B	10.3	B	11.8	B	11.1	B	12.5
WB Through/Right		--	--	--	--	--	--	--	--	--	--	--	--	A	9.6	A	9.7	B	10.4	B	10.7
SB Left		--	--	--	--	--	--	--	--	--	--	--	--	A	7.5	A	7.6	A	7.5	A	7.6
21) <u>S. Powhaton Road/E. Yale Avenue</u>	TWSC																				
EB Left		--	--	--	--	--	--	--	--	--	--	--	--	A	7.8	A	7.8	A	7.8	A	7.9
SB Left		--	--	--	--	--	--	--	--	--	--	--	--	B	10.8	B	12.7	B	10.9	B	12.9
SB Right		--	--	--	--	--	--	--	--	--	--	--	--	A	9.0	A	8.9	A	9.0	A	9.0
22) <u>Monaghan Road/E. Yale Avenue</u>	Roundabout																				
EB Approach		--	--	--	--	--	--	--	--	--	--	--	--	A	4.2	A	4.7	A	4.5	A	5.0
WB Approach		--	--	--	--	--	--	--	--	--	--	--	--	A	4.6	A	4.3	A	4.9	A	4.7
NB Approach		--	--	--	--	--	--	--	--	--	--	--	--	A	3.5	A	5.3	A	3.7	A	5.8
SB Approach		--	--	--	--	--	--	--	--	--	--	--	--	A	4.6	A	4.4	A	4.9	A	4.6
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--	--	--	--	--	--	--	4.3		4.8		4.6		5.1	
Entire Intersection LOS		--	--	--	--	--	--	--	--	--	--	--	--	A		A		A		A	
23) <u>E. Yale Avenue/S. Del Ray Street</u>	TWSC																				
EB Left		--	--	--	--	--	--	--	--	--	--	--	--	A	8.2	A	7.9	A	8.3	A	8.0
SB Left		--	--	--	--	--	--	--	--	--	--	--	--	B	12.6	B	13.0	B	13.7	B	14.4
SB Right		--	--	--	--	--	--	--	--	--	--	--	--	A	9.7	A	9.1	A	9.9	A	9.2

Table 1 (Page 4 of 4)  
Intersection Levels of Service Analysis  
Cottonwood Creek Phase 1  
Aurora, Colorado  
LSC #230040; January, 2024

Intersection Location	Traffic Control	Existing Traffic				2028 Background Traffic				2028 Total Traffic				2040 Background Traffic				2040 Total Traffic			
		Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay	Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay	Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay	Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay	Level of Service AM	Move-ment Delay	Level of Service PM	Move-ment Delay
24) <u>E. Yale Avenue/Hayesmount Road</u>	TWSC																				
EB Left		--	--	--	--	--	--	--	--	--	--	--	--	A	8.2	A	7.9	A	8.2	A	8.0
SB Left		--	--	--	--	--	--	--	--	--	--	--	--	B	13.1	B	14.1	B	13.4	B	14.7
SB Right		--	--	--	--	--	--	--	--	--	--	--	--	A	9.7	A	9.2	A	9.8	A	9.3
27) <u>E. Jewell Avenue/Phase 1 Full Movement Access</u>	TWSC																				
NB Left		--	--	--	--	--	--	--	--	B	12.4	B	14.0	--	--	--	--	C	17.2	C	22.0
NB Right		--	--	--	--	--	--	--	--	A	9.0	A	0.0	--	--	--	--	A	9.0	B	10.6
WB Left/Through or Left		--	--	--	--	--	--	--	--	A	0.0	A	8.2	--	--	--	--	A	7.8	A	8.9
28) <u>E. Jewell Avenue/Phase 1 RIRO Access</u>	TWSC																				
NB Approach		--	--	--	--	--	--	--	--	A	8.6	A	9.0	--	--	--	--	A	9.6	B	11.2
29) <u>Monaghan Road/Retail RIRO Access</u>	TWSC																				
WB Right		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	A	9.7	A	9.5
30) <u>Monaghan Road/Phase 1 South Access</u>	TWSC																				
WB Approach		--	--	--	--	--	--	--	--	A	9.1	A	8.8	--	--	--	--	A	9.9	A	9.6
SB Left/Through or Left		--	--	--	--	--	--	--	--	A	7.4	A	7.5	--	--	--	--	A	8.1	A	8.1

**Table 2**  
**Trip Generation Estimate**  
**Cottonwood Creek Phase 1**  
**Aurora, CO**  
**LSC #230040; January, 2024**

Land Use Description	Trip Generation Units	Trip Generation Rates <sup>(1)</sup>					Average Weekday Traffic	Total Trips Generated		Afternoon Peak Hour	
		Average Weekday Traffic	Morning Peak Hour		Afternoon Peak Hour			In	Out	In	Out
			In	Out	In	Out					
Residential Land Uses											
Single Family Detached Housing <sup>(2)</sup>	835 DU <sup>(3)</sup>	9.43	0.18	0.52	0.59	0.35	7,874	152	433	494	290
Single Family Attached Housing <sup>(4)</sup>	266 DU	7.20	0.15	0.33	0.32	0.25	1,915	40	88	86	65
	1,101 DU			Total Residential Trips			9,789	192	521	580	355
Short-Term Non-Residential Land Uses											
Oil and Gas <sup>(5)</sup>	82.2 Acres	1.00	0.100	0.100	0.100	0.100	82	8	8	8	8
Neighborhood Park <sup>(6)</sup>	12.6 Acres	0.78	0.012	0.008	0.061	0.050	10	0	0	1	1
Community Center <sup>(7)</sup>	50 KSF <sup>(8)</sup>	28.27	1.261	0.649	1.523	1.717	1,413	63	32	76	86
Fire Station <sup>(9)</sup>	10 KSF	4.80	0.341	0.139	0.139	0.341	48	3	1	1	3
				Total Short-Term Non-Residential Trips			1,553	74	41	86	98
Long-Term Non-Residential Land Uses											
School <sup>(10)</sup>	500 Students	2.27	0.400	0.340	0.074	0.086	1,135	200	170	37	43
Shopping Plaza <sup>(11)</sup>	50 KSF	67.52	1.07	0.66	2.54	2.65	3,376	54	33	127	132
				Total Long-Term Non-Residential Trips			4,511	254	203	164	175
Grand Total							15,853	520	765	830	628
Residential Trips Internal to the Cottonwood Creek Master Plan Area <sup>(12)</sup>							713	33	71	36	26
Non-Residential Trips Internal to the Cottonwood Creek Master Plan Area <sup>(12)</sup>							1,805	149	68	80	99
External Trips (Total Trips - Internal Trips)							13,335	338	626	714	503
Pass-By Trips <sup>(13)</sup>							1,090	14	14	40	40
Primary Trips (New External Trips = Total Trips - Internal Trips - Passby Trips)							12,245	324	612	674	463

**Notes:**

(1) Source: *Trip Generation, Institute of Transportation Engineers*, 11th Edition, 2021.

(2) ITE Land Use No. 210 - Single-Family Detached Housing

(3) DU = dwelling unit

(4) ITE Land Use No. 215 - Single-Family Attached Housing

(5) Future Oil and Gas use rates were estimated by LSC

(6) ITE Land Use No. 411 -Public Park

(7) ITE Land Use No. 495 - Recreational Community Center - average rates used; assumes a FAR of 20%

(8) KSF = 1,000 square feet of floor space

(9) ITE Land Use No. 575 Fire and Rescue Station, Daily and AM trip generation rates are estimates by LSC

(10) ITE Land Use No. 520 - Elementary School

(11) ITE Land Use No. 821 - Shopping Plaza (40-150 KSF No Supermarket) - average rates used

(12) Internal trips were estimated by LSC. See Appendix Table 1 for internal trip reduction assumptions by land use

(13) 34% of the external retail trips were assumed to be pass-by trips based on the percentages shown for Land Use No. 820 - Shopping Center in Table E.9 of the *Trip Generation Handbook - An ITE Proposed Recommended Practice, Third Edition 2017* by ITE

Source: LSC Transportation Consultants, Inc.







Table #5 Intersection #8 - E. Jewell Avenue/S. Del Ray Street Cottonwood Creek Phase 1 Aurora, CO LSC #230040; January, 2024																										
Warrant Analysis <sup>(1)</sup>																										
Warrant 1: Eight Hour Vehicular Volume Evaluation												Warrant 2: Four Hour Vehicular Volume Evaluation			Warrant 3: Peak Hour Vehicular Volume Evaluation											
Warrant Thresholds												Warrant Threshold Met?			70% Warrant Threshold Minor Minimum			Warrant Threshold Met?			70% Warrant Threshold Minor Minimum			Warrant Threshold Met?		
			Condition A (70%)		Condition B (70%)		North Leg		South Leg																	
Hour	Major <sup>(2)</sup>	Minor 1 <sup>(3)</sup>	North Leg	South Leg	Major	Minor	Major	Minor	A	B	A	B		North Leg	South Leg		North Leg	South Leg		North Leg	South Leg					
2040 Background Traffic																										
6-7 AM	693	53	30		420	140	630	70	No	No	No	No	175	No	No		315	No	No							
7-8 AM	955	91	49		420	140	630	70	No	Yes	No	No	80	Yes	No		180	No	No							
8-9 AM	675	78	39		420	140	630	70	No	Yes	No	No	175	No	No		315	No	No							
9-10 AM	587	49	29		420	140	630	70	No	No	No	No	230	No	No		370	No	No							
10-11 AM	556	49	28		420	140	630	70	No	No	No	No	230	No	No		370	No	No							
11-12 PM	666	46	37		420	140	630	70	No	No	No	No	175	No	No		315	No	No							
12-1 PM	1177	37	27		420	140	630	70	No	No	No	No	80	No	No		120	No	No							
1-2 PM	1153	54	15		420	140	630	70	No	No	No	No	80	No	No		120	No	No							
2-3 PM	972	57	23		420	140	630	70	No	No	No	No	80	No	No		180	No	No							
3-4 PM	1321	55	41		420	140	630	70	No	No	No	No	80	No	No		100	No	No							
4-5 PM	1294	69	33		420	140	630	70	No	No	No	No	80	No	No		100	No	No							
5-6 PM	1407	68	32		420	140	630	70	No	No	No	No	80	No	No		100	No	No							
6-7 PM	1085	54	20		420	140	630	70	No	No	No	No	80	No	No		145	No	No							
7-8 PM	713	40	17		420	140	630	70	No	No	No	No	140	No	No		265	No	No							
8-9 PM	494	28	14		420	140	630	70	No	No	No	No	285	No	No		Low Vol	No	No							
9-10 PM	424	23	9		420	140	630	70	No	No	No	No	285	No	No		Low Vol	No	No							
Numbers of Hours the Warrant Thresholds Are Met									0	2	0	0	1			0	0			0						
Warrant Met?									No				No			No										
2040 Total Traffic																										
6-7 AM	835	198	34		420	140	630	70	Yes	Yes	No	No	110	Yes	No		220	No	No							
7-8 AM	1202	344	55		420	140	630	70	Yes	Yes	No	No	80	Yes	No		100	Yes	No							
8-9 AM	927	289	45		420	140	630	70	Yes	Yes	No	No	80	Yes	No		180	Yes	No							
9-10 AM	807	181	34		420	140	630	70	Yes	Yes	No	No	110	Yes	No		220	No	No							
10-11 AM	832	181	35		420	140	630	70	Yes	Yes	No	No	110	Yes	No		220	No	No							
11-12 PM	1018	172	44		420	140	630	70	Yes	Yes	No	No	80	Yes	No		145	Yes	No							
12-1 PM	1613	121	59		420	140	630	70	No	Yes	No	No	80	Yes	No		100	Yes	No							
1-2 PM	1386	172	26		420	140	630	70	Yes	Yes	No	No	80	Yes	No		100	Yes	No							
2-3 PM	1197	180	37		420	140	630	70	Yes	Yes	No	No	80	Yes	No		120	Yes	No							
3-4 PM	1610	175	61		420	140	630	70	Yes	Yes	No	No	80	Yes	No		100	Yes	No							
4-5 PM	1614	219	54		420	140	630	70	Yes	Yes	No	No	80	Yes	No		100	Yes	No							
5-6 PM	1737	216	52		420	140	630	70	Yes	Yes	No	No	80	Yes	No		100	Yes	No							
6-7 PM	1353	172	36		420	140	630	70	Yes	Yes	No	No	80	Yes	No		100	Yes	No							
7-8 PM	896	125	29		420	140	630	70	No	Yes	No	No	110	Yes	No		220	No	No							
8-9 PM	655	91	25		420	140	630	70	No	Yes	No	No	175	No	No		315	No	No							
9-10 PM	546	70	18		420	140	630	70	No	No	No	No	230	No	No		370	No	No							
Numbers of Hours the Warrant Thresholds Are Met									12	15	0	0	14			0	10			0						
Warrant Met?									Yes				Yes			Yes										
Notes:																										
(1) Thresholds are based on 2 or more lanes on the major approach and 2 or more lanes on the minor approach with the 70% factor applied for a posted speed limit above 40 mph																										
(2) The major street traffic includes all movements (left, through, and right)																										
(3) The minor street traffic includes left, through, and half of right-turn volumes from the minor street																										
Source: LSC Transportation Consultants, Inc.																										

Table #6																																
Intersection #9 - E. Jewell Avenue/Hayesmount Road																																
Cottonwood Creek Phase 1																																
Aurora, CO																																
LSC #230040; January, 2024																																
Warrant Analysis <sup>(1)</sup>																																
Warrant 1: Eight Hour Vehicular Volume Evaluation												Warrant 2: Four Hour Vehicular Volume Evaluation			Warrant 3: Peak Hour Vehicular Volume Evaluation																	
Warrant Thresholds												Warrant Threshold Met?			70% Warrant Threshold Minimum			Warrant Threshold Met?			70% Warrant Threshold Minimum			Warrant Threshold Met?								
Condition A (70%)												Condition B (70%)			NB Leg			SB Leg			70% Warrant Threshold Minimum			Warrant Threshold Met?			70% Warrant Threshold Minimum			Warrant Threshold Met?		
Hour	Major <sup>(2)</sup>	Minor 1 <sup>(3)</sup>	Minor 2 <sup>(3)</sup>	NB Leg	SB Leg	Major	Minor	Major	Minor	A	B	A	B	70% Warrant Threshold Minimum	NB Leg	SB Leg	70% Warrant Threshold Minimum	NB Leg	SB Leg	70% Warrant Threshold Minimum	NB Leg	SB Leg										
2040 Background Traffic																																
6-7 AM	629	91	52	420	140	630	70	No	No	No	No	No	No	175	No	No	315	No	No													
7-8 AM	864	159	91	420	140	630	70	Yes	Yes	No	Yes	No	Yes	110	Yes	No	220	No	No													
8-9 AM	630	134	87	420	140	630	70	No	No	No	No	No	No	175	No	No	315	No	No													
9-10 AM	531	85	71	420	140	630	70	No	No	No	No	No	No	230	No	No	370	No	No													
10-11 AM	518	85	84	420	140	630	70	No	No	No	No	No	No	230	No	No	370	No	No													
11-12 PM	611	81	107	420	140	630	70	No	No	No	No	No	No	175	No	No	315	No	No													
12-1 PM	984	65	283	420	140	630	70	No	No	Yes	Yes	Yes	Yes	80	No	Yes	180	No	Yes													
1-2 PM	952	93	101	420	140	630	70	No	Yes	No	Yes	Yes	Yes	80	Yes	Yes	180	No	No													
2-3 PM	812	98	127	420	140	630	70	No	Yes	No	Yes	Yes	Yes	110	No	Yes	220	No	No													
3-4 PM	1102	95	170	420	140	630	70	No	Yes	Yes	Yes	Yes	Yes	80	Yes	Yes	120	No	Yes													
4-5 PM	1085	119	187	420	140	630	70	No	Yes	Yes	Yes	Yes	Yes	80	Yes	Yes	145	No	Yes													
5-6 PM	1175	117	182	420	140	630	70	No	Yes	Yes	Yes	Yes	Yes	80	Yes	Yes	120	No	Yes													
6-7 PM	908	93	145	420	140	630	70	No	Yes	Yes	Yes	Yes	Yes	80	Yes	Yes	180	No	No													
7-8 PM	599	69	107	420	140	630	70	No	No	No	No	No	No	230	No	No	370	No	No													
8-9 PM	419	50	104	420	140	630	70	No	No	No	No	No	No	285	No	No	Low Vol	No	No													
9-10 PM	357	38	74	420	140	630	70	No	No	No	No	No	No	Low Vol	No	No	Low Vol	No	No													
Numbers of Hours the Warrant Thresholds Are Met												1	7	5	8	6			7	0			4									
Warrant Met?												Yes				Yes			Yes													
2040 Total Traffic																																
6-7 AM	771	119	61	420	140	630	70	No	Yes	No	No	No	No	140	No	No	265	No	No													
7-8 AM	1038	206	108	420	140	630	70	Yes	Yes	No	Yes	No	Yes	80	Yes	Yes	145	Yes	No													
8-9 AM	761	173	102	420	140	630	70	Yes	Yes	No	Yes	No	Yes	140	Yes	No	265	No	No													
9-10 AM	642	109	84	420	140	630	70	No	Yes	No	Yes	No	Yes	175	No	No	315	No	No													
10-11 AM	636	109	99	420	140	630	70	No	Yes	No	Yes	No	Yes	175	No	No	315	No	No													
11-12 PM	749	104	126	420	140	630	70	No	Yes	No	Yes	No	Yes	140	No	No	265	No	No													
12-1 PM	1189	84	340	420	140	630	70	No	Yes	Yes	Yes	Yes	Yes	80	Yes	Yes	120	No	Yes													
1-2 PM	1108	120	122	420	140	630	70	No	Yes	No	Yes	Yes	Yes	80	Yes	Yes	120	Yes	Yes													
2-3 PM	955	126	153	420	140	630	70	No	Yes	Yes	Yes	Yes	Yes	80	Yes	Yes	180	No	No													
3-4 PM	1299	122	207	420	140	630	70	No	Yes	Yes	Yes	Yes	Yes	80	Yes	Yes	100	Yes	Yes													
4-5 PM	1281	152	226	420	140	630	70	Yes	Yes	Yes	Yes	Yes	Yes	80	Yes	Yes	100	Yes	Yes													
5-6 PM	1383	150	220	420	140	630	70	Yes	Yes	Yes	Yes	Yes	Yes	80	Yes	Yes	100	Yes	Yes													
6-7 PM	1065	120	175	420	140	630	70	No	Yes	Yes	Yes	Yes	Yes	80	Yes	Yes	145	No	Yes													
7-8 PM	705	88	129	420	140	630	70	No	Yes	No	Yes	No	Yes	140	No	No	265	No	No													
8-9 PM	500	62	125	420	140	630	70	No	No	No	No	No	No	230	No	No	370	No	No													
9-10 PM	425	49	89	420	140	630	70	No	No	No	No	No	No	285	No	No	Low Vol	No	No													
Numbers of Hours the Warrant Thresholds Are Met												4	14	6	13	9			8	5			6									
Warrant Met?												Yes				Yes			Yes													
Notes:																																
(1) Thresholds are based on 2 or more lanes on the major approach and 2 or more lanes on the minor approach with the 70% factor applied for a posted speed limit above 40 mph																																
(2) The major street traffic includes all movements (left, through, and right)																																
(3) The minor street traffic includes left, through, and half of right-turn volumes from the minor street																																
Source: LSC Transportation Consultants, Inc.																																

**Table 7**  
**Traffic Signal Warrant Summary**  
**Cottonwood Creek Phase 1**  
**Aurora, CO**  
**LSC #230040; January, 2024**

Intersection No. & Location	Intersection Specific Table	Scenario Where Traffic Signal Warrant(s) Are Projected To Be Met
6) E. Jewell Avenue/S. Powhaton Road	Table 3	2028 Total
7) E. Jewell Avenue/Monaghan Road	Table 4	2040 Background
8) E. Jewell Avenue/"Street A"	Table 5	2040 Total
9) E. Jewell Avenue/Hayesmount Road	Table 6	2040 Background

**Table 8 (Page 1 of 4)**  
**95th Percentile Queue Lengths**  
**Cottonwood Creek Phase 1**  
**Aurora, CO**  
**LSC #230040; January, 2024**

Intersection No. & Location	2040	Turn Lane Lengths Recommended <sup>(1)</sup> (feet)	95th Percentile Queue Length	
	Assumed Posted Speed Limit (mph)		2040 Total	
			AM Peak (feet)	PM Peak (feet)
6) <u>E. Jewell Avenue/E. Powhaton Road</u>				
EB Left	45	275	261	261
EB Through	45	---	150	582
EB Right	45	275	0	0
WB Left	45	275	m8	m14
WB Through	45	---	693	207
WB Right	45	275	m0	m0
NB Left	45	275	45	34
NB Through	45	---	42	44
NB Right	45	275	0	0
SB Left	45	275	92	208
SB Through	45	---	38	47
SB Right	45	275	0	0
7) <u>E. Jewell Avenue/Monaghan Road</u>				
EB Left	45	2 @ 300	105	285
EB Through	45	---	48	115
EB Right	45	275	0	0
WB Left	45	275	m51	m62
WB Through	45	---	363	242
WB Right	45	275	0	0
NB Left	45	275	234	187
NB Through	45	---	104	86
NB Right	45	275	0	0
SB Left	45	2 @ 275	87	154
SB Through	45	---	46	119
SB Right	45	275	0	0
8) <u>E. Jewell Avenue/S. Del Ray Street</u>				
EB Left	45	275	24	m67
EB Through	45	---	87	220
EB Right	45	275	17	79
WB Left	45	275	76	67
WB Through/Right	45	---	307	164
NB Left	35	250	240	169
NB Through	35	---	27	23
NB Right	35	200	0	0
SB Left	35	200	17	12
SB Through	35	---	16	40
SB Right	35	200	0	0

**Notes:**

m = metered by adjacent signals

(1) Auxiliary turn lane lengths on arterial roadways are based on the NR-B classification in the *CDOT State Highway Access Code*.

The lengths shown are consistent with Recommended Improvements shown in Table 9

**Table 8 (Page 2 of 4)**  
**95th Percentile Queue Lengths**  
**Cottonwood Creek Phase 1**  
**Aurora, CO**  
**LSC #230040; January, 2024**

Intersection No. & Location	2040	Turn Lane Lengths Recommended <sup>(1)</sup> (feet)	95th Percentile Queue Length	
	Assumed Posted Speed Limit (mph)		2040 Total	
			AM Peak (feet)	PM Peak (feet)
9) <u>E. Jewell Avenue/N. Hayesmount Road</u>				
EB Left	45	275	11	5
EB Through	45	---	23	108
EB Right	45	275	0	11
WB Left	45	275	m9	23
WB Through	45	---	166	142
WB Right	45	275	m5	3
NB Left	35	200	96	78
NB Through	35	---	115	85
NB Right	35	200	0	0
SB Left	35	200	37	73
SB Through	35	---	52	140
SB Right	35	200	0	0
14) <u>Monaghan Road/Phase 1 North Access</u>				
WB Approach	25	---	<25	<25
NB Through	45	---	---	---
NB Right	45	275	---	---
SB Left	45	275	<25	<25
SB Through	45	---	---	---
15) <u>Monaghan Road/E. Iliff Avenue</u>				
EB Left	35	200	<25	<25
EB Through/Right	35	---	<25	<25
WB Left	35	200	<25	<25
WB Through/Right	35	---	<25	<25
NB Left	45	275	<25	<25
NB Through	45	---	---	---
NB Right	45	275	---	---
SB Left	45	275	<25	<25
SB Through	45	---	---	---
SB Right	45	275	---	---

**Notes:**

m = metered by adjacent signals

(1) Auxiliary turn lane lengths on arterial roadways are based on the NR-B classification in the *CDOT State Highway Access Code*.

The lengths shown are consistent with Recommended Improvements shown in Table 9

**Table 8 (Page 3 of 4)**  
**95th Percentile Queue Lengths**  
**Cottonwood Creek Phase 1**  
**Aurora, CO**  
**LSC #230040; January, 2024**

Intersection No. & Location	2040 Assumed Posted Speed Limit (mph)	Turn Lane Lengths Recommended <sup>(1)</sup> (feet)	95th Percentile Queue Length	
			2040 Total	
			AM Peak (feet)	PM Peak (feet)
16) <u>S. Del Ray Street/E. Iliff Avenue</u>				
EB Approach	35	Construct as modern 1-lane roundabout	<25	<25
WB Approach	35		25	<25
NB Approach	35		<25	<25
SB Approach	35		<25	25
17) <u>E. Iliff Avenue/Hayesmouth Road</u>				
EB Left	35	200	<25	<25
EB Through/Right	35	---	<25	<25
WB Left	35	200	<25	<25
WB Through/Right	35	---	<25	<25
NB Left	35	200	<25	<25
NB Through	35	---	---	---
NB Right	35	200	---	---
SB Left	35	200	<25	<25
SB Through	35	---	---	---
SB Right	35	200	---	---
21) <u>E. Yale Avenue/Powhaton Road</u>				
EB Left	45	275	<25	<25
EB Through	45	---	---	---
WB Through	45	---	---	---
WB Right	45	275	---	---
SB Left	45	275	<25	<25
SB Right	45	continuous	<25	<25
22) <u>Monaghan Road/E. Yale Avenue</u>				
EB Approach	45	Construct as modern 2-lane roundabout	<25	25
WB Approach	45		25	25
NB Approach	45		<25	25
SB Approach	45		<25	<25
23) <u>E. Yale Avenue/S. Del Ray Street</u>				
EB Left	45	275	<25	<25
EB Through	45	---	---	---
WB Through	45	---	---	---
WB Right	45	275	---	---
SB Left	35	200	<25	<25
SB Right	35	continuous	<25	<25

**Notes:**

m = metered by adjacent signals

(1) Auxiliary turn lane lengths on arterial roadways are based on the NR-B classification in the *CDOT State Highway Access Code*.

The lengths shown are consistent with Recommended Improvements shown in Table 9



**Table 8 (Page 4 of 4)**  
**95th Percentile Queue Lengths**  
**Cottonwood Creek Phase 1**  
**Aurora, CO**  
**LSC #230040; January, 2024**

Intersection No. & Location	2040 Assumed Posted Speed Limit (mph)	Turn Lane Lengths Recommended <sup>(1)</sup> (feet)	95th Percentile Queue Length	
			2040 Total	
			AM Peak (feet)	PM Peak (feet)
24) <u>E. Yale Avenue/Hayesmouth Road</u>				
EB Left	45	275	<25	<25
EB Through	45	---	---	---
WB Through	45	---	---	---
WB Right	45	275	---	---
SB Left	35	200	<25	<25
SB Right	35	continuous	<25	<25
27) <u>E. Jewell Avenue/Phase 1 Full-Movement Access</u>				
EB Through	45	---	---	---
EB Right	45	275	<25	<25
WB Left	45	275	<25	<25
WB Through	45	---	---	---
NB Left	25	100	<25	<25
NB Right	25	---	<25	<25
28) <u>E. Jewell Avenue/Phase 1 Right-in/Right-out Access</u>				
EB Through	45	---	---	---
EB Right	45	275	<25	<25
WB Through	45	---	---	---
NB Right	25	continuous	<25	<25
29) <u>Monaghan Road/Retail Right-in/Right-out</u>				
WB Right	25	continuous	<25	<25
NB Right	45	275	<25	<25
30) <u>Monaghan Road/Phase 1 South Access</u>				
WB Approach	25	---	<25	<25
NB Through	45	---	---	---
NB Right	45	275	---	---
SB Left	45	275	<25	<25
SB Through	45	---	---	---

**Notes:**

m = metered by adjacent signals

(1) Auxiliary turn lane lengths on arterial roadways are based on the NR-B classification in the *CDOT State Highway Access Code*.

The lengths shown are consistent with Recommended Improvements shown in Table 9

Table 9 (Page 1 of 3)  
Recommended Improvements to Public Street Network  
Cottonwood Creek Phase 1  
Aurora, CO  
LSC #230040; January, 2024

Inter-section						
No.	Intersection Location	Classification	2028 Recommended Improvements <sup>(1)</sup>	Responsibility	2040 Recommended Improvements <sup>(1)</sup>	Responsibility
#6	E. Jewell Avenue/ Powhaton Road	6-Lane Major Arterial/ 4-Lane Major Arterial	EB LT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Others	EB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Others
			WB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Others	WB LT Decel - construct lane 1 @ 275 feet + 160-foot taper	Others
			SB LT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Others	WB To NB RT Accel - construct lane - 1 @ 388 feet + 160-foot taper	Others
					NB LT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Others
					NB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Others
					NB to EB RT Accel - construct lane - 1 @ 388 feet + 160-foot taper	Others
					SB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Others
					SB to WB RT Accel - construct lane - 1 @ 388 feet + 160-foot taper	Others
					Traffic signalization when warranted	Others
#7	E. Jewell Avenue/ Monaghan Road	4/6-Lane Major Arterial/ 4-Lane Major Arterial	EB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Applicant	EB LT Decel - construct dual lanes - 2 @ 300 feet + 320-foot taper	Others
			NB LT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Applicant	EB to SB RT Accel - construct lane - 1 @ 388 feet + 160-foot taper	Applicant/Others
			SB - intially construct as a single lane approach	Applicant	WB LT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Applicant
					WB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Others
					WB to NB RT Accel - construct lane - 1 @ 388 feet + 160-foot taper	Others
					NB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Applicant
					NB to EB RT Accel - construct lane - 1 @ 388 feet + 160-foot taper	Applicant
					SB LT Decel - construct dual lanes - 2 @ 275 feet + 320-foot taper	Others
					SB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Others
#8	E. Jewell Avenue/ S. Del Ray Street	4-Lane Major Arterial/ 2-Lane Collector	EB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Applicant	EB LT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Others
			NB LT Decel - construct lane - 1 @ 250 feet + 100-foot taper	Applicant	WB LT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Applicant
					NB RT Decel - construct lane - 1 @ 200 feet + 120-foot taper	Applicant
					NB to EB RT Accel - construct lane - 1 @ 388 feet + 160-foot taper	Applicant
					SB RT Decel - construct lane - 1 @ 200 feet + 120-foot taper	Others
					SB LT Decel - construct lane - 1 @ 200 feet + 120-foot taper	Others
					SB RT Decel - construct lane - 1 @ 200 feet + 120-foot taper	Others
					Traffic signalization when warranted	Applicant/Others

(1) A transition taper of 18.5:1 is recommended for Watkins Road based on a posted speed limit of 55 mph.  
An appropriate redirect taper for 55 mph is 55:1  
A transition taper of 13.5:1 is recommended for E. Jewell Avenue, E Yale Avenue, Powhaton Road and Monaghan Road based on a posted speed limit of 45 mph. An appropriate redirect taper for 45 mph is 45:1  
A transition taper of 10:1 is recommended for all other roadways based on a posted speed of 35 mph. An appropriate redirect taper for 35 mph is 20:1  
Some of the right-turn deceleration and acceleration lane termini are close enough that a continuous right-turn lane may be appropriate between intersections.

Table 9 (Page 2 of 3)  
Recommended Improvements to Public Street Network  
Cottonwood Creek Phase 1  
Aurora, CO  
LSC #230040; January, 2024

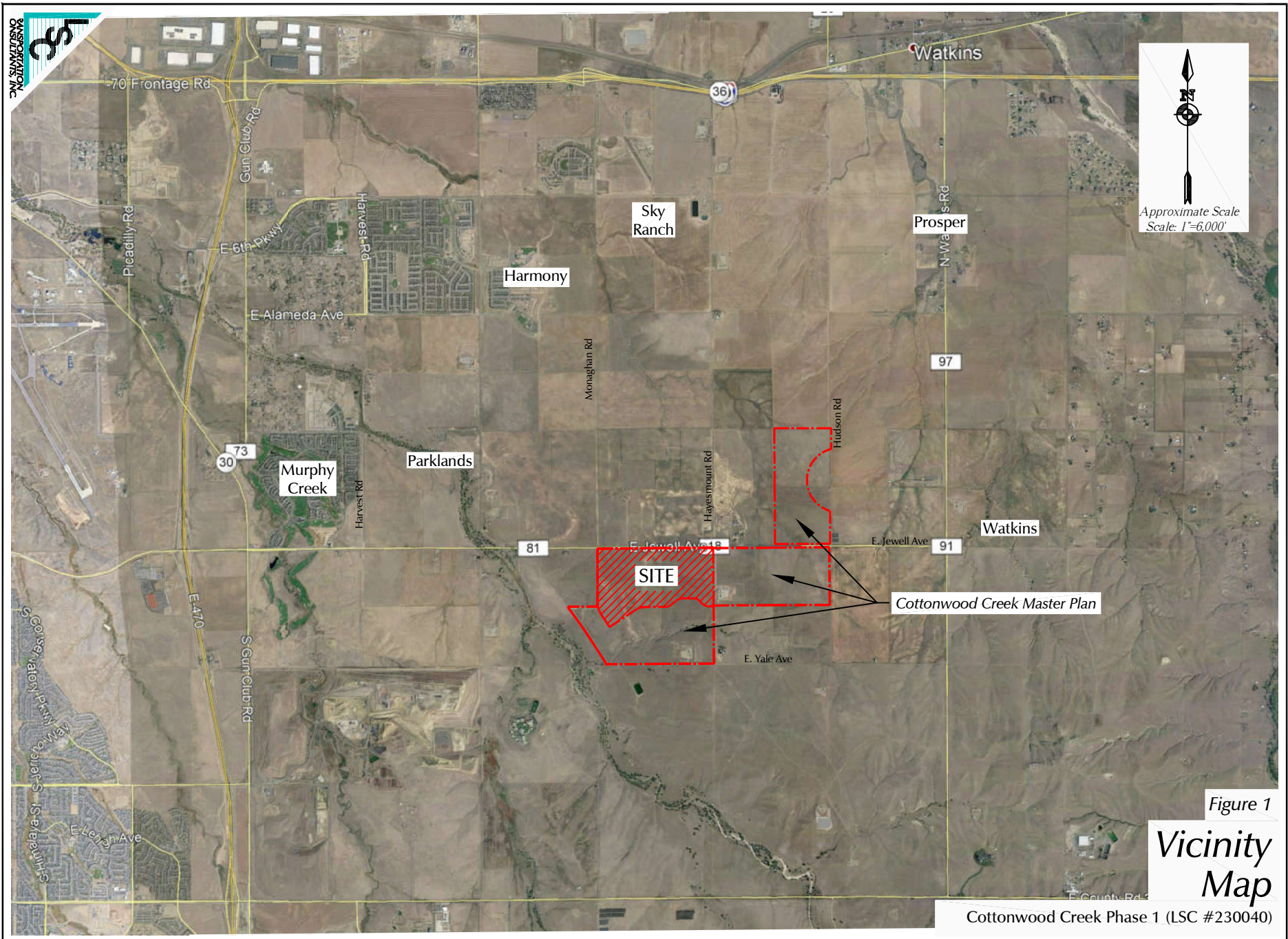
Inter-section No.	Intersection Location	Classification	2028 Recommended Improvements <sup>(1)</sup>		2040 Recommended Improvements <sup>(1)</sup>	
				Responsibility		Responsibility
#9	E. Jewell Avenue/ Hayesmount Drive	4-Lane Major Arterial/ 2-Lane Collector	EB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Applicant	EB LT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Others
			NB LT Decel - construct lane - 1 @ 200 feet + 120-foot taper	Applicant	WB LT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Applicant
					WB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Others
					NB RT Decel - construct lane - 1 @ 200 feet + 120-foot taper	Applicant
					NB to EB RT Accel - construct lane - 1 @ 388 feet + 160-foot taper	Applicant
					SB LT Decel - construct lane - 1 @ 200 feet + 120-foot taper	Others
					SB RT Decel - construct lane - 1 @ 200 feet + 120-foot taper	Others
					SB to WB RT Accel - construct lane - 1 @ 388 feet + 160-foot taper	Others
					Traffic signalization when warranted	Applicant/Others
#14	Monaghan Road/ Phase 1 North Access	4-Lane Major Arterial/ Local	NB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Applicant	SB LT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Applicant
#15	Monaghan Road/ E. Iliff Avenue	4-Lane Major Arterial/ 2-Lane Collector	WB LT Decel - construct lane - 1 @ 200 feet + 120-foot taper	Applicant	EB LT Decel - construct lane - 1 @ 200 feet + 120-foot taper	Applicant
			NB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Applicant	NB LT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Applicant
					SB LT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Applicant
					SB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Applicant
#16	S. Del Ray Street/ E. Iliff Avenue	2-Lane Collector/ 2-Lane Collector	Construct as modern one-lane roundabout	Applicant		
#17	E. Iliff Avenue/ Hayesmount Road	2-Lane Collector/ 2-Lane Collector	EB LT Decel - construct lane - 1 @ 200 feet + 120-foot taper	Applicant	WB LT Decel - construct lane - 1 @ 200 feet + 120-foot taper	Others
			SB RT Decel - construct lane - 1 @ 200 feet + 120-foot taper	Applicant	NB LT Decel - construct lane - 1 @ 200 feet + 120-foot taper	Others
					NB RT Decel - construct lane - 1 @ 200 feet + 120-foot taper	Others
					SB LT Decel - construct lane - 1 @ 200 feet + 120-foot taper	Others
#21	Powhaton Road/ E. Yale Avenue	4-Lane Major Arterial/ 4-Lane Minor Arterial			EB LT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Others
					WB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Others
					SB LT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Others

(1) A transition taper of 18.5:1 is recommended for Watkins Road based on a posted speed limit of 55 mph.  
An appropriate redirect taper for 55 mph is 55:1  
A transition taper of 13.5:1 is recommended for E. Jewell Avenue, E Yale Avenue, Powhaton Road and Monaghan Road based on a posted speed limit of 45 mph. An appropriate redirect taper for 45 mph is 45:1  
A transition taper of 10:1 is recommended for all other roadways based on a posted speed of 35 mph. An appropriate redirect taper for 35 mph is 20:1  
Some of the right-turn deceleration and acceleration lane termini are close enough that a continuous right-turn lane may be appropriate between intersections.

Table 9 (Page 3 of 3)  
Recommended Improvements to Public Street Network  
Cottonwood Creek Phase 1  
Aurora, CO  
LSC #230040; January, 2024

Inter-section No.	Intersection Location	Classification	2028 Recommended Improvements <sup>(1)</sup>	Responsibility	2040 Recommended Improvements <sup>(1)</sup>		Responsibility
#22	Monaghan Road/ E. Yale Avenue	4-Lane Major Arterial/ 4-Lane Minor Arterial			Construct as modern 2-lane roundabout		Applicant/Others
#23	E. Yale Avenue/ S. Del Ray Street	4-Lane Minor Arterial/ 3-Lane Collector			EB LT Decel - construct lane - 1 @ 275 feet + 160-foot taper		Applicant
					WB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper		Applicant
					SB LT Decel - construct lane - 1 @ 200 feet + 120-foot taper		Applicant
#24	E. Yale Avenue Hayesmount Road	4-Lane Minor Arterial/ 3-Lane Collector			EB LT Decel - construct lane - 1 @ 275 feet + 160-foot taper		Applicant
					WB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper		Applicant
					SB LT Decel - construct lane - 1 @ 200 feet + 120-foot taper		Applicant
#27	E. Jewell Avenue/Phase 1 Full-Movement Access	4-Lane Major Arterial/ Local	EB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Applicant	WB LT Decel - construct lane - 1 @ 275 feet + 160-foot taper		Applicant
			NB LT Decel - construct lane - 1 @ 100 feet + 120-foot taper	Applicant			
#28	E. Jewell Avenue/Phase 1 Right-in/Right-out Access	4-Lane Major Arterial/ Local	EB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Applicant			
#29	Monaghan Road/ Retail RIRO Access	4-Lane Major Arterial/ Local			NB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper		Applicant
#30	Monaghan Road/ Phase 1 South Access	4-Lane Major Arterial/ Local	NB RT Decel - construct lane - 1 @ 275 feet + 160-foot taper	Applicant	SB LT Decel - construct lane - 1 @ 275 feet + 160-foot taper		Applicant

(1) A transition taper of 18.5:1 is recommended for Watkins Road based on a posted speed limit of 55 mph.  
An appropriate redirect taper for 55 mph is 55:1  
A transition taper of 13.5:1 is recommended for E. Jewell Avenue, E Yale Avenue, Powhaton Road and Monaghan Road based on a posted speed limit of 45 mph. An appropriate redirect taper for 45 mph is 45:1  
A transition taper of 10:1 is recommended for all other roadways based on a posted speed of 35 mph. An appropriate redirect taper for 35 mph is 20:1  
Some of the right-turn deceleration and acceleration lane termini are close enough that a continuous right-turn lane may be appropriate between intersections.





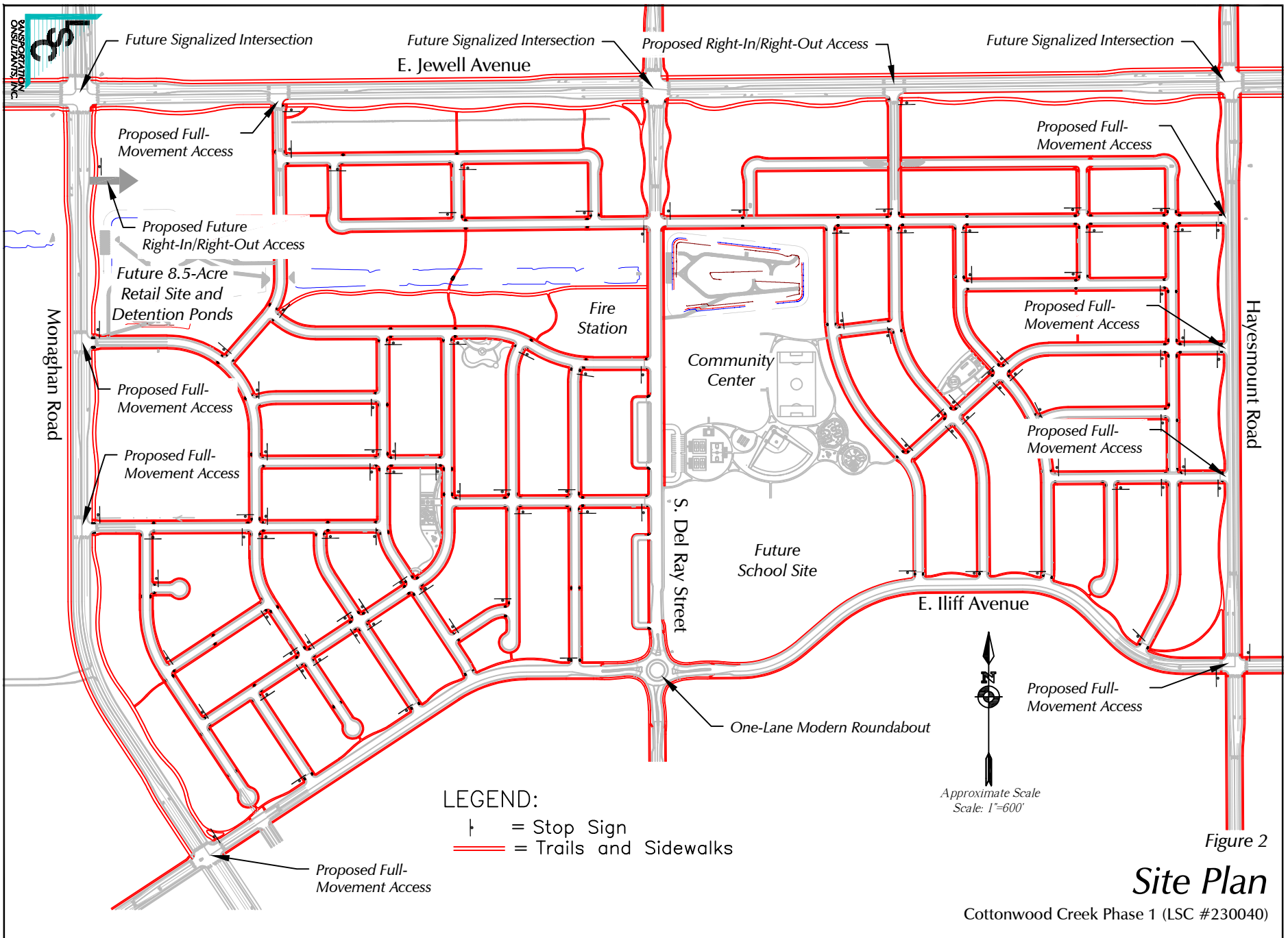
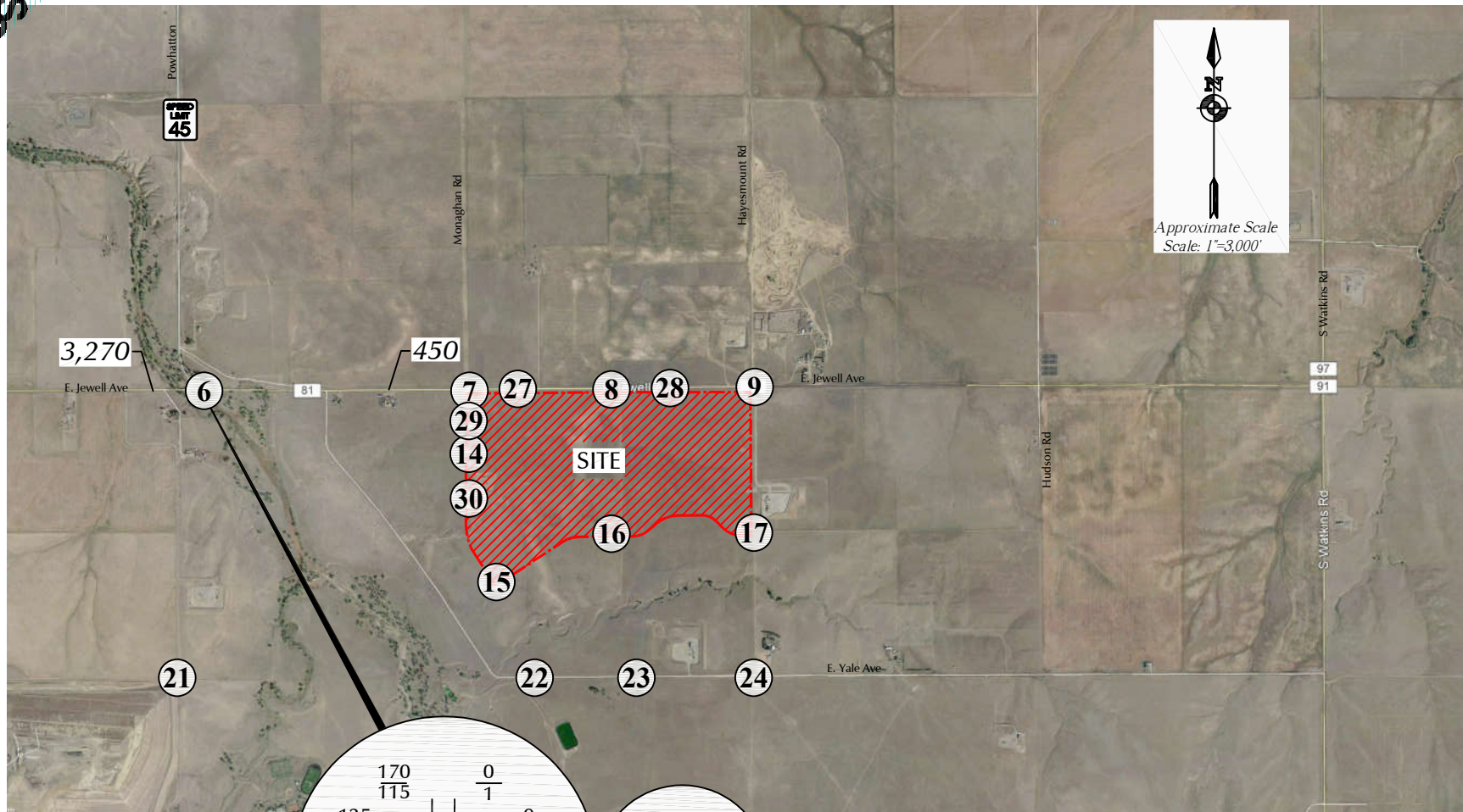




Figure 2

# Site Plan

Cottonwood Creek Phase 1 (LSC #230040)



# LEGEND:

-  = Stop Sign
-  = Speed Limit
- $\frac{26}{35}$  =  $\frac{\text{AM Peak Hour Traffic}}{\text{PM Peak Hour Traffic}}$
- 1,000 = Average Daily Traffic

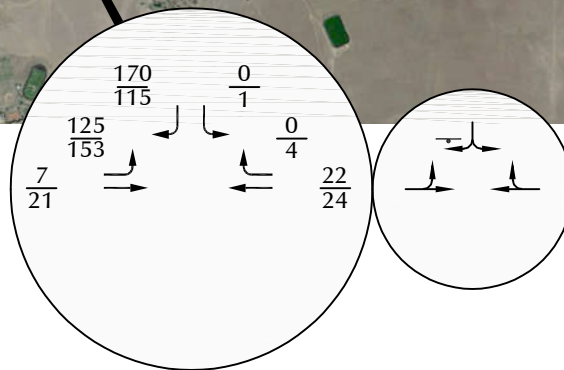


Figure 3

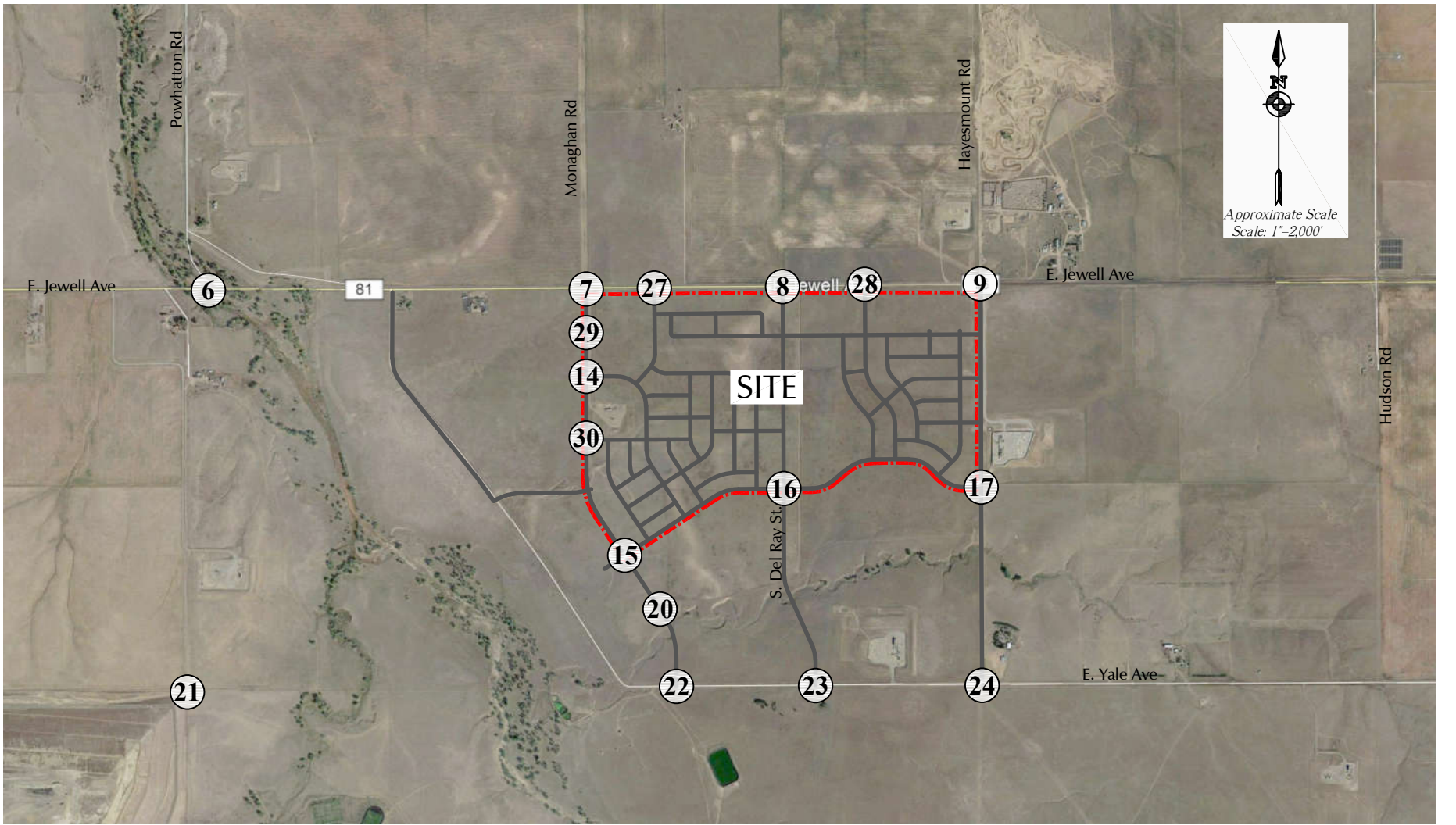
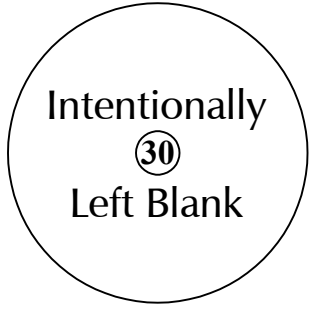
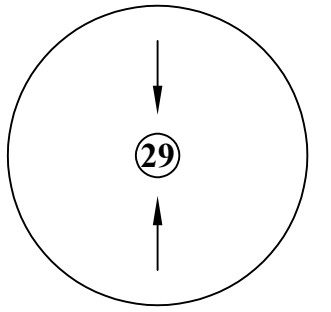
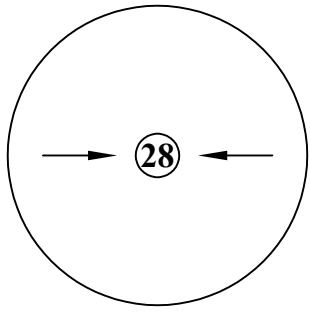
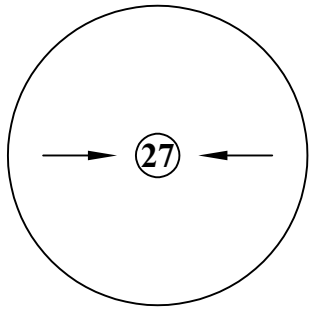
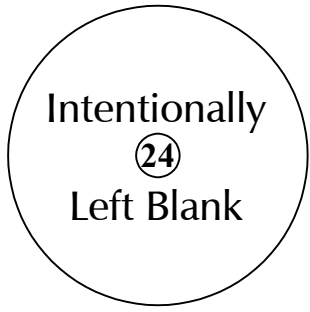
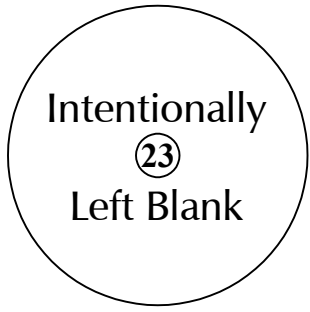
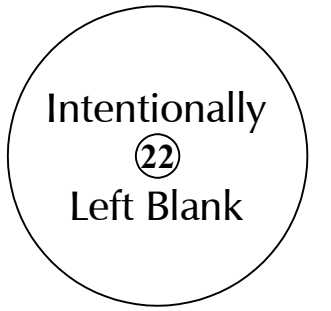
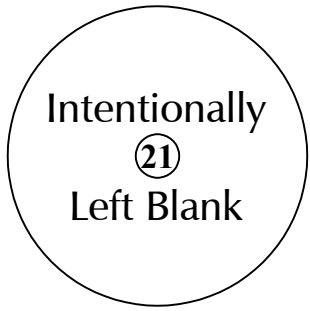
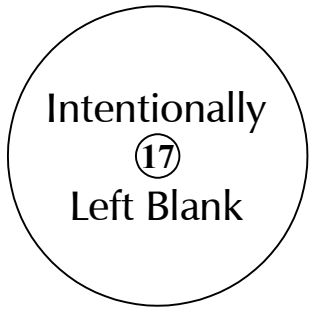
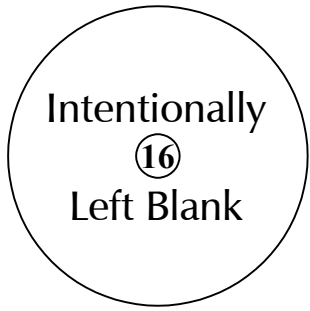
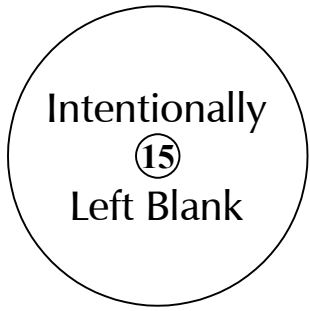
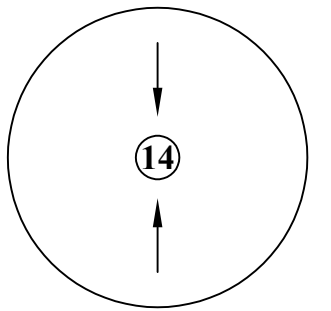
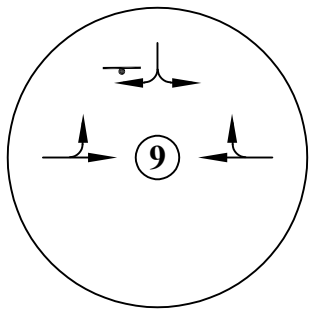
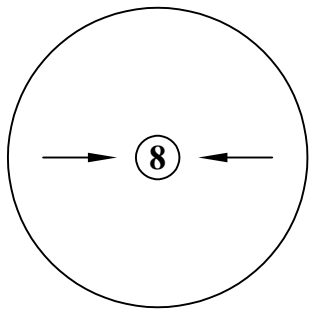
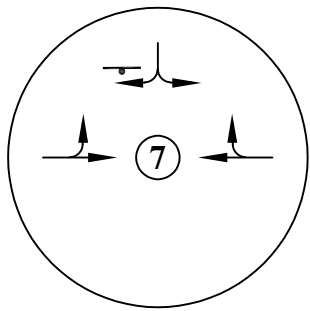
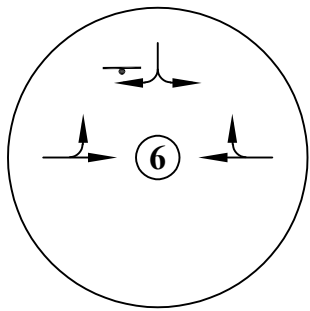
## Existing Traffic, Lane Geometry and Traffic Control

Cottonwood Creek Phase 1 (LSC #230040)











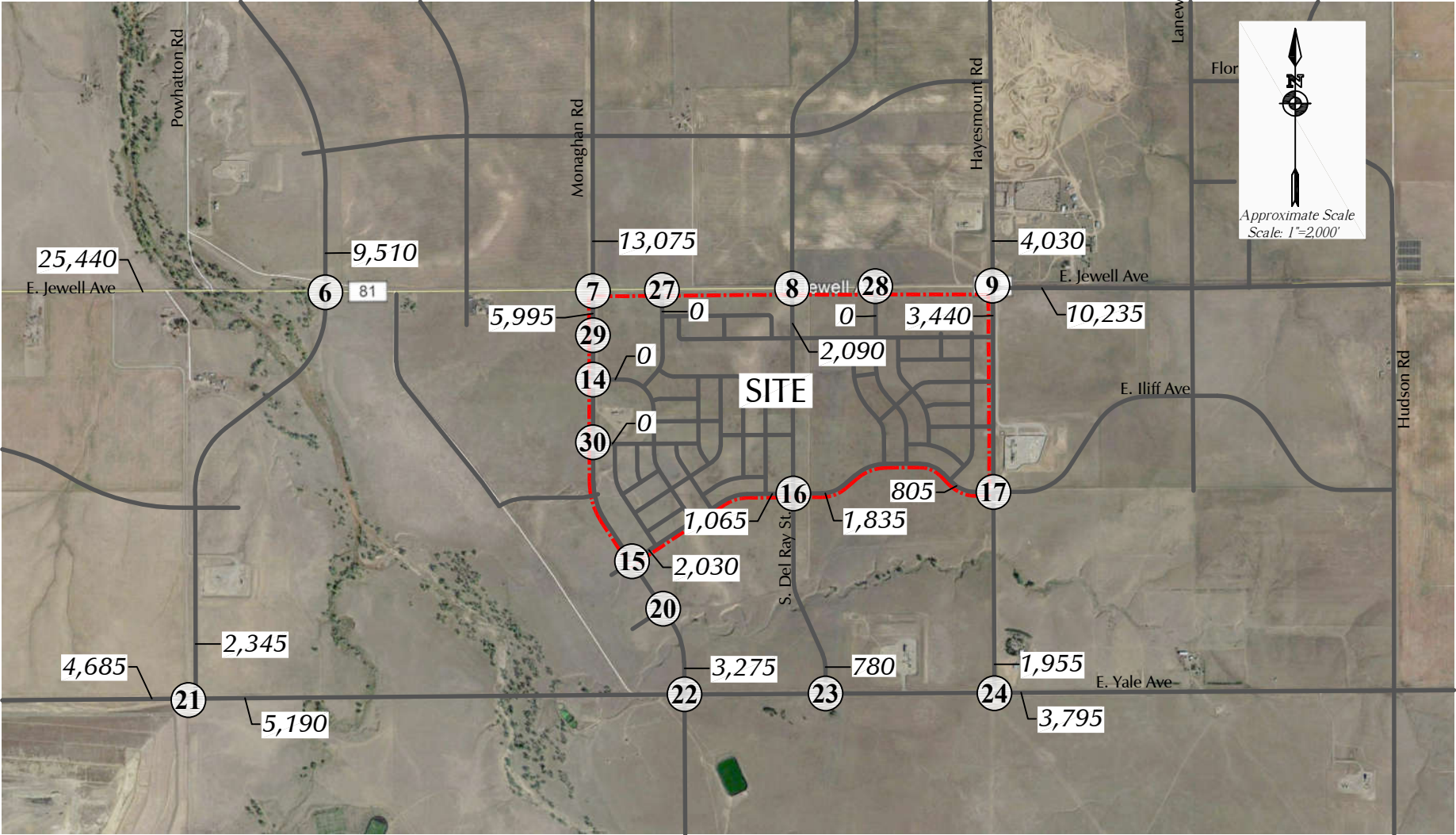
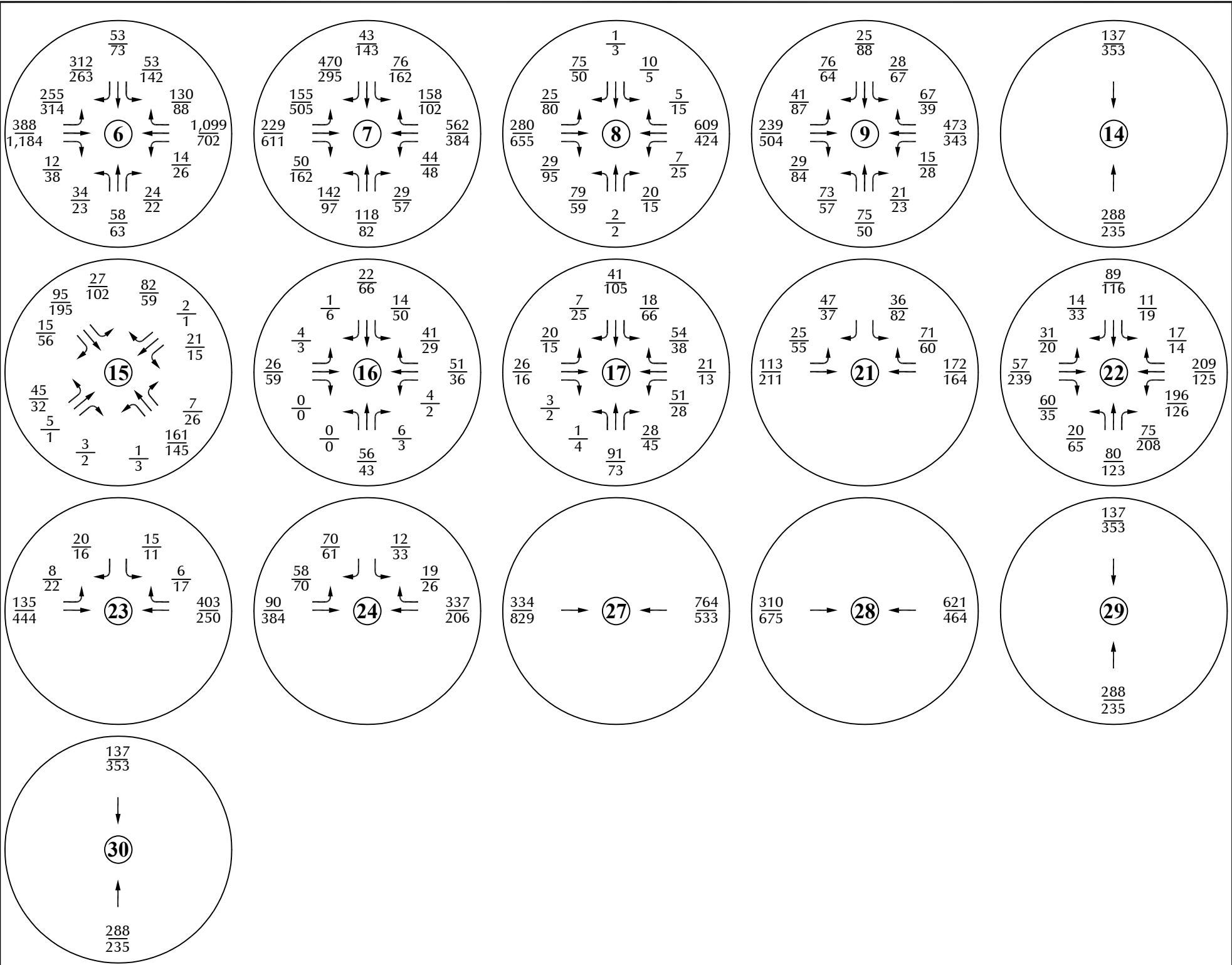
LEGEND:  
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 = Traffic Signal

Figure 4b  
*Year 2028 Background Lane  
 Geometry and Traffic Control*  
 Cottonwood Creek Phase 1 (LSC #230040)

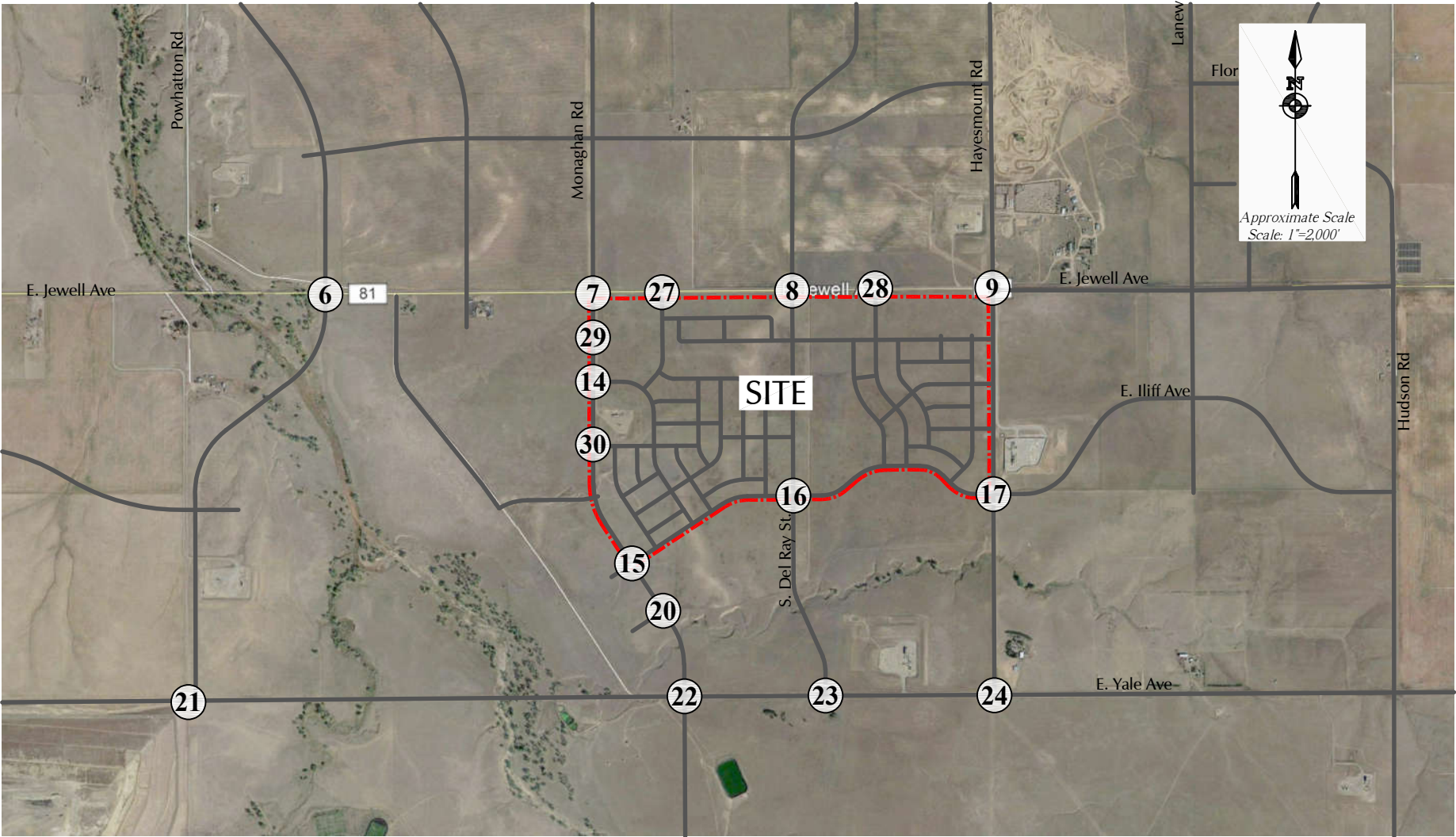
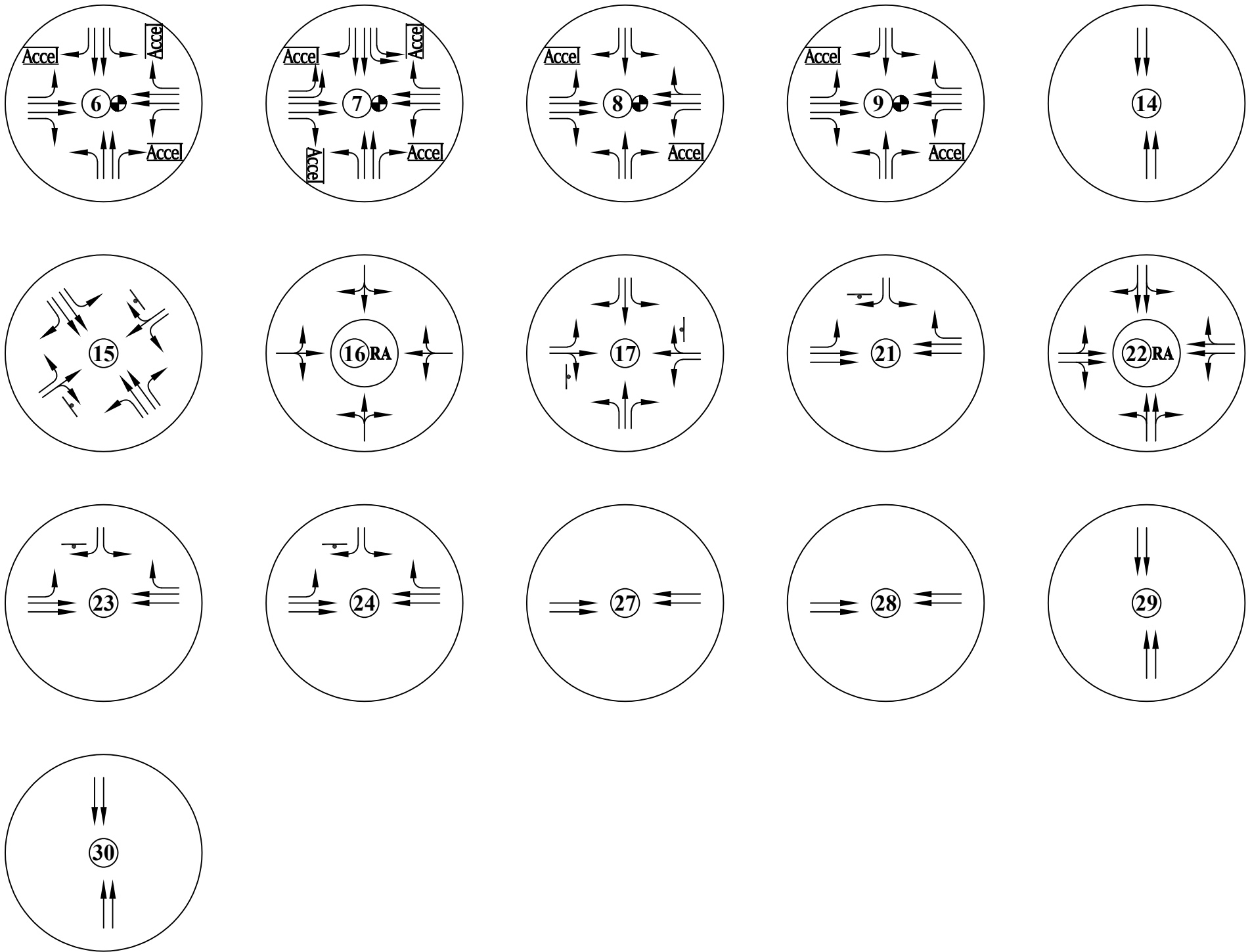


LEGEND:

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

Figure 5a  
**Year 2040**  
**Background Traffic**  
 Cottonwood Creek Phase 1 (LSC #230040)



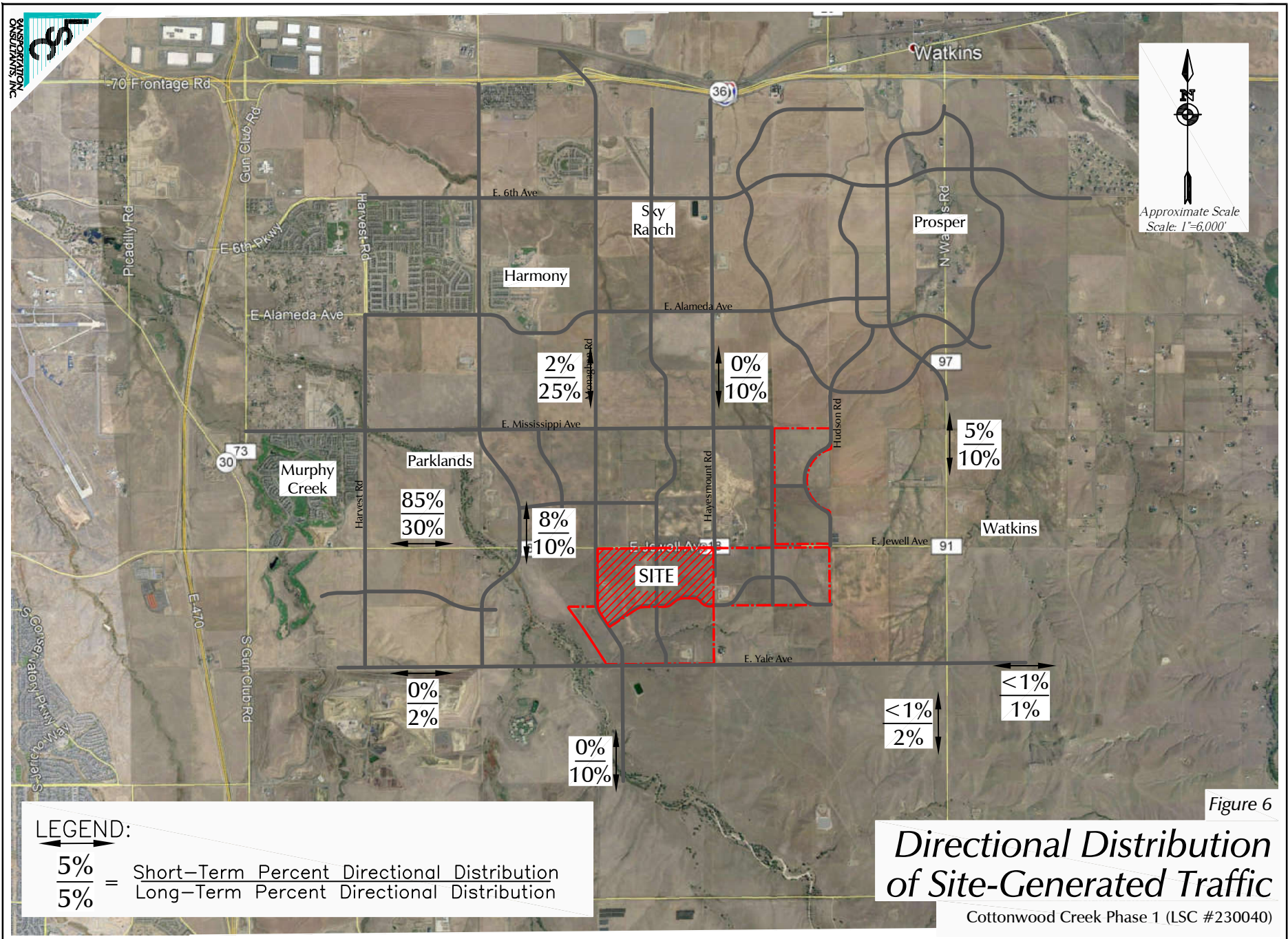


LEGEND:

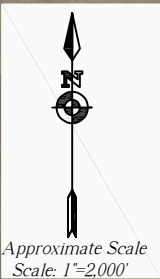
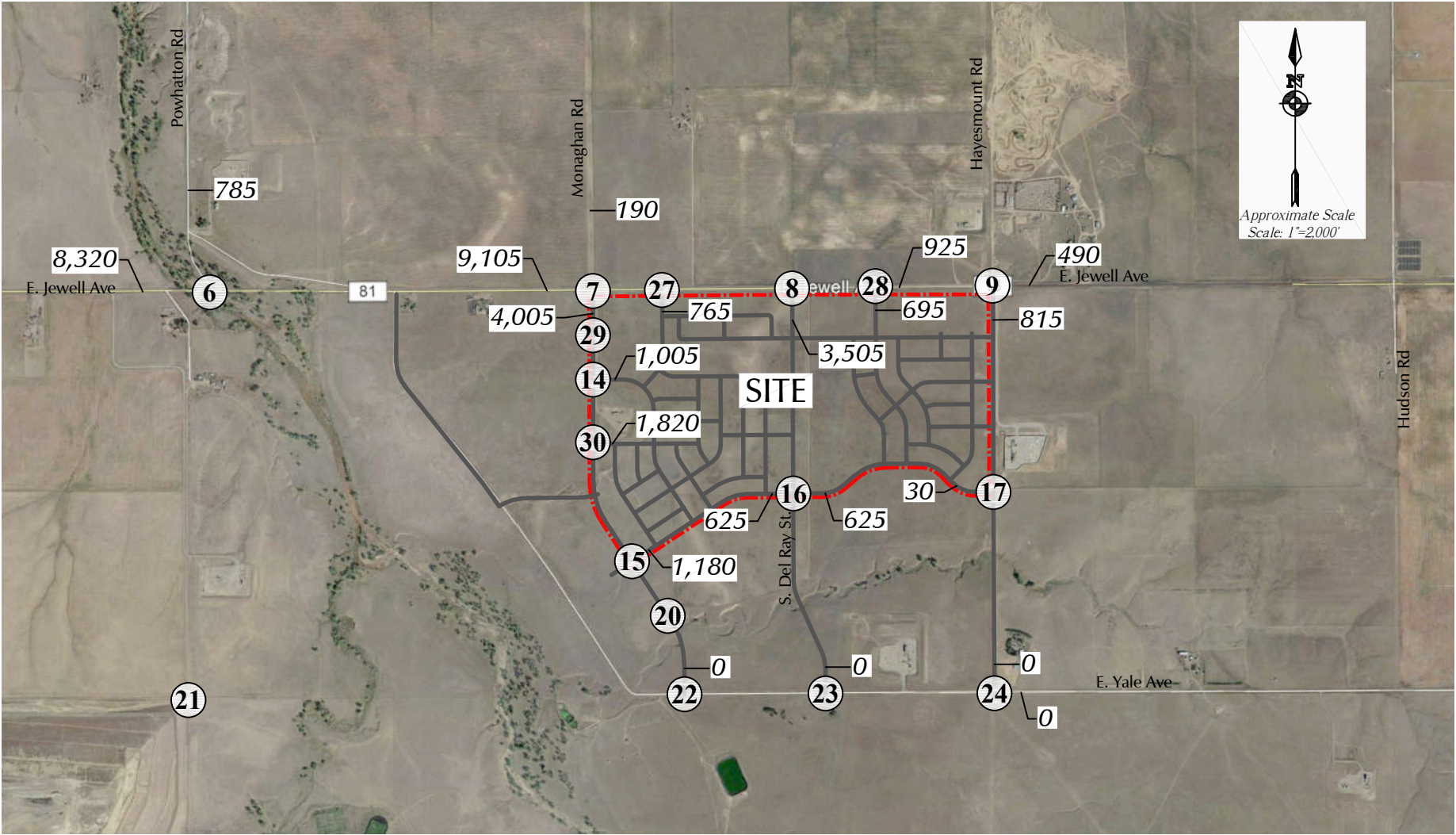
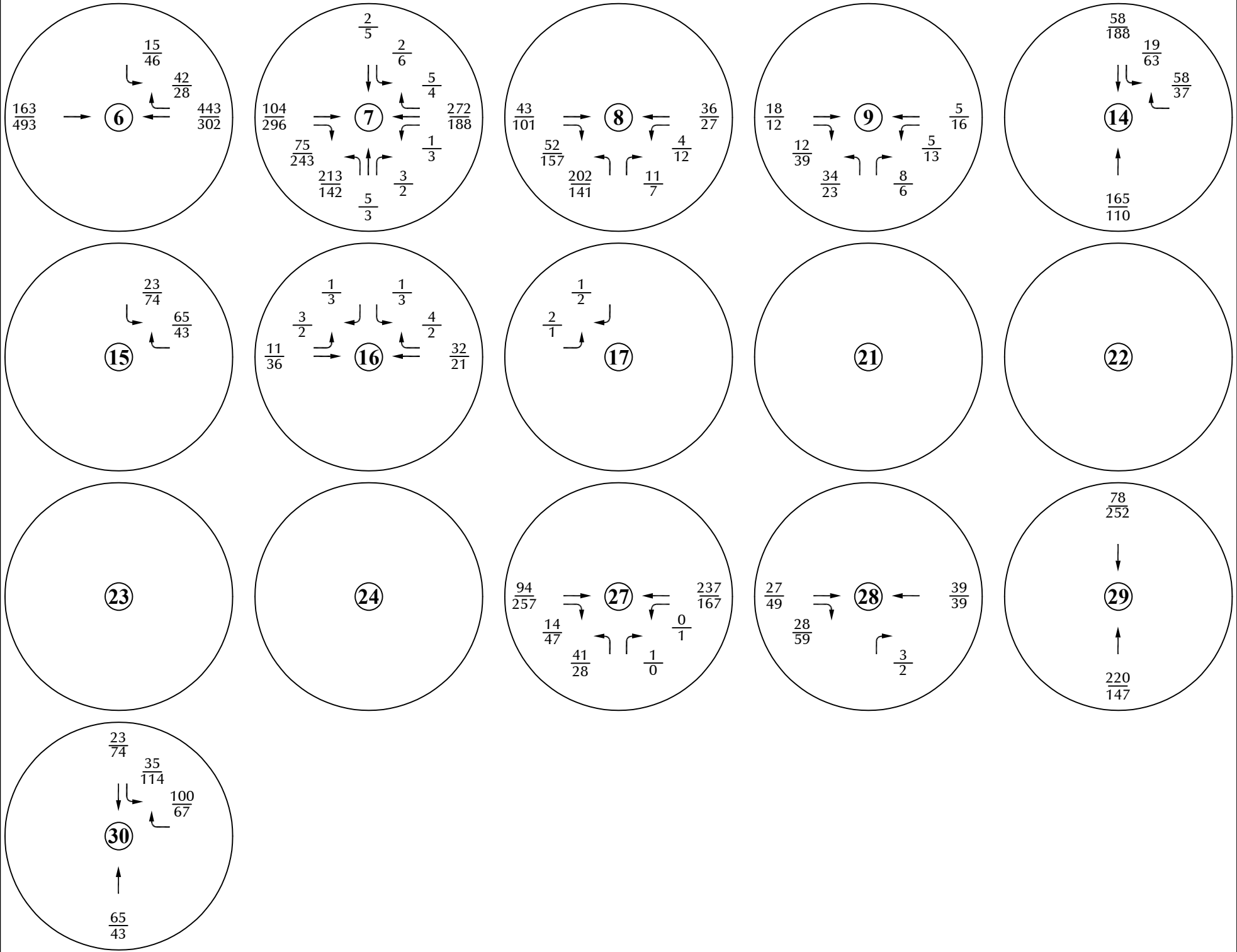
- = Stop Sign
- = Traffic Signal

Figure 5b  
 Year 2040 Background Lane  
 Geometry and Traffic Control  
 Cottonwood Creek Phase 1 (LSC #230040)









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

Figure 7a  
**Year 2028 Assignment of  
 Residential Site-Generated Traffic**  
 Cottonwood Creek Phase 1 (LSC #230040)



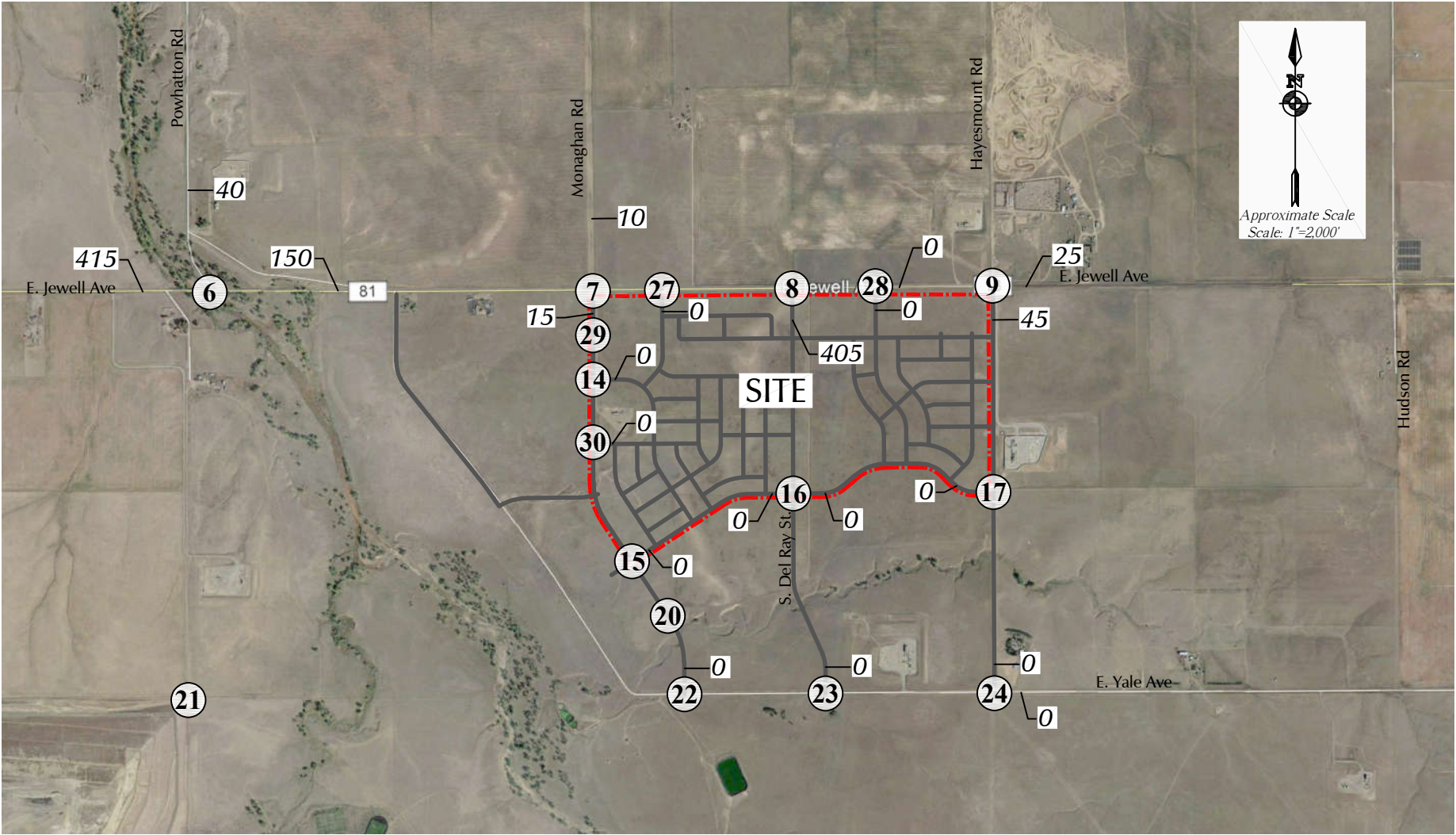
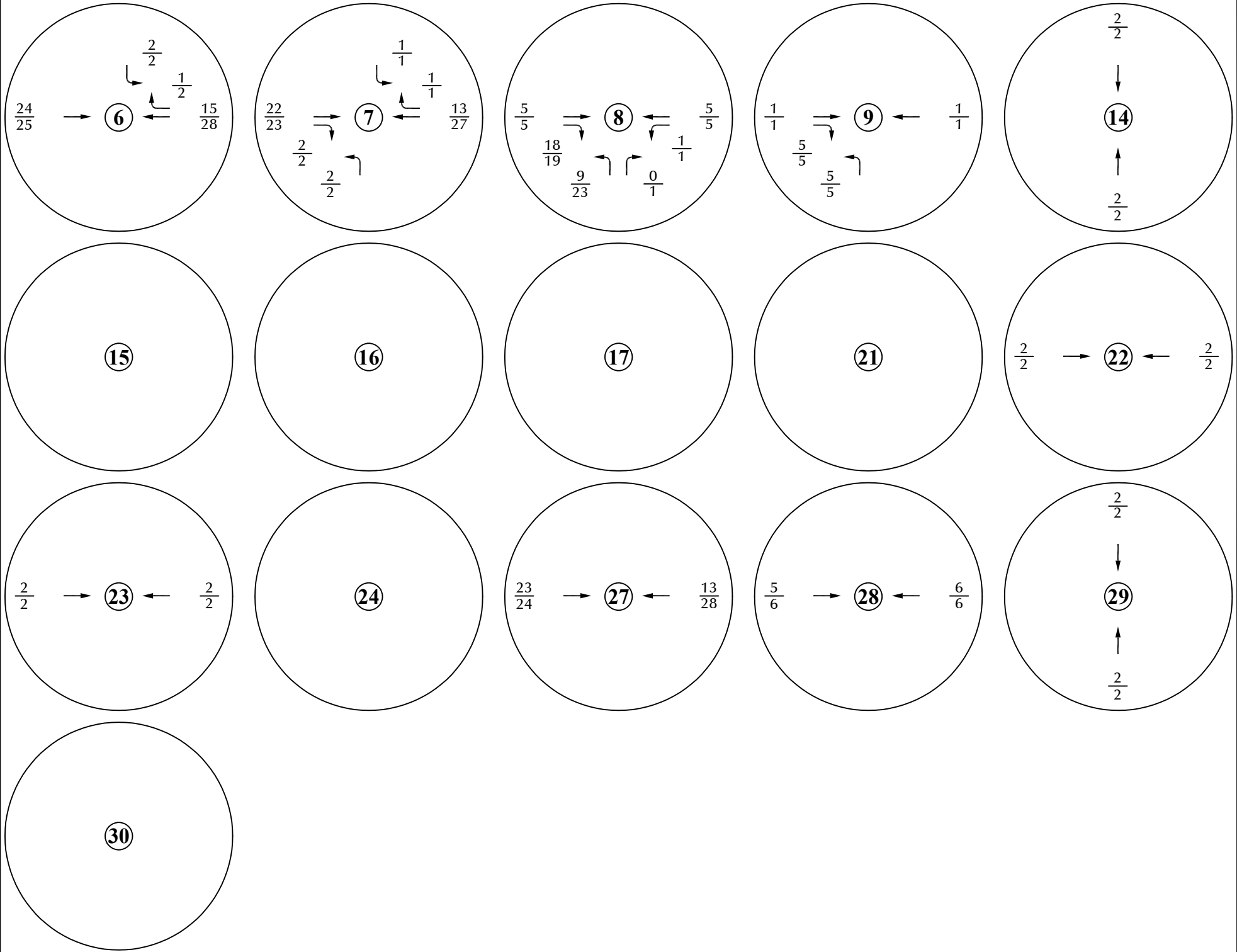


Figure 7b

**Year 2028 Assignment of  
Non-Residential Site-Generated Traffic**

Cottonwood Creek Phase 1 (LSC #230040)



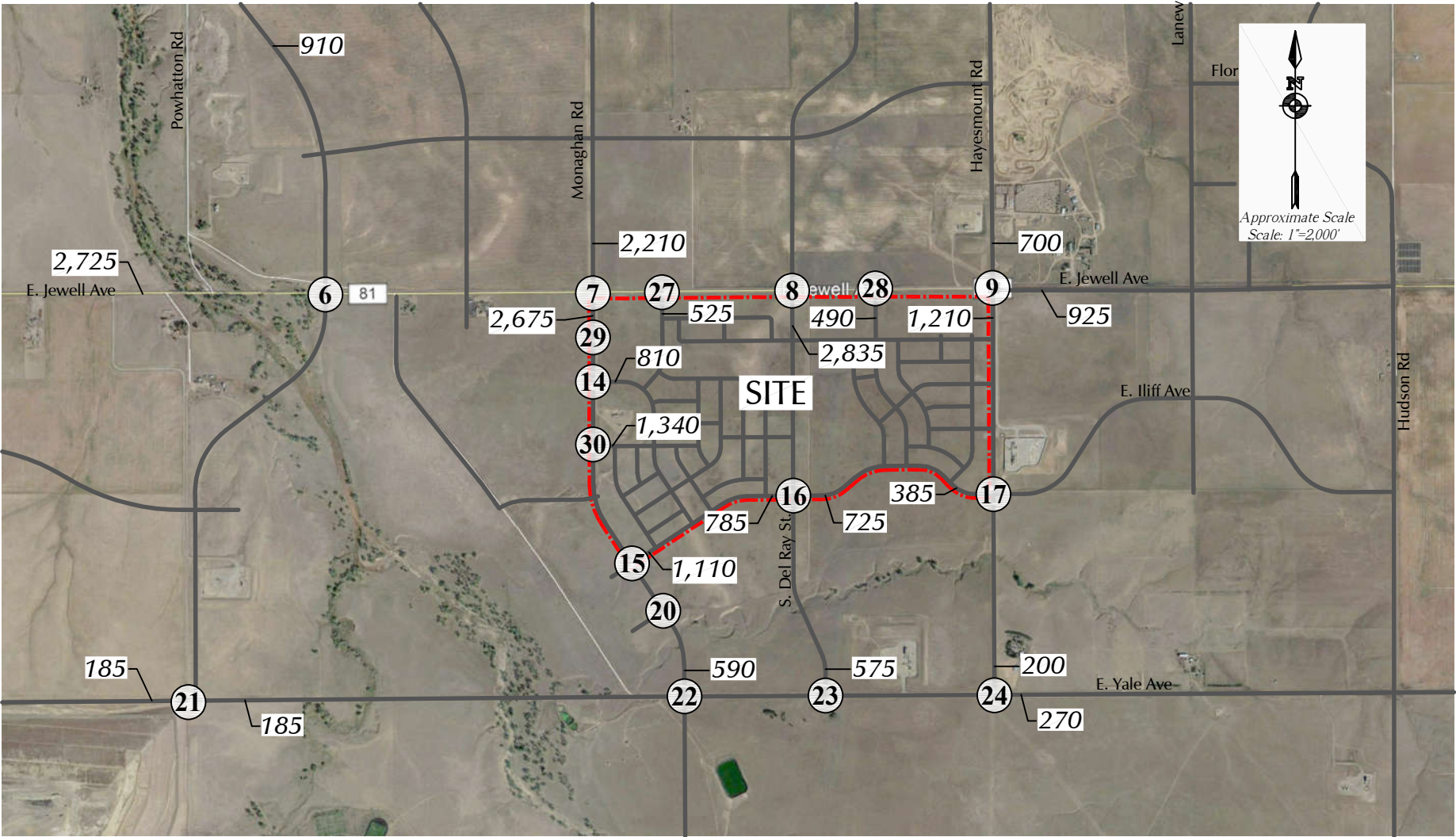
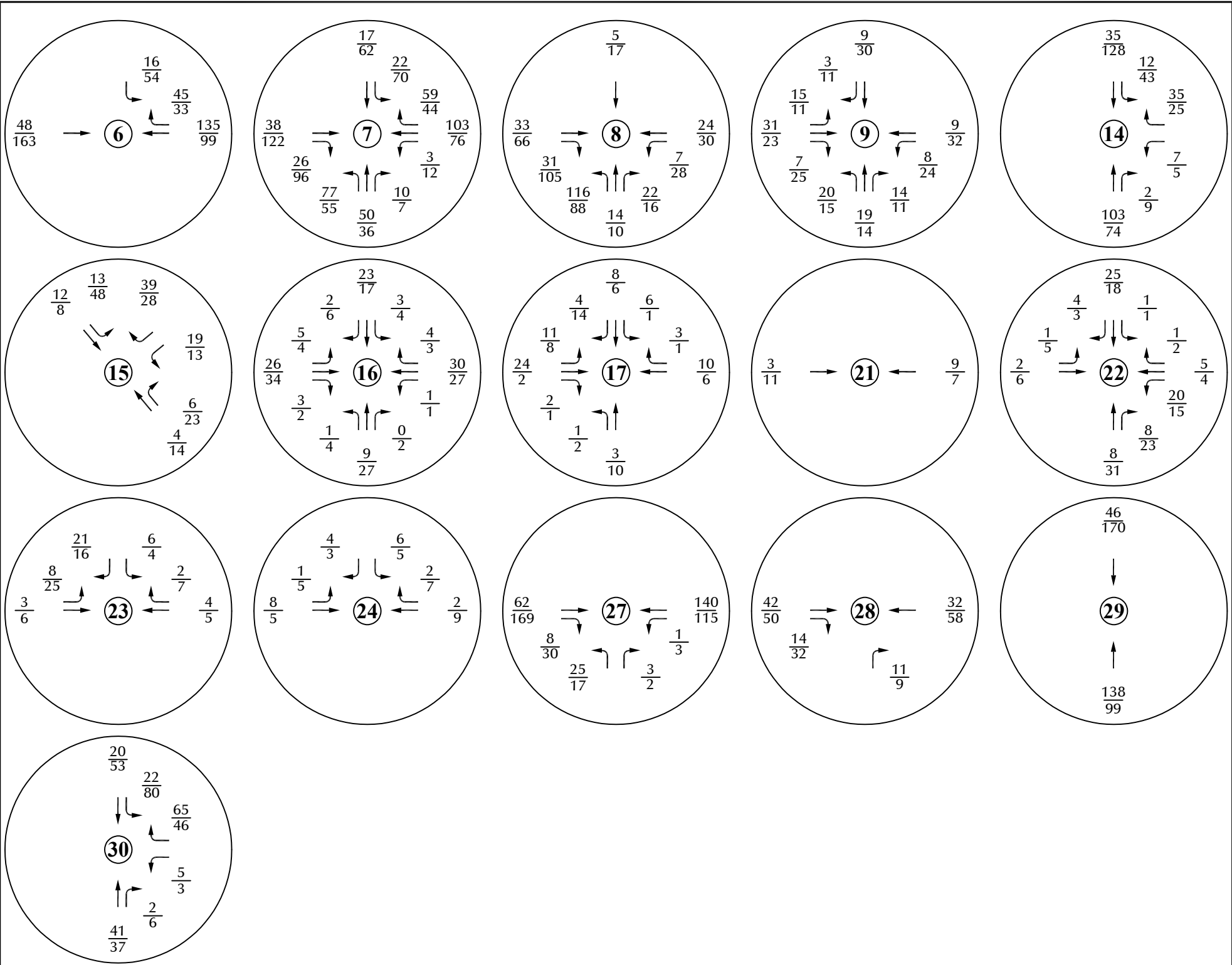


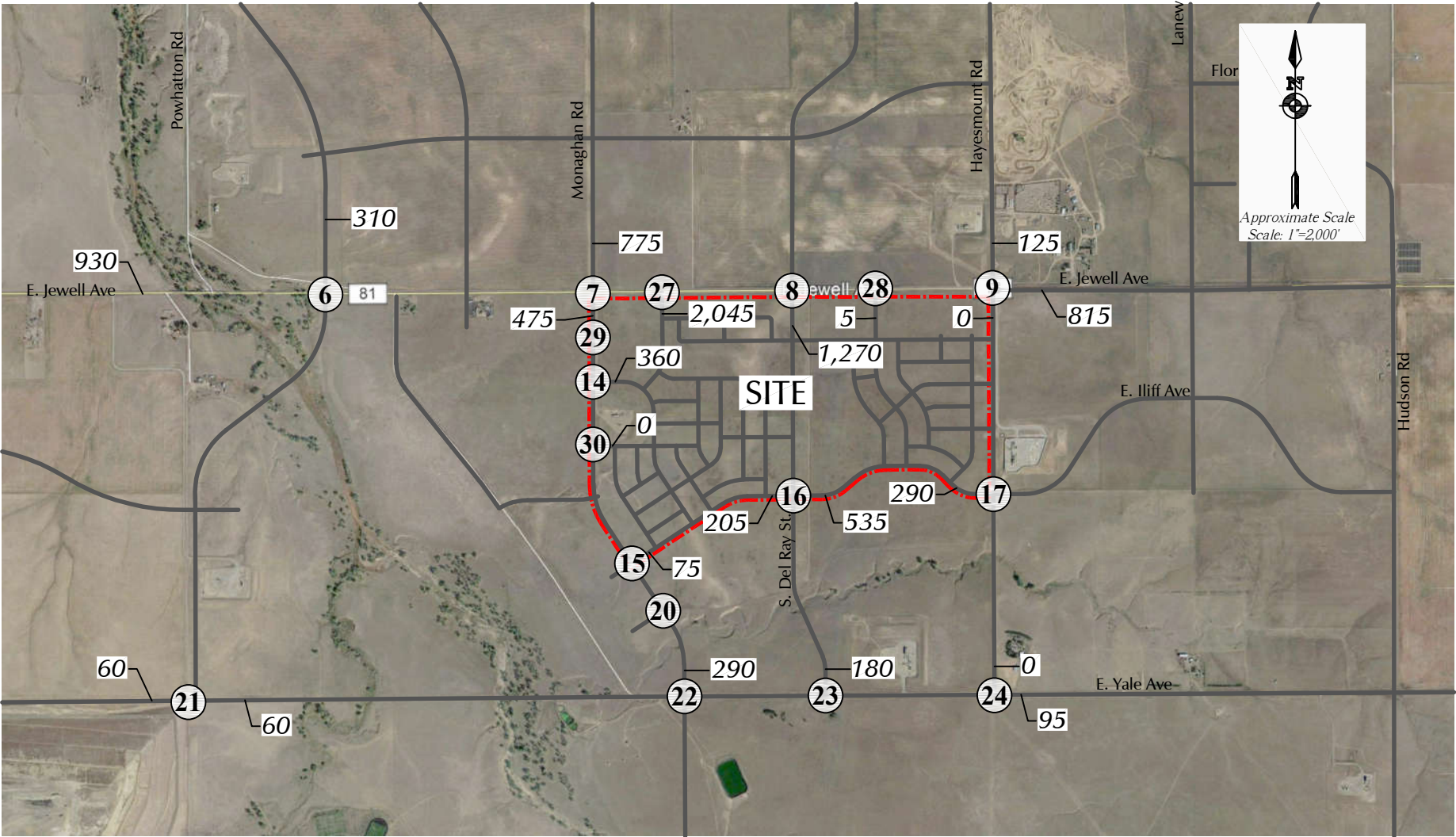
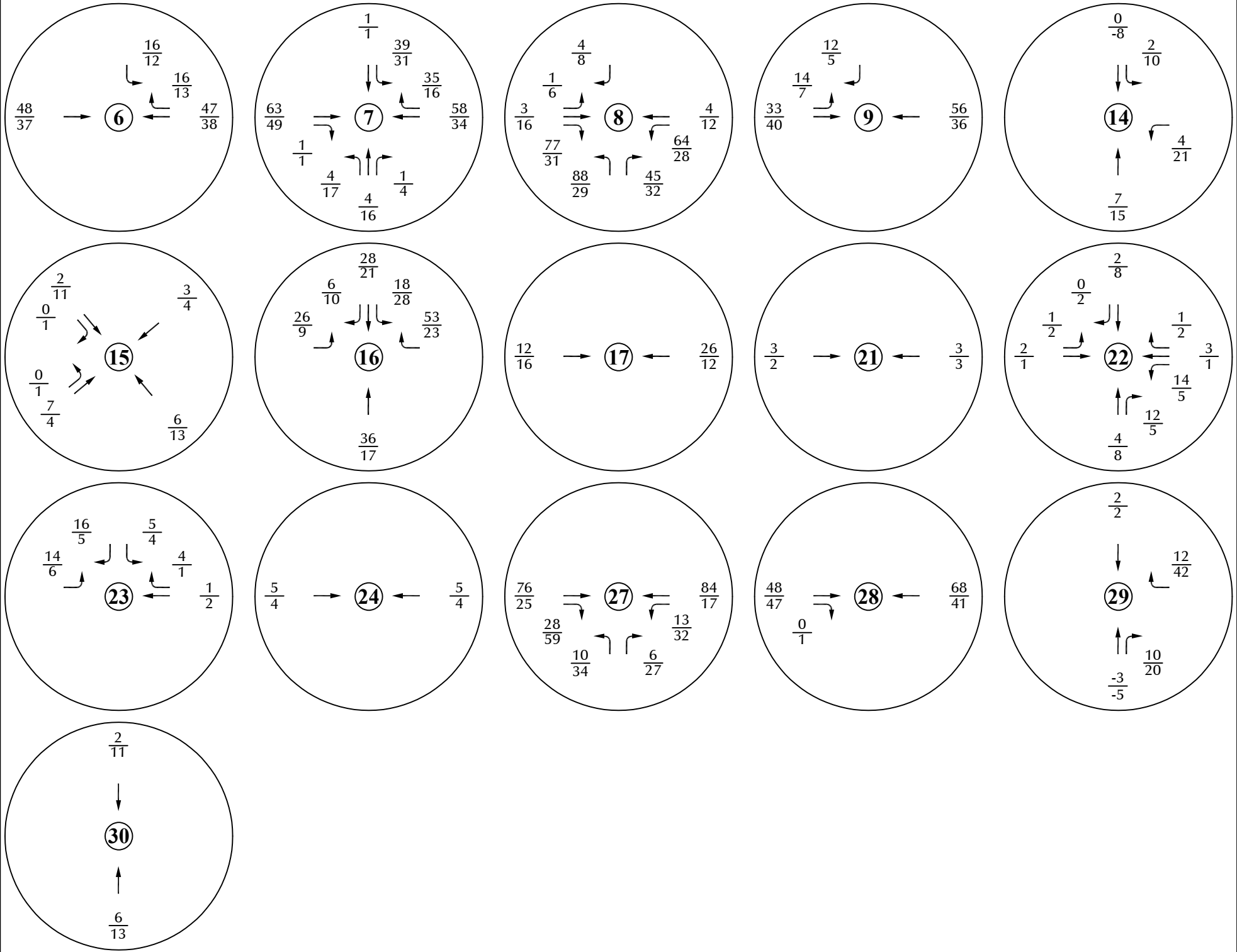
Figure 8a

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

*Year 2040 Assignment of  
 Residential Site-Generated Traffic*  
 Cottonwood Creek Phase 1 (LSC #230040)



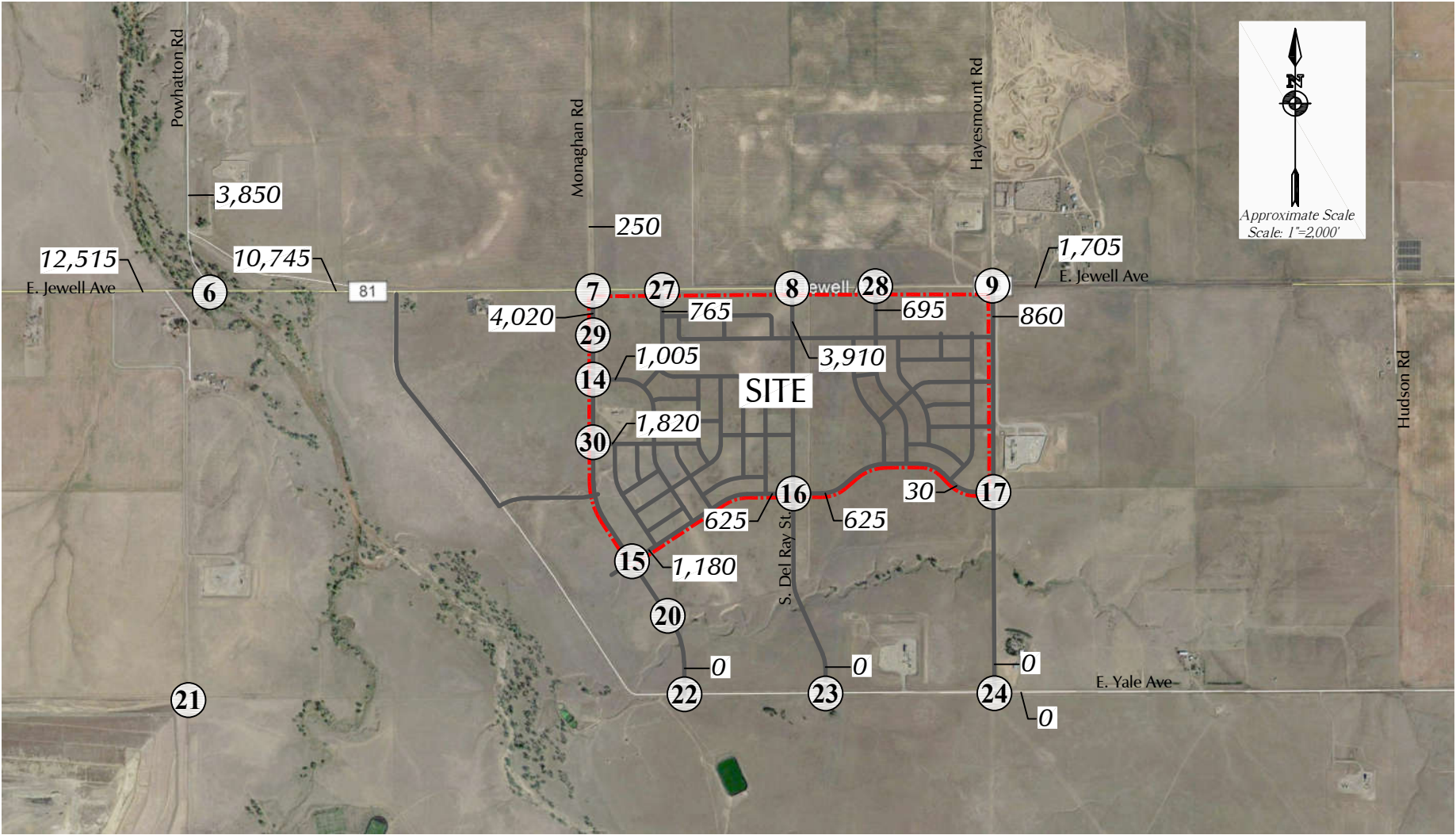
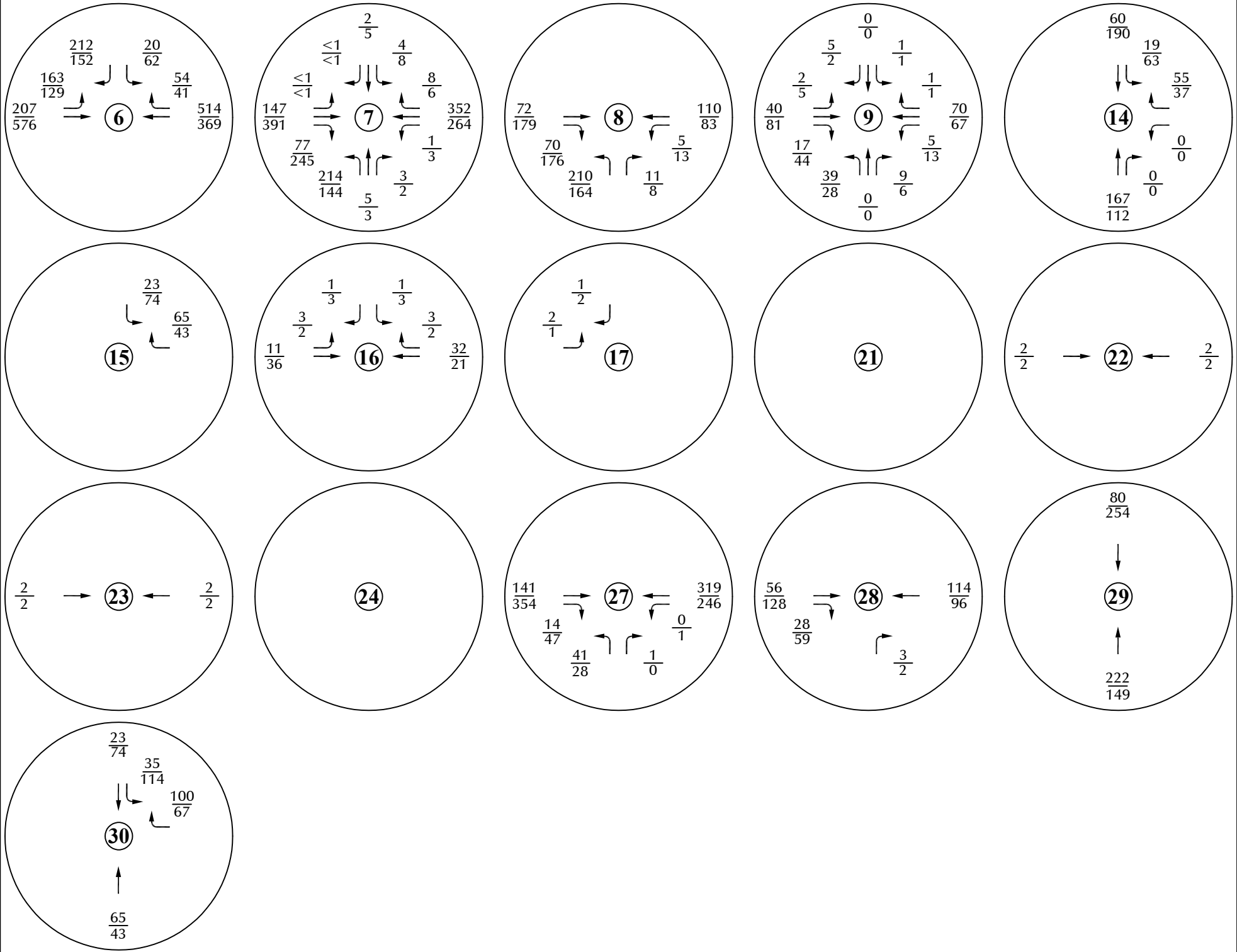




LEGEND:  
 $\frac{26}{35}$  = AM Peak Hour Traffic  
 $\frac{35}{26}$  = PM Peak Hour Traffic  
1,000 = Average Daily Traffic

Figure 8b  
Year 2040 Assignment of  
Non-Residential Site-Generated Traffic  
Cottonwood Creek Phase 1 (LSC #230040)

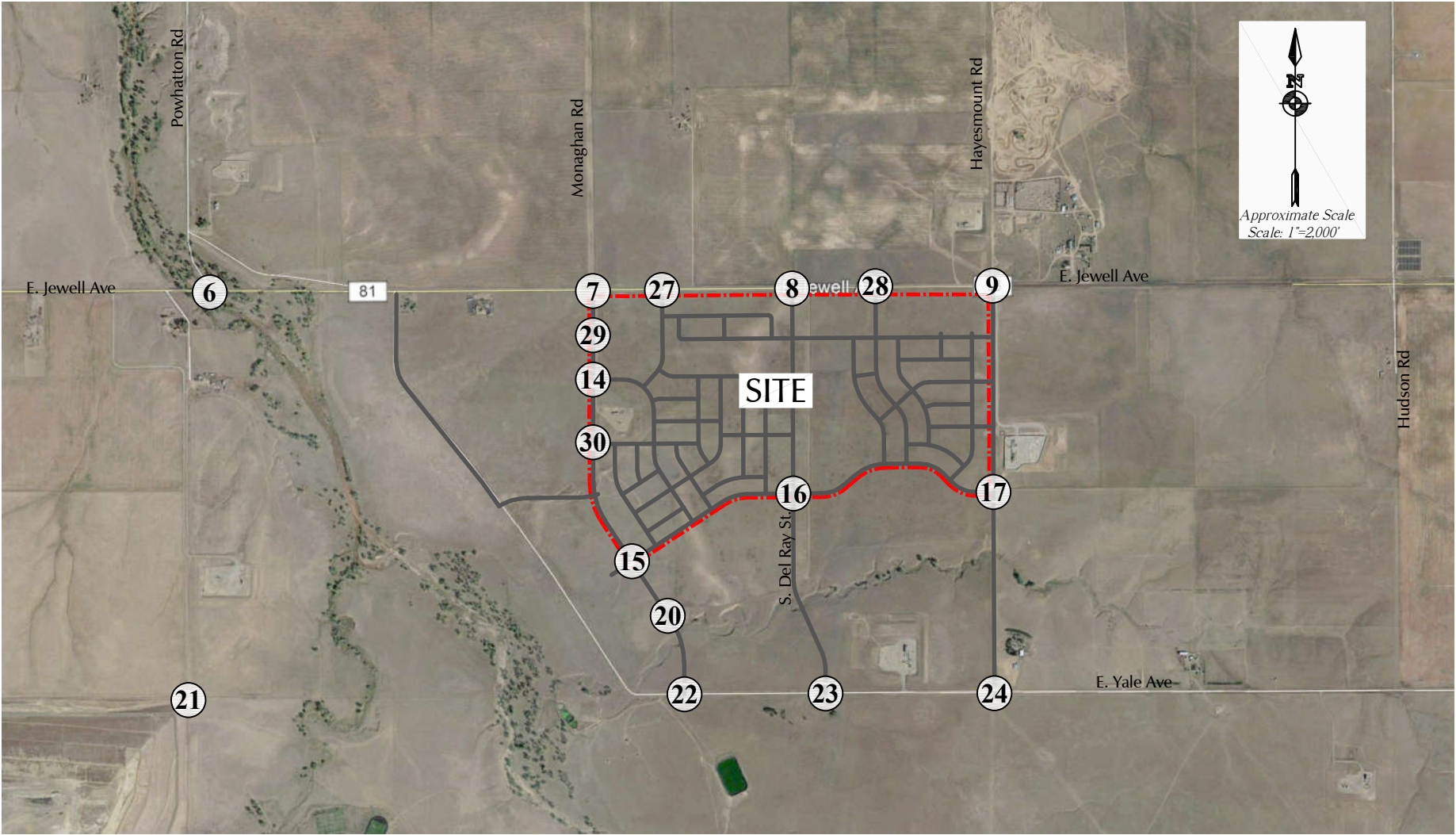
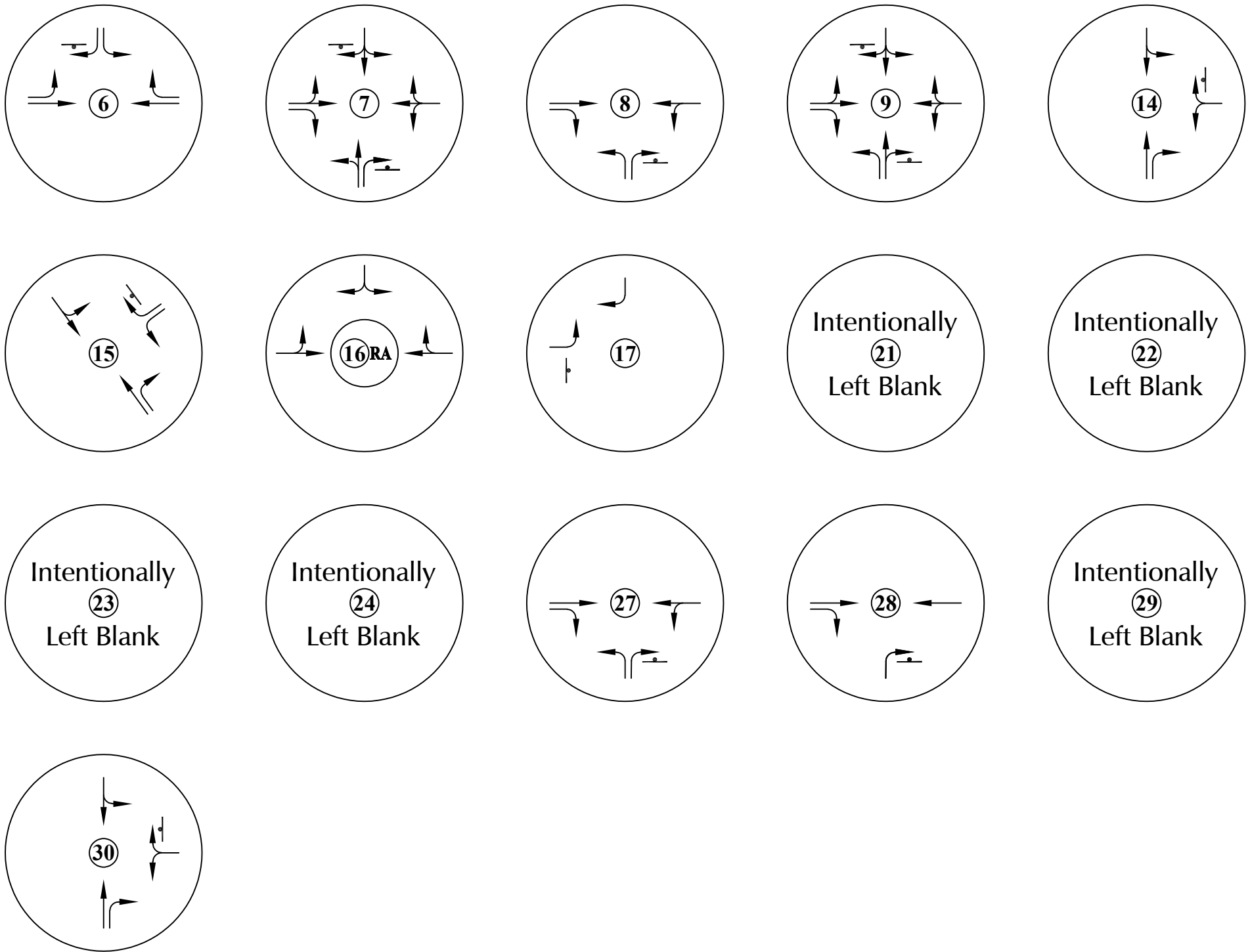




LEGEND:

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

Figure 9a  
**Year 2028**  
**Total Traffic**



LEGEND:

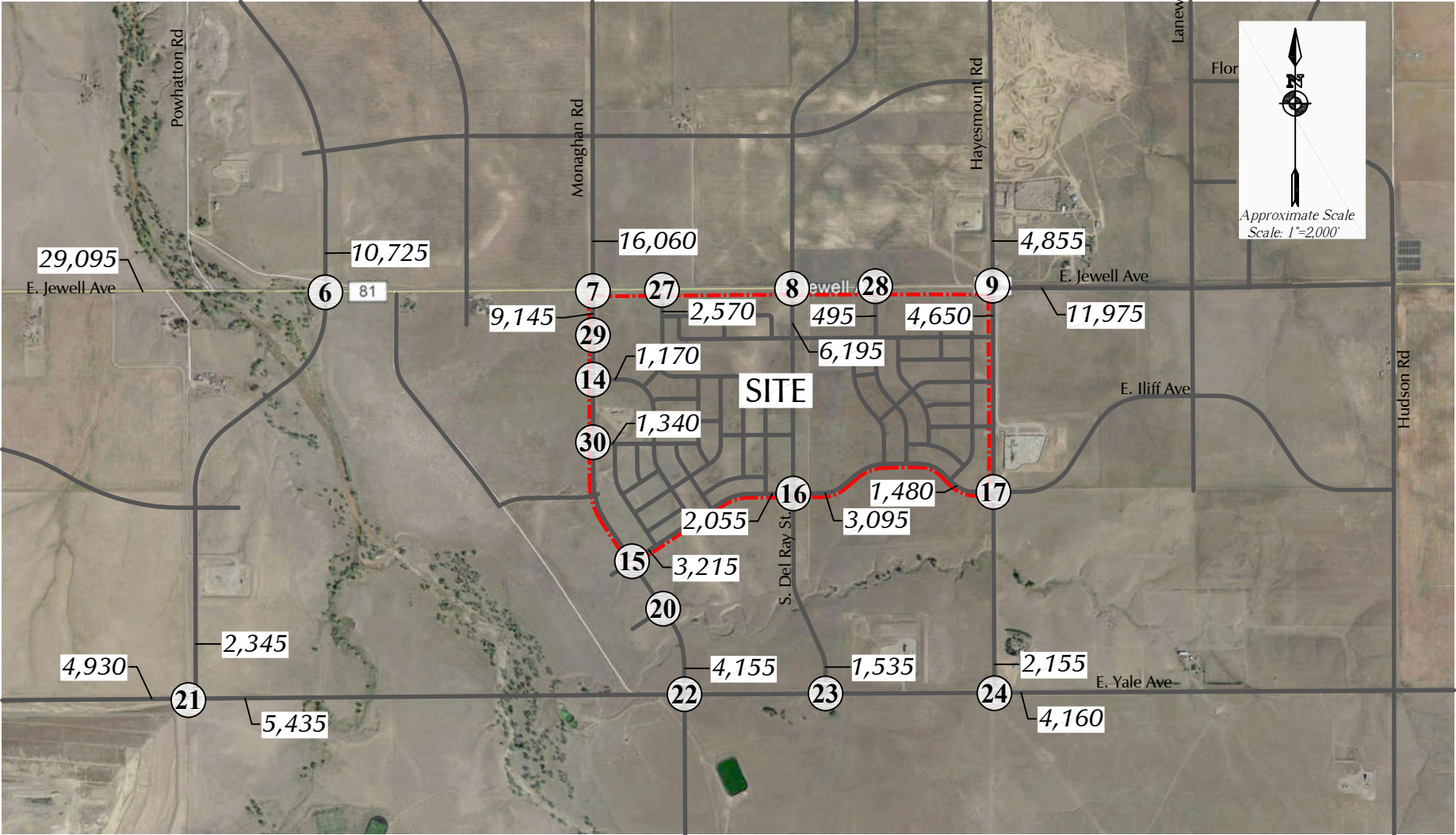
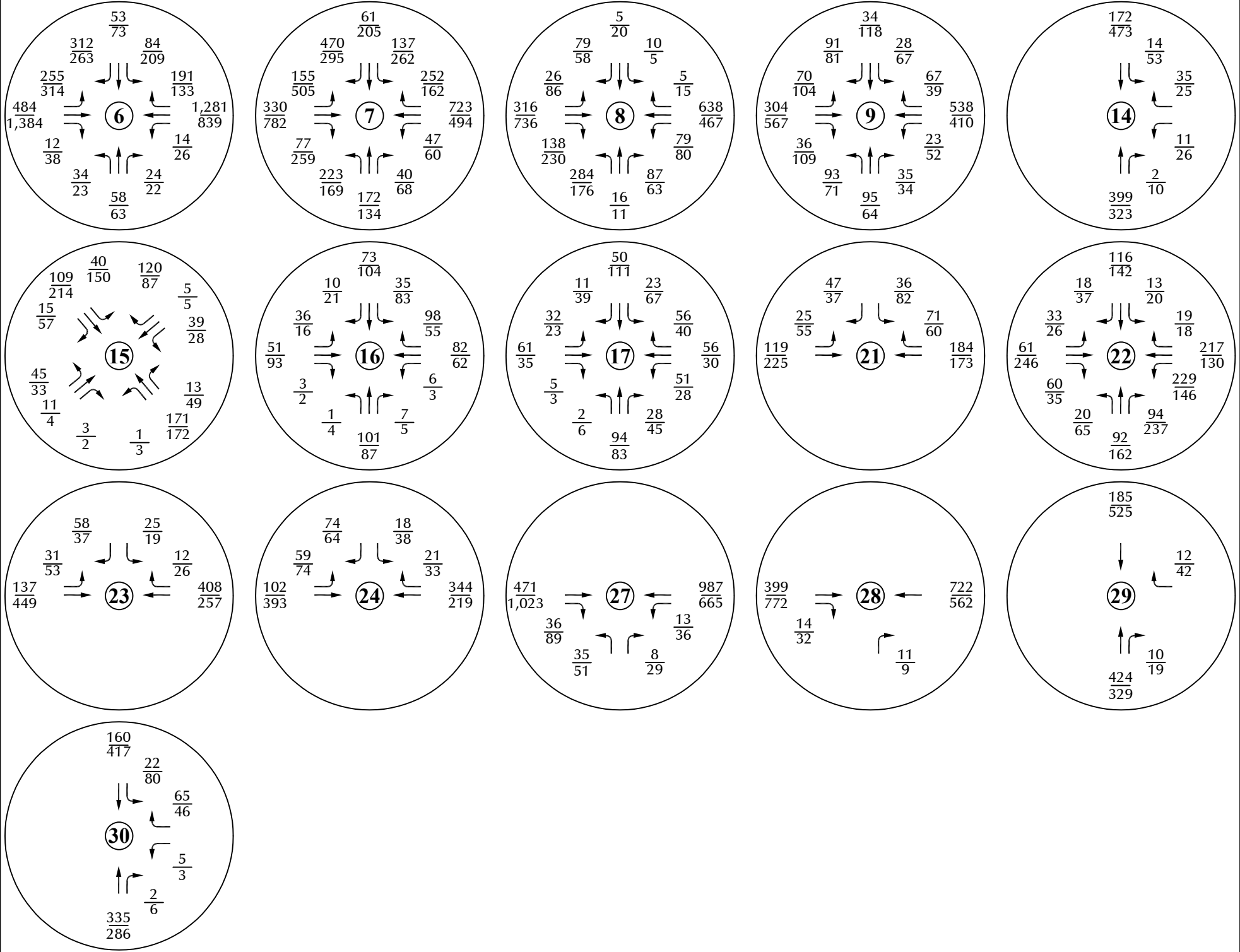
- = Stop Sign
- = Traffic Signal

Figure 9b

**Year 2028 Total Lane  
Geometry and Traffic Control**

Cottonwood Creek Phase 1 (LSC #230040)





LEGEND:

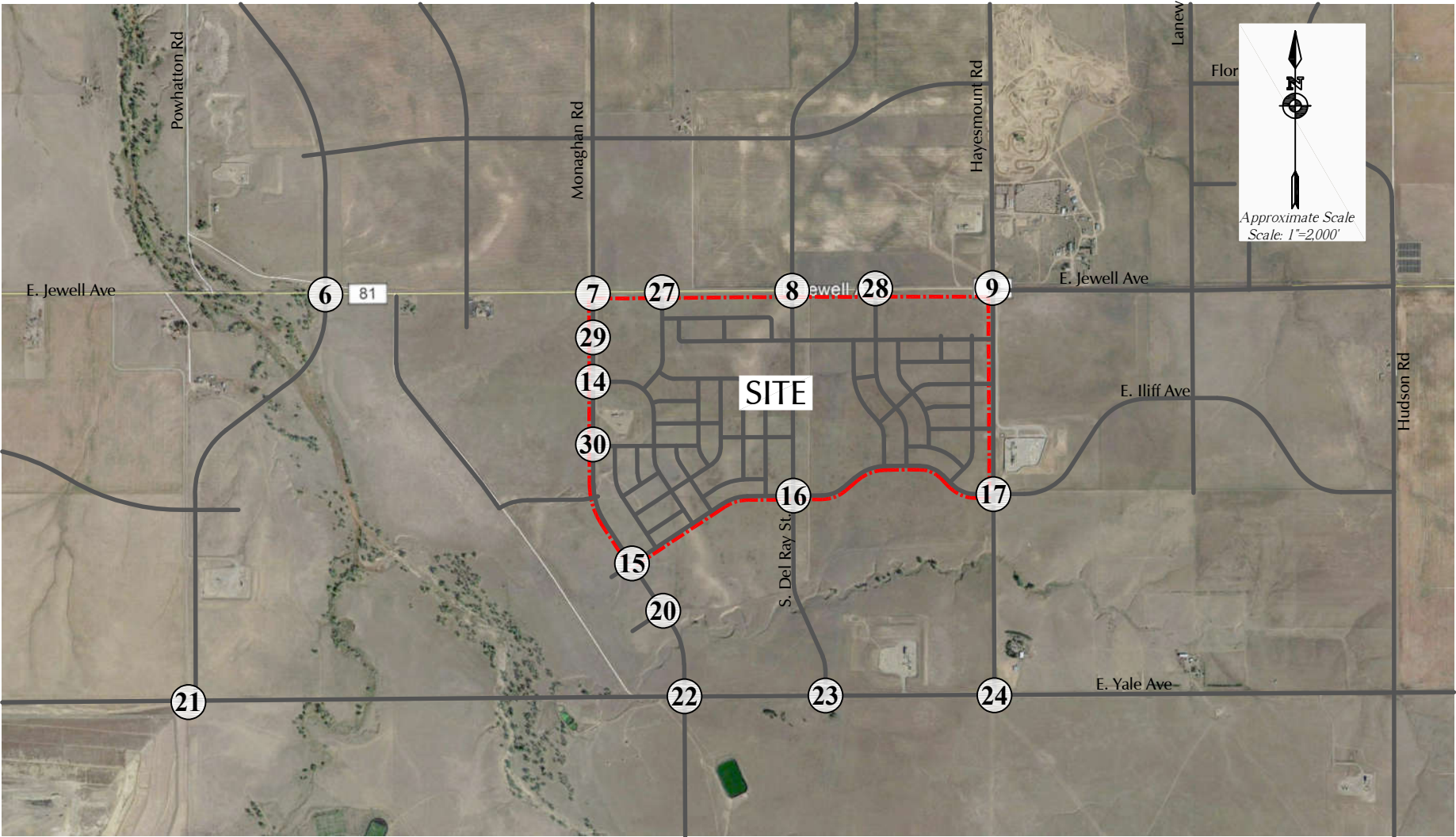
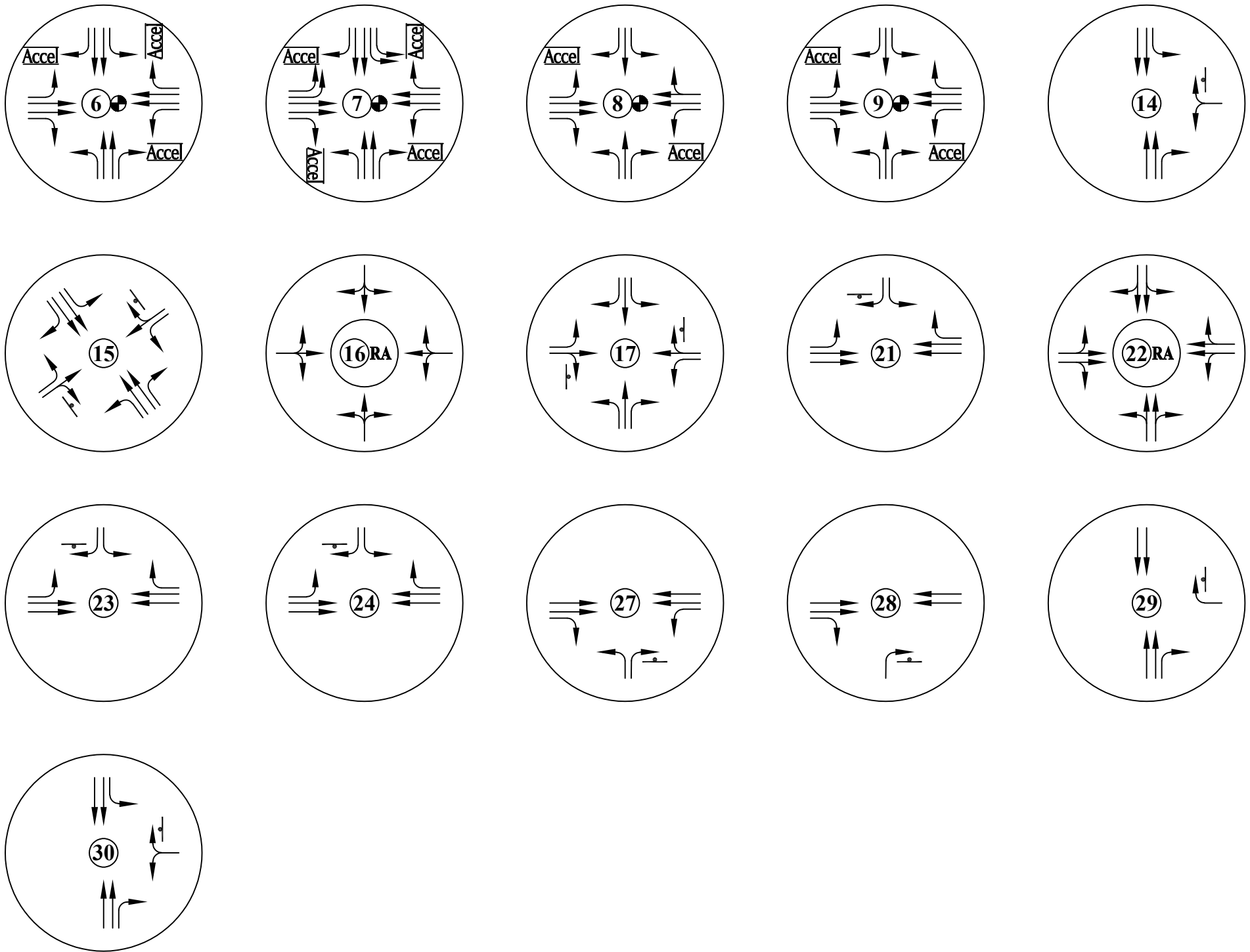
$\frac{26}{35}$	=	AM Peak Hour Traffic
$\frac{35}{35}$	=	PM Peak Hour Traffic
1,000	=	Average Daily Traffic

Figure 10a

**Year 2040**

**Total Traffic**

Cottonwood Creek Phase 1 (LSC #230040)





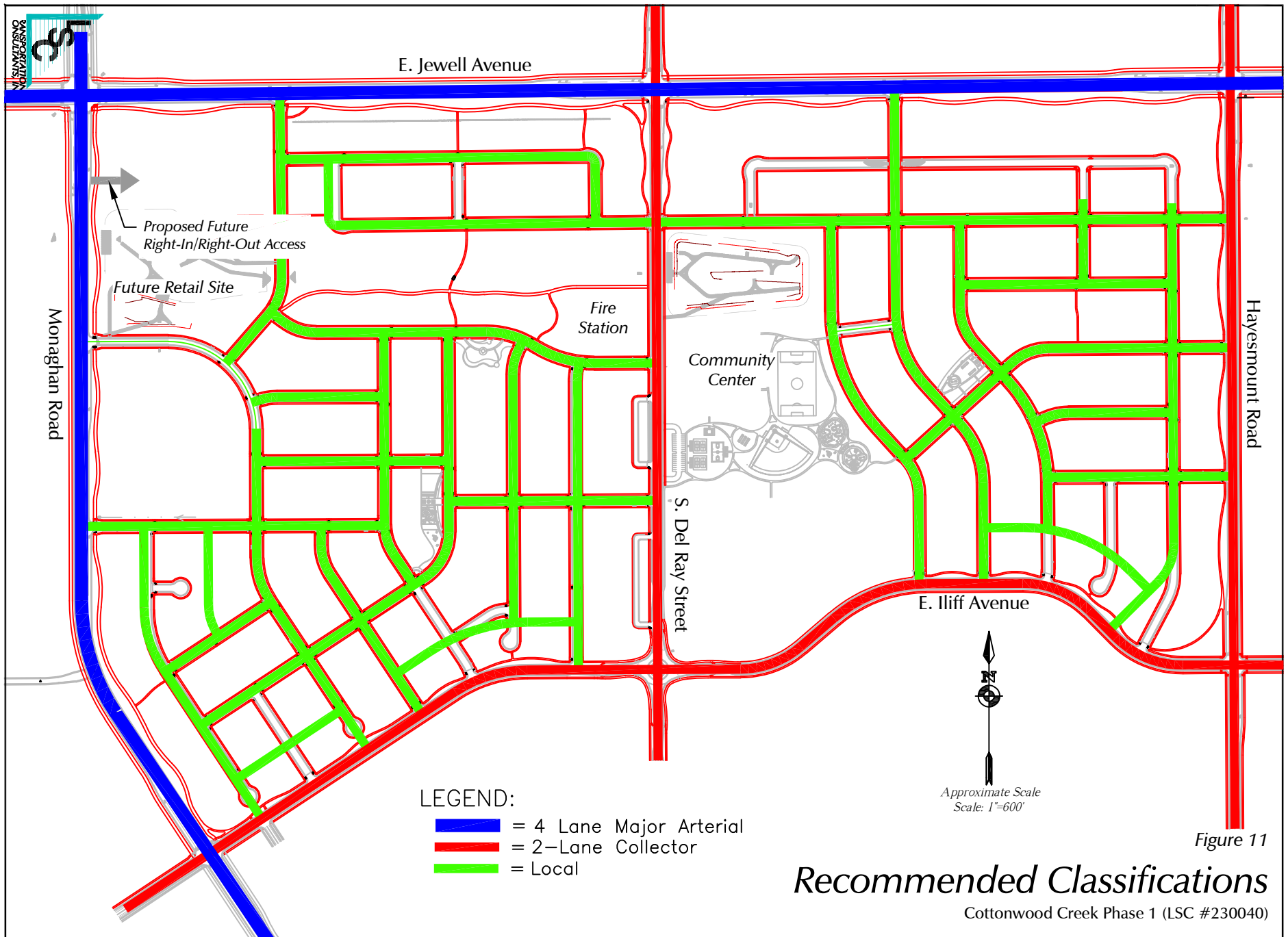
LEGEND:  
 = Stop Sign  
 = Traffic Signal

Figure 10b  
**Year 2040 Total Lane  
 Geometry and Traffic Control**  
 Cottonwood Creek Phase 1 (LSC #230040)







Appendix Table 1 Trip Generation Estimate Comparison to the Cottonwood Creek Master Traffic Impact Study Cottonwood Creek Phase 1 Aurora, CO LSC #230040; January, 2024																									
Phase	Planning Area	Land Use Description	Trip Generation Units			Trip Generation Rates <sup>(1)</sup>					Total Trips Generated From the July 2022 Master TIS					Total Trips Generated Based on the currently proposed land uses					Change in Total Trips Generated From the July 2022 Master TIS				
			July 2022 Master TIS	Currently Proposed	Change	Average Weekday Traffic	Morning Peak Hour		Afternoon Peak Hour	Average Weekday Traffic	Morning Peak Hour		Afternoon Peak Hour	Average Weekday Traffic	Morning Peak Hour		Afternoon Peak Hour	Average Weekday Traffic	Morning Peak Hour		Afternoon Peak Hour				
							In	Out			In	Out			In	Out			In	Out		In	Out	In	Out
1	PA-1	Single Family Detached Housing <sup>(2)</sup>	112 DU <sup>(3)</sup>	112 DU	0 DU <sup>(3)</sup>	9.43	0.182	0.518	0.592	0.348	1,056	20	58	66	39	1,056	20	58	66	39	0	0	0	0	0
1	PA-2	Single Family Detached Housing	280 DU	279 DU	-1 DU	9.43	0.182	0.518	0.592	0.348	2,640	51	145	166	97	2,631	51	145	165	97	-9	0	0	-1	0
1	PA-3	Single Family Detached Housing	402 DU	444 DU	42 DU	9.43	0.182	0.518	0.592	0.348	3,791	73	208	238	140	4,187	81	230	263	154	396	8	22	25	14
Future (Anticipated 2)	PA-4	Single Family Detached Housing	145 DU	159 DU	14 DU	9.43	0.182	0.518	0.592	0.348	1,367	26	75	86	50	1,499	29	82	94	55	132	3	7	8	5
Future (Anticipated 2)	PA-5	Single Family Detached Housing	194 DU	194 DU	0 DU	9.43	0.182	0.518	0.592	0.348	1,829	35	100	115	67	1,829	35	100	115	67	0	0	0	0	0
Future (Anticipated 2)	PA-6	Single Family Detached Housing	228 DU	227 DU	-1 DU	9.43	0.182	0.518	0.592	0.348	2,150	41	118	135	79	2,141	41	118	134	79	-9	0	0	-1	0
Future	PA-9	Single Family Detached Housing	254 DU	254 DU	0 DU	9.43	0.182	0.518	0.592	0.348	2,395	46	132	150	88	2,395	46	132	150	88	0	0	0	0	0
Future	PA-10	Single Family Detached Housing	134 DU	134 DU	0 DU	9.43	0.182	0.518	0.592	0.348	1,264	24	69	79	47	1,264	24	69	79	47	0	0	0	0	0
Future	PA-11	Single Family Detached Housing	132 DU	132 DU	0 DU	9.43	0.182	0.518	0.592	0.348	1,245	24	68	78	46	1,245	24	68	78	46	0	0	0	0	0
Future	PA-12	Single Family Detached Housing	141 DU	141 DU	0 DU	9.43	0.182	0.518	0.592	0.348	1,330	26	73	84	49	1,330	26	73	84	49	0	0	0	0	0
Future	PA-15	Single Family Detached Housing	353 DU	353 DU	0 DU	9.43	0.182	0.518	0.592	0.348	3,329	64	183	209	123	3,329	64	183	209	123	0	0	0	0	0
Future	PA-16	Single Family Detached Housing	371 DU	371 DU	0 DU	9.43	0.182	0.518	0.592	0.348	3,499	68	192	220	129	3,499	68	192	220	129	0	0	0	0	0
Future (Anticipated 2)	PA-7	Single Family Attached Housing <sup>(4)</sup>	202 DU	132 DU	-30 DU	7.20	0.149	0.331	0.325	0.245	1,454	30	67	66	50	950	20	44	43	32	-504	-10	-23	-23	-18
		Single Family Attached Housing	0 DU	40 DU		9.43	0.182	0.518	0.592	0.348	0	0	0	0	0	377	7	21	24	14	377	7	21	24	14
Future (Anticipated 2)	PA-8	Single Family Attached Housing	308 DU	264 DU	-2 DU	7.20	0.149	0.331	0.325	0.245	2,218	46	102	100	75	1,901	39	87	86	65	-317	-7	-15	-14	-10
		Single Family Detached Housing	0 DU	42 DU		9.43	0.182	0.518	0.592	0.348	0	0	0	0	0	396	8	22	25	15	396	8	22	25	15
Future	PA-13	Single Family Attached Housing	155 DU	155 DU	0 DU	7.20	0.149	0.331	0.325	0.245	1,116	23	51	50	38	1,116	23	51	50	38	0	0	0	0	0
Future	PA-14	Single Family Attached Housing	98 DU	98 DU	0 DU	7.20	0.149	0.331	0.325	0.245	706	15	32	32	24	706	15	32	32	24	0	0	0	0	0
1	PA-84	Single Family Attached Housing	259 DU	266 DU	7 DU	7.20	0.149	0.331	0.325	0.245	1,865	39	86	84	63	1,915	40	88	86	65	50	1	2	2	2
			3,768 DU	3,797 DU	29 DU	Total Residential Trips					33,254	651	1,759	1,958	1,204	33,766	661	1,795	2,003	1,226	512	10	36	45	22
Existing	PA-81	Oil and Gas <sup>(5)</sup>	15.2 Acres	15 Acres	0 Acres	1.00	0.100	0.100	0.100	0.100	15	2	2	2	2	15	2	2	2	2	0	0	0	0	0
Existing	PA-82	Oil and Gas	21.4 Acres	21 Acres	0 Acres	1.00	0.100	0.100	0.100	0.100	21	2	2	2	2	21	2	2	2	2	0	0	0	0	0
Existing	PA-83	Oil and Gas	45.6 Acres	46 Acres	0 Acres	1.00	0.100	0.100	0.100	0.100	46	5	5	5	5	46	5	5	5	5	0	0	0	0	0
			82.2 Acres	82.2 Acres	0.0 Acres	Total Oil and Gas Trips					82	9	9	9	9	82	9	9	9	9	0	0	0	0	0
Future (Anticipated 2)	PA-45	Pocket Park <sup>(6)</sup>	0.8 Acres	0.8 Acres	0 Acres	0.78	0.012	0.008	0.061	0.050	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
1	PA-46	Pocket Park	0.8 Acres	0.8 Acres	0 Acres	0.78	0.012	0.008	0.061	0.050	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
1	PA-47	Pocket Park	0.8 Acres	0.8 Acres	0 Acres	0.78	0.012	0.008	0.061	0.050	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Future (Anticipated 2)	PA-48	Pocket Park	0.8 Acres	0.8 Acres	0 Acres	0.78	0.012	0.008	0.061	0.050	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Future (Anticipated 2)	PA-49	Pocket Park	0.8 Acres	0.8 Acres	0 Acres	0.78	0.012	0.008	0.061	0.050	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Future (Anticipated 2)	PA-50	Pocket Park	2.7 Acres	2.7 Acres	0 Acres	0.78	0.012	0.008	0.061	0.050	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Future	PA-51	Pocket Park	0.8 Acres	0.8 Acres	0 Acres	0.78	0.012	0.008	0.061	0.050	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Future	PA-52	Pocket Park	0.8 Acres	0.8 Acres	0 Acres	0.78	0.012	0.008	0.061	0.050	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Future	PA-53	Pocket Park	0.8 Acres	0.8 Acres	0 Acres	0.78	0.012	0.008	0.061	0.050	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Future (Anticipated 2)	PA-54	Neighborhood Park <sup>(6)</sup>	3.0 Acres	3.0 Acres	0 Acres	0.78	0.012	0.008	0.061	0.050	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0
1	PA-55	Neighborhood Park	11.0 Acres	11.0 Acres	0 Acres	0.78	0.012	0.008	0.061	0.050	9	0	0	1	1	9	0	0	1	1	0	0	0	0	0
Future	PA-56	Neighborhood Park	9.1 Acres	9.1 Acres	0 Acres	0.78	0.012	0.008	0.061	0.050	7	0	0	1	0	7	0	0	1	0	0	0	0	0	0
Future	PA-57	Neighborhood Park	5.2 Acres	5.2 Acres	0 Acres	0.78	0.012	0.008	0.061	0.050	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0
Future	PA-58	Neighborhood Park	4.2 Acres	4.2 Acres	0 Acres	0.78	0.012	0.008	0.061	0.050	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0
			41.6 Acres	41.6 Acres	0.0 Acres	Total Park Trips					35	0	0	2	1	35	0	0	2	1	0	0	0	0	0
1	PA-74	Community Center <sup>(7)</sup>	50 KSF <sup>(8)</sup>	50 KSF	0 KSF <sup>(8)</sup>	28.27	1.261	0.649	1.523	1.717	1,413	63	32	76	86	1,413	63	32	76	86	0	0	0	0	0
1	PA-77	Fire Station <sup>(9)</sup>	10 KSF	10 KSF	0 KSF	4.80	0.341	0.139	0.139	0.341	48	3	1	1	3	48	3	1	1	3	0	0	0	0	0
1	PA-75	School <sup>(10)</sup>	500 Students	500 Students	0 Students	2.27	0.400	0.340	0.074	0.086	1,135	200	170	37	43	1,135	200	170	37	43	0	0	0	0	0
Future	PA-76	School	50																						

**Appendix Table 2**  
**Cottonwood Creek Master Plan Internal Trip Calculation**  
**Cottonwood Creek Phase 1**  
**Aurora, CO**  
**LSC #230040; January, 2024**

Land Use		Quantity	Unit	Raw ITE Trip Generation <sup>(1)</sup> (Individual Driveway Trips)												Percent Internal Trips										Total Internal Trips										Total External Trips									
				Daily	AM Peak Hour		PM Peak Hour		Daily	AM Peak Hour		PM Peak Hour		Daily	AM Peak Hour		PM Peak Hour		Daily	AM Peak Hour		PM Peak Hour		Daily	AM Peak Hour		PM Peak Hour																		
					In	Out	In	Out		In	Out	In	Out		In	Out	In	Out		In	Out	In	Out		In	Out																			
Residential Uses																																													
Single-Family Detached Housing		2,882	DU <sup>(2)</sup>	27,177	525	1,493	1,707	1,002	7%	17%	14%	6%	8%	1,986	87	207	108	78	25,191	438	1,286	1,599	924																						
Single-Family Attached Housing		915	DU	6,588	136	303	297	224	7%	17%	14%	6%	8%	482	23	42	19	18	6,106	113	261	278	206																						
				33,765	661	1,796	2,004	1,226							2,468	110	249	127	96	31,297	551	1,547	1,877	1,130																					
Non-Residential Uses																																													
Oil and Gas		82.2	Acres	82	9	9	9	9	0%	0%	0%	0%	0%	0	0	0	0	0	82	9	9	9	9																						
Park		41.6	Acres	35	0	0	2	1	75%	75%	75%	75%	75%	26	0	0	2	1	9	0	0	0	0																						
Community Center		50	KSF <sup>(3)</sup>	1,413	63	32	76	86	75%	75%	75%	75%	75%	1,060	47	24	57	65	353	16	8	19	21																						
Fire Station		10	KSF	48	3	1	1	3	0%	0%	0%	0%	0%	0	0	0	0	0	48	3	1	1	3																						
Elementary School		1,000	Students	2,270	400	340	74	86	50%	50%	25%	25%	50%	1,135	200	85	19	43	1,135	200	255	55	43																						
Commercial		76	KSF	4,932	96	61	221	226	5%	2%	2%	8%	8%	247	2	1	18	18	4,685	94	60	203	208																						
				8,780	571	443	383	411							2,468	249	110	96	127	6,312	322	333	287	284																					
				42,545	1,232	2,239	2,387	1,637	12%	29%	16%	9%	14%	4,936	359	359	223	223	37,609	873	1,880	2,164	1,414																						

Notes:

(1) See Appendix Table 1

(2) DU = dwelling Unit

(3) KSF = thousand square feet of floor area

LSC Transportation Consultants, Inc.

# Traffic Counts

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# COUNTER MEASURES INC.

1889 YORK STREET  
DENVER.COLORADO  
303-333-7409

N/S STREET: HARVEST ROAD  
E/W STREET: JEWELL AVENUE  
CITY: AURORA  
COUNTY: ARAPAHOE

File Name : HARVJEWELL  
Site Code : 00000025  
Start Date : 9/21/2021  
Page No : 1

## Groups Printed- VEHICLES

	HARVEST ROAD Southbound				JEWELL AVENUE Westbound				Northbound				JEWELL AVENUE 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	7	0	0	30	0	0	0	0	0	0	4	17	0	0	59
06:45 AM	1	0	7	0	0	32	1	0	0	0	0	0	4	20	0	0	65
Total	2	0	14	0	0	62	1	0	0	0	0	0	8	37	0	0	124
07:00 AM	2	0	10	0	0	34	1	0	0	0	0	0	0	34	0	0	81
07:15 AM	0	0	15	0	0	42	6	0	0	0	0	0	7	39	0	0	109
07:30 AM	2	0	14	0	0	53	1	0	0	0	0	0	2	31	0	0	103
07:45 AM	1	0	7	0	0	54	1	0	0	0	0	0	7	23	0	0	93
Total	5	0	46	0	0	183	9	0	0	0	0	0	16	127	0	0	386
08:00 AM	0	0	9	0	0	33	0	0	0	0	0	0	8	19	0	0	69
08:15 AM	1	0	6	0	0	24	0	0	0	0	0	0	9	26	0	0	66
Total	1	0	15	0	0	57	0	0	0	0	0	0	17	45	0	0	135
04:00 PM	3	0	11	0	0	42	3	0	0	0	0	0	14	41	0	0	114
04:15 PM	0	0	5	0	0	30	1	0	0	0	0	0	17	42	0	0	95
04:30 PM	0	0	14	0	0	29	4	0	0	0	0	0	11	43	0	0	101
04:45 PM	0	0	6	0	0	28	2	0	0	0	0	0	6	45	0	0	87
Total	3	0	36	0	0	129	10	0	0	0	0	0	48	171	0	0	397
05:00 PM	1	0	7	0	0	23	1	0	0	0	0	0	11	45	0	0	88
05:15 PM	2	0	8	0	0	24	0	0	0	0	0	0	11	47	0	0	92
05:30 PM	0	0	8	0	0	21	2	0	0	0	0	0	11	37	0	0	79
05:45 PM	1	0	5	0	0	29	2	0	0	0	0	0	8	37	0	0	82
Total	4	0	28	0	0	97	5	0	0	0	0	0	41	166	0	0	341
Grand Total	15	0	139	0	0	528	25	0	0	0	0	0	130	546	0	0	1383
Apprch %	9.7	0.0	90.3	0.0	0.0	95.5	4.5	0.0	0.0	0.0	0.0	0.0	19.2	80.8	0.0	0.0	
Total %	1.1	0.0	10.1	0.0	0.0	38.2	1.8	0.0	0.0	0.0	0.0	0.0	9.4	39.5	0.0	0.0	

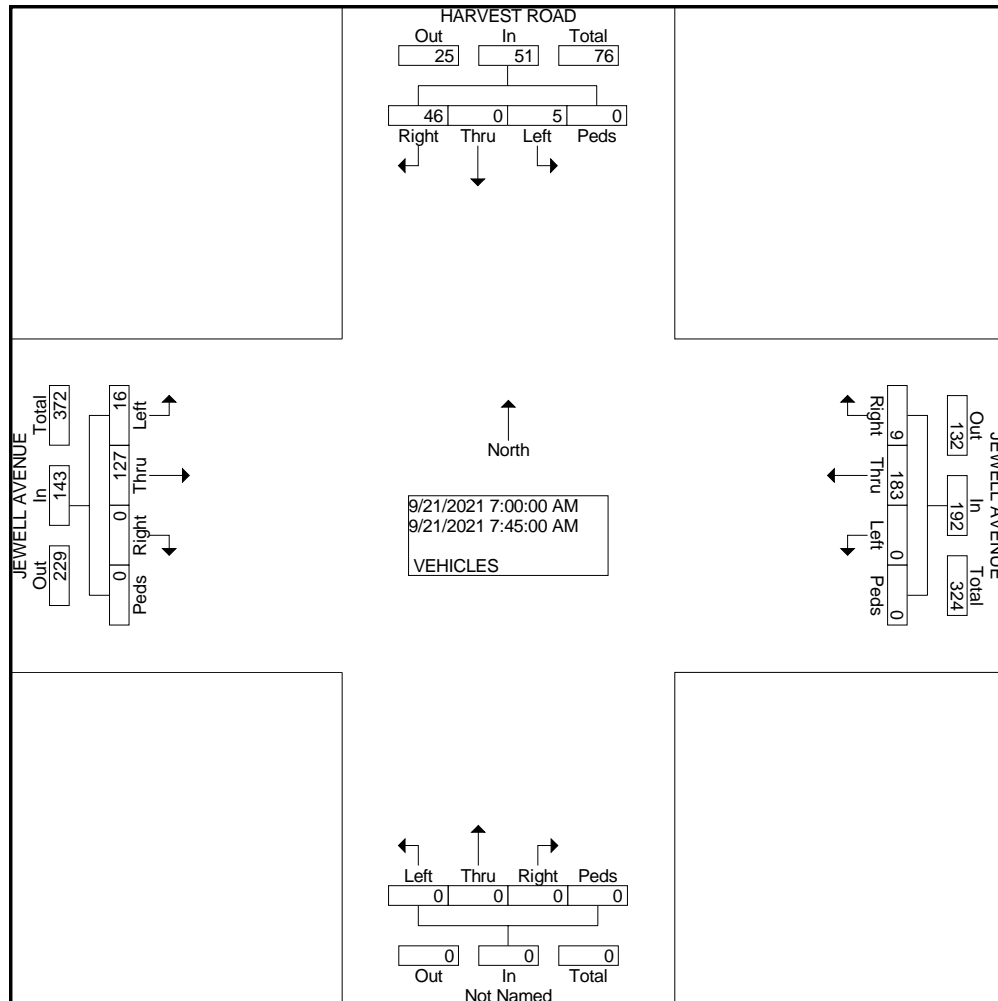
# COUNTER MEASURES INC.

1889 YORK STREET  
DENVER.COLORADO  
303-333-7409

N/S STREET: HARVEST ROAD  
E/W STREET: JEWELL AVENUE  
CITY: AURORA  
COUNTY: ARAPAHOE

File Name : HARVJEWELL  
Site Code : 00000025  
Start Date : 9/21/2021  
Page No : 2

	HARVEST ROAD Southbound					JEWELL AVENUE Westbound					Northbound					JEWELL AVENUE 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 08:15 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	5	0	46	0	51	0	183	9	0	192	0	0	0	0	0	16	127	0	0	143	386
Percent	9.8	0.0	90.2	0.0		0.0	95.3	4.7	0.0		0.0	0.0	0.0	0.0		11.2	88.8	0.0	0.0		
07:15																					
Volume	0	0	15	0	15	0	42	6	0	48	0	0	0	0	0	7	39	0	0	46	109
Peak Factor																					0.885
High Int.	07:30 AM					07:45 AM					6:15:00 AM					07:15 AM					
Volume	2	0	14	0	16	0	54	1	0	55	0	0	0	0	0	7	39	0	0	46	
Peak Factor	0.797					0.873										0.777					



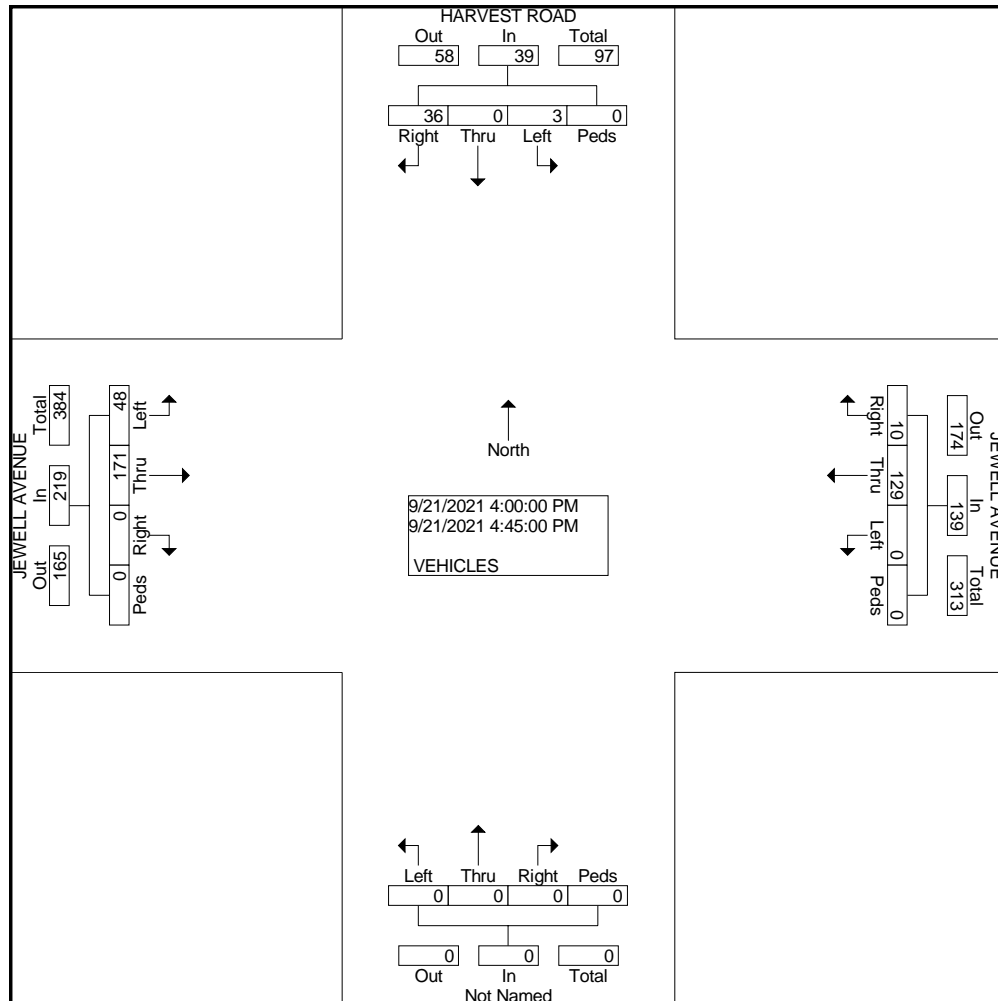
# COUNTER MEASURES INC.

1889 YORK STREET  
DENVER.COLORADO  
303-333-7409

N/S STREET: HARVEST ROAD  
E/W STREET: JEWELL AVENUE  
CITY: AURORA  
COUNTY: ARAPAHOE

File Name : HARVJEWELL  
Site Code : 00000025  
Start Date : 9/21/2021  
Page No : 2

	HARVEST ROAD Southbound					JEWELL AVENUE Westbound					Northbound					JEWELL AVENUE 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 04:00 PM to 05:45 PM - Peak 1 of 1																					
Intersection	04:00 PM																				
Volume	3	0	36	0	39	0	129	10	0	139	0	0	0	0	0	48	171	0	0	219	397
Percent	7.7	0.0	92.3	0.0		0.0	92.8	7.2	0.0		0.0	0.0	0.0	0.0		21.9	78.1	0.0	0.0		
04:00 Volume	3	0	11	0	14	0	42	3	0	45	0	0	0	0	0	14	41	0	0	55	114
Peak Factor																					0.871
High Int. Volume	04:00 PM					04:00 PM										04:15 PM					
Peak Factor	3	0	11	0	14	0	42	3	0	45	0	0	0	0	0	17	42	0	0	59	
																					0.928



# COUNTER MEASURES INC.

1889 YORK STREET  
DENVER.COLORADO  
303-333-7409

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

File Name : POWHJEWE  
Site Code : 00000015  
Start Date : 8/20/2019  
Page No : 1

## Groups Printed- VEHICLES

	POWHATON 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	23	0	0	4	0	0	0	0	0	0	26	2	0	0	55
06:45 AM	0	0	25	0	0	5	0	0	0	0	0	1	27	1	0	1	60
Total	0	0	48	0	0	9	0	0	0	0	0	1	53	3	0	1	115
07:00 AM	0	0	31	0	0	6	0	0	0	0	0	0	21	2	0	0	60
07:15 AM	0	0	27	0	0	7	0	0	0	0	0	0	17	2	0	0	53
07:30 AM	0	0	20	0	0	2	0	0	0	0	0	0	16	1	0	0	39
07:45 AM	0	0	19	0	0	3	1	0	0	0	0	0	15	5	0	0	43
Total	0	0	97	0	0	18	1	0	0	0	0	0	69	10	0	0	195
08:00 AM	0	0	18	0	0	3	0	0	0	0	0	0	14	1	0	0	36
08:15 AM	1	0	19	0	0	1	1	0	0	0	0	0	10	2	0	0	34
Total	1	0	37	0	0	4	1	0	0	0	0	0	24	3	0	0	70
04:00 PM	0	0	18	0	0	6	0	0	0	0	0	0	19	2	0	0	45
04:15 PM	2	0	25	0	0	1	0	0	0	0	0	0	22	3	0	0	53
04:30 PM	0	0	27	0	0	2	1	0	0	0	0	0	13	5	0	0	48
04:45 PM	1	0	27	0	0	8	2	0	0	0	0	0	20	7	0	0	65
Total	3	0	97	0	0	17	3	0	0	0	0	0	74	17	0	0	211
05:00 PM	0	0	30	0	0	7	0	0	0	0	0	0	23	2	0	0	62
05:15 PM	0	0	24	0	0	7	1	0	0	0	0	0	26	7	0	0	65
05:30 PM	0	0	26	0	0	5	1	0	0	0	0	0	13	8	0	0	53
05:45 PM	1	0	24	0	0	1	1	0	0	0	0	0	16	3	0	0	46
Total	1	0	104	0	0	20	3	0	0	0	0	0	78	20	0	0	226
Grand Total	5	0	383	0	0	68	8	0	0	0	0	1	298	53	0	1	817
Apprch %	1.3	0.0	98.7	0.0	0.0	89.5	10.5	0.0	0.0	0.0	0.0	100.0	84.7	15.1	0.0	0.3	
Total %	0.6	0.0	46.9	0.0	0.0	8.3	1.0	0.0	0.0	0.0	0.0	0.1	36.5	6.5	0.0	0.1	

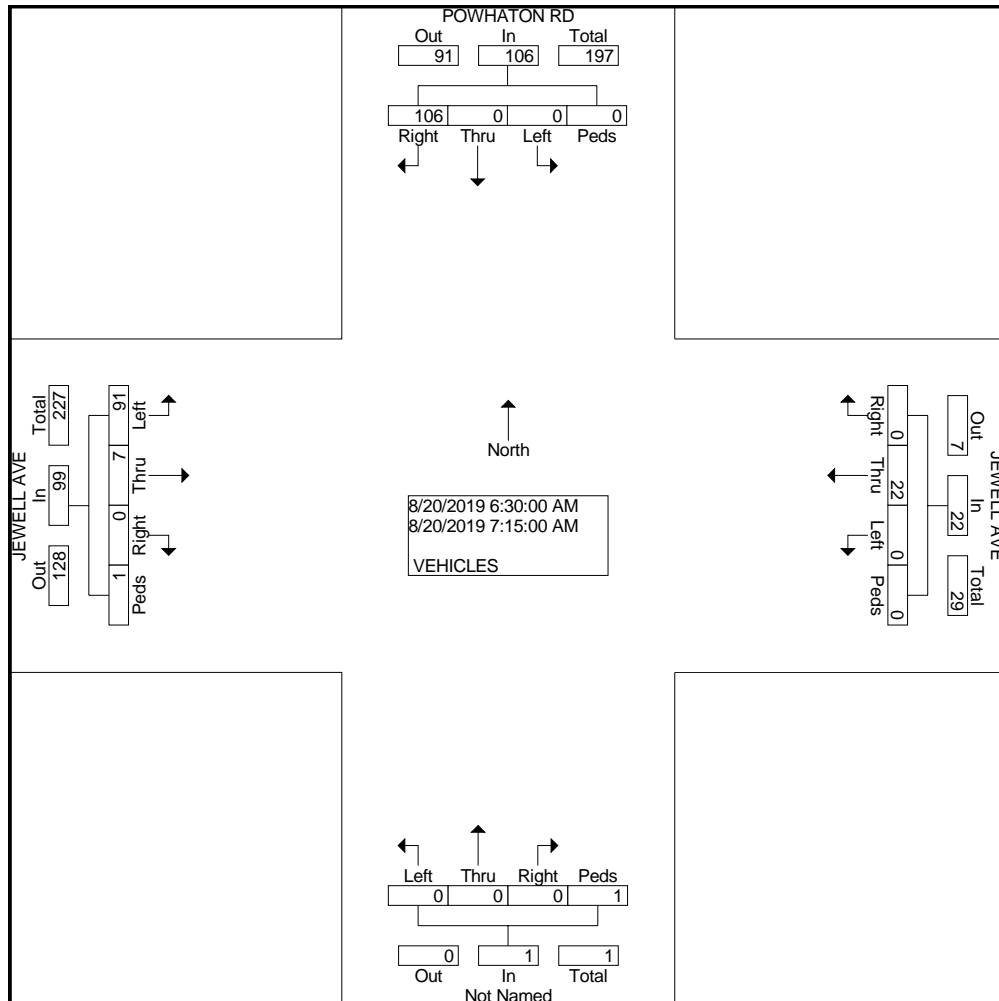
# COUNTER MEASURES INC.

1889 YORK STREET  
DENVER.COLORADO  
303-333-7409

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

File Name : POWHJEWE  
Site Code : 00000015  
Start Date : 8/20/2019  
Page No : 2

	POWHATON 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 07:15 AM - Peak 1 of 1	06:30 AM																				
Intersection	06:30 AM																				
Volume	0	0	106	0	106	0	22	0	0	22	0	0	0	1	1	91	7	0	1	99	228
Percent	0.0	0.0	100.0	0.0		0.0	100.0	0.0	0.0		0.0	0.0	0.0	100.0		91.9	7.1	0.0	1.0		
07:00																					
Volume	0	0	31	0	31	0	6	0	0	6	0	0	0	0	0	21	2	0	0	23	60
Peak Factor																					0.950
High Int.	07:00 AM					07:15 AM					06:45 AM					06:45 AM					
Volume	0	0	31	0	31	0	7	0	0	7	0	0	0	1	1	27	1	0	1	29	
Peak Factor	0.85					0.78					0.25					0.85					3
	5					6					0					3					



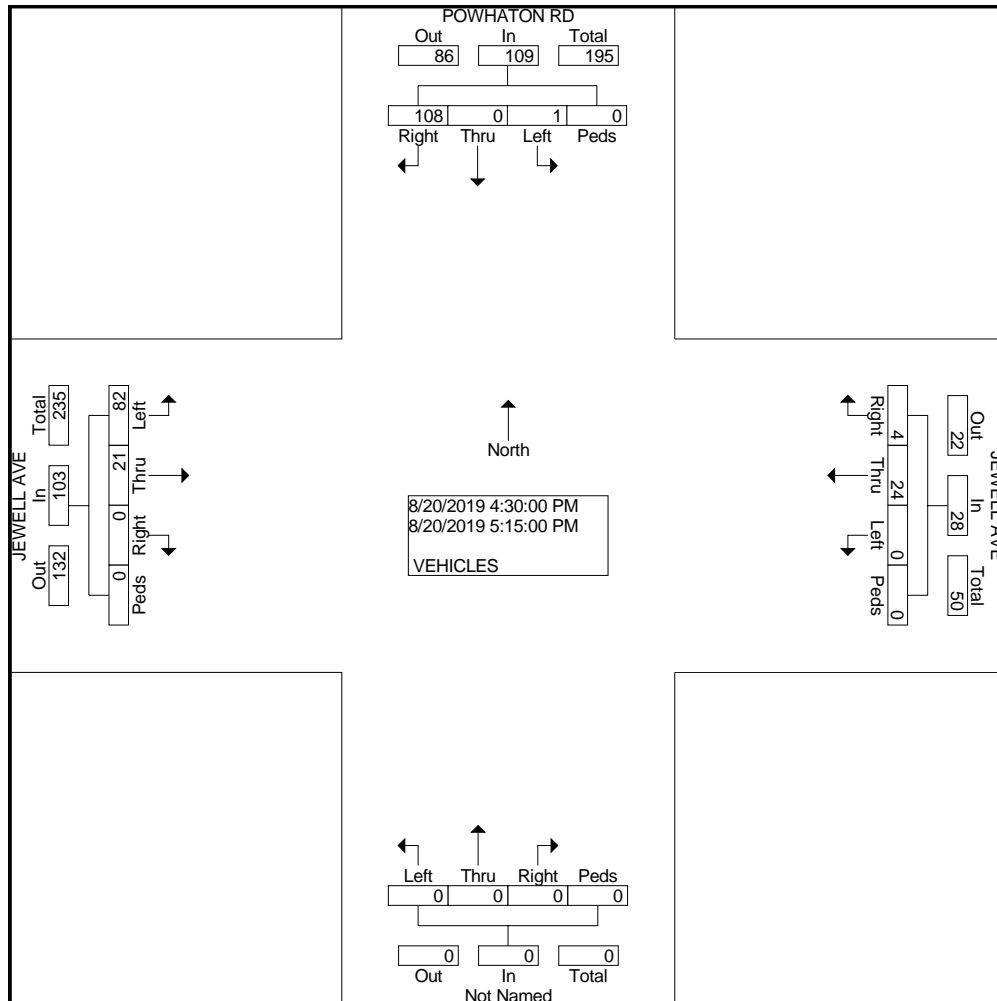
# COUNTER MEASURES INC.

1889 YORK STREET  
DENVER.COLORADO  
303-333-7409

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

File Name : POWHJEWE  
Site Code : 00000015  
Start Date : 8/20/2019  
Page No : 2

	POWHATON 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 04:30 PM to 05:15 PM - Peak 1 of 1	04:30 PM																				
Intersection	04:30 PM																				
Volume	1	0	108	0	109	0	24	4	0	28	0	0	0	0	0	82	21	0	0	103	240
Percent	0.9	0.0	99.1	0.0		0.0	85.7	14.3	0.0		0.0	0.0	0.0	0.0		79.6	20.4	0.0	0.0		
05:15																					
Volume	0	0	24	0	24	0	7	1	0	8	0	0	0	0	0	26	7	0	0	33	65
Peak Factor																					0.923
High Int.	05:00 PM					04:45 PM										05:15 PM					
Volume	0	0	30	0	30	0	8	2	0	10	0	0	0	0	0	26	7	0	0	33	
Peak Factor	0.90					0.70										0.78					
	8					0										0					



# COUNTER MEASURES INC.

1889 YORK STREET  
DENVER.COLORADO  
303-333-7409

N/S STREET: WATKINS RD  
E/W STREET: E. JEWELL AVE  
CITY: WATKINS  
COUNTY: ARAPAHOE

File Name : WATKJEWELL  
Site Code : 00000005  
Start Date : 1/4/2023  
Page No : 1

## Groups Printed- VEHICLES

	WATKINS RD Southbound				NO ACCESS Westbound				WATKINS 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	0	11	2	0	0	0	0	0	1	23	0	0	3	1	1	0	42
06:45 AM	0	20	1	0	0	0	0	0	1	13	0	0	0	0	3	0	38
Total	0	31	3	0	0	0	0	0	2	36	0	0	3	1	4	0	80
07:00 AM	0	20	3	0	0	0	0	0	0	4	0	0	0	0	0	0	27
07:15 AM	0	30	5	0	0	0	0	0	1	7	0	0	2	0	0	0	45
07:30 AM	0	22	1	0	0	0	0	0	2	10	0	0	2	0	1	0	38
07:45 AM	0	14	4	0	0	0	0	0	1	13	0	0	3	0	0	0	35
Total	0	86	13	0	0	0	0	0	4	34	0	0	7	0	1	0	145
08:00 AM	0	23	0	0	0	0	0	0	0	9	0	0	2	0	0	0	34
08:15 AM	0	25	0	0	0	0	0	0	0	17	0	0	1	0	1	0	44
Total	0	48	0	0	0	0	0	0	0	26	0	0	3	0	1	0	78
04:00 PM	0	22	1	0	0	0	0	0	1	22	0	0	0	0	2	0	48
04:15 PM	0	23	2	0	0	0	0	0	0	19	0	0	1	0	0	0	45
04:30 PM	0	19	1	0	0	0	0	0	0	40	0	0	3	0	1	0	64
04:45 PM	0	22	3	0	0	0	0	0	0	36	0	0	4	0	1	0	66
Total	0	86	7	0	0	0	0	0	1	117	0	0	8	0	4	0	223
05:00 PM	0	25	2	0	0	0	0	0	1	37	0	0	5	0	0	0	70
05:15 PM	0	30	0	0	0	0	0	0	0	30	0	0	1	0	0	0	61
05:30 PM	0	16	1	0	0	0	0	0	0	18	0	0	0	0	2	0	37
05:45 PM	0	6	2	0	0	0	0	0	0	31	0	0	0	0	1	0	40
Total	0	77	5	0	0	0	0	0	1	116	0	0	6	0	3	0	208
Grand Total	0	328	28	0	0	0	0	0	8	329	0	0	27	1	13	0	734
Apprch %	0.0	92.1	7.9	0.0	0.0	0.0	0.0	0.0	2.4	97.6	0.0	0.0	65.9	2.4	31.7	0.0	
Total %	0.0	44.7	3.8	0.0	0.0	0.0	0.0	0.0	1.1	44.8	0.0	0.0	3.7	0.1	1.8	0.0	

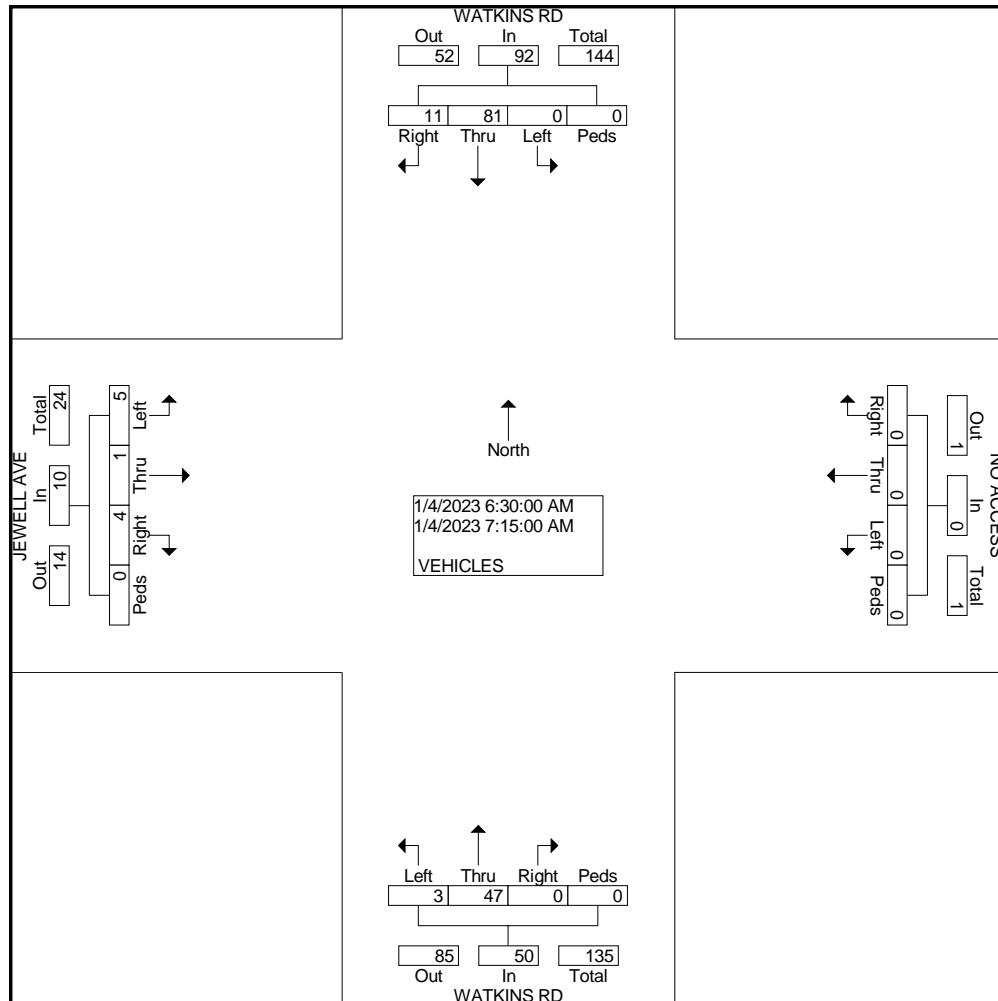
# COUNTER MEASURES INC.

1889 YORK STREET  
DENVER.COLORADO  
303-333-7409

N/S STREET: WATKINS RD  
E/W STREET: E. JEWELL AVE  
CITY: WATKINS  
COUNTY: ARAPAHOE

File Name : WATKJEWELL  
Site Code : 00000005  
Start Date : 1/4/2023  
Page No : 2

	WATKINS RD Southbound					NO ACCESS Westbound					WATKINS RD Northbound					JEWELL AVE Eastbound					Int.
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 08:15 AM - Peak 1 of 1	06:30 AM																				
Intersection	06:30 AM																				
Volume	0	81	11	0	92	0	0	0	0	0	3	47	0	0	50	5	1	4	0	10	152
Percent	0.0	88.0	12.0	0.0		0.0	0.0	0.0	0.0		6.0	94.0	0.0	0.0		50.0	10.0	40.0	0.0		
07:15																					
Volume	0	30	5	0	35	0	0	0	0	0	1	7	0	0	8	2	0	0	0	2	45
Peak Factor																					0.844
High Int.	07:15 AM					6:15:00 AM					06:30 AM					06:30 AM					
Volume	0	30	5	0	35	0	0	0	0	0	1	23	0	0	24	3	1	1	0	5	
Peak Factor	0.65										0.52					0.50					
	7										1					0					





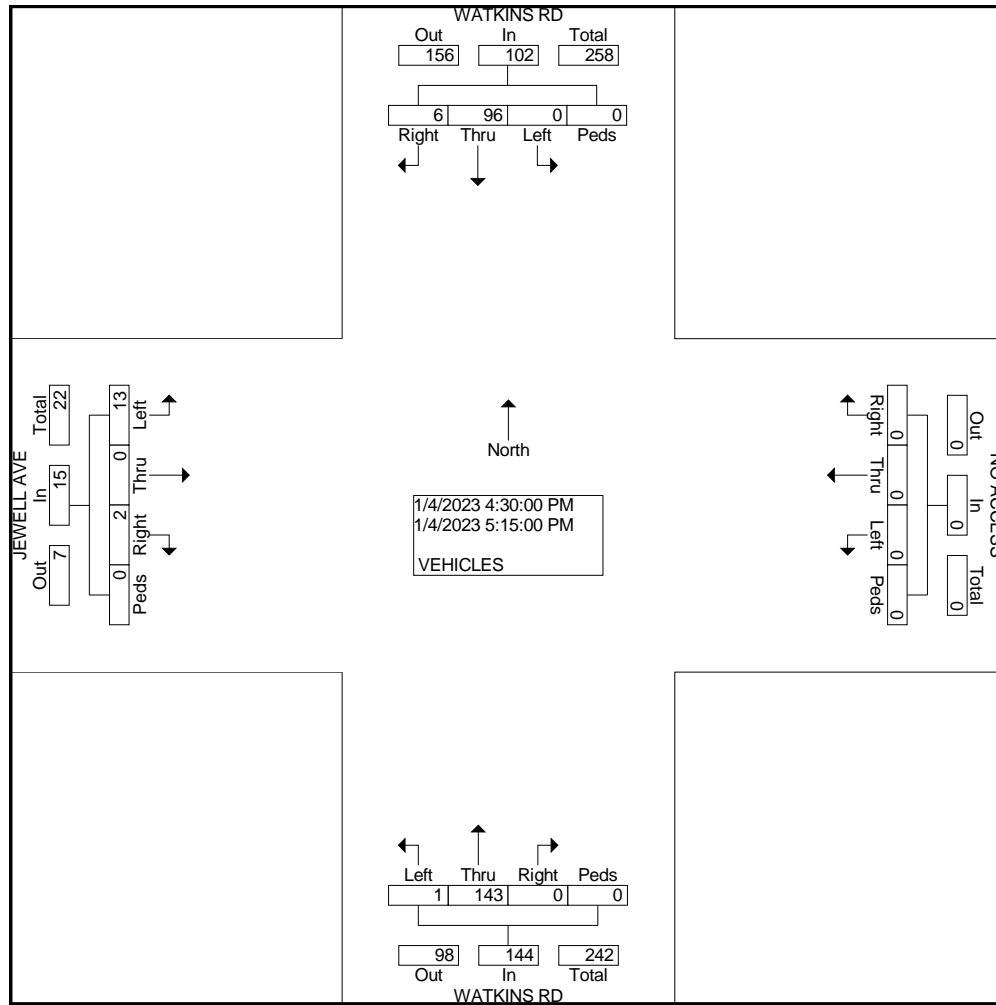
# COUNTER MEASURES INC.

1889 YORK STREET  
DENVER.COLORADO  
303-333-7409

N/S STREET: WATKINS RD  
E/W STREET: E. JEWELL AVE  
CITY: WATKINS  
COUNTY: ARAPAHOE

File Name : WATKJEWELL  
Site Code : 00000005  
Start Date : 1/4/2023  
Page No : 3

	WATKINS RD Southbound					NO ACCESS Westbound					WATKINS 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 04:00 PM to 05:45 PM - Peak 1 of 1																					
Intersection	04:30 PM																				
Volume	0	96	6	0	102	0	0	0	0	0	1	143	0	0	144	13	0	2	0	15	261
Percent	0.0	94.1	5.9	0.0		0.0	0.0	0.0	0.0		0.7	99.3	0.0	0.0		86.7	0.0	13.3	0.0		
05:00 Volume	0	25	2	0	27	0	0	0	0	0	1	37	0	0	38	5	0	0	0	5	70
Peak Factor	0.932																				
High Int. Volume	05:15 PM										04:30 PM					04:45 PM					
Peak Factor	0	30	0	0	30	0	0	0	0	0	0	40	0	0	40	4	0	1	0	5	
					0.85										0.90					0.75	
					0										0					0	



Location: JEWELL AVENUE E-O HARVEST ROAD  
City: AURORA  
County: ARAPAHOE  
Direction: EAST/WEST

**COUNTER MEASURES INC.**  
**1889 YORK STREET**  
**DENVER, COLORADO 80206**  
**303-333-7409**

Site Code: 212018  
Station ID: 212018

Start Time	21-Sep-21 Tue	EASTBOUN	WESTBOUN							Total
12:00 AM		5	6							11
01:00		4	2							6
02:00		4	2							6
03:00		3	7							10
04:00		17	10							27
05:00		34	49							83
06:00		59	116							175
07:00		133	193							326
08:00		77	107							184
09:00		79	83							162
10:00		63	79							142
11:00		71	90							161
12:00 PM		83	68							151
01:00		81	75							156
02:00		85	122							207
03:00		128	136							264
04:00		174	143							317
05:00		177	103							280
06:00		141	94							235
07:00		90	64							154
08:00		55	40							95
09:00		44	11							55
10:00		21	18							39
11:00		8	10							18
Total		1636	1628							3264
Percent		50.1%	49.9%							
AM Peak	-	07:00	07:00	-	-	-	-	-	-	07:00
Vol.	-	133	193	-	-	-	-	-	-	326
PM Peak	-	17:00	16:00	-	-	-	-	-	-	16:00
Vol.	-	177	143	-	-	-	-	-	-	317

Location: JEWELL AVENUE E-O HARVEST ROAD  
City: AURORA  
County: ARAPAHOE  
Direction: EAST/WEST

**COUNTER MEASURES INC.**  
**1889 YORK STREET**  
**DENVER, COLORADO 80206**  
**303-333-7409**

Site Code: 212018  
Station ID: 212018

Start Time	22-Sep-21 Wed	EASTBOUN	WESTBOUN							Total
12:00 AM		8	5							13
01:00		6	2							8
02:00		3	3							6
03:00		5	5							10
04:00		19	12							31
05:00		41	49							90
06:00		66	121							187
07:00		119	211							330
08:00		76	102							178
09:00		67	73							140
10:00		61	63							124
11:00		61	89							150
12:00 PM		81	71							152
01:00		91	57							148
02:00		100	120							220
03:00		119	157							276
04:00		143	160							303
05:00		152	135							287
06:00		141	88							229
07:00		81	49							130
08:00		65	26							91
09:00		28	22							50
10:00		21	10							31
11:00		15	14							29
Total		1569	1644							3213
Percent		48.8%	51.2%							
AM Peak	-	07:00	07:00	-	-	-	-	-	-	07:00
Vol.	-	119	211	-	-	-	-	-	-	330
PM Peak	-	17:00	16:00	-	-	-	-	-	-	16:00
Vol.	-	152	160	-	-	-	-	-	-	303

Location: JEWELL AVENUE E-O HARVEST ROAD  
City: AURORA  
County: ARAPAHOE  
Direction: EAST/WEST

**COUNTER MEASURES INC.**  
**1889 YORK STREET**  
**DENVER, COLORADO 80206**  
**303-333-7409**

Site Code: 212018  
Station ID: 212018

Start Time	23-Sep-21 Thu	EASTBOUN	WESTBOUN							Total
12:00 AM		9	9							18
01:00		3	4							7
02:00		6	2							8
03:00		5	2							7
04:00		14	10							24
05:00		42	43							85
06:00		53	105							158
07:00		126	206							332
08:00		84	112							196
09:00		72	83							155
10:00		61	77							138
11:00		77	93							170
12:00 PM		75	90							165
01:00		93	71							164
02:00		105	132							237
03:00		124	145							269
04:00		156	135							291
05:00		190	131							321
06:00		139	83							222
07:00		93	48							141
08:00		68	34							102
09:00		41	27							68
10:00		19	10							29
11:00		23	7							30
Total		1678	1659							3337
Percent		50.3%	49.7%							
AM Peak	-	07:00	07:00	-	-	-	-	-	-	07:00
Vol.	-	126	206	-	-	-	-	-	-	332
PM Peak	-	17:00	15:00	-	-	-	-	-	-	17:00
Vol.	-	190	145	-	-	-	-	-	-	321
Grand Total		4883	4931							9814
Percent		49.8%	50.2%							
ADT		ADT 3,271	AADT 3,271							

## **Level of Service Definitions**



## LEVEL OF SERVICE DEFINITIONS

From *Highway Capacity Manual*, Transportation Research Board, 2016, 6th Edition

### SIGNALIZED INTERSECTION LEVEL OF SERVICE (LOS)

<b><u>LOS</u></b>	<b><u>Average Vehicle Delay</u> sec/vehicle</b>	<b><u>Operational Characteristics</u></b>
<b>A</b>	<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>B</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.
<b>C</b>	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.
<b>D</b>	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.
<b>E</b>	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.
<b>F</b>	>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, 2016, 6th Edition




### 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.

## **Level of Service Reports**

Intersection						
Int Delay, s/veh	7.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	125	7	22	0	0	170
Future Vol, veh/h	125	7	22	0	0	170
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	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	133	7	23	0	0	181
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	23	0	-	0	296	23
Stage 1	-	-	-	-	23	-
Stage 2	-	-	-	-	273	-
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	1592	-	-	-	695	1054
Stage 1	-	-	-	-	1000	-
Stage 2	-	-	-	-	773	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1592	-	-	-	637	1054
Mov Cap-2 Maneuver	-	-	-	-	637	-
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	773	-
Approach	EB	WB		SB		
HCM Control Delay, s	7.1	0		9.1		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1592	-	-	-	1054	
HCM Lane V/C Ratio	0.084	-	-	-	0.172	
HCM Control Delay (s)	7.5	0	-	-	9.1	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0.3	-	-	-	0.6	

Intersection						
Int Delay, s/veh	6.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	153	21	24	4	1	115
Future Vol, veh/h	153	21	24	4	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	-	-	-	-	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	166	23	26	4	1	125
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	30	0	-	0	383	28
Stage 1	-	-	-	-	28	-
Stage 2	-	-	-	-	355	-
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	-	-	-	620	1047
Stage 1	-	-	-	-	995	-
Stage 2	-	-	-	-	710	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1583	-	-	-	554	1047
Mov Cap-2 Maneuver	-	-	-	-	554	-
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	710	-
Approach	EB	WB		SB		
HCM Control Delay, s	6.6	0		8.9		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1583	-	-	-	1039	
HCM Lane V/C Ratio	0.105	-	-	-	0.121	
HCM Control Delay (s)	7.5	0	-	-	8.9	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0.4	-	-	-	0.4	









Intersection						
Int Delay, s/veh	7.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	163	20	56	11	3	212
Future Vol, veh/h	163	20	56	11	3	212
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
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	177	22	61	12	3	230




Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	73	0	0	443	67
Stage 1	-	-	-	67	-
Stage 2	-	-	-	376	-
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	1527	-	-	572	997
Stage 1	-	-	-	956	-
Stage 2	-	-	-	694	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1527	-	-	505	997
Mov Cap-2 Maneuver	-	-	-	505	-
Stage 1	-	-	-	844	-
Stage 2	-	-	-	694	-




Approach	EB	WB	SB
HCM Control Delay, s	6.8	0	9.8
HCM LOS			A




Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1527	-	-	-	984
HCM Lane V/C Ratio	0.116	-	-	-	0.237
HCM Control Delay (s)	7.7	0	-	-	9.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.4	-	-	-	0.9

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	23	67	2	1	0
Future Vol, veh/h	0	23	67	2	1	0
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	-
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	0	25	73	2	1	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	75	0	-	0	99	74
Stage 1	-	-	-	-	74	-
Stage 2	-	-	-	-	25	-
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	1524	-	-	-	900	988
Stage 1	-	-	-	-	949	-
Stage 2	-	-	-	-	998	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1524	-	-	-	900	988
Mov Cap-2 Maneuver	-	-	-	-	900	-
Stage 1	-	-	-	-	949	-
Stage 2	-	-	-	-	998	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1524	-	-	-	900	
HCM Lane V/C Ratio	-	-	-	-	0.001	
HCM Control Delay (s)	0	-	-	-	9	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0	

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	22	64	1	1	5
Future Vol, veh/h	2	22	64	1	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
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	2	24	70	1	1	5
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	71	0	-	0	99	71
Stage 1	-	-	-	-	71	-
Stage 2	-	-	-	-	28	-
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	1529	-	-	-	900	991
Stage 1	-	-	-	-	952	-
Stage 2	-	-	-	-	995	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1529	-	-	-	899	991
Mov Cap-2 Maneuver	-	-	-	-	899	-
Stage 1	-	-	-	-	951	-
Stage 2	-	-	-	-	995	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.6	0		8.7		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1529	-	-	-	974	
HCM Lane V/C Ratio	0.001	-	-	-	0.007	
HCM Control Delay (s)	7.4	0	-	-	8.7	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0	

Intersection						
Int Delay, s/veh	6.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	129	58	39	10	13	152
Future Vol, veh/h	129	58	39	10	13	152
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
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	140	63	42	11	14	165
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	53	0	-	0	391	48
Stage 1	-	-	-	-	48	-
Stage 2	-	-	-	-	343	-
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	1553	-	-	-	613	1021
Stage 1	-	-	-	-	974	-
Stage 2	-	-	-	-	719	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1553	-	-	-	556	1021
Mov Cap-2 Maneuver	-	-	-	-	556	-
Stage 1	-	-	-	-	883	-
Stage 2	-	-	-	-	719	-
Approach	EB	WB		SB		
HCM Control Delay, s	5.2	0		9.6		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1553	-	-	-	-	958
HCM Lane V/C Ratio	0.09	-	-	-	-	0.187
HCM Control Delay (s)	7.5	0	-	-	-	9.6
HCM Lane LOS	A	A	-	-	-	A
HCM 95th %tile Q(veh)	0.3	-	-	-	-	0.7

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	71	49	2	2	0
Future Vol, veh/h	0	71	49	2	2	0
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	-
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	0	77	53	2	2	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	55	0	-	0	131	54
Stage 1	-	-	-	-	54	-
Stage 2	-	-	-	-	77	-
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	1550	-	-	-	863	1013
Stage 1	-	-	-	-	969	-
Stage 2	-	-	-	-	946	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1550	-	-	-	863	1013
Mov Cap-2 Maneuver	-	-	-	-	863	-
Stage 1	-	-	-	-	969	-
Stage 2	-	-	-	-	946	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9.2		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1550	-	-	-	863	
HCM Lane V/C Ratio	-	-	-	-	0.003	
HCM Control Delay (s)	0	-	-	-	9.2	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0	







Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	68	49	1	1	2
Future Vol, veh/h	5	68	49	1	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
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	5	74	53	1	1	2

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	54	0	138
Stage 1	-	-	54
Stage 2	-	-	84
Critical Hdwy	4.12	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.518
Pot Cap-1 Maneuver	1551	-	855
Stage 1	-	-	969
Stage 2	-	-	939
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1551	-	852
Mov Cap-2 Maneuver	-	-	852
Stage 1	-	-	966
Stage 2	-	-	939

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	8.8
HCM LOS			A













Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1551	-	-	-	953
HCM Lane V/C Ratio	0.004	-	-	-	0.003
HCM Control Delay (s)	7.3	0	-	-	8.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0



Intersection						
Int Delay, s/veh	4.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	163	207	514	54	20	212
Future Vol, veh/h	163	207	514	54	20	212
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	350	-	-	273	-	273
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	177	225	559	59	22	230
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	618	0	-	0	1138	559
Stage 1	-	-	-	-	559	-
Stage 2	-	-	-	-	579	-
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	962	-	-	-	223	529
Stage 1	-	-	-	-	572	-
Stage 2	-	-	-	-	560	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	962	-	-	-	182	529
Mov Cap-2 Maneuver	-	-	-	-	182	-
Stage 1	-	-	-	-	467	-
Stage 2	-	-	-	-	560	-
Approach	EB	WB		SB		
HCM Control Delay, s	4.2	0		17.9		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	962	-	-	-	182	529
HCM Lane V/C Ratio	0.184	-	-	-	0.119	0.436
HCM Control Delay (s)	9.6	-	-	-	27.4	17
HCM Lane LOS	A	-	-	-	D	C
HCM 95th %tile Q(veh)	0.7	-	-	-	0.4	2.2

Timings  
6: E. Jewell Ave & Powhatan Rd

2028 Total Traffic  
AM Peak Hour

							
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø4
Lane Configurations							
Traffic Volume (vph)	163	207	514	54	20	212	
Future Volume (vph)	163	207	514	54	20	212	
Turn Type	Perm	NA	NA	Perm	pm+pt	Perm	
Protected Phases		2	6		7		4
Permitted Phases	2			6	4	7	
Detector Phase	2	2	6	6	7	7	
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	20.0	20.0	20.0	20.0	10.0	10.0	20.0
Total Split (s)	65.0	65.0	65.0	65.0	25.0	25.0	25.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%	28%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	Max	Max	Max	Max	None	None	None
Act Effct Green (s)	60.1	60.1	60.1	60.1	7.6	7.6	
Actuated g/C Ratio	0.77	0.77	0.77	0.77	0.10	0.10	
v/c Ratio	0.28	0.16	0.39	0.05	0.13	0.64	
Control Delay	4.3	2.9	4.1	1.0	33.0	13.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.3	2.9	4.1	1.0	33.0	13.5	
LOS	A	A	A	A	C	B	
Approach Delay		3.5	3.8		15.2		
Approach LOS		A	A		B		
Intersection Summary							
Cycle Length: 90							
Actuated Cycle Length: 77.7							
Natural Cycle: 50							
Control Type: Semi Act-Uncoord							
Maximum v/c Ratio: 0.64							
Intersection Signal Delay: 6.0				Intersection LOS: A			
Intersection Capacity Utilization 52.7%				ICU Level of Service A			
Analysis Period (min) 15							

Splits and Phases: 6: E. Jewell Ave & Powhatan Rd



# HCM 6th Signalized Intersection Summary 6: E. Jewell Ave & Powhatan Rd

2028 Total Traffic  
AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	163	207	514	54	20	212
Future Volume (veh/h)	163	207	514	54	20	212
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	177	225	559	59	22	230
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	560	1332	1332	1129	301	268
Arrive On Green	0.71	0.71	0.71	0.71	0.17	0.17
Sat Flow, veh/h	805	1870	1870	1585	1781	1585
Grp Volume(v), veh/h	177	225	559	59	22	230
Grp Sat Flow(s),veh/h/ln	805	1870	1870	1585	1781	1585
Q Serve(g_s), s	9.7	3.3	10.3	0.9	0.9	11.9
Cycle Q Clear(g_c), s	20.1	3.3	10.3	0.9	0.9	11.9
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	560	1332	1332	1129	301	268
V/C Ratio(X)	0.32	0.17	0.42	0.05	0.07	0.86
Avail Cap(c_a), veh/h	560	1332	1332	1129	423	376
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.1	4.0	5.0	3.6	29.4	34.0
Incr Delay (d2), s/veh	1.5	0.3	1.0	0.1	0.1	13.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.9	2.9	0.0	0.4	5.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.6	4.2	5.9	3.7	29.5	47.2
LnGrp LOS	B	A	A	A	C	D
Approach Vol, veh/h		402	618		252	
Approach Delay, s/veh		7.0	5.7		45.6	
Approach LOS		A	A		D	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		65.0		19.2		65.0
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		60.0		20.0		60.0
Max Q Clear Time (g_c+I1), s		22.1		13.9		12.3
Green Ext Time (p_c), s		2.5		0.4		3.8
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			14.1			
HCM 6th LOS			B			

Intersection												
Int Delay, s/veh	6.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕			↕	↗		↕	
Traffic Vol, veh/h	0	149	77	1	352	8	214	5	3	4	2	0
Future Vol, veh/h	0	149	77	1	352	8	214	5	3	4	2	0
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	-	-	273	-	-	-	-	-	-	-	-	-
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	0	162	84	1	383	9	233	5	3	4	2	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	392	0	0	246	0	0	553	556	162	598	636	388
Stage 1	-	-	-	-	-	-	162	162	-	390	390	-
Stage 2	-	-	-	-	-	-	391	394	-	208	246	-
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	-	-	1320	-	-	444	439	883	414	395	660
Stage 1	-	-	-	-	-	-	840	764	-	634	608	-
Stage 2	-	-	-	-	-	-	633	605	-	794	703	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1167	-	-	1320	-	-	442	439	883	408	395	660
Mov Cap-2 Maneuver	-	-	-	-	-	-	442	439	-	408	395	-
Stage 1	-	-	-	-	-	-	840	764	-	634	607	-
Stage 2	-	-	-	-	-	-	630	604	-	785	703	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			22.1			14.1		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)	442	883	1167	-	-	1320	-	-	404			
HCM Lane V/C Ratio	0.539	0.004	-	-	-	0.001	-	-	0.016			
HCM Control Delay (s)	22.3	9.1	0	-	-	7.7	0	-	14.1			
HCM Lane LOS	C	A	A	-	-	A	A	-	B			
HCM 95th %tile Q(veh)	3.1	0	0	-	-	0	-	-	0			

HCM 6th TWSC  
8: S. Del Ray St & E. Jewell Ave

2028 Total Traffic  
AM Peak Hour

Intersection

Int Delay, s/veh 5.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑		↑	↑	↑
Traffic Vol, veh/h	72	70	5	110	210	11
Future Vol, veh/h	72	70	5	110	210	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	-	273	-	-	250	-
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	78	76	5	120	228	12

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	154
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	1426
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1426
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	777	983	-	-	1426	-
HCM Lane V/C Ratio	0.294	0.012	-	-	0.004	-
HCM Control Delay (s)	11.5	8.7	-	-	7.5	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	1.2	0	-	-	0	-

HCM 6th TWSC  
9: Hayesmouth Rd & E. Jewell Ave





2028 Total Traffic  
AM Peak Hour






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	2	40	17	5	70	1	39	0	9	1	0	5
Future Vol, veh/h	2	40	17	5	70	1	39	0	9	1	0	5
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	-	-	273	-	-	-	-	-	190	-	-	-
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	2	43	18	5	76	1	42	0	10	1	0	5
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	77	0	0	61	0	0	136	134	43	148	152	77
Stage 1	-	-	-	-	-	-	47	47	-	87	87	-
Stage 2	-	-	-	-	-	-	89	87	-	61	65	-
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	1522	-	-	1542	-	-	835	757	1027	820	740	984
Stage 1	-	-	-	-	-	-	967	856	-	921	823	-
Stage 2	-	-	-	-	-	-	918	823	-	950	841	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1522	-	-	1542	-	-	827	754	1027	809	737	984
Mov Cap-2 Maneuver	-	-	-	-	-	-	827	754	-	809	737	-
Stage 1	-	-	-	-	-	-	966	855	-	920	821	-
Stage 2	-	-	-	-	-	-	910	821	-	940	840	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.5			9.4			8.8		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1		NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1		
Capacity (veh/h)	827		1027	1522	-	-	1542	-	-	-	950	
HCM Lane V/C Ratio	0.051		0.01	0.001	-	-	0.004	-	-	-	0.007	
HCM Control Delay (s)	9.6		8.5	7.4	0	-	7.3	0	-	-	8.8	
HCM Lane LOS	A		A	A	A	-	A	A	-	-	A	
HCM 95th %tile Q(veh)	0.2		0	0	-	-	0	-	-	-	0	









HCM 6th TWSC  
14: Monaghan Rd & Phase 1 North Access

2028 Total Traffic  
AM Peak Hour

Intersection						
Int Delay, s/veh	2.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	55	167	0	19	60
Future Vol, veh/h	0	55	167	0	19	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	-	-	273	-	-
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	0	60	182	0	21	65
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	289	182	0	0	182	0
Stage 1	182	-	-	-	-	-
Stage 2	107	-	-	-	-	-
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	702	861	-	-	1393	-
Stage 1	849	-	-	-	-	-
Stage 2	917	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	691	861	-	-	1393	-
Mov Cap-2 Maneuver	691	-	-	-	-	-
Stage 1	849	-	-	-	-	-
Stage 2	902	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.5	0		1.8		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	861		1393	-	
HCM Lane V/C Ratio	-	0.069		0.015	-	
HCM Control Delay (s)	-	9.5		7.6	0	
HCM Lane LOS	-	A		A	A	
HCM 95th %tile Q(veh)	-	0.2		0	-	

Intersection						
Int Delay, s/veh	8.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	65	1	0	23	0
Future Vol, veh/h	0	65	1	0	23	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	190	-	273	-	-
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	0	71	1	0	25	0
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	51	1	0	0	1	0
Stage 1	1	-	-	-	-	-
Stage 2	50	-	-	-	-	-
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	958	1084	-	-	1622	-
Stage 1	1022	-	-	-	-	-
Stage 2	972	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	944	1084	-	-	1622	-
Mov Cap-2 Maneuver	944	-	-	-	-	-
Stage 1	1022	-	-	-	-	-
Stage 2	957	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	8.6	0		7.3		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT	
Capacity (veh/h)	-	-	-	1084	1622	-
HCM Lane V/C Ratio	-	-	-	0.065	0.015	-
HCM Control Delay (s)	-	-	0	8.6	7.3	0
HCM Lane LOS	-	-	A	A	A	A
HCM 95th %tile Q(veh)	-	-	-	0.2	0	-

Intersection				
Intersection Delay, s/veh	2.8			
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	15	38	0	2
Demand Flow Rate, veh/h	15	39	0	2
Vehicles Circulating, veh/h	1	3	16	36
Vehicles Exiting, veh/h	37	13	0	6
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	2.7	2.9	0.0	2.7
Approach LOS	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
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	15	39	0	2
Cap Entry Lane, veh/h	1378	1376	1358	1330
Entry HV Adj Factor	0.984	0.982	1.000	1.000
Flow Entry, veh/h	15	38	0	2
Cap Entry, veh/h	1357	1351	1358	1330
V/C Ratio	0.011	0.028	0.000	0.002
Control Delay, s/veh	2.7	2.9	2.7	2.7
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Intersection						
Int Delay, s/veh	4.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	0	0	1	0	1
Future Vol, veh/h	2	0	0	1	0	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	250	0	250	-	-	120
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	2	0	0	1	0	1
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1	0	1	0	-	0
Stage 1	0	-	-	-	-	-
Stage 2	1	-	-	-	-	-
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	1022	-	1622	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	1022	-	1622	-	-	-
Mov Cap-2 Maneuver	1022	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	8.5	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1622	-	1022	-	-	-
HCM Lane V/C Ratio	-	-	0.002	-	-	-
HCM Control Delay (s)	0	-	8.5	0	-	-
HCM Lane LOS	A	-	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-	-

HCM 6th TWSC  
27: Phase 1 Full-Movement Access & E. Jewell Ave

2028 Total Traffic  
AM Peak Hour

Intersection						
Int Delay, s/veh	1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑		↑	↑	↑
Traffic Vol, veh/h	141	14	0	319	41	1
Future Vol, veh/h	141	14	0	319	41	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	275	-	-	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	153	15	0	347	45	1
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	168	0	500	153
Stage 1	-	-	-	-	153	-
Stage 2	-	-	-	-	347	-
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	-	-	1410	-	530	893
Stage 1	-	-	-	-	875	-
Stage 2	-	-	-	-	716	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1410	-	530	893
Mov Cap-2 Maneuver	-	-	-	-	530	-
Stage 1	-	-	-	-	875	-
Stage 2	-	-	-	-	716	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		12.3	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	530	893	-	-	1410	-
HCM Lane V/C Ratio	0.084	0.001	-	-	-	-
HCM Control Delay (s)	12.4	9	-	-	0	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-

HCM 6th TWSC  
28: Phase 1 RIRO & E. Jewell Ave





2028 Total Traffic  
AM Peak Hour







Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↑		↗
Traffic Vol, veh/h	56	28	0	114	0	3
Future Vol, veh/h	56	28	0	114	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	275	-	-	-	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	61	30	0	124	0	3
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	-	-	-	61
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	-	-	0	-	0	1004
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	1004
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0		8.6		
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)	1004	-	-	-		
HCM Lane V/C Ratio	0.003	-	-	-		
HCM Control Delay (s)	8.6	-	-	-		
HCM Lane LOS	A	-	-	-		
HCM 95th %tile Q(veh)	0	-	-	-		



HCM 6th TWSC  
30: Monaghan Rd & Phase 1 South Access













2028 Total Traffic  
AM Peak Hour

Intersection						
Int Delay, s/veh	5.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	100	65	0	35	23
Future Vol, veh/h	0	100	65	0	35	23
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	-	-	250	-	-
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	0	109	71	0	38	25
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	172	71	0	0	71	0
Stage 1	71	-	-	-	-	-
Stage 2	101	-	-	-	-	-
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	818	991	-	-	1529	-
Stage 1	952	-	-	-	-	-
Stage 2	923	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	798	991	-	-	1529	-
Mov Cap-2 Maneuver	798	-	-	-	-	-
Stage 1	952	-	-	-	-	-
Stage 2	900	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.1	0		4.5		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	991	1529	-	
HCM Lane V/C Ratio	-	-	0.11	0.025	-	
HCM Control Delay (s)	-	-	9.1	7.4	0	
HCM Lane LOS	-	-	A	A	A	
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-	

Intersection						
Int Delay, s/veh	4.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	129	576	369	41	62	152
Future Vol, veh/h	129	576	369	41	62	152
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	350	-	-	273	-	273
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	140	626	401	45	67	165
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	446	0	-	0	1307	401
Stage 1	-	-	-	-	401	-
Stage 2	-	-	-	-	906	-
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	1114	-	-	-	176	649
Stage 1	-	-	-	-	676	-
Stage 2	-	-	-	-	394	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1114	-	-	-	154	649
Mov Cap-2 Maneuver	-	-	-	-	154	-
Stage 1	-	-	-	-	591	-
Stage 2	-	-	-	-	394	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.6	0		22		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1114	-	-	-	154	649
HCM Lane V/C Ratio	0.126	-	-	-	0.438	0.255
HCM Control Delay (s)	8.7	-	-	-	45.4	12.4
HCM Lane LOS	A	-	-	-	E	B
HCM 95th %tile Q(veh)	0.4	-	-	-	2	1

Timings  
6: E. Jewell Ave & Powhatan Rd

2028 Total Traffic  
PM Peak Hour

							
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø4
Lane Configurations							
Traffic Volume (vph)	129	576	369	41	62	152	
Future Volume (vph)	129	576	369	41	62	152	
Turn Type	Perm	NA	NA	Perm	pm+pt	Perm	
Protected Phases		2	6		7		4
Permitted Phases	2			6	4	7	
Detector Phase	2	2	6	6	7	7	
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	20.0	20.0	20.0	20.0	10.0	10.0	20.0
Total Split (s)	65.0	65.0	65.0	65.0	25.0	25.0	25.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%	28%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	Max	Max	Max	Max	None	None	None
Act Effct Green (s)	60.0	60.0	60.0	60.0	8.3	8.3	
Actuated g/C Ratio	0.77	0.77	0.77	0.77	0.11	0.11	
v/c Ratio	0.19	0.44	0.28	0.04	0.36	0.52	
Control Delay	3.5	4.6	3.5	1.0	37.9	12.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	3.5	4.6	3.5	1.0	37.9	12.2	
LOS	A	A	A	A	D	B	
Approach Delay		4.4	3.3		19.6		
Approach LOS		A	A		B		
Intersection Summary							
Cycle Length: 90							
Actuated Cycle Length: 78.3							
Natural Cycle: 50							
Control Type: Semi Act-Uncoord							
Maximum v/c Ratio: 0.52							
Intersection Signal Delay: 6.5				Intersection LOS: A			
Intersection Capacity Utilization 43.2%				ICU Level of Service A			
Analysis Period (min) 15							

Splits and Phases: 6: E. Jewell Ave & Powhatan Rd



HCM 6th Signalized Intersection Summary  
6: E. Jewell Ave & Powhatan Rd

2028 Total Traffic  
PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	129	576	369	41	62	152
Future Volume (veh/h)	129	576	369	41	62	152
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	140	626	401	45	67	165
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	727	1393	1393	1181	233	207
Arrive On Green	0.74	0.74	0.74	0.74	0.13	0.13
Sat Flow, veh/h	944	1870	1870	1585	1781	1585
Grp Volume(v), veh/h	140	626	401	45	67	165
Grp Sat Flow(s),veh/h/ln	944	1870	1870	1585	1781	1585
Q Serve(g_s), s	4.6	10.3	5.6	0.6	2.7	8.1
Cycle Q Clear(g_c), s	10.2	10.3	5.6	0.6	2.7	8.1
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	727	1393	1393	1181	233	207
V/C Ratio(X)	0.19	0.45	0.29	0.04	0.29	0.80
Avail Cap(c_a), veh/h	727	1393	1393	1181	442	394
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.0	3.9	3.3	2.7	31.6	34.0
Incr Delay (d2), s/veh	0.6	1.0	0.5	0.1	0.7	6.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	2.4	1.3	0.0	1.1	3.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.6	5.0	3.9	2.8	32.3	40.7
LnGrp LOS	A	A	A	A	C	D
Approach Vol, veh/h		766	446		232	
Approach Delay, s/veh		5.1	3.7		38.3	
Approach LOS		A	A		D	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		65.0		15.5		65.0
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		60.0		20.0		60.0
Max Q Clear Time (g_c+I1), s		12.3		10.1		7.6
Green Ext Time (p_c), s		5.2		0.5		2.5
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			10.0			
HCM 6th LOS			B			

Intersection												
Int Delay, s/veh	3.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↰	↱		↰	↱
Traffic Vol, veh/h	0	391	245	3	264	6	144	3	2	8	5	0
Future Vol, veh/h	0	391	245	3	264	6	144	3	2	8	5	0
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	-	-	273	-	-	-	-	-	-	-	-	-
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	0	425	266	3	287	7	157	3	2	9	5	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	294	0	0	691	0	0	724	725	425	858	988	291
Stage 1	-	-	-	-	-	-	425	425	-	297	297	-
Stage 2	-	-	-	-	-	-	299	300	-	561	691	-
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	1268	-	-	904	-	-	341	352	629	277	247	748
Stage 1	-	-	-	-	-	-	607	586	-	712	668	-
Stage 2	-	-	-	-	-	-	710	666	-	512	446	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1268	-	-	904	-	-	334	351	629	273	246	748
Mov Cap-2 Maneuver	-	-	-	-	-	-	334	351	-	273	246	-
Stage 1	-	-	-	-	-	-	607	586	-	712	665	-
Stage 2	-	-	-	-	-	-	701	663	-	507	446	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.1			25.1			19.5		
HCM LOS							D			C		
Minor Lane/Major Mvmt	NBLn1		NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1		
Capacity (veh/h)	334		629	1268	-	-	904	-	-	-	262	
HCM Lane V/C Ratio	0.478		0.003	-	-	-	0.004	-	-	-	0.054	
HCM Control Delay (s)	25.3		10.7	0	-	-	9	0	-	-	19.5	
HCM Lane LOS	D		B	A	-	-	A	A	-	-	C	
HCM 95th %tile Q(veh)	2.5		0	0	-	-	0	-	-	-	0.2	

Intersection						
Int Delay, s/veh	3.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↘	↗
Traffic Vol, veh/h	179	176	13	83	164	8
Future Vol, veh/h	179	176	13	83	164	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	273	-	-	250	-
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	195	191	14	90	178	9
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	386	0	313	195
Stage 1	-	-	-	-	195	-
Stage 2	-	-	-	-	118	-
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	-	-	1172	-	680	846
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	907	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1172	-	671	846
Mov Cap-2 Maneuver	-	-	-	-	671	-
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	895	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		1.1		12.2	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	671	846	-	-	1172	-
HCM Lane V/C Ratio	0.266	0.01	-	-	0.012	-
HCM Control Delay (s)	12.3	9.3	-	-	8.1	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	1.1	0	-	-	0	-







HCM 6th TWSC  
9: Hayesmouth Rd & E. Jewell Ave






2028 Total Traffic  
PM Peak Hour

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	5	81	44	13	67	1	28	0	6	1	0	2
Future Vol, veh/h	5	81	44	13	67	1	28	0	6	1	0	2
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	-	-	273	-	-	-	-	-	190	-	-	-
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	5	88	48	14	73	1	30	0	7	1	0	2
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	74	0	0	136	0	0	201	200	88	228	248	74
Stage 1	-	-	-	-	-	-	98	98	-	102	102	-
Stage 2	-	-	-	-	-	-	103	102	-	126	146	-
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	1526	-	-	1448	-	-	757	696	970	727	655	988
Stage 1	-	-	-	-	-	-	908	814	-	904	811	-
Stage 2	-	-	-	-	-	-	903	811	-	878	776	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1526	-	-	1448	-	-	747	686	970	715	646	988
Mov Cap-2 Maneuver	-	-	-	-	-	-	747	686	-	715	646	-
Stage 1	-	-	-	-	-	-	904	811	-	900	803	-
Stage 2	-	-	-	-	-	-	892	803	-	869	773	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			1.2			9.8			9.1		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)	747	970	1526	-	-	1448	-	-	876			
HCM Lane V/C Ratio	0.041	0.007	0.004	-	-	0.01	-	-	0.004			
HCM Control Delay (s)	10	8.7	7.4	0	-	7.5	0	-	9.1			
HCM Lane LOS	B	A	A	A	-	A	A	-	A			
HCM 95th %tile Q(veh)	0.1	0	0	-	-	0	-	-	0			







HCM 6th TWSC  
14: Monaghan Rd & Phase 1 North Access

2028 Total Traffic  
PM Peak Hour

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	37	112	0	63	190
Future Vol, veh/h	0	37	112	0	63	190
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	-	-	273	-	-
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	0	40	122	0	68	207
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	465	122	0	0	122	0
Stage 1	122	-	-	-	-	-
Stage 2	343	-	-	-	-	-
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	556	929	-	-	1465	-
Stage 1	903	-	-	-	-	-
Stage 2	719	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	527	929	-	-	1465	-
Mov Cap-2 Maneuver	527	-	-	-	-	-
Stage 1	903	-	-	-	-	-
Stage 2	682	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.1	0		1.9		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	929	1465	-	
HCM Lane V/C Ratio	-	-	0.043	0.047	-	
HCM Control Delay (s)	-	-	9.1	7.6	0	
HCM Lane LOS	-	-	A	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-	

Intersection						
Int Delay, s/veh	7.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	43	1	0	74	0
Future Vol, veh/h	0	43	1	0	74	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	190	-	273	-	-
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	0	47	1	0	80	0
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	161	1	0	0	1	0
Stage 1	1	-	-	-	-	-
Stage 2	160	-	-	-	-	-
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	830	1084	-	-	1622	-
Stage 1	1022	-	-	-	-	-
Stage 2	869	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	789	1084	-	-	1622	-
Mov Cap-2 Maneuver	789	-	-	-	-	-
Stage 1	1022	-	-	-	-	-
Stage 2	826	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	8.5	0		7.3		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT	
Capacity (veh/h)	-	-	-	1084	1622	-
HCM Lane V/C Ratio	-	-	-	0.043	0.05	-
HCM Control Delay (s)	-	-	0	8.5	7.3	0
HCM Lane LOS	-	-	A	A	A	A
HCM 95th %tile Q(veh)	-	-	-	0.1	0.2	-

Intersection				
Intersection Delay, s/veh	2.9			
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	41	25	0	6
Demand Flow Rate, veh/h	42	25	0	6
Vehicles Circulating, veh/h	3	2	45	23
Vehicles Exiting, veh/h	26	43	0	4
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	2.9	2.8	0.0	2.7
Approach LOS	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
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	42	25	0	6
Cap Entry Lane, veh/h	1376	1377	1318	1348
Entry HV Adj Factor	0.981	0.982	1.000	1.000
Flow Entry, veh/h	41	25	0	6
Cap Entry, veh/h	1350	1352	1318	1348
V/C Ratio	0.031	0.018	0.000	0.004
Control Delay, s/veh	2.9	2.8	2.7	2.7
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Intersection						
Int Delay, s/veh	2.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	0	0	1	0	2
Future Vol, veh/h	1	0	0	1	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	250	0	250	-	-	120
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	1	0	0	1	0	2
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1	0	2	0	-	0
Stage 1	0	-	-	-	-	-
Stage 2	1	-	-	-	-	-
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	1022	-	1620	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	1022	-	1620	-	-	-
Mov Cap-2 Maneuver	1022	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	8.5	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1620	-	1022	-	-	-
HCM Lane V/C Ratio	-	-	0.001	-	-	-
HCM Control Delay (s)	0	-	8.5	0	-	-
HCM Lane LOS	A	-	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-	-

HCM 6th TWSC  
27: Phase 1 Full-Movement Access & E. Jewell Ave

2028 Total Traffic  
PM Peak Hour

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↕	↘	↗
Traffic Vol, veh/h	354	47	1	246	28	0
Future Vol, veh/h	354	47	1	246	28	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	275	-	-	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	385	51	1	267	30	0
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	436	0	654	385
Stage 1	-	-	-	-	385	-
Stage 2	-	-	-	-	269	-
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	-	-	1124	-	431	663
Stage 1	-	-	-	-	688	-
Stage 2	-	-	-	-	776	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1124	-	431	663
Mov Cap-2 Maneuver	-	-	-	-	431	-
Stage 1	-	-	-	-	688	-
Stage 2	-	-	-	-	775	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		14	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	431	-	-	-	1124	-
HCM Lane V/C Ratio	0.071	-	-	-	0.001	-
HCM Control Delay (s)	14	0	-	-	8.2	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0	-

HCM 6th TWSC  
28: Phase 1 RIRO & E. Jewell Ave

2028 Total Traffic  
PM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↑		↗
Traffic Vol, veh/h	128	59	0	96	0	2
Future Vol, veh/h	128	59	0	96	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	275	-	-	-	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	139	64	0	104	0	2
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	139
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	-	-	0	-	0	909
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	909
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		9	
HCM LOS					A	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)	909	-	-	-		
HCM Lane V/C Ratio	0.002	-	-	-		
HCM Control Delay (s)	9	-	-	-		
HCM Lane LOS	A	-	-	-		
HCM 95th %tile Q(veh)	0	-	-	-		







HCM 6th TWSC  
30: Monaghan Rd & Phase 1 South Access

2028 Total Traffic  
PM Peak Hour

Intersection

Int Delay, s/veh 4.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	67	43	0	114	74
Future Vol, veh/h	0	67	43	0	114	74
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	-	-	250	-	-
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	0	73	47	0	124	80

























Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	375	47	0
Stage 1	47	-	-
Stage 2	328	-	-
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	626	1022	-
Stage 1	975	-	-
Stage 2	730	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	574	1022	-
Mov Cap-2 Maneuver	574	-	-
Stage 1	975	-	-
Stage 2	669	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.8	0	4.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	1022	1560
HCM Lane V/C Ratio	-	-	0.071	0.079
HCM Control Delay (s)	-	-	8.8	7.5
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.3

Timings  
6: Powhaton Rd & E. Jewell Ave

2040 Background Traffic  
AM Peak Hour

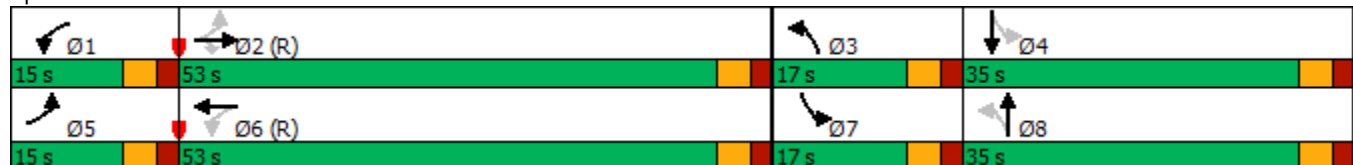
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	255	388	12	14	1099	130	34	58	24	53	53	312
Future Volume (vph)	255	388	12	14	1099	130	34	58	24	53	53	312
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		Free	8		Free	4		Free
Detector Phase	5	2	2	1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	20.0		5.0	20.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0		10.0	25.0		10.0	25.0	
Total Split (s)	15.0	53.0	53.0	15.0	53.0		17.0	35.0		17.0	35.0	
Total Split (%)	12.5%	44.2%	44.2%	12.5%	44.2%		14.2%	29.2%		14.2%	29.2%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
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)	83.7	80.2	80.2	60.0	54.1	120.0	23.3	20.0	120.0	26.2	23.3	120.0
Actuated g/C Ratio	0.70	0.67	0.67	0.50	0.45	1.00	0.19	0.17	1.00	0.22	0.19	1.00
v/c Ratio	0.60	0.17	0.01	0.03	0.73	0.09	0.13	0.10	0.02	0.19	0.08	0.21
Control Delay	28.8	11.2	0.0	10.7	30.0	0.1	32.4	43.0	0.0	33.5	40.6	0.3
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	28.8	11.2	0.0	10.7	30.0	0.1	32.4	43.0	0.0	33.5	40.6	0.3
LOS	C	B	A	B	C	A	C	D	A	C	D	A
Approach Delay		17.8			26.7			31.1			9.6	
Approach LOS		B			C			C			A	

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.73  
 Intersection Signal Delay: 21.6  
 Intersection Capacity Utilization 73.7%  
 Analysis Period (min) 15

Intersection LOS: C  
 ICU Level of Service D

























Splits and Phases: 6: Powhaton Rd & E. Jewell Ave



# HCM 6th Signalized Intersection Summary

## 6: Powhatan Rd & E. Jewell Ave

2040 Background Traffic  
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	255	388	12	14	1099	130	34	58	24	53	53	312
Future Volume (veh/h)	255	388	12	14	1099	130	34	58	24	53	53	312
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	268	408	13	15	1157	0	36	61	0	56	56	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	364	2186	975	622	1962		327	589		327	614	
Arrive On Green	0.08	0.62	0.62	0.02	0.55	0.00	0.03	0.17	0.00	0.04	0.17	0.00
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	268	408	13	15	1157	0	36	61	0	56	56	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	7.5	6.0	0.4	0.4	26.0	0.0	2.0	1.7	0.0	3.1	1.6	0.0
Cycle Q Clear(g_c), s	7.5	6.0	0.4	0.4	26.0	0.0	2.0	1.7	0.0	3.1	1.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	364	2186	975	622	1962		327	589		327	614	
V/C Ratio(X)	0.74	0.19	0.01	0.02	0.59		0.11	0.10		0.17	0.09	
Avail Cap(c_a), veh/h	372	2186	975	742	1962		453	888		441	888	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.0	10.0	9.0	11.3	17.9	0.0	39.7	42.5	0.0	39.5	41.7	0.0
Incr Delay (d2), s/veh	7.3	0.2	0.0	0.0	1.3	0.0	0.1	0.1	0.0	0.2	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	2.2	0.1	0.2	10.1	0.0	0.9	0.8	0.0	1.4	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.3	10.2	9.0	11.3	19.2	0.0	39.9	42.6	0.0	39.7	41.8	0.0
LnGrp LOS	C	B	A	B	B		D	D		D	D	
Approach Vol, veh/h	689			1172			97			112		
Approach Delay, s/veh	15.3			19.1			41.6			40.7		
Approach LOS	B			B			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.0	78.8	8.5	25.7	14.5	71.2	9.4	24.9				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	48.0	12.0	30.0	10.0	48.0	12.0	30.0				
Max Q Clear Time (g_c+I1), s	2.4	8.0	4.0	3.6	9.5	28.0	5.1	3.7				
Green Ext Time (p_c), s	0.0	2.6	0.0	0.2	0.0	7.8	0.0	0.3				

### Intersection Summary

























HCM 6th Ctrl Delay	20.0
HCM 6th LOS	C

### Notes

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

Timings  
7: Monaghan Rd & E. Jewell Ave

2040 Background Traffic  
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	229	50	44	562	158	142	118	29	76	43	470
Future Volume (vph)	155	229	50	44	562	158	142	118	29	76	43	470
Turn Type	Prot	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free	6		Free	8		Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
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	20.0		10.0	20.0		10.0	20.0		10.0	20.0	
Total Split (s)	15.0	53.0		15.0	53.0		22.0	30.0		22.0	30.0	
Total Split (%)	12.5%	44.2%		12.5%	44.2%		18.3%	25.0%		18.3%	25.0%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	-2.0		0.0	-2.0		0.0	-2.0		0.0	-2.0	
Total Lost Time (s)	5.0	3.0		5.0	3.0		5.0	3.0		5.0	3.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effect Green (s)	11.0	78.9	120.0	76.8	72.3	120.0	23.7	14.8	120.0	8.2	9.0	120.0
Actuated g/C Ratio	0.09	0.66	1.00	0.64	0.60	1.00	0.20	0.12	1.00	0.07	0.08	1.00
v/c Ratio	0.52	0.10	0.03	0.06	0.28	0.10	0.56	0.29	0.02	0.34	0.17	0.31
Control Delay	71.1	6.4	0.0	9.7	13.0	0.1	48.9	49.0	0.0	56.9	53.1	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	71.1	6.4	0.0	9.7	13.0	0.1	48.9	49.0	0.0	56.9	53.1	0.5
LOS	E	A	A	A	B	A	D	D	A	E	D	A
Approach Delay		28.8			10.1			43.9			11.6	
Approach LOS		C			B			D			B	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 111 (93%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 19.2

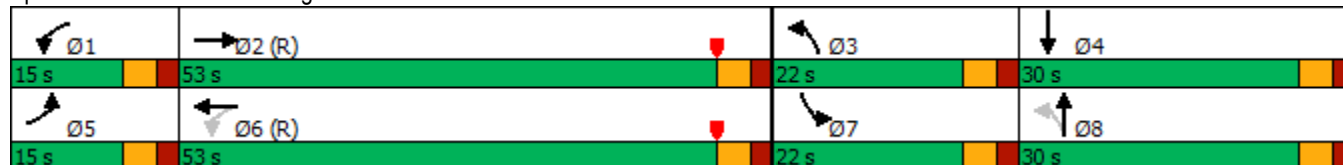
Intersection LOS: B

Intersection Capacity Utilization 45.3%

ICU Level of Service A

Analysis Period (min) 15

























Splits and Phases: 7: Monaghan Rd & E. Jewell Ave



# HCM 6th Signalized Intersection Summary

## 7: Monaghan Rd & E. Jewell Ave

2040 Background Traffic  
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	155	229	50	44	562	158	142	118	29	76	43	470
Future Volume (veh/h)	155	229	50	44	562	158	142	118	29	76	43	470
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	163	241	0	46	592	0	149	124	0	80	45	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	220	2420		840	2310		269	406		134	207	
Arrive On Green	0.06	0.68	0.00	0.03	0.65	0.00	0.09	0.11	0.00	0.04	0.06	0.00
Sat Flow, veh/h	3456	3554	1585	1781	3554	1585	1781	3554	1585	3456	3554	1585
Grp Volume(v), veh/h	163	241	0	46	592	0	149	124	0	80	45	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1781	1777	1585	1781	1777	1585	1728	1777	1585
Q Serve(g_s), s	5.6	2.8	0.0	1.1	8.4	0.0	9.3	3.8	0.0	2.7	1.4	0.0
Cycle Q Clear(g_c), s	5.6	2.8	0.0	1.1	8.4	0.0	9.3	3.8	0.0	2.7	1.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	220	2420		840	2310		269	406		134	207	
V/C Ratio(X)	0.74	0.10		0.05	0.26		0.55	0.31		0.60	0.22	
Avail Cap(c_a), veh/h	288	2420		930	2310		353	800		490	800	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	55.2	6.5	0.0	6.9	8.8	0.0	47.0	48.8	0.0	56.8	53.9	0.0
Incr Delay (d2), s/veh	7.1	0.1	0.0	0.0	0.3	0.0	1.8	0.4	0.0	4.2	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.9	0.0	0.4	3.0	0.0	4.1	1.7	0.0	1.2	0.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.3	6.6	0.0	6.9	9.1	0.0	48.8	49.2	0.0	61.0	54.4	0.0
LnGrp LOS	E	A		A	A		D	D		E	D	
Approach Vol, veh/h		404			638			273			125	
Approach Delay, s/veh		29.1			8.9			49.0			58.6	
Approach LOS		C			A			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.9	84.7	16.4	10.0	12.6	81.0	9.7	16.7				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	48.0	17.0	25.0	10.0	48.0	17.0	25.0				
Max Q Clear Time (g_c+I1), s	3.1	4.8	11.3	3.4	7.6	10.4	4.7	5.8				
Green Ext Time (p_c), s	0.0	1.5	0.2	0.1	0.1	4.0	0.1	0.5				

### Intersection Summary























HCM 6th Ctrl Delay	26.5
HCM 6th LOS	C

### Notes

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

Timings  
8: S. Del Ray Street & E. Jewell Ave

2040 Background Traffic  
AM Peak Hour

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	25	280	29	7	609	79	2	20	10	1	75
Future Volume (vph)	25	280	29	7	609	79	2	20	10	1	75
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6	3	8		7	4	
Permitted Phases	2		2	6		8		Free	4		Free
Detector Phase	5	2	2	1	6	3	8		7	4	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0		5.0	15.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	10.0	20.0		10.0	20.0	
Total Split (s)	10.0	45.0	45.0	10.0	45.0	40.0	50.0		15.0	25.0	
Total Split (%)	8.3%	37.5%	37.5%	8.3%	37.5%	33.3%	41.7%		12.5%	20.8%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
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)	94.5	94.1	94.1	92.0	89.5	17.0	16.3	120.0	9.2	15.0	120.0
Actuated g/C Ratio	0.79	0.78	0.78	0.77	0.75	0.14	0.14	1.00	0.08	0.12	1.00
v/c Ratio	0.04	0.11	0.02	0.01	0.24	0.37	0.01	0.01	0.08	0.00	0.05
Control Delay	4.7	4.9	0.4	2.9	6.5	48.2	43.0	0.0	44.2	46.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.7	4.9	0.4	2.9	6.5	48.2	43.0	0.0	44.2	46.0	0.1
LOS	A	A	A	A	A	D	D	A	D	D	A
Approach Delay		4.5			6.5		38.6			5.9	
Approach LOS		A			A		D			A	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 6 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.37

Intersection Signal Delay: 8.7

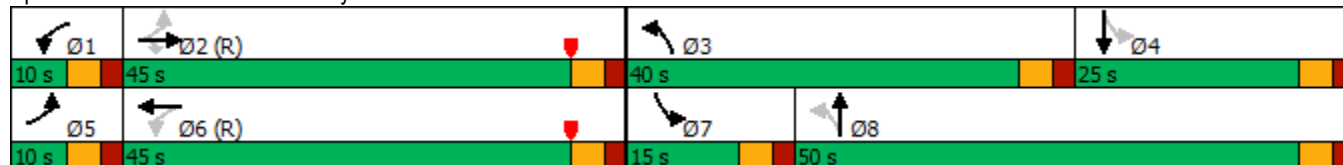
Intersection LOS: A

Intersection Capacity Utilization 41.6%

ICU Level of Service A
























Analysis Period (min) 15

Splits and Phases: 8: S. Del Ray Street & E. Jewell Ave



# HCM 6th Signalized Intersection Summary 8: S. Del Ray Street & E. Jewell Ave

2040 Background Traffic  
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	280	29	7	609	5	79	2	20	10	1	75
Future Volume (veh/h)	25	280	29	7	609	5	79	2	20	10	1	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	26	295	31	7	641	5	83	2	0	11	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	581	2466	1100	778	2452	19	265	220		188	139	
Arrive On Green	0.02	0.69	0.69	0.01	0.68	0.68	0.06	0.12	0.00	0.01	0.07	0.00
Sat Flow, veh/h	1781	3554	1585	1781	3614	28	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	26	295	31	7	315	331	83	2	0	11	1	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1865	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.5	3.3	0.7	0.1	8.3	8.3	5.0	0.1	0.0	0.7	0.1	0.0
Cycle Q Clear(g_c), s	0.5	3.3	0.7	0.1	8.3	8.3	5.0	0.1	0.0	0.7	0.1	0.0
Prop In Lane	1.00		1.00	1.00		0.02	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	581	2466	1100	778	1206	1266	265	220		188	139	
V/C Ratio(X)	0.04	0.12	0.03	0.01	0.26	0.26	0.31	0.01		0.06	0.01	
Avail Cap(c_a), veh/h	612	2466	1100	836	1206	1266	684	701		314	312	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	5.7	6.1	5.7	5.9	7.5	7.5	45.8	46.7	0.0	50.3	51.4	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.5	0.5	0.7	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.1	0.2	0.0	2.9	3.1	2.2	0.1	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.7	6.2	5.8	5.9	8.1	8.0	46.4	46.8	0.0	50.4	51.4	0.0
LnGrp LOS	A	A	A	A	A	A	D	D		D	D	
Approach Vol, veh/h	352			653			85			12		
Approach Delay, s/veh	6.1			8.0			46.4			50.5		
Approach LOS	A			A			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.0	88.3	11.7	13.9	7.9	86.4	6.5	19.1				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	40.0	35.0	20.0	5.0	40.0	10.0	45.0				
Max Q Clear Time (g_c+I1), s	2.1	5.3	7.0	2.1	2.5	10.3	2.7	2.1				
Green Ext Time (p_c), s	0.0	1.9	0.2	0.0	0.0	3.7	0.0	0.0				

## Intersection Summary

HCM 6th Ctrl Delay 10.9  
HCM 6th LOS B

























## Notes

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



Timings  
9: Hayesmouth Rd & E. Jewell Ave

2040 Background Traffic  
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	239	29	15	473	67	73	75	21	28	25	76
Future Volume (vph)	41	239	29	15	473	67	73	75	21	28	25	76
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		Free	4		Free
Detector Phase	5	2	2	1	6	6	3	8		7	4	
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	20.0	20.0	10.0	20.0	20.0	10.0	20.0		10.0	20.0	
Total Split (s)	15.0	60.0	60.0	15.0	60.0	60.0	15.0	30.0		15.0	30.0	
Total Split (%)	12.5%	50.0%	50.0%	12.5%	50.0%	50.0%	12.5%	25.0%		12.5%	25.0%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max		None	Max	
Act Effect Green (s)	68.5	65.4	65.4	65.3	60.4	60.4	38.2	32.4	120.0	34.4	28.6	120.0
Actuated g/C Ratio	0.57	0.54	0.54	0.54	0.50	0.50	0.32	0.27	1.00	0.29	0.24	1.00
v/c Ratio	0.09	0.13	0.03	0.03	0.28	0.08	0.18	0.16	0.01	0.07	0.06	0.05
Control Delay	8.2	12.3	2.2	6.0	12.5	1.3	29.3	37.1	0.0	28.0	38.5	0.1
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	8.2	12.3	2.2	6.0	12.5	1.3	29.3	37.1	0.0	28.0	38.5	0.1
LOS	A	B	A	A	B	A	C	D	A	C	D	A
Approach Delay		10.8			11.0			29.1			13.5	
Approach LOS		B			B			C			B	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 55 (46%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.28

Intersection Signal Delay: 13.8

Intersection LOS: B

Intersection Capacity Utilization 40.5%

ICU Level of Service A

Analysis Period (min) 15




























Splits and Phases: 9: Hayesmouth Rd & E. Jewell Ave



# HCM 6th Signalized Intersection Summary

## 9: Hayesmouth Rd & E. Jewell Ave

2040 Background Traffic  
AM Peak Hour











												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (veh/h)	41	239	29	15	473	67	73	75	21	28	25	76
Future Volume (veh/h)	41	239	29	15	473	67	73	75	21	28	25	76
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	252	31	16	498	71	77	79	0	29	26	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	515	1994	889	669	1942	866	416	429		364	390	
Arrive On Green	0.03	0.56	0.56	0.02	0.55	0.55	0.05	0.23	0.00	0.03	0.21	0.00
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	43	252	31	16	498	71	77	79	0	29	26	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	1.3	4.0	1.1	0.5	8.9	2.6	4.0	4.1	0.0	1.5	1.3	0.0
Cycle Q Clear(g_c), s	1.3	4.0	1.1	0.5	8.9	2.6	4.0	4.1	0.0	1.5	1.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	515	1994	889	669	1942	866	416	429		364	390	
V/C Ratio(X)	0.08	0.13	0.03	0.02	0.26	0.08	0.18	0.18		0.08	0.07	
Avail Cap(c_a), veh/h	607	1994	889	787	1942	866	481	429		466	390	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	11.3	12.4	11.8	11.5	14.4	12.9	34.8	37.2	0.0	35.8	38.1	0.0
Incr Delay (d2), s/veh	0.1	0.1	0.1	0.0	0.3	0.2	0.2	0.9	0.0	0.1	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	1.5	0.4	0.2	3.4	0.9	1.8	2.0	0.0	0.7	0.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.4	12.6	11.9	11.6	14.7	13.1	35.0	38.2	0.0	35.9	38.5	0.0
LnGrp LOS	B	B	B	B	B	B	D	D		D	D	
Approach Vol, veh/h		326			585			156			55	
Approach Delay, s/veh		12.3			14.4			36.6			37.1	
Approach LOS		B			B			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.1	72.3	10.6	30.0	8.8	70.6	8.1	32.5				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	55.0	10.0	25.0	10.0	55.0	10.0	25.0				
Max Q Clear Time (g_c+I1), s	2.5	6.0	6.0	3.3	3.3	10.9	3.5	6.1				
Green Ext Time (p_c), s	0.0	1.7	0.0	0.1	0.0	3.5	0.0	0.3				

### Intersection Summary

HCM 6th Ctrl Delay	18.0
HCM 6th LOS	B

### Notes

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











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	45	5	3	21	2	82	1	161	7	27	95	15
Future Vol, veh/h	45	5	3	21	2	82	1	161	7	27	95	15
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	250	-	-	250	-	-	350	-	273	350	-	273
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	47	5	3	22	2	86	1	169	7	28	100	16







Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	244	334	50	280	343	85	116	0	0	176	0	0
Stage 1	156	156	-	171	171	-	-	-	-	-	-	-
Stage 2	88	178	-	109	172	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	690	585	1008	650	578	957	1470	-	-	1398	-	-
Stage 1	831	768	-	814	756	-	-	-	-	-	-	-
Stage 2	910	751	-	885	755	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	616	573	1008	633	566	957	1470	-	-	1398	-	-
Mov Cap-2 Maneuver	616	573	-	633	566	-	-	-	-	-	-	-
Stage 1	830	753	-	813	755	-	-	-	-	-	-	-
Stage 2	825	750	-	859	740	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11.1		9.5		0		1.5	
HCM LOS	B		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1470	-	-	616	684	633	942	1398	-	-
HCM Lane V/C Ratio	0.001	-	-	0.077	0.012	0.035	0.094	0.02	-	-
HCM Control Delay (s)	7.5	-	-	11.3	10.3	10.9	9.2	7.6	-	-
HCM Lane LOS	A	-	-	B	B	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0	0.1	0.3	0.1	-	-







Intersection				
Intersection Delay, s/veh	3.3			
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	31	101	65	39
Demand Flow Rate, veh/h	32	103	66	39
Vehicles Circulating, veh/h	42	64	47	59
Vehicles Exiting, veh/h	56	49	27	108
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.0	3.5	3.2	3.0
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
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	32	103	66	39
Cap Entry Lane, veh/h	1322	1293	1315	1299
Entry HV Adj Factor	0.983	0.980	0.982	0.988
Flow Entry, veh/h	31	101	65	39
Cap Entry, veh/h	1299	1267	1292	1284
V/C Ratio	0.024	0.080	0.050	0.030
Control Delay, s/veh	3.0	3.5	3.2	3.0
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0







Intersection												
Int Delay, s/veh	5.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	26	3	51	21	54	1	91	28	18	41	7
Future Vol, veh/h	20	26	3	51	21	54	1	91	28	18	41	7
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	250	-	-	250	-	-	250	-	120	250	-	120
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	27	3	54	22	57	1	96	29	19	43	7
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	233	208	43	198	186	96	50	0	0	125	0	0
Stage 1	81	81	-	98	98	-	-	-	-	-	-	-
Stage 2	152	127	-	100	88	-	-	-	-	-	-	-
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	722	689	1027	761	708	960	1557	-	-	1462	-	-
Stage 1	927	828	-	908	814	-	-	-	-	-	-	-
Stage 2	850	791	-	906	822	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	656	679	1027	728	698	960	1557	-	-	1462	-	-
Mov Cap-2 Maneuver	656	679	-	728	698	-	-	-	-	-	-	-
Stage 1	926	817	-	907	813	-	-	-	-	-	-	-
Stage 2	777	790	-	862	811	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	10.5			9.9			0.1			2		
HCM LOS	B			A								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1557	-	-	656	704	728	869	1462	-	-		
HCM Lane V/C Ratio	0.001	-	-	0.032	0.043	0.074	0.091	0.013	-	-		
HCM Control Delay (s)	7.3	-	-	10.7	10.3	10.3	9.6	7.5	-	-		
HCM Lane LOS	A	-	-	B	B	B	A	A	-	-		
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0.2	0.3	0	-	-		

Intersection						
Int Delay, s/veh	2.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	113	172	71	36	47
Future Vol, veh/h	25	113	172	71	36	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	350	-	-	273	350	-
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	119	181	75	38	49
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	256	0	-	0	293	91
Stage 1	-	-	-	-	181	-
Stage 2	-	-	-	-	112	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1306	-	-	-	674	949
Stage 1	-	-	-	-	832	-
Stage 2	-	-	-	-	900	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1306	-	-	-	661	949
Mov Cap-2 Maneuver	-	-	-	-	661	-
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	900	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.4	0		9.8		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1306	-	-	-	661	949
HCM Lane V/C Ratio	0.02	-	-	-	0.057	0.052
HCM Control Delay (s)	7.8	-	-	-	10.8	9
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2	0.2

Intersection									
Intersection Delay, s/veh	4.3								
Intersection LOS	A								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	156		444		184		121		
Demand Flow Rate, veh/h	159		452		188		123		
Vehicles Circulating, veh/h	318		141		107		455		
Vehicles Exiting, veh/h	260		154		370		138		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	4.2		4.6		3.5		4.6		
Approach LOS	A		A		A		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.472	0.528	0.469	0.531	0.468	0.532	0.472	0.528	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
Entry Flow, veh/h	75	84	212	240	88	100	58	65	
Cap Entry Lane, veh/h	1007	1084	1186	1260	1223	1297	888	965	
Entry HV Adj Factor	0.976	0.983	0.983	0.980	0.984	0.977	0.981	0.988	
Flow Entry, veh/h	73	83	208	235	87	98	57	64	
Cap Entry, veh/h	984	1065	1166	1234	1204	1267	872	953	
V/C Ratio	0.074	0.078	0.179	0.191	0.072	0.077	0.065	0.067	
Control Delay, s/veh	4.3	4.1	4.7	4.6	3.6	3.5	4.7	4.4	
LOS	A	A	A	A	A	A	A	A	
95th %tile Queue, veh	0	0	1	1	0	0	0	0	



























Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	135	403	6	15	20
Future Vol, veh/h	8	135	403	6	15	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	350	-	-	273	250	-
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	8	142	424	6	16	21
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	430	0	-	0	511	212
Stage 1	-	-	-	-	424	-
Stage 2	-	-	-	-	87	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1126	-	-	-	492	793
Stage 1	-	-	-	-	628	-
Stage 2	-	-	-	-	926	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1126	-	-	-	489	793
Mov Cap-2 Maneuver	-	-	-	-	489	-
Stage 1	-	-	-	-	624	-
Stage 2	-	-	-	-	926	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.5	0		10.9		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1126	-	-	-	489	793
HCM Lane V/C Ratio	0.007	-	-	-	0.032	0.027
HCM Control Delay (s)	8.2	-	-	-	12.6	9.7
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0.1

Intersection						
Int Delay, s/veh	2.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	58	90	337	19	12	70
Future Vol, veh/h	58	90	337	19	12	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	350	-	-	273	250	-
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	61	95	355	20	13	74
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	375	0	-	0	525	178
Stage 1	-	-	-	-	355	-
Stage 2	-	-	-	-	170	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1180	-	-	-	482	834
Stage 1	-	-	-	-	681	-
Stage 2	-	-	-	-	843	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1180	-	-	-	457	834
Mov Cap-2 Maneuver	-	-	-	-	457	-
Stage 1	-	-	-	-	646	-
Stage 2	-	-	-	-	843	-
Approach	EB	WB		SB		
HCM Control Delay, s	3.2	0		10.2		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1180	-	-	-	457	834
HCM Lane V/C Ratio	0.052	-	-	-	0.028	0.088
HCM Control Delay (s)	8.2	-	-	-	13.1	9.7
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.3

Timings  
6: Powhaton Rd & E. Jewell Ave

2040 Background Traffic  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	314	1184	38	26	702	88	23	63	22	142	73	263
Future Volume (vph)	314	1184	38	26	702	88	23	63	22	142	73	263
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		Free	8		Free	4		Free
Detector Phase	5	2	2	1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	20.0		5.0	20.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0		10.0	25.0		10.0	25.0	
Total Split (s)	15.0	53.0	53.0	15.0	53.0		17.0	35.0		17.0	35.0	
Total Split (%)	12.5%	44.2%	44.2%	12.5%	44.2%		14.2%	29.2%		14.2%	29.2%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
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)	76.4	69.4	69.4	58.3	52.0	120.0	22.7	20.0	120.0	33.3	26.2	120.0
Actuated g/C Ratio	0.64	0.58	0.58	0.49	0.43	1.00	0.19	0.17	1.00	0.28	0.22	1.00
v/c Ratio	0.66	0.61	0.04	0.12	0.48	0.06	0.09	0.11	0.01	0.40	0.10	0.17
Control Delay	17.8	20.1	0.1	11.6	23.1	0.1	30.4	43.1	0.0	36.3	38.3	0.2
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	17.8	20.1	0.1	11.6	23.1	0.1	30.4	43.1	0.0	36.3	38.3	0.2
LOS	B	C	A	B	C	A	C	D	A	D	D	A
Approach Delay		19.1			20.2			31.6			16.7	
Approach LOS		B			C			C			B	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 48 (40%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 19.5

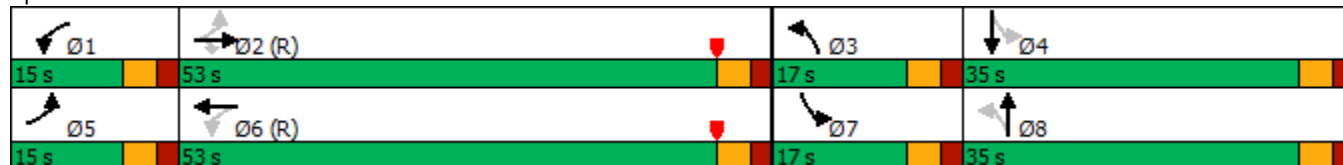
Intersection LOS: B

Intersection Capacity Utilization 66.1%

ICU Level of Service C

























Analysis Period (min) 15

Splits and Phases: 6: Powhaton Rd & E. Jewell Ave



# HCM 6th Signalized Intersection Summary 6: Powhatan Rd & E. Jewell Ave

2040 Background Traffic  
PM Peak Hour

























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	314	1184	38	26	702	88	23	63	22	142	73	263
Future Volume (veh/h)	314	1184	38	26	702	88	23	63	22	142	73	263
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	331	1246	40	27	739	0	24	66	0	149	77	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	474	1986	886	242	1778		320	590		410	806	
Arrive On Green	0.08	0.56	0.56	0.02	0.50	0.00	0.02	0.17	0.00	0.08	0.23	0.00
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	331	1246	40	27	739	0	24	66	0	149	77	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	10.0	28.6	1.4	0.9	15.7	0.0	1.3	1.9	0.0	8.0	2.1	0.0
Cycle Q Clear(g_c), s	10.0	28.6	1.4	0.9	15.7	0.0	1.3	1.9	0.0	8.0	2.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	474	1986	886	242	1778		320	590		410	806	
V/C Ratio(X)	0.70	0.63	0.05	0.11	0.42		0.07	0.11		0.36	0.10	
Avail Cap(c_a), veh/h	474	1986	886	346	1778		458	888		439	888	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	15.4	18.0	12.0	15.8	18.9	0.0	40.0	42.5	0.0	35.3	36.7	0.0
Incr Delay (d2), s/veh	4.5	1.5	0.1	0.2	0.7	0.0	0.1	0.1	0.0	0.5	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	11.1	0.5	0.3	6.3	0.0	0.6	0.8	0.0	3.5	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.9	19.5	12.1	16.0	19.6	0.0	40.1	42.6	0.0	35.9	36.7	0.0
LnGrp LOS	B	B	B	B	B		D	D		D	D	
Approach Vol, veh/h	1617			766			90			226		
Approach Delay, s/veh	19.4			19.5			41.9			36.2		
Approach LOS	B			B			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.0	72.1	7.8	32.2	15.0	65.0	15.0	24.9				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	48.0	12.0	30.0	10.0	48.0	12.0	30.0				
Max Q Clear Time (g_c+I1), s	2.9	30.6	3.3	4.1	12.0	17.7	10.0	3.9				
Green Ext Time (p_c), s	0.0	8.1	0.0	0.3	0.0	5.1	0.1	0.3				
Intersection Summary												
HCM 6th Ctrl Delay	21.6											
HCM 6th LOS	C											

## Notes

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

Timings  
7: Monaghan Rd & E. Jewell Ave

2040 Background Traffic  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	505	611	162	48	384	102	97	82	57	162	143	295
Future Volume (vph)	505	611	162	48	384	102	97	82	57	162	143	295
Turn Type	Prot	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free	6		Free	8		Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
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	20.0		10.0	20.0		10.0	20.0		10.0	20.0	
Total Split (s)	25.0	54.0		15.0	44.0		15.0	32.0		19.0	36.0	
Total Split (%)	20.8%	45.0%		12.5%	36.7%		12.5%	26.7%		15.8%	30.0%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	-2.0		0.0	-2.0		0.0	-2.0		0.0	-2.0	
Total Lost Time (s)	5.0	3.0		5.0	3.0		5.0	3.0		5.0	3.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effect Green (s)	24.7	77.4	120.0	61.7	57.1	120.0	17.0	10.8	120.0	13.6	12.7	120.0
Actuated g/C Ratio	0.21	0.64	1.00	0.51	0.48	1.00	0.14	0.09	1.00	0.11	0.11	1.00
v/c Ratio	0.75	0.28	0.11	0.11	0.24	0.07	0.47	0.27	0.04	0.44	0.40	0.20
Control Delay	70.0	6.1	0.1	14.9	25.8	0.1	47.2	52.7	0.1	54.1	52.7	0.3
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	6.1	0.1	14.9	25.8	0.1	47.2	52.7	0.1	54.1	52.7	0.3
LOS	E	A	A	B	C	A	D	D	A	D	D	A
Approach Delay		30.6			19.9			37.7			27.3	
Approach LOS		C			B			D			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 111 (93%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 28.3

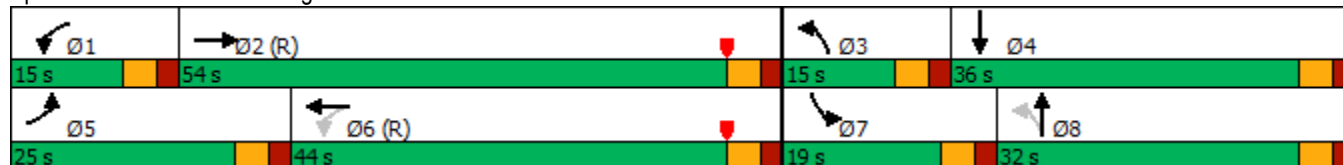
Intersection LOS: C

Intersection Capacity Utilization 49.2%

ICU Level of Service A

























Analysis Period (min) 15

Splits and Phases: 7: Monaghan Rd & E. Jewell Ave



# HCM 6th Signalized Intersection Summary 7: Monaghan Rd & E. Jewell Ave

2040 Background Traffic  
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	505	611	162	48	384	102	97	82	57	162	143	295
Future Volume (veh/h)	505	611	162	48	384	102	97	82	57	162	143	295
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	532	643	0	51	404	0	102	86	0	171	151	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	576	2433		542	1962		208	287		232	286	
Arrive On Green	0.17	0.68	0.00	0.03	0.55	0.00	0.07	0.08	0.00	0.07	0.08	0.00
Sat Flow, veh/h	3456	3554	1585	1781	3554	1585	1781	3554	1585	3456	3554	1585
Grp Volume(v), veh/h	532	643	0	51	404	0	102	86	0	171	151	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1781	1777	1585	1781	1777	1585	1728	1777	1585
Q Serve(g_s), s	18.2	8.4	0.0	1.5	6.9	0.0	6.3	2.7	0.0	5.8	4.9	0.0
Cycle Q Clear(g_c), s	18.2	8.4	0.0	1.5	6.9	0.0	6.3	2.7	0.0	5.8	4.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	576	2433		542	1962		208	287		232	286	
V/C Ratio(X)	0.92	0.26		0.09	0.21		0.49	0.30		0.74	0.53	
Avail Cap(c_a), veh/h	576	2433		630	1962		237	859		403	977	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.2	7.3	0.0	11.4	13.6	0.0	48.1	51.9	0.0	54.9	53.0	0.0
Incr Delay (d2), s/veh	20.8	0.3	0.0	0.1	0.2	0.0	1.8	0.6	0.0	4.6	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.3	2.8	0.0	0.6	2.7	0.0	2.8	1.2	0.0	2.6	2.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.0	7.5	0.0	11.5	13.8	0.0	49.9	52.5	0.0	59.5	54.5	0.0
LnGrp LOS	E	A		B	B		D	D		E	D	
Approach Vol, veh/h		1175			455			188			322	
Approach Delay, s/veh		35.8			13.6			51.1			57.1	
Approach LOS		D			B			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.1	85.2	13.1	12.7	25.0	69.3	13.0	12.7				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	49.0	10.0	31.0	20.0	39.0	14.0	27.0				
Max Q Clear Time (g_c+I1), s	3.5	10.4	8.3	6.9	20.2	8.9	7.8	4.7				
Green Ext Time (p_c), s	0.0	4.4	0.0	0.8	0.0	2.5	0.2	0.4				

## Intersection Summary























HCM 6th Ctrl Delay	35.6
HCM 6th LOS	D

## Notes

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

Timings  
8: S. Del Ray Street & E. Jewell Ave

2040 Background Traffic  
PM Peak Hour

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	80	655	95	25	424	59	2	15	5	3	50
Future Volume (vph)	80	655	95	25	424	59	2	15	5	3	50
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6	3	8		7	4	
Permitted Phases	2		2	6		8		Free	4		Free
Detector Phase	5	2	2	1	6	3	8		7	4	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	15.0		5.0	15.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	25.0	20.0		10.0	20.0	
Total Split (s)	10.0	60.0	60.0	10.0	60.0	25.0	40.0		10.0	25.0	
Total Split (%)	8.3%	50.0%	50.0%	8.3%	50.0%	20.8%	33.3%		8.3%	20.8%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
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)	89.0	85.1	85.1	85.8	81.8	24.0	21.0	120.0	8.0	15.0	120.0
Actuated g/C Ratio	0.74	0.71	0.71	0.72	0.68	0.20	0.18	1.00	0.07	0.12	1.00
v/c Ratio	0.12	0.27	0.09	0.05	0.19	0.19	0.01	0.01	0.04	0.01	0.03
Control Delay	9.0	12.5	3.1	4.9	9.6	39.0	37.0	0.0	40.8	46.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.0	12.5	3.1	4.9	9.6	39.0	37.0	0.0	40.8	46.3	0.0
LOS	A	B	A	A	A	D	D	A	D	D	A
Approach Delay		11.1			9.4		31.1			5.7	
Approach LOS		B			A		C			A	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 6 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.27

Intersection Signal Delay: 11.4

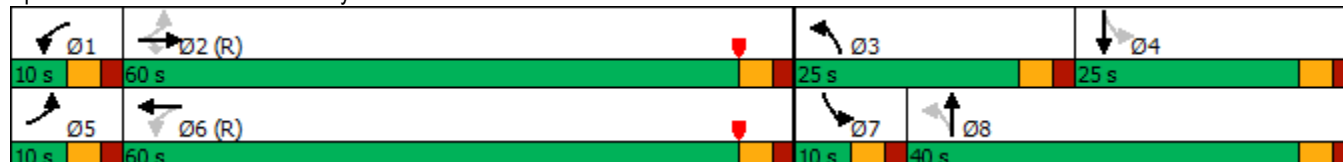
Intersection LOS: B

Intersection Capacity Utilization 47.3%

ICU Level of Service A

Analysis Period (min) 15

























Splits and Phases: 8: S. Del Ray Street & E. Jewell Ave





# HCM 6th Signalized Intersection Summary 8: S. Del Ray Street & E. Jewell Ave

2040 Background Traffic  
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	655	95	25	424	15	59	2	15	5	3	50
Future Volume (veh/h)	80	655	95	25	424	15	59	2	15	5	3	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	84	689	100	26	446	16	62	2	0	5	3	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	647	2232	996	473	2146	77	367	327		122	66	
Arrive On Green	0.04	0.63	0.63	0.02	0.61	0.61	0.15	0.17	0.00	0.01	0.04	0.00
Sat Flow, veh/h	1781	3554	1585	1781	3499	125	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	84	689	100	26	226	236	62	2	0	5	3	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1848	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.1	10.7	3.0	0.6	6.8	6.8	3.5	0.1	0.0	0.3	0.2	0.0
Cycle Q Clear(g_c), s	2.1	10.7	3.0	0.6	6.8	6.8	3.5	0.1	0.0	0.3	0.2	0.0
Prop In Lane	1.00		1.00	1.00		0.07	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	647	2232	996	473	1090	1133	367	327		122	66	
V/C Ratio(X)	0.13	0.31	0.10	0.05	0.21	0.21	0.17	0.01		0.04	0.05	
Avail Cap(c_a), veh/h	652	2232	996	504	1090	1133	405	546		184	312	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	7.8	10.3	8.9	8.4	10.3	10.3	40.0	40.9	0.0	55.2	55.9	0.0
Incr Delay (d2), s/veh	0.1	0.4	0.2	0.0	0.4	0.4	0.2	0.0	0.0	0.1	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	3.9	1.0	0.2	2.6	2.7	1.5	0.0	0.0	0.1	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.9	10.6	9.1	8.4	10.7	10.7	40.3	40.9	0.0	55.4	56.2	0.0
LnGrp LOS	A	B	A	A	B	B	D	D		E	E	
Approach Vol, veh/h	873			488			64			8		
Approach Delay, s/veh	10.2			10.6			40.3			55.7		
Approach LOS	B			B			D			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.9	80.4	22.5	9.3	9.7	78.6	5.8	26.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	55.0	20.0	20.0	5.0	55.0	5.0	35.0				
Max Q Clear Time (g_c+I1), s	2.6	12.7	5.5	2.2	4.1	8.8	2.3	2.1				
Green Ext Time (p_c), s	0.0	5.2	0.1	0.0	0.0	2.6	0.0	0.0				

## Intersection Summary

























HCM 6th Ctrl Delay	11.9
HCM 6th LOS	B

## Notes

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

Timings  
9: Hayesmouth Rd & E. Jewell Ave

2040 Background Traffic  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	504	84	28	343	39	57	50	23	67	88	64
Future Volume (vph)	87	504	84	28	343	39	57	50	23	67	88	64
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		Free	4		Free
Detector Phase	5	2	2	1	6	6	3	8		7	4	
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	20.0	20.0	10.0	20.0	20.0	10.0	20.0		10.0	20.0	
Total Split (s)	15.0	60.0	60.0	15.0	60.0	60.0	15.0	30.0		15.0	30.0	
Total Split (%)	12.5%	50.0%	50.0%	12.5%	50.0%	50.0%	12.5%	25.0%		12.5%	25.0%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max		None	Max	
Act Effect Green (s)	68.4	62.9	62.9	63.2	56.8	56.8	35.7	28.7	120.0	36.3	29.0	120.0
Actuated g/C Ratio	0.57	0.52	0.52	0.53	0.47	0.47	0.30	0.24	1.00	0.30	0.24	1.00
v/c Ratio	0.16	0.29	0.10	0.06	0.22	0.05	0.14	0.12	0.02	0.16	0.21	0.04
Control Delay	5.8	11.3	4.5	7.3	15.1	1.3	29.0	39.8	0.0	29.1	39.8	0.0
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	5.8	11.3	4.5	7.3	15.1	1.3	29.0	39.8	0.0	29.1	39.8	0.0
LOS	A	B	A	A	B	A	C	D	A	C	D	A
Approach Delay		9.8			13.2			28.1			25.0	
Approach LOS		A			B			C			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 55 (46%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.29

Intersection Signal Delay: 14.7

Intersection LOS: B

Intersection Capacity Utilization 41.0%

ICU Level of Service A

Analysis Period (min) 15

























Splits and Phases: 9: Hayesmouth Rd & E. Jewell Ave



# HCM 6th Signalized Intersection Summary

## 9: Hayesmouth Rd & E. Jewell Ave

2040 Background Traffic  
PM Peak Hour











												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	87	504	84	28	343	39	57	50	23	67	88	64
Future Volume (veh/h)	87	504	84	28	343	39	57	50	23	67	88	64
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	92	531	88	29	361	41	60	53	0	71	93	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	612	1974	881	490	1925	859	353	390		388	401	
Arrive On Green	0.04	0.56	0.56	0.03	0.54	0.54	0.04	0.21	0.00	0.04	0.21	0.00
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	92	531	88	29	361	41	60	53	0	71	93	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.7	9.4	3.1	0.9	6.2	1.5	3.2	2.8	0.0	3.7	4.9	0.0
Cycle Q Clear(g_c), s	2.7	9.4	3.1	0.9	6.2	1.5	3.2	2.8	0.0	3.7	4.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	612	1974	881	490	1925	859	353	390		388	401	
V/C Ratio(X)	0.15	0.27	0.10	0.06	0.19	0.05	0.17	0.14		0.18	0.23	
Avail Cap(c_a), veh/h	690	1974	881	593	1925	859	434	390		459	401	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	11.3	13.9	12.5	11.7	14.0	12.9	35.4	38.7	0.0	35.0	39.0	0.0
Incr Delay (d2), s/veh	0.1	0.3	0.2	0.0	0.2	0.1	0.2	0.7	0.0	0.2	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	3.6	1.1	0.3	2.4	0.5	1.4	1.3	0.0	1.6	2.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.4	14.3	12.8	11.7	14.2	13.0	35.6	39.4	0.0	35.2	40.3	0.0
LnGrp LOS	B	B	B	B	B	B	D	D		D	D	
Approach Vol, veh/h	711				431				113		164	
Approach Delay, s/veh	13.7				14.0				37.4		38.1	
Approach LOS	B				B				D		D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.1	71.7	9.5	30.7	9.8	70.0	10.2	30.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	55.0	10.0	25.0	10.0	55.0	10.0	25.0				
Max Q Clear Time (g_c+I1), s	2.9	11.4	5.2	6.9	4.7	8.2	5.7	4.8				
Green Ext Time (p_c), s	0.0	3.8	0.0	0.3	0.1	2.4	0.0	0.2				

### Intersection Summary

HCM 6th Ctrl Delay 18.5  
HCM 6th LOS B

### Notes

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











Intersection												
Int Delay, s/veh	3.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	32	1	2	15	1	59	3	145	26	102	195	56
Future Vol, veh/h	32	1	2	15	1	59	3	145	26	102	195	56
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	250	-	-	250	-	-	350	-	273	350	-	273
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	34	1	2	16	1	62	3	153	27	107	205	59

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	502	605	103	476	637	77	264	0	0	180	0	0
Stage 1	419	419	-	159	159	-	-	-	-	-	-	-
Stage 2	83	186	-	317	478	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	452	410	932	472	393	968	1297	-	-	1393	-	-
Stage 1	582	588	-	827	765	-	-	-	-	-	-	-
Stage 2	916	745	-	669	554	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	396	378	932	442	362	968	1297	-	-	1393	-	-
Mov Cap-2 Maneuver	396	378	-	442	362	-	-	-	-	-	-	-
Stage 1	581	543	-	825	763	-	-	-	-	-	-	-
Stage 2	854	744	-	615	511	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	14.5		10		0.1		2.3	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1297	-	-	396	626	442	942	1393	-	-
HCM Lane V/C Ratio	0.002	-	-	0.085	0.005	0.036	0.067	0.077	-	-
HCM Control Delay (s)	7.8	-	-	14.9	10.8	13.4	9.1	7.8	-	-
HCM Lane LOS	A	-	-	B	B	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0	0.1	0.2	0.2	-	-







Intersection				
Intersection Delay, s/veh	3.4			
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	65	71	48	128
Demand Flow Rate, veh/h	66	73	49	130
Vehicles Circulating, veh/h	126	49	120	41
Vehicles Exiting, veh/h	45	120	72	81
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.5	3.3	3.3	3.6
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
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	66	73	49	130
Cap Entry Lane, veh/h	1213	1313	1221	1323
Entry HV Adj Factor	0.981	0.976	0.982	0.982
Flow Entry, veh/h	65	71	48	128
Cap Entry, veh/h	1191	1281	1198	1299
V/C Ratio	0.054	0.056	0.040	0.098
Control Delay, s/veh	3.5	3.3	3.3	3.6
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Intersection												
Int Delay, s/veh	4.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	16	2	28	13	38	4	73	45	66	105	25
Future Vol, veh/h	15	16	2	28	13	38	4	73	45	66	105	25
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	250	-	-	250	-	-	250	-	120	250	-	120
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	16	17	2	29	14	40	4	77	47	69	111	26

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	385	381	111	357	360	77	137	0	0	124	0	0
Stage 1	249	249	-	85	85	-	-	-	-	-	-	-
Stage 2	136	132	-	272	275	-	-	-	-	-	-	-
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	573	552	942	598	567	984	1447	-	-	1463	-	-
Stage 1	755	701	-	923	824	-	-	-	-	-	-	-
Stage 2	867	787	-	734	683	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	519	524	942	560	539	984	1447	-	-	1463	-	-
Mov Cap-2 Maneuver	519	524	-	560	539	-	-	-	-	-	-	-
Stage 1	753	668	-	920	822	-	-	-	-	-	-	-
Stage 2	816	785	-	680	651	-	-	-	-	-	-	-







Approach	EB		WB		NB		SB	
HCM Control Delay, s	12		10.4		0.2		2.6	
HCM LOS	B		B					







Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1447	-	-	519	551	560	813	1463	-	-
HCM Lane V/C Ratio	0.003	-	-	0.03	0.034	0.053	0.066	0.047	-	-
HCM Control Delay (s)	7.5	-	-	12.2	11.8	11.8	9.7	7.6	-	-
HCM Lane LOS	A	-	-	B	B	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0.2	0.2	0.1	-	-

Intersection						
Int Delay, s/veh	2.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	55	211	164	60	82	37
Future Vol, veh/h	55	211	164	60	82	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	350	-	-	273	350	-
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	58	222	173	63	86	39
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	236	0	-	0	400	87
Stage 1	-	-	-	-	173	-
Stage 2	-	-	-	-	227	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1328	-	-	-	578	954
Stage 1	-	-	-	-	840	-
Stage 2	-	-	-	-	789	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1328	-	-	-	553	954
Mov Cap-2 Maneuver	-	-	-	-	553	-
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	789	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.6	0		11.5		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1328	-	-	-	553	954
HCM Lane V/C Ratio	0.044	-	-	-	0.156	0.041
HCM Control Delay (s)	7.8	-	-	-	12.7	8.9
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6	0.1



























Intersection									
Intersection Delay, s/veh	4.8								
Intersection LOS	A								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	310		280		416		177		
Demand Flow Rate, veh/h	316		286		424		180		
Vehicles Circulating, veh/h	280		222		298		340		
Vehicles Exiting, veh/h	240		500		298		168		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	4.7		4.3		5.3		4.4		
Approach LOS	A		A		A		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	R	LT	TR	
RT Channelized									
Lane Util	0.472	0.528	0.469	0.531	0.474	0.526	0.472	0.528	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
Entry Flow, veh/h	149	167	134	152	201	223	85	95	
Cap Entry Lane, veh/h	1043	1119	1101	1176	1026	1102	987	1064	
Entry HV Adj Factor	0.978	0.984	0.983	0.978	0.982	0.982	0.976	0.985	
Flow Entry, veh/h	146	164	132	149	197	219	83	94	
Cap Entry, veh/h	1020	1101	1082	1149	1008	1083	964	1048	
V/C Ratio	0.143	0.149	0.122	0.129	0.196	0.202	0.086	0.089	
Control Delay, s/veh	4.8	4.6	4.4	4.2	5.4	5.2	4.5	4.2	
LOS	A	A	A	A	A	A	A	A	
95th %tile Queue, veh	0	1	0	0	1	1	0	0	

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	22	444	250	17	11	16
Future Vol, veh/h	22	444	250	17	11	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	350	-	-	273	250	-
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	23	467	263	18	12	17
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	281	0	-	0	543	132
Stage 1	-	-	-	-	263	-
Stage 2	-	-	-	-	280	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1278	-	-	-	470	893
Stage 1	-	-	-	-	757	-
Stage 2	-	-	-	-	742	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1278	-	-	-	462	893
Mov Cap-2 Maneuver	-	-	-	-	462	-
Stage 1	-	-	-	-	743	-
Stage 2	-	-	-	-	742	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.4	0		10.7		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1278	-	-	-	462	893
HCM Lane V/C Ratio	0.018	-	-	-	0.025	0.019
HCM Control Delay (s)	7.9	-	-	-	13	9.1
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	0.1

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	70	384	206	26	33	61
Future Vol, veh/h	70	384	206	26	33	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	350	-	-	273	250	-
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	74	404	217	27	35	64
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	244	0	-	0	567	109
Stage 1	-	-	-	-	217	-
Stage 2	-	-	-	-	350	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1319	-	-	-	454	924
Stage 1	-	-	-	-	798	-
Stage 2	-	-	-	-	684	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1319	-	-	-	429	924
Mov Cap-2 Maneuver	-	-	-	-	429	-
Stage 1	-	-	-	-	753	-
Stage 2	-	-	-	-	684	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.2	0		10.9		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1319	-	-	-	429	924
HCM Lane V/C Ratio	0.056	-	-	-	0.081	0.069
HCM Control Delay (s)	7.9	-	-	-	14.1	9.2
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.3	0.2

Timings  
6: Powhaton Rd & E. Jewell Ave

2040 Total Traffic  
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	255	484	12	14	1281	191	34	58	24	84	53	312
Future Volume (vph)	255	484	12	14	1281	191	34	58	24	84	53	312
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		Free	8		Free	4		Free
Detector Phase	5	2	2	1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	20.0		5.0	20.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0		10.0	25.0		10.0	25.0	
Total Split (s)	15.0	53.0	53.0	15.0	53.0		17.0	35.0		17.0	35.0	
Total Split (%)	12.5%	44.2%	44.2%	12.5%	44.2%		14.2%	29.2%		14.2%	29.2%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
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)	77.5	73.0	73.0	54.4	48.5	120.0	23.3	20.0	120.0	31.3	24.6	120.0
Actuated g/C Ratio	0.65	0.61	0.61	0.45	0.40	1.00	0.19	0.17	1.00	0.26	0.20	1.00
v/c Ratio	0.64	0.24	0.01	0.03	0.94	0.13	0.13	0.10	0.02	0.26	0.08	0.21
Control Delay	34.6	12.8	0.0	9.9	45.2	0.2	31.4	43.0	0.0	33.8	39.3	0.3
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	34.6	12.8	0.0	9.9	45.2	0.2	31.4	43.0	0.0	33.8	39.3	0.3
LOS	C	B	A	A	D	A	C	D	A	C	D	A
Approach Delay		20.0			39.1			30.8			11.2	
Approach LOS		B			D			C			B	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 29.1

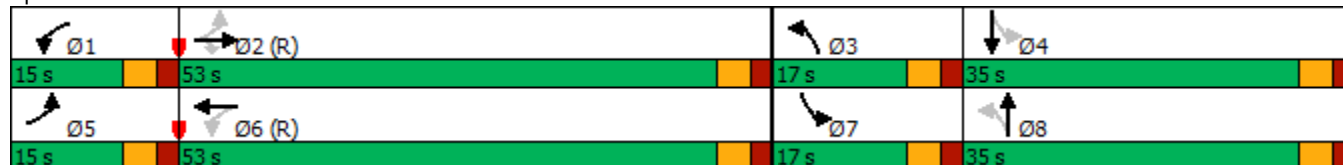
Intersection LOS: C

Intersection Capacity Utilization 78.7%

ICU Level of Service D

Analysis Period (min) 15





























Splits and Phases: 6: Powhaton Rd & E. Jewell Ave



# HCM 6th Signalized Intersection Summary

## 6: Powhaton Rd & E. Jewell Ave

2040 Total Traffic  
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (veh/h)	255	484	12	14	1281	191	34	58	24	84	53	312
Future Volume (veh/h)	255	484	12	14	1281	191	34	58	24	84	53	312
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	268	509	13	15	1348	0	36	61	0	88	56	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	305	2120	946	555	1886		335	589		360	679	
Arrive On Green	0.08	0.60	0.60	0.02	0.53	0.00	0.03	0.17	0.00	0.05	0.19	0.00
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	268	509	13	15	1348	0	36	61	0	88	56	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	7.9	8.1	0.4	0.5	34.4	0.0	2.0	1.7	0.0	4.9	1.6	0.0
Cycle Q Clear(g_c), s	7.9	8.1	0.4	0.5	34.4	0.0	2.0	1.7	0.0	4.9	1.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	305	2120	946	555	1886		335	589		360	679	
V/C Ratio(X)	0.88	0.24	0.01	0.03	0.71		0.11	0.10		0.24	0.08	
Avail Cap(c_a), veh/h	307	2120	946	674	1886		461	888		441	888	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	22.3	11.4	9.8	12.4	21.3	0.0	39.7	42.5	0.0	38.3	39.9	0.0
Incr Delay (d2), s/veh	23.6	0.3	0.0	0.0	2.3	0.0	0.1	0.1	0.0	0.3	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	3.0	0.1	0.2	13.8	0.0	0.9	0.8	0.0	2.1	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.9	11.7	9.9	12.4	23.6	0.0	39.8	42.6	0.0	38.7	39.9	0.0
LnGrp LOS	D	B	A	B	C		D	D		D	D	
Approach Vol, veh/h		790			1363			97			144	
Approach Delay, s/veh		23.3			23.5			41.6			39.2	
Approach LOS		C			C			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.0	76.6	8.5	27.9	14.9	68.7	11.6	24.9				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	48.0	12.0	30.0	10.0	48.0	12.0	30.0				
Max Q Clear Time (g_c+I1), s	2.5	10.1	4.0	3.6	9.9	36.4	6.9	3.7				
Green Ext Time (p_c), s	0.0	3.4	0.0	0.2	0.0	6.7	0.1	0.3				

### Intersection Summary

























HCM 6th Ctrl Delay	25.1
HCM 6th LOS	C

### Notes

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

Timings  
7: Monaghan Rd & E. Jewell Ave

2040 Total Traffic  
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	330	77	47	723	252	223	172	40	137	61	470
Future Volume (vph)	155	330	77	47	723	252	223	172	40	137	61	470
Turn Type	Prot	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free	6		Free	8		Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
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	20.0		10.0	20.0		10.0	20.0		10.0	20.0	
Total Split (s)	15.0	53.0		15.0	53.0		22.0	30.0		22.0	30.0	
Total Split (%)	12.5%	44.2%		12.5%	44.2%		18.3%	25.0%		18.3%	25.0%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	-2.0		0.0	-2.0		0.0	-2.0		0.0	-2.0	
Total Lost Time (s)	5.0	3.0		5.0	3.0		5.0	3.0		5.0	3.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effect Green (s)	11.0	74.0	120.0	72.2	67.6	120.0	28.2	15.0	120.0	10.4	9.8	120.0
Actuated g/C Ratio	0.09	0.62	1.00	0.60	0.56	1.00	0.24	0.12	1.00	0.09	0.08	1.00
v/c Ratio	0.52	0.16	0.05	0.08	0.38	0.17	0.72	0.41	0.03	0.49	0.22	0.31
Control Delay	73.2	7.7	0.1	10.6	17.2	0.2	52.9	50.9	0.0	57.5	52.6	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	73.2	7.7	0.1	10.6	17.2	0.2	52.9	50.9	0.0	57.5	52.6	0.5
LOS	E	A	A	B	B	A	D	D	A	E	D	A
Approach Delay		24.8			12.7			47.3			16.9	
Approach LOS		C			B			D			B	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 111 (93%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 21.9

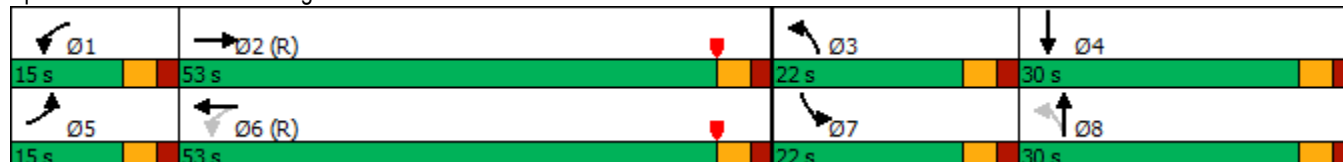
Intersection LOS: C

Intersection Capacity Utilization 55.1%

ICU Level of Service B

Analysis Period (min) 15

























Splits and Phases: 7: Monaghan Rd & E. Jewell Ave



# HCM 6th Signalized Intersection Summary

## 7: Monaghan Rd & E. Jewell Ave

2040 Total Traffic  
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	155	330	77	47	723	252	223	172	40	137	61	470
Future Volume (veh/h)	155	330	77	47	723	252	223	172	40	137	61	470
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	163	347	0	49	761	0	235	181	0	144	64	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	220	2260		719	2153		340	490		205	207	
Arrive On Green	0.06	0.64	0.00	0.03	0.61	0.00	0.14	0.14	0.00	0.06	0.06	0.00
Sat Flow, veh/h	3456	3554	1585	1781	3554	1585	1781	3554	1585	3456	3554	1585
Grp Volume(v), veh/h	163	347	0	49	761	0	235	181	0	144	64	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1781	1777	1585	1781	1777	1585	1728	1777	1585
Q Serve(g_s), s	5.6	4.7	0.0	1.3	12.9	0.0	14.6	5.6	0.0	4.9	2.1	0.0
Cycle Q Clear(g_c), s	5.6	4.7	0.0	1.3	12.9	0.0	14.6	5.6	0.0	4.9	2.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	220	2260		719	2153		340	490		205	207	
V/C Ratio(X)	0.74	0.15		0.07	0.35		0.69	0.37		0.70	0.31	
Avail Cap(c_a), veh/h	288	2260		808	2153		345	800		490	800	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	55.2	8.8	0.0	8.8	11.9	0.0	44.6	47.0	0.0	55.4	54.2	0.0
Incr Delay (d2), s/veh	7.1	0.1	0.0	0.0	0.5	0.0	5.7	0.5	0.0	4.3	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	1.7	0.0	0.5	4.8	0.0	6.8	2.4	0.0	2.2	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.3	9.0	0.0	8.8	12.3	0.0	50.3	47.5	0.0	59.7	55.0	0.0
LnGrp LOS	E	A		A	B		D	D		E	E	
Approach Vol, veh/h		510			810			416			208	
Approach Delay, s/veh		26.0			12.1			49.1			58.3	
Approach LOS		C			B			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.0	79.3	21.7	10.0	12.6	75.7	12.1	19.5				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	48.0	17.0	25.0	10.0	48.0	17.0	25.0				
Max Q Clear Time (g_c+I1), s	3.3	6.7	16.6	4.1	7.6	14.9	6.9	7.6				
Green Ext Time (p_c), s	0.0	2.2	0.0	0.2	0.1	5.3	0.3	0.8				

### Intersection Summary

HCM 6th Ctrl Delay	28.6
HCM 6th LOS	C























### Notes

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



Timings  
8: S. Del Ray Street & E. Jewell Ave

2040 Total Traffic  
AM Peak Hour

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	26	316	138	79	638	284	16	87	10	5	79
Future Volume (vph)	26	316	138	79	638	284	16	87	10	5	79
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6	3	8		7	4	
Permitted Phases	2		2	6		8		Free	4		Free
Detector Phase	5	2	2	1	6	3	8		7	4	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0		5.0	15.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	10.0	20.0		10.0	20.0	
Total Split (s)	10.0	45.0	45.0	10.0	45.0	40.0	50.0		15.0	25.0	
Total Split (%)	8.3%	37.5%	37.5%	8.3%	37.5%	33.3%	41.7%		12.5%	20.8%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
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)	75.6	70.4	70.4	79.2	74.0	29.0	26.7	120.0	9.2	15.0	120.0
Actuated g/C Ratio	0.63	0.59	0.59	0.66	0.62	0.24	0.22	1.00	0.08	0.12	1.00
v/c Ratio	0.06	0.16	0.15	0.12	0.31	0.75	0.04	0.06	0.08	0.02	0.05
Control Delay	9.5	13.2	4.1	6.6	13.8	51.9	32.8	0.1	40.2	46.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.5	13.2	4.1	6.6	13.8	51.9	32.8	0.1	40.2	46.4	0.1
LOS	A	B	A	A	B	D	C	A	D	D	A
Approach Delay		10.4			13.0		39.4			6.9	
Approach LOS		B			B		D			A	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 6 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 18.0

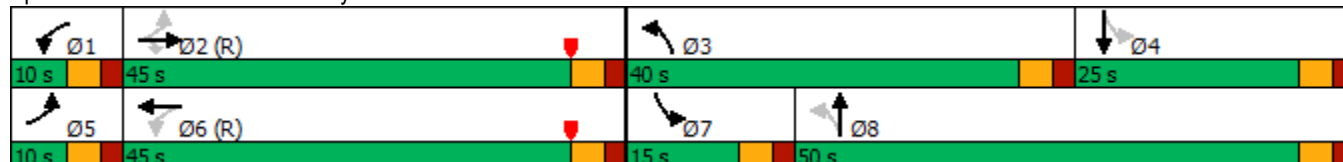
Intersection LOS: B

Intersection Capacity Utilization 56.9%

ICU Level of Service B













Analysis Period (min) 15

Splits and Phases: 8: S. Del Ray Street & E. Jewell Ave



# HCM 6th Signalized Intersection Summary 8: S. Del Ray Street & E. Jewell Ave

2040 Total Traffic  
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	316	138	79	638	5	284	16	87	10	5	79
Future Volume (veh/h)	26	316	138	79	638	5	284	16	87	10	5	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No				No				No			
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	27	333	145	83	672	5	299	17	0	11	5	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	450	1921	857	582	2007	15	477	450		199	156	
Arrive On Green	0.02	0.54	0.54	0.04	0.55	0.55	0.17	0.24	0.00	0.01	0.08	0.00
Sat Flow, veh/h	1781	3554	1585	1781	3615	27	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	27	333	145	83	330	347	299	17	0	11	5	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1866	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.8	5.7	5.6	2.5	12.2	12.2	17.7	0.8	0.0	0.7	0.3	0.0
Cycle Q Clear(g_c), s	0.8	5.7	5.6	2.5	12.2	12.2	17.7	0.8	0.0	0.7	0.3	0.0
Prop In Lane	1.00		1.00	1.00		0.01	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	450	1921	857	582	986	1035	477	450		199	156	
V/C Ratio(X)	0.06	0.17	0.17	0.14	0.33	0.33	0.63	0.04		0.06	0.03	
Avail Cap(c_a), veh/h	480	1921	857	586	986	1035	694	701		325	312	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.0	14.0	13.9	11.3	14.6	14.6	38.4	34.9	0.0	49.3	50.5	0.0
Incr Delay (d2), s/veh	0.1	0.2	0.4	0.1	0.9	0.9	1.4	0.0	0.0	0.1	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	2.2	2.0	0.9	4.8	5.1	7.8	0.4	0.0	0.3	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.0	14.2	14.4	11.4	15.5	15.5	39.8	34.9	0.0	49.4	50.6	0.0
LnGrp LOS	B	B	B	B	B	B	D	C		D	D	
Approach Vol, veh/h	505				760				316			
Approach Delay, s/veh	14.1				15.0				39.5			
Approach LOS	B				B				D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.7	69.9	25.4	15.0	8.0	71.6	6.5	33.9				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	40.0	35.0	20.0	5.0	40.0	10.0	45.0				
Max Q Clear Time (g_c+I1), s	4.5	7.7	19.7	2.3	2.8	14.2	2.7	2.8				
Green Ext Time (p_c), s	0.0	2.5	0.8	0.0	0.0	3.8	0.0	0.1				

## Intersection Summary

























HCM 6th Ctrl Delay	19.9
HCM 6th LOS	B

## Notes

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

# Timings 9: Hayessmouth Rd & E. Jewell Ave

2040 Total Traffic  
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	304	36	23	538	67	93	95	35	28	34	91
Future Volume (vph)	70	304	36	23	538	67	93	95	35	28	34	91
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		Free	4		Free
Detector Phase	5	2	2	1	6	6	3	8		7	4	
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	20.0	20.0	10.0	20.0	20.0	10.0	20.0		10.0	20.0	
Total Split (s)	15.0	60.0	60.0	15.0	60.0	60.0	15.0	30.0		15.0	30.0	
Total Split (%)	12.5%	50.0%	50.0%	12.5%	50.0%	50.0%	12.5%	25.0%		12.5%	25.0%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max		None	Max	
Act Effect Green (s)	68.2	63.1	63.1	64.6	59.5	59.5	38.4	32.4	120.0	32.8	25.9	120.0
Actuated g/C Ratio	0.57	0.53	0.53	0.54	0.50	0.50	0.32	0.27	1.00	0.27	0.22	1.00
v/c Ratio	0.16	0.17	0.04	0.04	0.32	0.08	0.23	0.20	0.02	0.08	0.09	0.06
Control Delay	5.5	8.7	1.2	6.7	14.1	1.2	30.0	37.5	0.0	28.0	39.1	0.1
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	5.5	8.7	1.2	6.7	14.1	1.2	30.0	37.5	0.0	28.0	39.1	0.1
LOS	A	A	A	A	B	A	C	D	A	C	D	A
Approach Delay		7.5			12.5			28.5			13.8	
Approach LOS		A			B			C			B	

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 55 (46%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.32

Intersection Signal Delay: 13.7

Intersection LOS: B

Intersection Capacity Utilization 43.4%

ICU Level of Service A

Analysis Period (min) 15

























Splits and Phases: 9: Hayessmouth Rd & E. Jewell Ave



# HCM 6th Signalized Intersection Summary

## 9: Hayesmouth Rd & E. Jewell Ave

2040 Total Traffic  
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	304	36	23	538	67	93	95	35	28	34	91
Future Volume (veh/h)	70	304	36	23	538	67	93	95	35	28	34	91
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	74	320	38	24	566	71	98	100	0	29	36	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	476	1936	864	612	1882	840	426	448		361	390	
Arrive On Green	0.04	0.54	0.54	0.02	0.53	0.53	0.06	0.24	0.00	0.03	0.21	0.00
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	74	320	38	24	566	71	98	100	0	29	36	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.2	5.4	1.3	0.7	10.7	2.6	5.1	5.2	0.0	1.5	1.9	0.0
Cycle Q Clear(g_c), s	2.2	5.4	1.3	0.7	10.7	2.6	5.1	5.2	0.0	1.5	1.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	476	1936	864	612	1882	840	426	448		361	390	
V/C Ratio(X)	0.16	0.17	0.04	0.04	0.30	0.08	0.23	0.22		0.08	0.09	
Avail Cap(c_a), veh/h	557	1936	864	720	1882	840	473	448		463	390	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.2	13.7	12.7	12.2	15.8	13.9	33.7	36.6	0.0	35.8	38.3	0.0
Incr Delay (d2), s/veh	0.2	0.2	0.1	0.0	0.4	0.2	0.3	1.1	0.0	0.1	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	2.1	0.5	0.3	4.2	1.0	2.2	2.5	0.0	0.7	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.4	13.8	12.8	12.3	16.2	14.1	34.0	37.8	0.0	35.9	38.8	0.0
LnGrp LOS	B	B	B	B	B	B	C	D		D	D	
Approach Vol, veh/h	432			661			198			65		
Approach Delay, s/veh	13.5			15.8			35.9			37.5		
Approach LOS	B			B			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.8	70.4	11.9	30.0	9.6	68.6	8.1	33.8				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	55.0	10.0	25.0	10.0	55.0	10.0	25.0				
Max Q Clear Time (g_c+I1), s	2.7	7.4	7.1	3.9	4.2	12.7	3.5	7.2				
Green Ext Time (p_c), s	0.0	2.1	0.1	0.1	0.1	4.0	0.0	0.4				

### Intersection Summary






HCM 6th Ctrl Delay	19.1
HCM 6th LOS	B











### Notes

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

HCM 6th TWSC  
14: Monaghan Rd & Phase 1 North Access

2040 Total Traffic  
AM Peak Hour

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	35	399	2	14	172
Future Vol, veh/h	11	35	399	2	14	172
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	-	-	273	350	-
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	12	37	420	2	15	181
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	541	-	0	0	422	0
Stage 1	420	-	-	-	-	-
Stage 2	121	-	-	-	-	-
Critical Hdwy	6.84	-	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	-	-	-	2.22	-
Pot Cap-1 Maneuver	*542	0	-	-	1134	-
Stage 1	*631	0	-	-	-	-
Stage 2	*969	0	-	-	-	-
Platoon blocked, %	1		-	-		-
Mov Cap-1 Maneuver	*535	-	-	-	1134	-
Mov Cap-2 Maneuver	*535	-	-	-	-	-
Stage 1	*631	-	-	-	-	-
Stage 2	*956	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	11.9	0		0.6		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)		-	-	535	1134	-
HCM Lane V/C Ratio		-	-	0.022	0.013	-
HCM Control Delay (s)		-	-	11.9	8.2	-
HCM Lane LOS		-	-	B	A	-
HCM 95th %tile Q(veh)		-	-	0.1	0	-
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

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	45	11	3	39	5	120	1	171	13	40	109	15
Future Vol, veh/h	45	11	3	39	5	120	1	171	13	40	109	15
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	250	-	-	250	-	-	350	-	273	350	-	273
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	47	12	3	41	5	126	1	180	14	42	115	16











Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	294	395	58	330	397	90	131	0	0	194	0	0
Stage 1	199	199	-	182	182	-	-	-	-	-	-	-
Stage 2	95	196	-	148	215	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	636	540	996	599	539	950	1452	-	-	1377	-	-
Stage 1	784	735	-	802	748	-	-	-	-	-	-	-
Stage 2	901	737	-	840	724	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	534	523	996	573	522	950	1452	-	-	1377	-	-
Mov Cap-2 Maneuver	534	523	-	573	522	-	-	-	-	-	-	-
Stage 1	783	712	-	801	747	-	-	-	-	-	-	-
Stage 2	775	736	-	799	702	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	12.1		10.1		0		1.9	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1452	-	-	534	582	573	920	1377	-	-
HCM Lane V/C Ratio	0.001	-	-	0.089	0.025	0.072	0.143	0.031	-	-
HCM Control Delay (s)	7.5	-	-	12.4	11.3	11.8	9.6	7.7	-	-
HCM Lane LOS	A	-	-	B	B	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.1	0.2	0.5	0.1	-	-

Intersection				
Intersection Delay, s/veh	4.1			
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	95	195	114	125
Demand Flow Rate, veh/h	97	199	116	128
Vehicles Circulating, veh/h	123	148	132	95
Vehicles Exiting, veh/h	100	100	88	252
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.7	4.6	3.8	3.8
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
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	97	199	116	128
Cap Entry Lane, veh/h	1217	1187	1206	1252
Entry HV Adj Factor	0.979	0.981	0.982	0.980
Flow Entry, veh/h	95	195	114	125
Cap Entry, veh/h	1191	1164	1184	1227
V/C Ratio	0.080	0.168	0.096	0.102
Control Delay, s/veh	3.7	4.6	3.8	3.8
LOS	A	A	A	A
95th %tile Queue, veh	0	1	0	0









Intersection												
Int Delay, s/veh	6.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	32	61	5	51	56	56	2	94	28	23	50	11
Future Vol, veh/h	32	61	5	51	56	56	2	94	28	23	50	11
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	250	-	-	250	-	-	250	-	120	250	-	120
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	34	64	5	54	59	59	2	99	29	24	53	12







Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	278	233	53	245	216	99	65	0	0	128	0	0
Stage 1	101	101	-	103	103	-	-	-	-	-	-	-
Stage 2	177	132	-	142	113	-	-	-	-	-	-	-
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	674	667	1014	709	682	957	1537	-	-	1458	-	-
Stage 1	905	811	-	903	810	-	-	-	-	-	-	-
Stage 2	825	787	-	861	802	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	582	656	1014	644	670	957	1537	-	-	1458	-	-
Mov Cap-2 Maneuver	582	656	-	644	670	-	-	-	-	-	-	-
Stage 1	904	798	-	902	809	-	-	-	-	-	-	-
Stage 2	717	786	-	775	789	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11.2		10.6		0.1		2.1	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1537	-	-	582	674	644	788	1458	-	-
HCM Lane V/C Ratio	0.001	-	-	0.058	0.103	0.083	0.15	0.017	-	-
HCM Control Delay (s)	7.3	-	-	11.6	11	11.1	10.4	7.5	-	-
HCM Lane LOS	A	-	-	B	B	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.3	0.3	0.5	0.1	-	-







Intersection						
Int Delay, s/veh	2.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	119	184	71	36	47
Future Vol, veh/h	25	119	184	71	36	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	350	-	-	273	350	-
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	125	194	75	38	49
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	269	0	-	0	309	97
Stage 1	-	-	-	-	194	-
Stage 2	-	-	-	-	115	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1292	-	-	-	659	940
Stage 1	-	-	-	-	820	-
Stage 2	-	-	-	-	897	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1292	-	-	-	646	940
Mov Cap-2 Maneuver	-	-	-	-	646	-
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	897	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.4	0		9.8		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1292	-	-	-	646	940
HCM Lane V/C Ratio	0.02	-	-	-	0.059	0.053
HCM Control Delay (s)	7.8	-	-	-	10.9	9
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2	0.2

Intersection									
Intersection Delay, s/veh	4.6								
Intersection LOS	A								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	162		489		217		155		
Demand Flow Rate, veh/h	165		499		221		157		
Vehicles Circulating, veh/h	384		156		115		500		
Vehicles Exiting, veh/h	273		180		434		155		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	4.5		4.9		3.7		4.9		
Approach LOS	A		A		A		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR	
RT Channelized									
Lane Util	0.473	0.527	0.471	0.529	0.471	0.529	0.471	0.529	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
Entry Flow, veh/h	78	87	235	264	104	117	74	83	
Cap Entry Lane, veh/h	948	1025	1169	1244	1214	1288	852	928	
Entry HV Adj Factor	0.974	0.985	0.979	0.983	0.981	0.983	0.982	0.987	
Flow Entry, veh/h	76	86	230	259	102	115	73	82	
Cap Entry, veh/h	924	1009	1145	1222	1191	1266	837	916	
V/C Ratio	0.082	0.085	0.201	0.212	0.086	0.091	0.087	0.089	
Control Delay, s/veh	4.7	4.3	4.9	4.8	3.7	3.6	5.1	4.8	
LOS	A	A	A	A	A	A	A	A	
95th %tile Queue, veh	0	0	1	1	0	0	0	0	

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	31	137	408	12	25	58
Future Vol, veh/h	31	137	408	12	25	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	350	-	-	273	250	-
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	33	144	429	13	26	61
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	442	0	-	0	567	215
Stage 1	-	-	-	-	429	-
Stage 2	-	-	-	-	138	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1114	-	-	-	454	790
Stage 1	-	-	-	-	624	-
Stage 2	-	-	-	-	874	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1114	-	-	-	440	790
Mov Cap-2 Maneuver	-	-	-	-	440	-
Stage 1	-	-	-	-	605	-
Stage 2	-	-	-	-	874	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.5	0		11		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1114	-	-	-	440	790
HCM Lane V/C Ratio	0.029	-	-	-	0.06	0.077
HCM Control Delay (s)	8.3	-	-	-	13.7	9.9
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2	0.3

HCM 6th TWSC  
24: E Yale Ave & Hayesmouth Rd

2040 Total Traffic  
AM Peak Hour

Intersection						
Int Delay, s/veh	2.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	59	102	344	21	18	74
Future Vol, veh/h	59	102	344	21	18	74
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	350	-	-	273	250	-
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	62	107	362	22	19	78
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	384	0	-	0	540	181
Stage 1	-	-	-	-	362	-
Stage 2	-	-	-	-	178	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1171	-	-	-	472	831
Stage 1	-	-	-	-	675	-
Stage 2	-	-	-	-	835	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1171	-	-	-	447	831
Mov Cap-2 Maneuver	-	-	-	-	447	-
Stage 1	-	-	-	-	639	-
Stage 2	-	-	-	-	835	-
Approach	EB	WB		SB		
HCM Control Delay, s	3	0		10.5		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1171	-	-	-	447	831
HCM Lane V/C Ratio	0.053	-	-	-	0.042	0.094
HCM Control Delay (s)	8.2	-	-	-	13.4	9.8
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.3

HCM 6th TWSC  
27: Phase 1 Full-Movement Access & E. Jewell Ave

2040 Total Traffic  
AM Peak Hour

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	471	36	13	987	35	8
Future Vol, veh/h	471	36	13	987	35	8
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	275	-	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	496	38	14	1039	37	8

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	534
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	1313
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	1
Mov Cap-1 Maneuver	-	-	1313
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	15.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	333	899	-	-	1313	-
HCM Lane V/C Ratio	0.111	0.009	-	-	0.01	-
HCM Control Delay (s)	17.2	9	-	-	7.8	-
HCM Lane LOS	C	A	-	-	A	-
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-

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

HCM 6th TWSC  
28: Phase 1 RIRO Access & E. Jewell Ave

2040 Total Traffic  
AM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗		↑↑		↗
Traffic Vol, veh/h	399	14	0	722	0	11
Future Vol, veh/h	399	14	0	722	0	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	-	155	-	-	-	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	420	15	0	760	0	12
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	210
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	796
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	796
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		9.6	
HCM LOS					A	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)	796	-	-	-		
HCM Lane V/C Ratio	0.015	-	-	-		
HCM Control Delay (s)	9.6	-	-	-		
HCM Lane LOS	A	-	-	-		
HCM 95th %tile Q(veh)	0	-	-	-		



HCM 6th TWSC  
29: Monaghan Rd & Retail RIRO

2040 Total Traffic  
AM Peak Hour

Intersection

Int Delay, s/veh 0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↗↗	↗		↗↗
Traffic Vol, veh/h	0	12	424	10	0	185
Future Vol, veh/h	0	12	424	10	0	185
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	-	205	-	-
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	13	446	11	0	195

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	223	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.94	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.32	-
Pot Cap-1 Maneuver	0	780	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	780	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.7	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	- 780	-
HCM Lane V/C Ratio	-	- 0.016	-
HCM Control Delay (s)	-	- 9.7	-
HCM Lane LOS	-	- A	-
HCM 95th %tile Q(veh)	-	- 0	-

HCM 6th TWSC  
30: Monaghan Rd & Phase 1 South Access

2040 Total Traffic  
AM Peak Hour

Intersection						
Int Delay, s/veh	1.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↕↕	↕	↕	↕↕
Traffic Vol, veh/h	5	65	335	2	22	160
Future Vol, veh/h	5	65	335	2	22	160
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	-	-	205	255	-
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	5	68	353	2	23	168

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	483	177	0	0	355
Stage 1	353	-	-	-	-
Stage 2	130	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22
Pot Cap-1 Maneuver	*593	835	-	-	1200
Stage 1	*682	-	-	-	-
Stage 2	*969	-	-	-	-
Platoon blocked, %	1	-	-	-	-
Mov Cap-1 Maneuver	*581	835	-	-	1200
Mov Cap-2 Maneuver	*581	-	-	-	-
Stage 1	*682	-	-	-	-
Stage 2	*951	-	-	-	-

























Approach	WB	NB	SB
HCM Control Delay, s	9.9	0	1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	810	1200
HCM Lane V/C Ratio	-	-	0.091	0.019
HCM Control Delay (s)	-	-	9.9	8.1
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.1

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

# Timings 6: Powhaton Rd & E. Jewell Ave

2040 Total Traffic  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	314	1384	38	26	839	133	23	63	22	209	73	263
Future Volume (vph)	314	1384	38	26	839	133	23	63	22	209	73	263
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		Free	8		Free	4		Free
Detector Phase	5	2	2	1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	20.0		5.0	20.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0		10.0	25.0		10.0	25.0	
Total Split (s)	15.0	53.0	53.0	15.0	53.0		17.0	35.0		17.0	35.0	
Total Split (%)	12.5%	44.2%	44.2%	12.5%	44.2%		14.2%	29.2%		14.2%	29.2%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
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)	76.4	69.4	69.4	55.1	48.8	120.0	22.7	20.0	120.0	33.3	26.2	120.0
Actuated g/C Ratio	0.64	0.58	0.58	0.46	0.41	1.00	0.19	0.17	1.00	0.28	0.22	1.00
v/c Ratio	0.71	0.71	0.04	0.15	0.61	0.09	0.09	0.11	0.01	0.60	0.10	0.17
Control Delay	25.6	22.9	0.1	10.4	23.5	0.1	30.4	43.1	0.0	42.2	38.3	0.2
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	25.6	22.9	0.1	10.4	23.5	0.1	30.4	43.1	0.0	42.2	38.3	0.2
LOS	C	C	A	B	C	A	C	D	A	D	D	A
Approach Delay		22.9			20.0			31.6			21.4	
Approach LOS		C			C			C			C	

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 48 (40%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 22.1

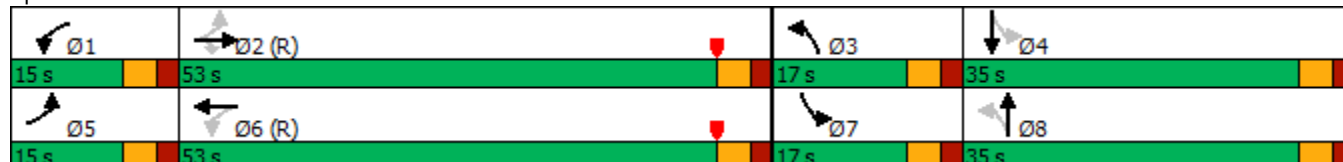
Intersection LOS: C

Intersection Capacity Utilization 73.2%

ICU Level of Service D

Analysis Period (min) 15





























Splits and Phases: 6: Powhaton Rd & E. Jewell Ave



# HCM 6th Signalized Intersection Summary

## 6: Powhatan Rd & E. Jewell Ave

2040 Total Traffic  
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (veh/h)	314	1384	38	26	839	133	23	63	22	209	73	263
Future Volume (veh/h)	314	1384	38	26	839	133	23	63	22	209	73	263
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	331	1457	40	27	883	0	24	66	0	220	77	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	405	1928	860	183	1720		320	590		439	864	
Arrive On Green	0.08	0.54	0.54	0.02	0.48	0.00	0.02	0.17	0.00	0.10	0.24	0.00
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	331	1457	40	27	883	0	24	66	0	220	77	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	10.0	38.1	1.4	0.9	20.5	0.0	1.3	1.9	0.0	12.0	2.0	0.0
Cycle Q Clear(g_c), s	10.0	38.1	1.4	0.9	20.5	0.0	1.3	1.9	0.0	12.0	2.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	405	1928	860	183	1720		320	590		439	864	
V/C Ratio(X)	0.82	0.76	0.05	0.15	0.51		0.07	0.11		0.50	0.09	
Avail Cap(c_a), veh/h	405	1928	860	287	1720		458	888		439	888	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.8	21.3	12.9	19.1	21.3	0.0	40.0	42.5	0.0	35.3	35.1	0.0
Incr Delay (d2), s/veh	12.2	2.8	0.1	0.4	1.1	0.0	0.1	0.1	0.0	0.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	15.2	0.5	0.4	8.3	0.0	0.6	0.8	0.0	5.2	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.0	24.1	13.0	19.4	22.4	0.0	40.1	42.6	0.0	36.2	35.2	0.0
LnGrp LOS	C	C	B	B	C		D	D		D	D	
Approach Vol, veh/h	1828			910			90			297		
Approach Delay, s/veh	25.3			22.3			41.9			36.0		
Approach LOS	C			C			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.0	70.1	7.8	34.2	15.0	63.1	17.0	24.9				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	48.0	12.0	30.0	10.0	48.0	12.0	30.0				
Max Q Clear Time (g_c+I1), s	2.9	40.1	3.3	4.0	12.0	22.5	14.0	3.9				
Green Ext Time (p_c), s	0.0	5.4	0.0	0.3	0.0	6.1	0.0	0.3				

### Intersection Summary

























HCM 6th Ctrl Delay	25.9
HCM 6th LOS	C

### Notes

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

Timings  
7: Monaghan Rd & E. Jewell Ave

2040 Total Traffic  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	505	782	259	60	494	162	169	134	68	262	205	295
Future Volume (vph)	505	782	259	60	494	162	169	134	68	262	205	295
Turn Type	Prot	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free	6		Free	8		Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
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	20.0		10.0	20.0		10.0	20.0		10.0	20.0	
Total Split (s)	25.0	54.0		15.0	44.0		15.0	32.0		19.0	36.0	
Total Split (%)	20.8%	45.0%		12.5%	36.7%		12.5%	26.7%		15.8%	30.0%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	-2.0		0.0	-2.0		0.0	-2.0		0.0	-2.0	
Total Lost Time (s)	5.0	3.0		5.0	3.0		5.0	3.0		5.0	3.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effect Green (s)	24.7	73.6	120.0	58.7	53.8	120.0	20.3	12.3	120.0	13.2	15.5	120.0
Actuated g/C Ratio	0.21	0.61	1.00	0.49	0.45	1.00	0.17	0.10	1.00	0.11	0.13	1.00
v/c Ratio	0.75	0.38	0.17	0.17	0.33	0.11	0.75	0.39	0.05	0.73	0.47	0.20
Control Delay	68.1	8.1	0.2	17.6	30.0	0.1	59.9	53.1	0.1	63.6	51.4	0.3
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	68.1	8.1	0.2	17.6	30.0	0.1	59.9	53.1	0.1	63.6	51.4	0.3
LOS	E	A	A	B	C	A	E	D	A	E	D	A
Approach Delay		26.4			22.2			46.5			35.8	
Approach LOS		C			C			D			D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 111 (93%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 29.8

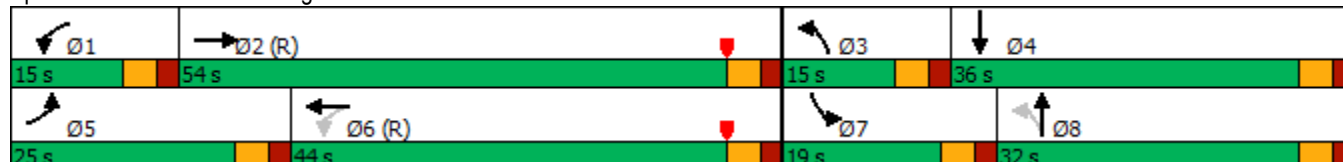
Intersection LOS: C

Intersection Capacity Utilization 58.1%

ICU Level of Service B

Analysis Period (min) 15

























Splits and Phases: 7: Monaghan Rd & E. Jewell Ave



# HCM 6th Signalized Intersection Summary

## 7: Monaghan Rd & E. Jewell Ave

2040 Total Traffic  
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	505	782	259	60	494	162	169	134	68	262	205	295
Future Volume (veh/h)	505	782	259	60	494	162	169	134	68	262	205	295
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	532	823	0	63	520	0	178	141	0	276	216	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	576	2295		457	1833		239	310		335	359	
Arrive On Green	0.17	0.65	0.00	0.04	0.52	0.00	0.08	0.09	0.00	0.10	0.10	0.00
Sat Flow, veh/h	3456	3554	1585	1781	3554	1585	1781	3554	1585	3456	3554	1585
Grp Volume(v), veh/h	532	823	0	63	520	0	178	141	0	276	216	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1781	1777	1585	1781	1777	1585	1728	1777	1585
Q Serve(g_s), s	18.2	12.8	0.0	2.0	10.0	0.0	10.0	4.5	0.0	9.4	7.0	0.0
Cycle Q Clear(g_c), s	18.2	12.8	0.0	2.0	10.0	0.0	10.0	4.5	0.0	9.4	7.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	576	2295		457	1833		239	310		335	359	
V/C Ratio(X)	0.92	0.36		0.14	0.28		0.75	0.45		0.82	0.60	
Avail Cap(c_a), veh/h	576	2295		540	1833		239	859		403	977	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.2	9.8	0.0	13.4	16.5	0.0	48.5	52.0	0.0	53.2	51.6	0.0
Incr Delay (d2), s/veh	20.8	0.4	0.0	0.1	0.4	0.0	12.0	1.0	0.0	11.1	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.3	4.6	0.0	0.8	3.9	0.0	5.7	2.0	0.0	4.5	3.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.0	10.2	0.0	13.6	16.9	0.0	60.5	53.1	0.0	64.3	53.3	0.0
LnGrp LOS	E	B		B	B		E	D		E	D	
Approach Vol, veh/h		1355			583			319			492	
Approach Delay, s/veh		33.7			16.5			57.2			59.4	
Approach LOS		C			B			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.4	80.5	15.0	15.1	25.0	64.9	16.6	13.5				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	49.0	10.0	31.0	20.0	39.0	14.0	27.0				
Max Q Clear Time (g_c+I1), s	4.0	14.8	12.0	9.0	20.2	12.0	11.4	6.5				
Green Ext Time (p_c), s	0.0	5.9	0.0	1.1	0.0	3.3	0.2	0.7				

### Intersection Summary

























HCM 6th Ctrl Delay	37.4
HCM 6th LOS	D

### Notes

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

Timings  
8: S. Del Ray Street & E. Jewell Ave

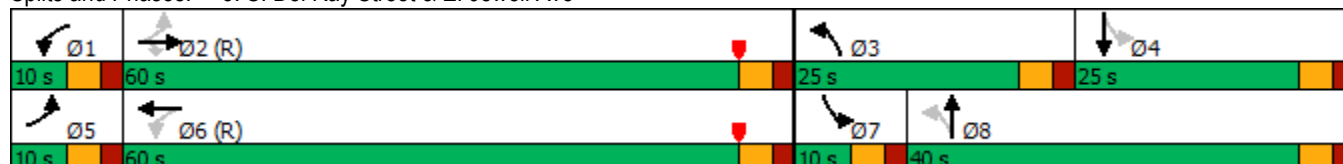
2040 Total Traffic  
PM Peak Hour

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						
Traffic Volume (vph)	86	736	230	80	467	176	11	63	5	20	58
Future Volume (vph)	86	736	230	80	467	176	11	63	5	20	58
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6	3	8		7	4	
Permitted Phases	2		2	6		8		Free	4		Free
Detector Phase	5	2	2	1	6	3	8		7	4	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	15.0		5.0	15.0	
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	25.0	20.0		10.0	20.0	
Total Split (s)	10.0	60.0	60.0	10.0	60.0	25.0	40.0		10.0	25.0	
Total Split (%)	8.3%	50.0%	50.0%	8.3%	50.0%	20.8%	33.3%		8.3%	20.8%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
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)	78.1	71.6	71.6	76.9	69.3	28.0	26.0	120.0	11.0	15.0	120.0
Actuated g/C Ratio	0.65	0.60	0.60	0.64	0.58	0.23	0.22	1.00	0.09	0.12	1.00
v/c Ratio	0.16	0.37	0.23	0.19	0.25	0.53	0.03	0.04	0.03	0.09	0.04
Control Delay	11.6	17.8	6.1	6.7	12.8	43.4	33.7	0.0	32.6	47.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.6	17.8	6.1	6.7	12.8	43.4	33.7	0.0	32.6	47.6	0.1
LOS	B	B	A	A	B	D	C	A	C	D	A
Approach Delay		14.7			11.9		32.1			13.4	
Approach LOS		B			B		C			B	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 6 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.53
Intersection Signal Delay: 16.1
Intersection Capacity Utilization 53.7%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service A

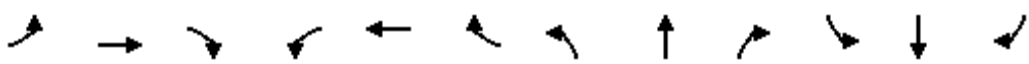











Splits and Phases: 8: S. Del Ray Street & E. Jewell Ave





# HCM 6th Signalized Intersection Summary 8: S. Del Ray Street & E. Jewell Ave

2040 Total Traffic  
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	736	230	80	467	15	176	11	63	5	20	58
Future Volume (veh/h)	86	736	230	80	467	15	176	11	63	5	20	58
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No				No				No			
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	91	775	242	84	492	16	185	12	0	5	21	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	543	1912	853	357	1888	61	467	467		197	168	
Arrive On Green	0.04	0.54	0.54	0.04	0.54	0.54	0.17	0.25	0.00	0.01	0.09	0.00
Sat Flow, veh/h	1781	3554	1585	1781	3513	114	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	91	775	242	84	249	259	185	12	0	5	21	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1850	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.7	15.5	10.0	2.5	9.0	9.1	10.1	0.6	0.0	0.3	1.2	0.0
Cycle Q Clear(g_c), s	2.7	15.5	10.0	2.5	9.0	9.1	10.1	0.6	0.0	0.3	1.2	0.0
Prop In Lane	1.00		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	543	1912	853	357	955	994	467	467		197	168	
V/C Ratio(X)	0.17	0.41	0.28	0.24	0.26	0.26	0.40	0.03		0.03	0.13	
Avail Cap(c_a), veh/h	546	1912	853	361	955	994	467	546		260	312	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	11.7	16.4	15.1	12.4	14.9	14.9	35.5	34.0	0.0	49.2	50.3	0.0
Incr Delay (d2), s/veh	0.1	0.6	0.8	0.3	0.7	0.6	0.5	0.0	0.0	0.1	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	6.0	3.7	1.0	3.6	3.8	4.4	0.3	0.0	0.1	0.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.8	17.0	15.9	12.8	15.6	15.6	36.0	34.0	0.0	49.2	50.6	0.0
LnGrp LOS	B	B	B	B	B	B	D	C		D	D	
Approach Vol, veh/h	1108				592				197			
Approach Delay, s/veh	16.4				15.2				35.9			
Approach LOS	B				B				D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.7	69.6	25.0	15.8	9.8	69.5	5.8	35.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	55.0	20.0	20.0	5.0	55.0	5.0	35.0				
Max Q Clear Time (g_c+I1), s	4.5	17.5	12.1	3.2	4.7	11.1	2.3	2.6				
Green Ext Time (p_c), s	0.0	6.6	0.3	0.0	0.0	2.9	0.0	0.0				

## Intersection Summary

























HCM 6th Ctrl Delay	18.4
HCM 6th LOS	B

## Notes

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

Timings  
9: Hayesmouth Rd & E. Jewell Ave

2040 Total Traffic  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	104	567	109	52	410	39	71	64	34	67	118	81
Future Volume (vph)	104	567	109	52	410	39	71	64	34	67	118	81
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		Free	4		Free
Detector Phase	5	2	2	1	6	6	3	8		7	4	
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	20.0	20.0	10.0	20.0	20.0	10.0	20.0		10.0	20.0	
Total Split (s)	15.0	60.0	60.0	15.0	60.0	60.0	15.0	30.0		15.0	30.0	
Total Split (%)	12.5%	50.0%	50.0%	12.5%	50.0%	50.0%	12.5%	25.0%		12.5%	25.0%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max		None	Max	
Act Effect Green (s)	67.3	60.0	60.0	63.5	56.5	56.5	36.1	28.7	120.0	35.9	28.6	120.0
Actuated g/C Ratio	0.56	0.50	0.50	0.53	0.47	0.47	0.30	0.24	1.00	0.30	0.24	1.00
v/c Ratio	0.21	0.34	0.14	0.12	0.26	0.05	0.19	0.15	0.02	0.17	0.28	0.05
Control Delay	4.7	10.3	3.2	8.2	16.1	0.8	29.9	40.2	0.0	29.1	41.1	0.1
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	4.7	10.3	3.2	8.2	16.1	0.8	29.9	40.2	0.0	29.1	41.1	0.1
LOS	A	B	A	A	B	A	C	D	A	C	D	A
Approach Delay		8.5			14.1			27.7			25.6	
Approach LOS		A			B			C			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 55 (46%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.34

Intersection Signal Delay: 14.7

Intersection LOS: B

Intersection Capacity Utilization 42.9%

ICU Level of Service A




























Analysis Period (min) 15

Splits and Phases: 9: Hayesmouth Rd & E. Jewell Ave



# HCM 6th Signalized Intersection Summary 9: Hayesmouth Rd & E. Jewell Ave

2040 Total Traffic  
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (veh/h)	104	567	109	52	410	39	71	64	34	67	118	81
Future Volume (veh/h)	104	567	109	52	410	39	71	64	34	67	118	81
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	109	597	115	55	432	41	75	67	0	71	124	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	572	1934	863	456	1903	849	334	394		379	390	
Arrive On Green	0.04	0.54	0.54	0.04	0.54	0.54	0.05	0.21	0.00	0.04	0.21	0.00
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	109	597	115	55	432	41	75	67	0	71	124	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	3.3	11.0	4.3	1.6	7.7	1.5	3.9	3.5	0.0	3.7	6.7	0.0
Cycle Q Clear(g_c), s	3.3	11.0	4.3	1.6	7.7	1.5	3.9	3.5	0.0	3.7	6.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	572	1934	863	456	1903	849	334	394		379	390	
V/C Ratio(X)	0.19	0.31	0.13	0.12	0.23	0.05	0.22	0.17		0.19	0.32	
Avail Cap(c_a), veh/h	642	1934	863	542	1903	849	401	394		450	390	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	11.6	15.0	13.4	11.9	14.7	13.3	35.1	38.8	0.0	35.0	40.3	0.0
Incr Delay (d2), s/veh	0.2	0.4	0.3	0.1	0.3	0.1	0.3	0.9	0.0	0.2	2.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	4.3	1.6	0.6	3.0	0.5	1.7	1.7	0.0	1.6	3.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.8	15.4	13.8	12.0	15.0	13.4	35.4	39.7	0.0	35.3	42.4	0.0
LnGrp LOS	B	B	B	B	B	B	D	D		D	D	
Approach Vol, veh/h		821			528			142			195	
Approach Delay, s/veh		14.7			14.6			37.4			39.8	
Approach LOS		B			B			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.2	70.3	10.5	30.0	10.2	69.3	10.2	30.3				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	55.0	10.0	25.0	10.0	55.0	10.0	25.0				
Max Q Clear Time (g_c+I1), s	3.6	13.0	5.9	8.7	5.3	9.7	5.7	5.5				
Green Ext Time (p_c), s	0.0	4.5	0.0	0.5	0.1	2.9	0.0	0.2				

## Intersection Summary

HCM 6th Ctrl Delay	19.5
HCM 6th LOS	B

## Notes

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

HCM 6th TWSC  
14: Monaghan Rd & Phase 1 North Access

2040 Total Traffic  
PM Peak Hour











Intersection						
Int Delay, s/veh	0.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑↑	↑	↑	↑↑
Traffic Vol, veh/h	26	25	323	10	53	473
Future Vol, veh/h	26	25	323	10	53	473
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	-	-	273	350	-
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	27	26	340	11	56	498

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	701	-	0	0	351
Stage 1	340	-	-	-	-
Stage 2	361	-	-	-	-
Critical Hdwy	6.84	-	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	-	-	-	2.22
Pot Cap-1 Maneuver	*611	0	-	-	1204
Stage 1	*692	0	-	-	-
Stage 2	*849	0	-	-	-
Platoon blocked, %	1	-	-	-	-
Mov Cap-1 Maneuver	*582	-	-	-	1204
Mov Cap-2 Maneuver	*582	-	-	-	-
Stage 1	*692	-	-	-	-
Stage 2	*809	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.5	0	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	582	1204
HCM Lane V/C Ratio	-	-	0.047	0.046
HCM Control Delay (s)	-	-	11.5	8.1
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1

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











Intersection												
Int Delay, s/veh	4.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	33	4	2	28	5	87	3	172	49	150	214	57
Future Vol, veh/h	33	4	2	28	5	87	3	172	49	150	214	57
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	250	-	-	250	-	-	350	-	273	350	-	273
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	35	4	2	29	5	92	3	181	52	158	225	60

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	640	780	113	618	788	91	285	0	0	233	0	0
Stage 1	541	541	-	187	187	-	-	-	-	-	-	-
Stage 2	99	239	-	431	601	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	360	325	918	373	322	949	1274	-	-	1332	-	-
Stage 1	493	519	-	797	744	-	-	-	-	-	-	-
Stage 2	896	706	-	573	488	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	291	286	918	334	283	949	1274	-	-	1332	-	-
Mov Cap-2 Maneuver	291	286	-	334	283	-	-	-	-	-	-	-
Stage 1	492	457	-	795	743	-	-	-	-	-	-	-
Stage 2	802	705	-	499	430	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	18.4		11.4		0.1		2.9	
HCM LOS	C		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1274	-	-	291	371	334	841	1332	-	-
HCM Lane V/C Ratio	0.002	-	-	0.119	0.017	0.088	0.115	0.119	-	-
HCM Control Delay (s)	7.8	-	-	19	14.9	16.8	9.8	8.1	-	-
HCM Lane LOS	A	-	-	C	B	C	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.1	0.3	0.4	0.4	-	-

Intersection				
Intersection Delay, s/veh	4.1			
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	117	126	101	218
Demand Flow Rate, veh/h	119	128	103	222
Vehicles Circulating, veh/h	203	115	206	73
Vehicles Exiting, veh/h	92	194	116	170
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.2	3.9	4.1	4.3
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
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	119	128	103	222
Cap Entry Lane, veh/h	1122	1227	1118	1281
Entry HV Adj Factor	0.984	0.982	0.982	0.981
Flow Entry, veh/h	117	126	101	218
Cap Entry, veh/h	1103	1205	1098	1257
V/C Ratio	0.106	0.104	0.092	0.173
Control Delay, s/veh	4.2	3.9	4.1	4.3
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	1







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	23	35	3	28	30	40	6	83	45	67	111	39
Future Vol, veh/h	23	35	3	28	30	40	6	83	45	67	111	39
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	250	-	-	250	-	-	250	-	120	250	-	120
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	24	37	3	29	32	42	6	87	47	71	117	41

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	419	405	117	399	399	87	158	0	0	134	0	0
Stage 1	259	259	-	99	99	-	-	-	-	-	-	-
Stage 2	160	146	-	300	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	544	535	935	561	539	971	1422	-	-	1451	-	-
Stage 1	746	694	-	907	813	-	-	-	-	-	-	-
Stage 2	842	776	-	709	666	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	476	507	935	507	510	971	1422	-	-	1451	-	-
Mov Cap-2 Maneuver	476	507	-	507	510	-	-	-	-	-	-	-
Stage 1	743	660	-	903	810	-	-	-	-	-	-	-
Stage 2	771	773	-	635	633	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	12.6		11.2		0.3		2.3	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1422	-	-	476	526	507	700	1451	-	-
HCM Lane V/C Ratio	0.004	-	-	0.051	0.076	0.058	0.105	0.049	-	-
HCM Control Delay (s)	7.5	-	-	13	12.4	12.5	10.7	7.6	-	-
HCM Lane LOS	A	-	-	B	B	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.2	0.2	0.4	0.2	-	-















Intersection						
Int Delay, s/veh	2.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	55	225	173	60	82	37
Future Vol, veh/h	55	225	173	60	82	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	350	-	-	273	350	-
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	58	237	182	63	86	39
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	245	0	-	0	417	91
Stage 1	-	-	-	-	182	-
Stage 2	-	-	-	-	235	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1318	-	-	-	564	949
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	782	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1318	-	-	-	539	949
Mov Cap-2 Maneuver	-	-	-	-	539	-
Stage 1	-	-	-	-	794	-
Stage 2	-	-	-	-	782	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.5	0		11.7		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1318	-	-	-	539	949
HCM Lane V/C Ratio	0.044	-	-	-	0.16	0.041
HCM Control Delay (s)	7.9	-	-	-	12.9	9
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6	0.1

Intersection									
Intersection Delay, s/veh	5.1								
Intersection LOS	A								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	323		310		488		209		
Demand Flow Rate, veh/h	330		316		497		213		
Vehicles Circulating, veh/h	330		271		313		366		
Vehicles Exiting, veh/h	249		539		347		221		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	5.0		4.7		5.8		4.6		
Approach LOS	A		A		A		A		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR	
Assumed Moves	LT	TR	LT	TR	LT	R	LT	TR	
RT Channelized									
Lane Util	0.470	0.530	0.472	0.528	0.489	0.511	0.469	0.531	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
Entry Flow, veh/h	155	175	149	167	243	254	100	113	
Cap Entry Lane, veh/h	996	1073	1052	1128	1012	1088	964	1040	
Entry HV Adj Factor	0.979	0.978	0.979	0.985	0.982	0.980	0.982	0.980	
Flow Entry, veh/h	152	171	146	164	239	249	98	111	
Cap Entry, veh/h	975	1049	1030	1111	994	1067	947	1020	
V/C Ratio	0.156	0.163	0.142	0.148	0.240	0.233	0.104	0.109	
Control Delay, s/veh	5.1	4.9	4.8	4.5	6.0	5.6	4.8	4.5	
LOS	A	A	A	A	A	A	A	A	
95th %tile Queue, veh	1	1	0	1	1	1	0	0	

HCM 6th TWSC  
23: E Yale Ave & S. Del Ray Street

2040 Total Traffic  
PM Peak Hour

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	449	257	26	19	37
Future Vol, veh/h	53	449	257	26	19	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	350	-	-	273	250	-
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	56	473	271	27	20	39
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	298	0	-	0	620	136
Stage 1	-	-	-	-	271	-
Stage 2	-	-	-	-	349	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1260	-	-	-	420	888
Stage 1	-	-	-	-	750	-
Stage 2	-	-	-	-	685	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1260	-	-	-	402	888
Mov Cap-2 Maneuver	-	-	-	-	402	-
Stage 1	-	-	-	-	717	-
Stage 2	-	-	-	-	685	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.8	0		11		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1260	-	-	-	402	888
HCM Lane V/C Ratio	0.044	-	-	-	0.05	0.044
HCM Control Delay (s)	8	-	-	-	14.4	9.2
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2	0.1

Intersection						
Int Delay, s/veh	2.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	74	393	219	33	38	64
Future Vol, veh/h	74	393	219	33	38	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	350	-	-	273	250	-
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	78	414	231	35	40	67
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	266	0	-	0	594	116
Stage 1	-	-	-	-	231	-
Stage 2	-	-	-	-	363	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1295	-	-	-	436	914
Stage 1	-	-	-	-	785	-
Stage 2	-	-	-	-	674	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1295	-	-	-	410	914
Mov Cap-2 Maneuver	-	-	-	-	410	-
Stage 1	-	-	-	-	738	-
Stage 2	-	-	-	-	674	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.3	0		11.3		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1295	-	-	-	410	914
HCM Lane V/C Ratio	0.06	-	-	-	0.098	0.074
HCM Control Delay (s)	8	-	-	-	14.7	9.3
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.3	0.2

HCM 6th TWSC  
27: Phase 1 Full-Movement Access & E. Jewell Ave

2040 Total Traffic  
PM Peak Hour

Intersection						
Int Delay, s/veh	0.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	1023	89	36	665	51	29
Future Vol, veh/h	1023	89	36	665	51	29
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	275	-	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	1077	94	38	700	54	31

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1171
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	968
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	1
Mov Cap-1 Maneuver	-	-	968
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	17.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	265	669	-	-	968	-
HCM Lane V/C Ratio	0.203	0.046	-	-	0.039	-
HCM Control Delay (s)	22	10.6	-	-	8.9	-
HCM Lane LOS	C	B	-	-	A	-
HCM 95th %tile Q(veh)	0.7	0.1	-	-	0.1	-

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

HCM 6th TWSC  
28: Phase 1 RIRO Access & E. Jewell Ave

2040 Total Traffic  
PM Peak Hour





Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗		↑↑		↗
Traffic Vol, veh/h	772	32	0	562	0	9
Future Vol, veh/h	772	32	0	562	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	155	-	-	-	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	813	34	0	592	0	9
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	407
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	593
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	593
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		11.2	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)	593	-	-	-		
HCM Lane V/C Ratio	0.016	-	-	-		
HCM Control Delay (s)	11.2	-	-	-		
HCM Lane LOS	B	-	-	-		
HCM 95th %tile Q(veh)	0	-	-	-		

HCM 6th TWSC  
29: Monaghan Rd & Retail RIRO

2040 Total Traffic  
PM Peak Hour

Intersection

Int Delay, s/veh 0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	42	329	19	0	525
Future Vol, veh/h	0	42	329	19	0	525
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	-	205	-	-
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	44	346	20	0	553






Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	173	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.94	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.32	-
Pot Cap-1 Maneuver	0	840	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	-	840	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	840
HCM Lane V/C Ratio	-	-	0.053
HCM Control Delay (s)	-	-	9.5
HCM Lane LOS	-	-	A
HCM 95th %tile Q(veh)	-	-	0.2

HCM 6th TWSC  
30: Monaghan Rd & Phase 1 South Access

2040 Total Traffic  
PM Peak Hour













Intersection						
Int Delay, s/veh	1.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	46	286	6	80	417
Future Vol, veh/h	3	46	286	6	80	417
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	-	-	205	255	-
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	3	48	301	6	84	439
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	689	151	0	0	307	0
Stage 1	301	-	-	-	-	-
Stage 2	388	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	*575	868	-	-	1250	-
Stage 1	*725	-	-	-	-	-
Stage 2	*873	-	-	-	-	-
Platoon blocked, %	1	-	-	-	-	-
Mov Cap-1 Maneuver	*536	868	-	-	1250	-
Mov Cap-2 Maneuver	*536	-	-	-	-	-
Stage 1	*725	-	-	-	-	-
Stage 2	*814	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.6	0		1.3		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	836	1250	-	
HCM Lane V/C Ratio	-	-	0.062	0.067	-	
HCM Control Delay (s)	-	-	9.6	8.1	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	0.2	0.2	-	
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon



## **Queuing Reports**

Queues  
6: Powhatan Rd & E. Jewell Ave

2040 Total Traffic  
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	268	509	13	15	1348	201	36	61	25	88	56	328
v/c Ratio	0.64	0.24	0.01	0.03	0.94	0.13	0.13	0.10	0.02	0.26	0.08	0.21
Control Delay	34.6	12.8	0.0	9.9	45.2	0.2	31.4	43.0	0.0	33.8	39.3	0.3
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	34.6	12.8	0.0	9.9	45.2	0.2	31.4	43.0	0.0	33.8	39.3	0.3
Queue Length 50th (ft)	139	84	0	6	571	0	20	21	0	51	18	0
Queue Length 95th (ft)	#261	150	0	m8	#693	m0	45	42	0	92	38	0
Internal Link Dist (ft)	572			487			5293			453		
Turn Bay Length (ft)	350	273		350	273		350	273		350	273	
Base Capacity (vph)	418	2151	1005	497	1431	1583	355	884	1583	356	908	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	0.64	0.24	0.01	0.03	0.94	0.13	0.10	0.07	0.02	0.25	0.06	0.21

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  
7: Monaghan Rd & E. Jewell Ave

2040 Total Traffic  
AM Peak Hour












												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	163	347	81	49	761	265	235	181	42	144	64	495
v/c Ratio	0.52	0.16	0.05	0.08	0.38	0.17	0.72	0.41	0.03	0.49	0.22	0.31
Control Delay	73.2	7.7	0.1	10.6	17.2	0.2	52.9	50.9	0.0	57.5	52.6	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	73.2	7.7	0.1	10.6	17.2	0.2	52.9	50.9	0.0	57.5	52.6	0.5
Queue Length 50th (ft)	69	35	0	10	89	0	159	68	0	55	24	0
Queue Length 95th (ft)	105	48	0	m51	363	0	234	104	0	87	46	0
Internal Link Dist (ft)	525				856				561			
Turn Bay Length (ft)	350		273	350		273	350		273	350		273
Base Capacity (vph)	328	2183	1583	701	1993	1583	327	796	1583	486	796	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	0.50	0.16	0.05	0.07	0.38	0.17	0.72	0.23	0.03	0.30	0.08	0.31

Intersection Summary

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

Queues  
8: S. Del Ray Street & E. Jewell Ave

2040 Total Traffic  
AM Peak Hour













											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	27	333	145	83	677	299	17	92	11	5	83
v/c Ratio	0.06	0.16	0.15	0.12	0.31	0.75	0.04	0.06	0.08	0.02	0.05
Control Delay	9.5	13.2	4.1	6.6	13.8	51.9	32.8	0.1	40.2	46.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.5	13.2	4.1	6.6	13.8	51.9	32.8	0.1	40.2	46.4	0.1
Queue Length 50th (ft)	6	61	0	3	179	219	10	0	8	4	0
Queue Length 95th (ft)	24	87	17	76	307	240	27	0	17	16	0
Internal Link Dist (ft)	449				551			416		1159	
Turn Bay Length (ft)	350	273		350	250			190	250	190	
Base Capacity (vph)	481	2077	993	693	2179	538	698	1583	194	310	1583
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.16	0.15	0.12	0.31	0.56	0.02	0.06	0.06	0.02	0.05
Intersection Summary											

## Queues

2040 Total Traffic

## 9: Hayesmouth Rd &amp; E. Jewell Ave

AM Peak Hour













												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	74	320	38	24	566	71	98	100	37	29	36	96
v/c Ratio	0.16	0.17	0.04	0.04	0.32	0.08	0.23	0.20	0.02	0.08	0.09	0.06
Control Delay	5.5	8.7	1.2	6.7	14.1	1.2	30.0	37.5	0.0	28.0	39.1	0.1
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	5.5	8.7	1.2	6.7	14.1	1.2	30.0	37.5	0.0	28.0	39.1	0.1
Queue Length 50th (ft)	25	62	0	4	152	5	54	63	0	15	23	0
Queue Length 95th (ft)	11	23	0	m9	166	m5	96	115	0	37	52	0
Internal Link Dist (ft)	543			467			2598			1148		
Turn Bay Length (ft)	350			273	350			273	250			190
Base Capacity (vph)	481	1859	883	645	1755	840	426	503	1583	426	402	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	0.15	0.17	0.04	0.04	0.32	0.08	0.23	0.20	0.02	0.07	0.09	0.06

## Intersection Summary

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

Queues  
6: Powhatan Rd & E. Jewell Ave

2040 Total Traffic  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	331	1457	40	27	883	140	24	66	23	220	77	277
v/c Ratio	0.71	0.71	0.04	0.15	0.61	0.09	0.09	0.11	0.01	0.60	0.10	0.17
Control Delay	25.6	22.9	0.1	10.4	23.5	0.1	30.4	43.1	0.0	42.2	38.3	0.2
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	25.6	22.9	0.1	10.4	23.5	0.1	30.4	43.1	0.0	42.2	38.3	0.2
Queue Length 50th (ft)	128	473	0	8	199	0	13	23	0	134	25	0
Queue Length 95th (ft)	#261	582	0	m14	207	m0	34	44	0	208	47	0
Internal Link Dist (ft)		572			487			5293			453	
Turn Bay Length (ft)	350		273	350		273	350		273	350		273
Base Capacity (vph)	469	2046	961	235	1439	1583	351	884	1583	368	925	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	0.71	0.71	0.04	0.11	0.61	0.09	0.07	0.07	0.01	0.60	0.08	0.17

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  
7: Monaghan Rd & E. Jewell Ave

2040 Total Traffic  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	532	823	273	63	520	171	178	141	72	276	216	311
v/c Ratio	0.75	0.38	0.17	0.17	0.33	0.11	0.75	0.39	0.05	0.73	0.47	0.20
Control Delay	68.1	8.1	0.2	17.6	30.0	0.1	59.9	53.1	0.1	63.6	51.4	0.3
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	68.1	8.1	0.2	17.6	30.0	0.1	59.9	53.1	0.1	63.6	51.4	0.3
Queue Length 50th (ft)	227	76	0	15	128	0	117	54	0	107	82	0
Queue Length 95th (ft)	285	115	0	m62	242	0	#187	86	0	154	119	0
Internal Link Dist (ft)		525			856			561			499	
Turn Bay Length (ft)	350		273	350		273	350		273	350		273
Base Capacity (vph)	706	2171	1583	422	1586	1583	238	855	1583	400	973	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	0.75	0.38	0.17	0.15	0.33	0.11	0.75	0.16	0.05	0.69	0.22	0.20

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  
8: S. Del Ray Street & E. Jewell Ave

2040 Total Traffic  
PM Peak Hour

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	91	775	242	84	508	185	12	66	5	21	61
v/c Ratio	0.16	0.37	0.23	0.19	0.25	0.53	0.03	0.04	0.03	0.09	0.04
Control Delay	11.6	17.8	6.1	6.7	12.8	43.4	33.7	0.0	32.6	47.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.6	17.8	6.1	6.7	12.8	43.4	33.7	0.0	32.6	47.6	0.1
Queue Length 50th (ft)	20	172	19	3	113	135	8	0	4	15	0
Queue Length 95th (ft)	m67	220	79	67	164	169	23	0	12	40	0
Internal Link Dist (ft)		449			551		416			1159	
Turn Bay Length (ft)	350		273	350		250		190	250		190
Base Capacity (vph)	577	2110	1041	442	2034	349	559	1583	143	310	1583
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.37	0.23	0.19	0.25	0.53	0.02	0.04	0.03	0.07	0.04

Intersection Summary

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















## Queues

## 9: Hayesmouth Rd &amp; E. Jewell Ave

2040 Total Traffic

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	109	597	115	55	432	41	75	67	36	71	124	85
v/c Ratio	0.21	0.34	0.14	0.12	0.26	0.05	0.19	0.15	0.02	0.17	0.28	0.05
Control Delay	4.7	10.3	3.2	8.2	16.1	0.8	29.9	40.2	0.0	29.1	41.1	0.1
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	4.7	10.3	3.2	8.2	16.1	0.8	29.9	40.2	0.0	29.1	41.1	0.1
Queue Length 50th (ft)	45	152	25	12	107	1	41	43	0	38	81	0
Queue Length 95th (ft)	5	108	11	23	142	3	78	85	0	73	140	0
Internal Link Dist (ft)		543			467			2598			1148	
Turn Bay Length (ft)	350		273	350		273	250		190	250		190
Base Capacity (vph)	545	1770	849	483	1665	802	410	446	1583	442	444	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	0.20	0.34	0.14	0.11	0.26	0.05	0.18	0.15	0.02	0.16	0.28	0.05
Intersection Summary												